Boardman River Crossing Mobility Study

Grand Traverse County, Michigan

Final Environmental Impact Statement and Section 4(f) / 6(f) Evaluation

Volume I
(Sections 1 through 10)

Prepared for the
Grand Traverse County Road Commission
in cooperation with the
Michigan Department of Transportation
and Federal Highway Administration

February 2001

This document has been published by authorization of the Director of the State of Michigan's Department of Transportation in keeping with the intent of the National Environmental Policy Act (NEPA) of 1969, and subsequent implementing regulations and policies that direct agencies to provide the public and other agencies an opportunity to review and comment on proposed projects and alternatives so that potential impacts of the project can be considered and taken into account during the decision-making process. This Final Environmental Impact Statement has been prepared by MDOT in compliance with Section 1506.5(c) of NEPA, with the assistance of a team of consultants led by Parsons Transportation Group Inc. A consultant disclosure statement is included in Section 8.

The cost of publishing 250 copies of this document at $40.00 per copy is $10,000. The document has been printed in accordance with Michigan Executive Directive 1991-6.

FHWA-MI-EIS-99-01-F

Boardman River Crossing Mobility Study
Grand Traverse County, Michigan

Final Environmental Impact Statement and Section 4(f)/6(f) Evaluation
Submitted Pursuant to 42 U.S.C. 4332(2)(c) and 49 U.S.C. 303
by the
U.S. Department of Transportation
Federal Highway Administration
and
Michigan Department of Transportation
and
Grand Traverse County Road Commission

Feb-2-2001
Date of Approval

FHWA Division Administrator

The following persons may be contacted for additional information concerning this document:

Mr. James A. Kirschensteiner
Programs and Operations Engineer
Federal Highway Administration
315 W. Allegan Street, Room 211
Lansing, Michigan 48933
Phone: (517) 377-1880

Mr. Micheal K. Dillenbeck
Manager
Grand Traverse County Road Commission
3949 Silver Lake Road
Traverse City, Michigan 49684
Phone. (231) 922-4848

This Final Environmental Impact Statement (EIS) describes the Recommended Alternative and alternatives eliminated from further consideration for the Boardman River Crossing Mobility Study. The Recommended Alternative is the Hartman-Hammond Road Connector with Three Mile Road Widening Alternative. This alternative consists of a new Boardman River crossing, a new roadway connecting Hartman Road to U.S. Route 31/M-37, and widening of segments of Hartman Road, Hammond Road, and Three Mile Road. This alternative will replace the transportation service provided by the existing Cass Road Bridge and will improve east-west mobility in the project area. The total estimated cost of the Recommended Alternative is $25.9 million.

The Final EIS summarizes information presented in the Draft EIS (May 20, 1999), responds to public and agency comments regarding social, economic, and environmental issues, and describes the selection of the Recommended Alternative. Important issues and major concerns include potential impacts to wetlands, land use and development, aesthetics, cultural resources, and Section 4(f) properties.

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SUMMARY

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SUMMARY

The Draft Environmental Impact Statement (Draft EIS or DEIS) for this project was circulated in May 1999. Since its circulation, the agency and public comments received have been addressed, and a Recommended Alternative has been selected. This Final Environmental Impact Statement (Final EIS or FEIS) summarizes the comments received and how they were addressed; presents new analysis that was conducted after circulation of the Draft EIS and as a result of comments on the Draft EIS; identifies the Recommended Alternative; and describes the social, economic, and environmental impacts of the Recommended Alternative and proposed mitigation measures. As part of the National Environmental Policy Act of 1969 and Section 404 of the Clean Water Act joint regulatory review process, concurrence on the selection of the Recommended Alternative is being sought from the participating resource agencies.

A notice of availability of this document will be published in the Federal Register, and the document will be circulated for review. A minimum 30-day no-action/comment period will be provided for the Final EIS. After the comments on the Final EIS have been received and addressed, the Federal Highway Administration (FHWA) will make a final decision on whether and how to proceed with the project. This will be documented in the Record of Decision. After the Record of Decision has been published, the project can proceed to final design, permit application, and implementation.

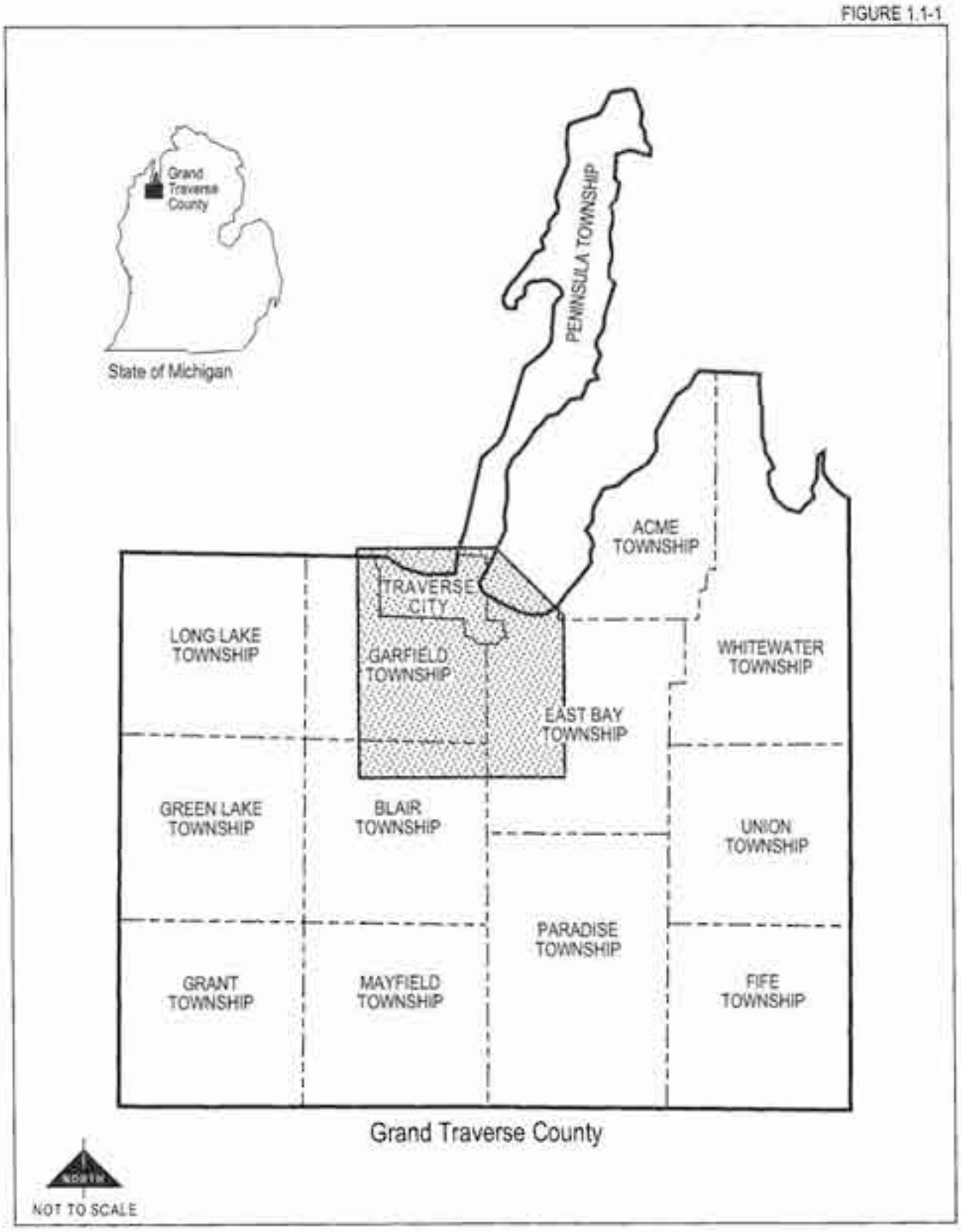
This document has been prepared as a condensed Final EIS. As such it summarizes information from the Draft EIS which has not changed and focuses on the changes that have occurred since the Draft EIS was circulated. Changes made to this section include the selection of a Recommended Alternative and the evaluation of additional alternatives after circulation of the Draft EIS. For this section, as well as all other sections in the document, the Draft EIS can be referenced for additional information.

1.1 DESCRIPTION OF THE PROJECT

Grand Traverse County, Michigan, located in the northwest corner of Michigan's lower peninsula, offers visitors and residents some of the most beautiful countryside in the Great Lakes region (Figure 1.1-1). Grand Traverse County and its main urban center, Traverse City, are among the fastest growing areas in the state and among its most popular tourist destinations. Over the next 15 years, population and employment are projected to increase substantially in Grand Traverse County.

The Cass Road Bridge is located approximately 4.8 kilometers (3 miles) south of Traverse City, Michigan (Figure 1.1-2). It is in poor condition and is on the Michigan Critical Bridge List maintained by the Michigan Department of Transportation (MDOT). The bridge was included on the list because of its physical condition, traffic volumes, and the anticipated impact on the local road system if it is closed. The replacement of the Cass Road Bridge has been approved for Critical Bridge funding, which would cover a portion of replacement costs. Because of physical deterioration, traffic on the bridge is limited to one lane of travel.

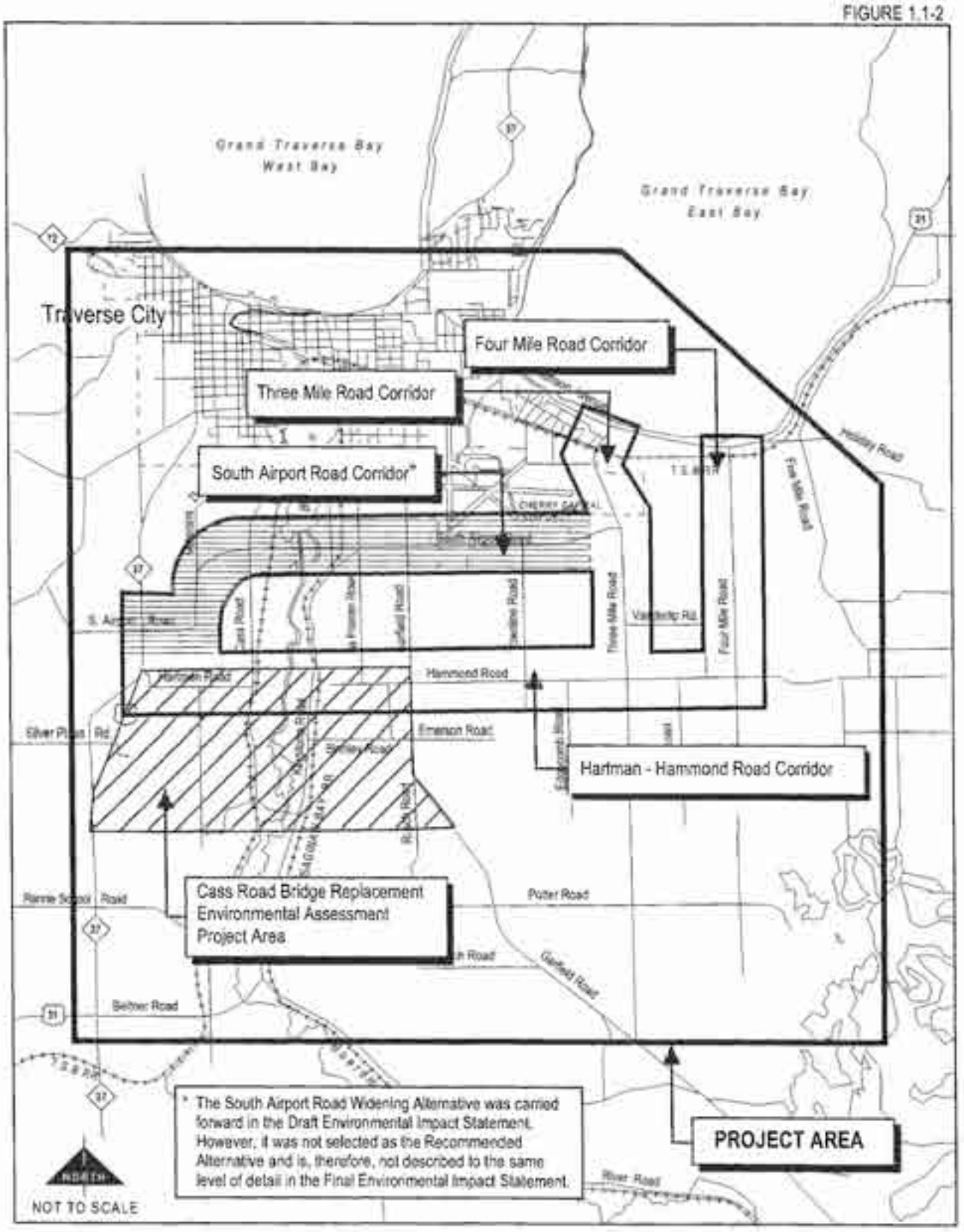
FIGURE 1.1-1



BOARDMAN RIVER CROSSING MOBILITY STUDY

REGIONAL CONTEXT

FIGURE 1.1-2



BOARDMAN RIVER CROSSING MOBILITY STUDY

PROJECT AREA

The purpose of the project is to replace the transportation service over the Boardman River that was provided by the Cass Road Bridge. Since a large investment would be required to the keep the bridge open, it was deemed prudent to evaluate bridge replacement alternatives in locations other than along the existing alignment where the investment could be more effective in the overall transportation network. Therefore, in addition to replacing the transportation service provided by the existing bridge, the purpose of the project is to address the east-west surface transportation system flow constriction problems which have developed, and which are forecasted to increase in significance in the near future in and around Traverse City, Grand Traverse County, Michigan.

The Grand Traverse County Road Commission (GTCRC), supported by the Traverse City Area Transportation and Land Use Study (TC-TALUS), Grand Traverse County, and the Charter Township of Garfield, completed an Environmental Assessment (EA) in April 1997, to evaluate prudent and feasible alternatives for the Cass Road Bridge replacement.

Based on the nature of the public and agency comments on the EA and at the Public Hearing, the GTCRC, MDOT, and FHWA agreed to expand the study to more fully evaluate other alternatives. This more detailed analysis led to the preparation of the EIS for the Boardman River Crossing Mobility Study, beginning in fall 1997. The decision to proceed with an EIS was based primarily on the concern that the proposed bridge connecting Hartman and Hammond roads, which would also facilitate east-west travel within the Traverse City area, may cause secondary and cumulative impacts on land uses beyond the initially defined project area. In addition, the improved east-west access across the Boardman River may require additional road improvements to the east beyond those considered and described in the EA. In response to these issues, the Boardman River Crossing Mobility Study was initiated to address not only the needs associated with the deficient Cass Road Bridge, but also the improvement of east-west mobility within the Traverse City area.

The boundaries of the EIS project area were expanded beyond the EA study to include an area bounded by U.S. Route 31/M-37 on the west; U.S. Route 31/M-72 on the north; Five Mile Road on the east; and Beitner Road on the south (Figure 1.1-2). The purpose of this expanded project area was to accommodate the consideration of a variety of alternatives to address east-west mobility within the Traverse City area.

The Boardman River Crossing Mobility Study is a separate project from the U.S. Route 31 Regional Corridor Study. The Regional Corridor Study was conducted by MDOT and is a bypass study that evaluates numerous miles of new alignment in an attempt to address regional mobility. That study has progressed to a point where three alternative corridors have been identified. At this time, no determination has been made regarding whether or not the Regional Corridor Study will proceed further. MDOT has indicated that if one of the alternatives evaluated in the Boardman River Crossing Mobility Study is constructed, they will evaluate the effect that alternative has on travel patterns and then determine how to proceed with the Regional Corridor Study. Correspondence from MDOT reiterating this position is provided in Appendix E.

1.2 ALTERNATIVES

1.2.1 Alternatives Selected for Evaluation in the Draft EIS

The alternatives selected for evaluation in this Draft EIS were: 1) the No-Build Alternative; 2) the Transportation System Management (TSM) Alternative; 3) the Hartman-Hammond Road Connector with Three Mile Road Alternative; and 4) the South Airport Road Widening with Three Mile Road Alternative.

No-Build Alternative. The No-Build Alternative consists of closure of the Cass Road Bridge. Additionally as part of this alternative, typical low-cost, low-impact improvements will continue to be made to improve the efficiency of the existing roadway network in the project area.

Transportation System Management Alternative. The TSM alternative includes improvements which maximize the efficiency of the present transportation system, such as intersection improvements along South Airport Road at Barlow Road, Garfield Road, and Three Mile Road; interconnection of traffic signals; and access control measures.

Hartman-Hammond Road Connector with Three Mile Road Alternative. The Hartman-Hammond Connector Alternative involves building a new bridge across the Boardman River valley to connect Hartman and Hammond roads. This alternative includes relocating and redesigning Hartman Road, either as a five-lane road or as a four-lane boulevard, between U.S. Route 31/M-37 and Cass Road. The boulevard design assumes the road will narrow to a five-lane road just west of Cass Road. East of the Hartman Road/Cass Road intersection, the Hartman-Hammond Connector will be four lanes to LaFranier Road.

This alternative also includes the widening of Three Mile Road to four/five lanes between South Airport Road and U.S. Route 31/M-72 and the reconstruction of Four Mile Road between Hammond Road and U.S. Route 31/M-72, retaining its existing two-lane cross section. The Four Mile Road improvement would occur prior to the widening of Three Mile Road so that it could be used as a detour route while Three Mile Road is being improved.

South Airport Road Widening with Three Mile Road Alternative. The South Airport Road Alternative involves widening this existing road from U.S. Route 31/M-37 to Garfield Road as a six-lane boulevard, and from Garfield Road to Three Mile Road as a four-lane road.

The Three Mile Road widening and Four Mile Road reconstruction, described as part of the Hartman-Hammond Connector Alternative above, are also included as part of this alternative.

1.2.2 Recommended Alternative

Following circulation of the Draft EIS, public and agency comments were received and addressed, suggested new or additional evaluation of alternatives was conducted, and concurrence from the resource agencies on the alternatives carried forward was received. The Hartman-Hammond Road Connector with Three Mile Road Alternative was selected as the Recommended Alternative. It is the alternative determined to best meet the project purpose and need and goals established for the project. The primary reasons for this selection were:

- It replaces the transportation service provided by the Cass Road Bridge and is the alternative projected to provide the greatest improvement to east-west mobility.
- It will cost substantially less than the South Airport Road Alternative – the other build alternative determined to meet the purpose and need of the project.
- It conforms to development patterns planned for by the affected communities.

As part of this recommendation, the four-lane boulevard cross section between U.S. Route 31/M-37 and Cass Road was selected instead of the five-lane cross section. The estimated cost of the Recommended Alternative is $25.9 million.

1.2.3 Alternatives Considered and Dismissed in the Draft EIS

Two Travel Demand Management (TDM) alternatives and several additional build alternatives were also considered for this project. However, after evaluation it was determined that these alternatives did not meet the purpose and need for the project, and they were subsequently dismissed from further consideration. The primary reason most of these alternatives were dismissed from consideration was that they are not projected to improve east-west mobility in the project area to the extent they would meet the purpose and need of the project. Additionally, many of the build alternatives dismissed included rehabilitation or replacement of the existing Cass Road Bridge at its current location. This would result in a Section 4(f) impact to the Grand Traverse Nature Education Reserve. It was concluded that this impact should be avoided if possible.

One of the build alternatives considered and dismissed in the Draft EIS was the Smart Roads Alternative. This alternative combines elements of the TSM and TDM alternatives and one of the build alternatives and includes the addition of four new bus routes. The build elements of this alternative consist of reconstructing the Cass Road Bridge as a two-lane structure; widening Beitner Road, including the bridge over the Boardman River, to four lanes; widening Keystone Road to four lanes between Beitner Road and Hammond Road; and extending Hammond Road to Keystone Road. The Section 4(f) impacts to the Grand Traverse Nature Education Reserve associated with this alternative precluded selection of this alternative for evaluation. However, since this alternative received some local support, the alternative was considered from a traffic standpoint with and without the Cass Road Bridge improvement. Based on the evaluation, it was determined that this alternative will not meet the purpose and need for the project (See Section 3.3.2.).

1.2.4 Alternatives Evaluated after Draft EIS Circulation

After review of the Draft EIS, the U.S. Environmental Protection Agency (EPA) and the Michigan Department of Environmental Quality (MDEQ) suggested that additional evaluation of alternatives, primarily consisting of combining alternatives previously considered, be conducted. These alternatives included combining TDM alternatives with build alternatives; enhancing the local transit system; and combining the South Airport Road Alternative with another build alternative - Beitner Road/Keystone Road Improvements – dismissed in the Draft EIS. After evaluation, these alternatives were also dismissed from further consideration (See Section 3.4.).

1.3 SUMMARY OF IMPACTS

The following is a summary of impacts associated with the Recommended Alternative, relative to the No-Build Alternative. More detailed descriptions of the impacts are included in Section 5, Environmental Consequences. Figure 1.3-1 depicts the environmental constraints identified in the project area. A summary of the substantial impacts is presented in Table 1.3-1. For comparison purposes, this table also includes the impacts identified for the South Airport Road Alternative and for the Hartman-Hammond Connector Alternative with five-lane cross section.

1.3.1 Physical Environment

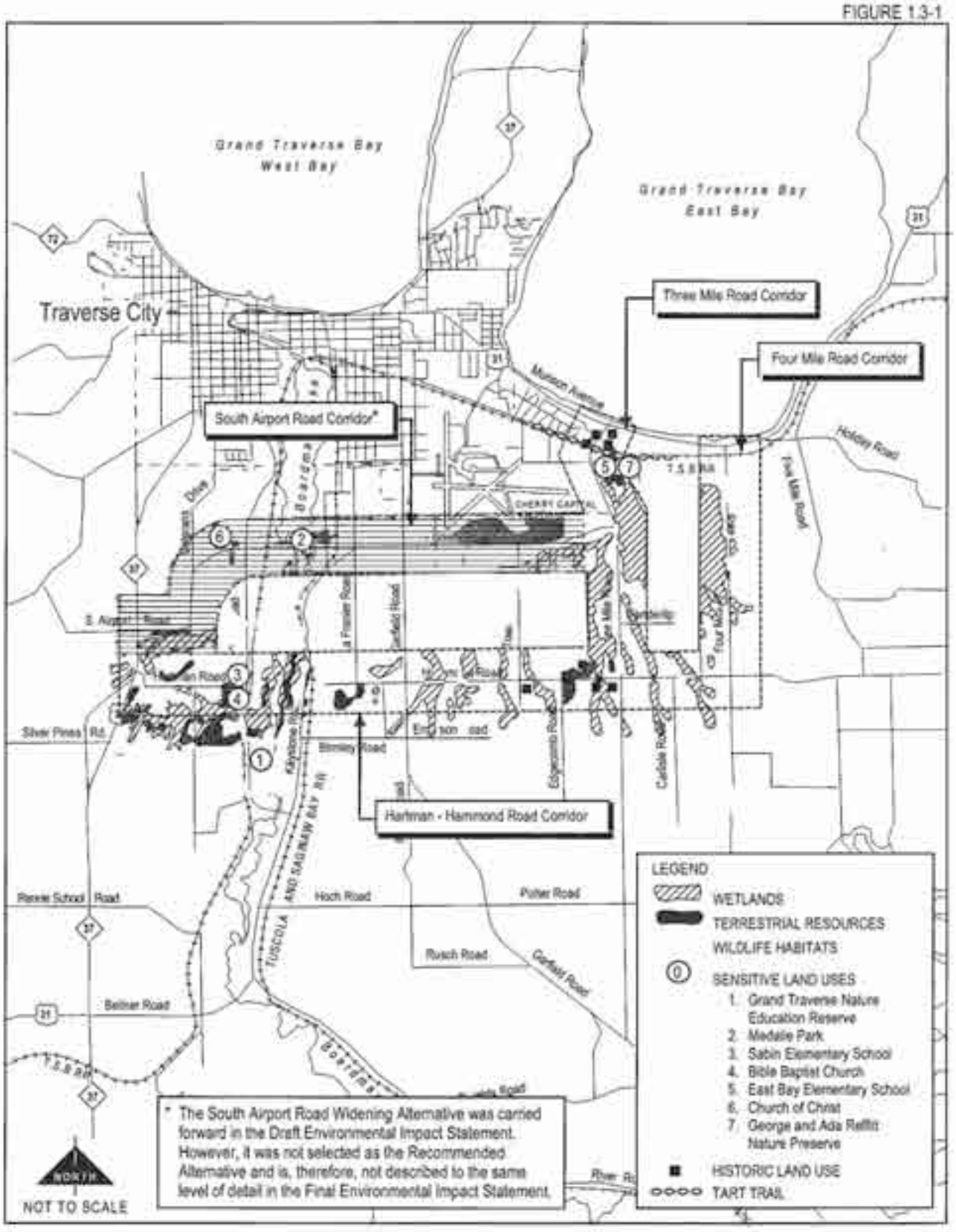
Geological Resources. No impacts to bedrock geology are anticipated. Impacts to topography will occur with the Recommended Alternative, primarily in areas of cut and fill. The Hartman-Hammond Connector will affect approximately 15.2 hectares (37.5 acres). East of the Boardman River, a 20-meter (65-foot) deep cut into the hill east of Keystone Road will be required in order to minimize the steepness of the proposed roadway. This is a significant cut; during final design, opportunities for the use of retaining walls to minimize the area disturbed will be considered. Only minor cut and fill activities will be necessary for Three Mile Road widening or Four Mile Road reconstruction.

Groundwater Resources. Since depth to water bearing deposits ranges from 16 to 46 meters (51 to 150 feet), there will be no direct impacts to existing aquifers; no sole source aquifers were identified in the project area. Direct impacts to groundwater recharge and discharge areas will occur as a result of the addition of impervious surface with the Recommended Alternative; however, they are expected to be minor. The Hartman-Hammond Connector will add 5.6 hectares (13.8 acres) of impervious surface and will affect areas of both groundwater discharge and recharge. (See Table 1.3-1.) For comparison purposes, the Grand Traverse Mall added 22.8 hectares (57 acres) of impervious surface with no adverse effect to groundwater. Consequently, the amount of impervious surface added by the Hartman-Hammond Connector is not considered significant in regards to groundwater resources. The additional paving from Three Mile Road widening and Four Mile Road reconstruction is not expected to negatively affect groundwater infiltration rates.

Soil Resources. Impacts to soil resources include compacting and covering existing soils with impervious surface and exposing areas of cut in the existing bluffs west of Cass Road and in the Boardman River valley to erosion risks. The Hartman-Hammond Connector will directly impact 27.7 hectares (68.4 acres) of soil resources and require large areas of cut in the steep bluffs of the Boardman River valley and at the proposed new intersection with U.S. Route 31/M-37. This impact is not considered a significant impact to soil resources because much of the impact occurs adjacent to existing roadway and previously disturbed soil resources. Three Mile Road widening impacts a relatively minor amount of soil resources – 6.2 hectares (15.4 acres); soil impacts for the Four Mile Road reconstruction are limited to excavation of existing road subbase.

Surface Water Quality. Direct surface water quality impacts will generally consist of temporary increases in turbidity and downstream sedimentation resulting from fill and erosion of exposed soils during construction activities, and enclosing or moving certain portions of various tributaries within the watershed. The Hartman-Hammond Connector will result in minor impacts to surface waters. No significant impacts to the Boardman River will occur as a result of the proposed crossing. A bridge, constructed at the existing Three Mile Road crossing of the East Branch of Mitchell Creek to

FIGURE 1.3-1



BOARDMAN RIVER CROSSING MOBILITY STUDY

ENVIRONMENTAL CONSTRAINTS

Quantitative Impacts To	South Airport Road Widening		Hartman-Hammond Connector				Three Mile Road Widening*	
			Five-Lane		Four-Lane Boulevard			
Aquatic Resources Linear meters (feet) of stream enclosed or relocated	0.0	(0.0)	160.3	(526.0)	171.3	(562.0)	153.6	(504.0)
Wetland Resources [1] Hectares (acres) of wetlands displaced	0.1	(0.2)	1.9	(4.8)	2.0	(4.9)	0.0	(0.01) [3]
Terrestrial Resources [2] Hectares (acres) of woodlands displaced	4.5	(11.2)	4.7	(11.7)	5.1	(12.6)	0.0	(0.0)
Agricultural Resources Hectares (acres) of farmland displaced	0.0	(0.0)	2.3	(5.7)	2.9	(7.2)	0.0	(0.0)
Additional Impervious Surface Added to Watershed in Hectares (acres)	9.0	(22.3)	5.8	(14.4)	5.6	(13.8)	1.3	(3.1)
Number of Residential Structures Displaced	31		16		17		3	
Number of Commercial Structures Displaced	25 [4]		1		1		1	
Number of Institutional Structures Displaced	1		0		0		0	
Number of Category B Noise Receptors Impacted	11		11		11		8 or 11	
Number of Sites of Environmental Interest	1		1		1		1	
Number of Historic Structures Impacted	0		0		0		4	

* The Three Mile Road Widening is part of the South Airport Road Widening and the Hartman-Hammond Connector Alternatives. Projected traffic along Three Mile Road is greater under the South Airport Road Widening. As a result, three additional noise impacts were identified.

Key
1. Includes forested, emergent, scrub-shrub and riverine wetland categories
2. Includes mixed hardwood and pine plantation.
3. Equals 250 square feet.
4. Includes 37 businesses.

Summary of Quantitative Impacts ***Table 1.3-1***

Boardman River Crossing Mobility Study

accommodate widening the road, will ultimately improve stream conditions for migratory fish species and allow colonization of the stream bottom by aquatic macroinvertebrates.

1.3.2 Ecological Environment

Terrestrial Resources. Various types of terrestrial resources will be lost as a result of the construction activity related to the Recommended Alternative. Portions of pine plantation stands, mixed hardwood forest, forested wetland, and mature trees on residential properties will be displaced. The majority of the impacts to these resources occur near or within the Boardman River valley. Impacts to critical wildlife habitat include some fragmentation of forested wetland as a result of the proposed fill associated with the bridge abutments within the valley. The span of the bridge, however, will accommodate wildlife movement next to the river. Consequently, the bridge span mitigates the effects of wildlife habitat fragmentation. The recommended site for the proposed bridge crossing is in a portion of the valley where powerline installation, river dredging, and nearby manufacturing activity has previously affected wildlife habitat. The displacement of forested wetland within the valley is considered significant because of the difficulty involved with replacing this specific type of wildlife habitat.

Wetland Resources. Wetland resource impacts include direct habitat loss, increased runoff rates, increased erosion, and alteration of the hydrology of the remaining wetland systems. Two wetland complexes that include forested and scrub-shrub wetlands will be impacted along the Hartman-Hammond Connector. These complexes provide water quality protection for specific tributaries of the Boardman River and are part of an important wildlife corridor within the river valley. As noted above under Terrestrial Resources, the displacement of forested wetland for the Hartman-Hammond Connector is a significant impact. In the context of the affected wetland complexes, however, measuring approximately 140 hectares (350 acres), the proposed displacement of 2.0 hectares (4.9 acres) is a relatively small amount of impact (i.e., approximately one percent of the total). (See Table 1.3-1.) Wetland impacts associated with Three Mile Road widening are much less due to the built nature of the existing environment.

Aquatic Resources. For the most part, the aquatic resource impacts that occur with the Recommended Alternative will be temporary and related to construction activity, and minor due to the quality of the existing habitats and the types of fish and other aquatic species present in the affected stream channels. Direct impacts to aquatic resources within the Boardman River will also be minor and associated with local increases in turbidity during construction. Relocation of the Lower Branch of Mitchell Creek to widen Three Mile Road will affect a portion of stream channel that contains significant aquatic habitat consisting of several deep holes that serve as refuge areas for migratory salmonids and resident trout. Depreciation of water quality due to turbidity during relocation is likely to displace fish populations and aquatic macroinvertebrates to less favorable areas downstream. Consequently, the anticipated impacts to the Boardman River aquatic resources are not considered significant; however, the aquatic resource impacts within Mitchell Creek are potentially significant but can be greatly reduced through mitigation measures during final design and construction.

Wild and Scenic Rivers. No impacts to wild and scenic rivers will result from this project.

Threatened and Endangered Species. No impacts to federal- or state-listed Threatened or Endangered species are expected as a result of implementing the Recommended Alternative.

1.3.3 Land Use

Although the No-Build Alternative will generally promote continuation of existing land use patterns, it is not consistent with published future land use maps that illustrate the bridge connection between Hartman Road and Hammond Road. Due to its being integrated into a number of recent planning documents, the Hartman-Hammond Connector is compatible with existing land use plans. Widening Three Mile Road is also compatible with current revisions to East Bay Township's planning documents.

The Hartman-Hammond Connector will displace 17 residences and one commercial structure. (See Table 1.3-1.) Along Three Mile Road, three residences and one commercial structure will be displaced.

Impacts to agricultural land are minimal and confined along the Hartman-Hammond Connector where several agricultural parcels border Hartman Road. (See Table 1.3-1.)

Formal recreational resources that are impacted by the Recommended Alternative include the Traverse Area Recreational Trail (TART) and the George and Ada Reffitt Nature Preserve – both located along Three Mile Road. The potential impacts to these recreational lands are relatively minor and can be mitigated. Impacts to more informal recreational areas are potentially more significant and center on the Boardman River valley.

Within the valley, on privately-owned undeveloped land between the Grand Traverse Nature Education Reserve and the YMCA to the north, an informal trail system has been established that is well-used by the local community. This area of the valley is also the location for the long-planned Boardman Riverwalk trail system that ultimately connects the Reserve to Medalie Park and downtown Traverse City. The construction of a bridge in the valley as part of the Recommended Alternative and the subsequent introduction of vehicular traffic, without appropriate mitigation strategies, will likely have a significant impact on the user experience within the valley in a way that is difficult to quantify. This has been a major concern of a number of people within the community. Because mitigating strategies have not yet been discussed in detail, this concern remains unresolved.

1.3.4 Environmental Justice and Socio-economics

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, dated February 11, 1994, directs each federal agency to develop a strategy to address environmental justice concerns in its policies. The purpose of the Executive Order is to avoid disproportionately high adverse impacts to minority and low-income populations with respect to human health and the environment. Six of fifteen government-assisted apartment complexes in the county are located in the project area. None of these will be impacted by the Recommended Alternative. No disproportionately high adverse impacts to low-income or minority populations are anticipated as a result of this project.

The Hartman-Hammond Connector will benefit existing and planned industrial and office development on or near Hammond Road by providing a direct route to U.S. Route 31/M-37, and will greatly facilitate school bus traffic that is currently unable to cross the Boardman River at the Cass Road Bridge. This improved access is considered to be a significantly positive impact. It will also provide an alternate through route to and from Three Mile Road and U.S. Route 31/M-72 and points northeast,

for ground freight and other traffic that would prefer to not use the more congested South Airport Road. At major intersections, such as the Cass Road/Hartman Road intersection, this alternative will also better accommodate turning movements of larger and heavier trucks. Businesses, residences, and institutions on Three Mile Road, however, may find it more difficult to make cross-traffic turns although through-motorists will benefit from extra lanes. Three Mile Road widening may create greater safety concerns for buses and cars entering and exiting East Bay Elementary School. Due to the higher traffic and wider road, the school will further lose any existing sense of integration with the local residential community west of Three Mile Road. Maintaining safe pedestrian access to the school will diminish this potential impact.

1.3.5 Cultural Resources

The State Historic Preservation Office (SHPO) has determined that the widening of Three Mile Road associated with the Recommended Alternative will have an adverse impact on four historic properties. (See Table 1.3-1.) While none of the historic structures will be displaced, the widening will reduce the setback at these four properties from 23 meters (75 feet) to 15 meters (50 feet). The SHPO has determined that the road widening and reduction in setback constitutes an adverse impact because it will diminish the integrity of the properties' location, setting, and feeling.

1.3.6 Visual Resources

The Hartman-Hammond Connector crosses a rural landscape between U.S. Route 31/M-37 and LaFranier Road, and the Boardman River valley, a significant natural feature of the project area. High viewer sensitivity to the natural resources of the valley increases the importance of visual resource issues through this area. The new intersection with U.S. Route 31/M-37 and Hartman Road and the crossing of the Boardman River valley will create deep cuts and steep side slopes to set the road into the existing landscape [up to 20 meters (65 feet) deep]. The existing elevations entering the valley offer panoramic views at each approach.

At the river crossing, the proposed bridge will be approximately 61 meters (200 feet) long and 21 meters (70 feet) wide, and will be elevated 6 to 11 meters (18 to 35 feet) above the valley floor on large earthen abutments set back over 15.2 meters (50 feet) from the edge of the river. Both single and multiple span designs have been preliminarily discussed that accommodate pedestrian trails. A significant number of people from the greater Grand Traverse community feel strongly about preserving the existing natural resources in the river valley. Because of this, the bridge connection has the potential to become a dominant visual feature in the landscape and a significant impact. Final design will influence the ultimate significance of the bridge on the aesthetic environment.

The existing development and mature trees on Three Mile Road contribute to a sense of village character that will be diminished by the road widening. However, widening the road will offer a significant opportunity to improve the visual quality of the Three Mile Road/U.S. Route 31 intersection. This location, as a termination point looking north to Traverse City State Park and the East Arm of Grand Traverse Bay visible across the street, is an important visual feature. Widening this intersection emphasizes the natural focal point of the park and bay.

1.3.7 Air Quality

No violations of the National Ambient Air Quality Standards are projected for this project. Therefore, no air quality mitigation measures are required for the roadway improvements.

No portion of this project is within a designated nonattainment area for any of the air pollutants for which the U.S. EPA has established standards. Accordingly, a conformity determination under 40 CFR Part 93 ("Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans for Transportation Plans, Programs, and Projects Funded or Approved Under Title 23 U.S. Code or the Federal Transit Act") is not required.

1.3.8 Noise

Under the Recommended Alternative, noise impacts were identified at 19 sensitive receptors. (See Table 1.3-1.) The most significant noise impacts are projected for the receptors located the closest to the Hartman-Hammond Connector. Noise mitigation, however, is not feasible for this project. Noise barriers would not be effective for most of the impacted receptors because maintaining access to these properties will require "breaks", which will limit their effectiveness. Noise barriers would also not be economically feasible for this project because the impacted receptors are dispersed throughout the corridor, requiring an individual barrier for most of the impacted receptors. Additionally, predicted noise levels are not great enough to justify the air conditioning or insulation of homes as a noise abatement measure.

1.3.9 Contaminated Sites and Sites of Environmental Interest

Construction of the Recommended Alternative may disturb potentially contaminated soil at two locations – the former Tower Automotive property (Hartman-Hammond Connector) and the Total Petroleum Station (Three Mile Road). (See Table 1.3-1.) Soil testing should be conducted at these locations prior to any construction.

1.3.10 Secondary and Cumulative Impacts

Based on documented growth trends in the Traverse City area, industrial, commercial, and residential growth and its attendant traffic will continue to increase in the foreseeable future, adding to development pressures on available township land. Both East Bay and Garfield Townships believe that this continued development pressure is unrelated to the proposed transportation improvements discussed in this document. Additional analysis conducted during preparation of the Final EIS indicates that there are numerous mitigating measures currently underway by the townships to manage future growth. Implementation of the Recommended Alternative will adhere to township requirements that reduce secondary and cumulative impacts.

Land Use and Socio-economic Impacts. Graphic depictions showing the character of a possible long range build-out scenario of the project corridors have been prepared by the townships in accordance with their long range plans. Although these illustrations include a bridge connection across the Boardman River, both township planning departments believe the development shown for the area accurately represents the long-range No-Build scenario. Traffic into and out of Traverse City on local roads such as LaFranier, Garfield, South Airport and Three Mile roads will continue to worsen as

development density increases. Closure of the Cass Road Bridge will further aggravate this condition. Most of these primary local roads have not been designed to support heavier traffic. As road conditions worsen, traffic on other secondary roads will increase as traffic seeks alternative routes. Significant adverse impacts of the No-Build Alternative include decreasing transportation efficiency, lengthening travel times, decreasing business effectiveness and worsening road safety. Eventually, if not addressed, local road congestion may adversely affect the local economy as the area loses its attractiveness to businesses and tourists.

The Recommended Alternative recognizes existing entry/exit circulation patterns of the Traverse City region and responds to serve the transportation needs of the economic community more efficiently. If implemented, a number of positive secondary and cumulative impacts are likely to result. They include better facilitating of light industrial truck traffic that conducts commerce within the Traverse City region, providing improved access to businesses on Cass and Hammond roads, and reducing travel time needed by buses and parents transporting children to and from local schools.

In contrast, the Recommended Alternative will also increase truck and automobile traffic through the Hartman Road-Cass Road intersection, raising safety concerns regarding daily pick-up and drop-off of children in front of Sabin School on Cass Road near the Hartman Road intersection. The significance of these potential impacts is unknown, but such impacts are likely to be addressed by designation of a safe pick-up/drop-off location in front of the school. Coordination with school officials will be conducted during final design.

The proposed widening of Three Mile Road to four/five lanes between South Airport Road and U.S. Route 31/M-72 will improve traffic movement. However, this type of facility is more compatible with non-residential land uses. Over time, increased traffic and changing land use along Three Mile Road through this area will act to further isolate East Bay Elementary School from the existing residential community and aggravate safety issues for pedestrians and bicyclists, as well as cars and buses entering and exiting the property. Mitigating measures, however, are proposed to address pedestrian and bicyclist activity on Three Mile Road and thereby reduce the significance of potential impacts.

Natural Environment Impacts. Secondary and cumulative natural environment impacts associated with the No-Build Alternative will occur in proportion to the growth and development of the Traverse City area. These include increased impervious surface, altered stream hydrology, increased soil erosion and sedimentation, degradation of aquatic habitat, fragmented wildlife habitat, and altered or displaced wetland resources. Existing planning documents and zoning ordinances identify mitigating measures to minimize development impact to the natural environment, thereby reducing the significance of potential impacts.

Analysis of probable secondary and cumulative impacts due to increased storm water runoff and pollutant loading indicates that the Boardman River, Jack's Creek, Mitchell Creek, or other tributaries crossed by the Recommended Alternative will not be adversely affected if storm water Best Management Practices (BMPs) are implemented. The impacts of removing trees adjacent to Mitchell Creek along Three Mile Road may affect water temperatures and resident fish. Replacing trees and shrubs that are removed to accommodate widening the road can counteract these effects.

Over time, Four Mile Road improvements that improve the road surface condition may attract more vehicles to this road. Baker's Creek, immediately adjacent to Four Mile Road contains wetland

vegetation, which may be sensitive to runoff pollutants. Long-term observation will be necessary to determine the effect this may have on the existing wetland plant community and water quality.

1.4 SUMMARY OF MITIGATION MEASURES

In this document, potential mitigation measures have been identified in areas where impacts will occur. During final design, efforts will be made to avoid or minimize the impacts of this project to the extent reasonable. Design modifications to avoid or minimize impacts could include shifting the alignment, maximizing slopes, and reducing the width of the median. In areas where impacts are unavoidable, BMPs will be incorporated into the road design. Additionally, the GTCRC will prepare an erosion and sedimentation control program, meeting the requirements of the Michigan Water Resources Commission to ensure compliance with Michigan's Soil Erosion and Sedimentation Control Act.

A conceptual wetland mitigation plan has been developed to address the wetland impacts identified for the Recommended Alternative. The plan calls for the creation of 3.8 hectares (9.5 acres) of new wetlands. Potential sites for the wetland creation have been identified along the Boardman River.

Fair and just compensation will be provided to property owners within the proposed right-of-way or otherwise significantly impacted by the right-of-way, as required by both the U.S. and Michigan constitutions. Relocation services will also be available to all businesses and residences displaced by this project. Impacts to recreational properties can be mitigated with landscaping.

Prior to widening Three Mile Road, the four properties eligible for the National Register of Historic Places on Three Mile Road will be photographed and a report will be created to document the development of recreational housing in the Traverse City area. Original photographs and reports will be submitted to the SHPO and appropriate local archives designated by the SHPO. A copy of historic information collected for the specific properties will also be provided to individual landowners. Landscaping removed as a result of the Three Mile Road widening will be replaced as negotiated with the individual landowners.

Mitigation for secondary and cumulative socio-economic and natural resource impacts will come from coordination between local and regional planning agencies as well as from adhering to clearly defined ordinances that support the visions of each community. Additional coordination with the affected elementary schools will occur during final design to further reduce safety concerns. Based on existing comprehensive plans, both townships expect to employ a number of growth and access management techniques to direct and control development.

Section 2

PURPOSE AND NEED

Section 2
PURPOSE AND NEED

This Final Environmental Impact Statement (Final EIS or FEIS) is considered a condensed Final EIS, where information that has not changed from the Draft Environmental Impact Statement (Draft EIS or DEIS) is summarized and changes in the project since the Draft EIS was circulated are addressed more fully. However, since this section is a critical element in the project and this document, much of the information from the Draft EIS is repeated with new information provided in *italics*.

2.1 PURPOSE AND NEED FOR ACTION

The purpose of the project is to replace the transportation service that was provided by the now structurally deficient and functionally obsolete Cass Road Bridge over the Boardman River. The existing bridge is only one lane wide and posted at 10 tons for single axle vehicles. This precludes large vehicles such as school buses, fire trucks and fuel delivery vehicles from crossing at the Cass Road location. In addition, the purpose of the project is to address the east-west surface transportation system flow constriction problems which have developed, and which are forecasted to increase in significance in the near future in and around Traverse City, Grand Traverse County, Michigan.

2.1.1 Cass Road Bridge Deficiencies

The Traverse City Light and Power structure, which dams the Boardman River, serves as the foundation of the existing Cass Road Bridge. The 6-meter (20-foot) wide structure originally provided two 2.7-meter (9-foot) travel lanes. In 1983, the addition of a concrete side barrier reduced the available roadway travel width to 4.6 meters (15 feet). Over the years, the existing bridge deck has been repaired numerous times and in 1994, was resurfaced. The deck-resurfacing project included milling off a portion of the bridge deck and the addition of an asphalt overlay. During the milling process it was revealed that most of the concrete surface had deteriorated down to the bridge reinforcement. A new asphalt overlay was placed on top of the remaining concrete deck to provide a smooth-wearing surface. The bridge's structural support, however, cannot be economically enhanced without full removal and replacement. The structure also has a weight restriction of 10 tons for single-axle vehicles. Because of these problems, the Cass Road Bridge is structurally deficient and functionally obsolete for current and future use. The structure is currently listed on the Michigan Critical Bridge List.

Additionally, only one lane of travel is available for vehicles crossing this structure. The crossing is not signalized, and motorists are required to yield to oncoming vehicles on the bridge. These operating conditions result in the potential for severe accidents to occur. However, due to the relatively low volume of traffic currently using the crossing, accidents have been infrequent. Accident data compiled over the period from January 1, 1994 to December 31, 1998 indicate that the accident rate for the bridge averaged about two accidents per year. The most prevalent accidents were head-on and fixed object types. No fatalities were recorded during this period.

The Cass Road Bridge and Boardman Dam and hydroelectric plant are located within the Grand Traverse Nature Education Reserve — a Section 4(f) property. Section 4(f) properties may not be used for transportation projects if a feasible and prudent alternative exists. Any reconstruction or rehabilitation to the Cass Road Bridge and associated dam complex that would occur outside the existing footprint of this facility would constitute a 4(f) impact on this very sensitive area. As noted above, the structural deficiencies associated with the bridge will require full removal and replacement of the structure if it is to continue to accommodate vehicular traffic in the future. Reconstruction of the Cass Road Bridge to current standards, even to just a two-lane facility, would extend the current footprint of the complex, resulting in a 4(f) impact. Expanding the capacity of this bridge and its approaches would result in an even greater 4(f) impact, as well as impacts to high quality wetlands. Therefore, such an improvement can not be pursued unless no other prudent or feasible alternatives exist.

Since distribution of the Draft EIS, the existing right-of-way across the Cass Road Bridge has been investigated further. As a result of this investigation, it was determined that the existing right-of-way is no more than 6.1 meters (20 feet) wide. At a minimum, an additional 7.9 meters (26 feet) of right-of-way would be required to accommodate a new two-lane structure meeting current design standards. Additionally, based on preliminary review, to widen Cass Road and the bridge to four lanes would impact approximately 0.8 hectares (two acres) of known high quality wetlands.

Prior to the issuance of the Draft EIS, the Cass Road Bridge and Boardman Dam were evaluated to determine if they were eligible for the National Register of Historic Places. Based on the evaluation conducted, it was determined that neither the bridge nor the dam is eligible for listing on the National Register of Historic Places, and therefore, the complex itself is not a Section 4(f) property. This does not change the fact that improvements to the existing Cass Road Bridge would result in a 4(f) impact by encroaching upon the Grand Traverse Nature Education Reserve.

2.1.2 East-West Mobility Across the Boardman River

East-west travel across the Boardman River is limited to six crossings between Grand Traverse Bay and Beitner Road, a distance of almost 11 kilometers (seven miles). Three of these bridges, Grandview Parkway/U.S. Route 31, Front Street, and Eighth Street, are located within 1.6 kilometers (one mile) of each other within Traverse City. The other three Boardman River crossings are South Airport Road, Cass Road, and Beitner Road, located over the next 9.5 kilometers (six miles). The Grandview Parkway/U.S. Route 31, Eighth Street, and South Airport Road crossings consist of four through lanes (two in each direction). Front Street and Beitner Road consist of two through lanes, and as stated above, the Cass Road Bridge operates as a one-lane facility. Of these crossings, only the Cass Road Bridge is identified on the Michigan Critical Bridge List.

In the Traverse City Area Transportation and Land Use Study (TC-TALUS) area, the roadway network provides for approximately 98 percent of all transportation needs (TC-TALUS, 1995). Few north-south travel deficiencies have been identified in the area. However, because of the limited number of options available for crossing the Boardman River, the east-west crossings carry some of the highest volumes of traffic in the region. Traffic studies evaluating recent and projected population growth in the area indicate that east-west mobility across the Boardman River will be a major problem within the next few years. These problems will worsen with the eventual closure of the Cass Road Bridge.

This project is intended to serve local transportation needs and is separate from the U.S. Route 31 Regional Corridor Study. The Regional Corridor Study evaluated a bypass around Traverse City and is intended to serve regional travel. In 1991, the Michigan Department of Transportation commissioned the Traverse City External Single-Station Origin-Destination Study. At four "stations" outside of Traverse City, vehicles were stopped and drivers interviewed to determine the origin, destination, and purpose of their trip. The results of that study indicated that approximately 86 percent of the trips either originated or terminated in Traverse City, while 14 percent did neither and were classified as through trips. Addressing mobility on the east-west Boardman River crossings will serve the local transportation needs of the area (i.e., trips to, from, and within the City of Traverse City).

Existing Traffic and Level of Service. A review of existing traffic volumes and levels of service indicates that congestion on most of the Boardman River crossings is reaching an unacceptable level. Table 2.1-1 lists the existing (1997) traffic volumes and levels of service (LOS) on the Boardman River crossings based on travel demand modeling conducted for this project by the Michigan Department of Transportation (MDOT) and TC-TALUS. Typically, levels of service A through D are considered acceptable, while levels of service E or F are not. Currently, three of the Boardman River crossings listed in Table 2.1-1 operate at LOS D, where traffic flow is characterized as nearly unstable, with little freedom to maneuver. Levels of service were determined using the LOS boundaries for volume-to-capacity ratios documented in the Highway Capacity Manual (Transportation Research Board, 1998). The volume-to-capacity ratios were calculated by comparing peak hour volumes to peak hour capacities on the river crossings.

Table 2.1-1
Existing Annual Average Daily Traffic (AADT) and Levels of Service

River Crossing	Number of Lanes on Bridge	1997 AADT	Peak Hour Level of Service
Grandview Parkway/U.S. 31	4 lanes	30,000	D
Eighth Street	4 lanes	17,000	C
South Airport Road	4 lanes	29,500	D
Cass Road Bridge	1 lane	3,500	D
Beltner Road	2 lanes	4,000	B

Source: MDOT and TC-TALUS Travel Demand Modeling Results (1998).

Note: Peak hour traffic is assumed to be 10 percent of the AADT with a 55/45 directional split.

South Airport Road is considered the primary east-west arterial serving local traffic volumes (traffic generated by people living and conducting business in the Traverse City area). Over the years, South Airport Road has been widened to accommodate increased traffic volumes. Population and business growth within the Traverse City area, however, has increased to the point that traffic congestion is occurring on South Airport Road, particularly during morning and afternoon peak hours.

Population and Employment. The TC-TALUS technical committee and MDOT have evaluated population and employment trends and projections in a travel demand forecasting context.

The TC-TALUS study area consists of Acme, Blair, East Bay, Garfield, Green Lake, Long Lake, Peninsula, and Whitewater Townships in Grand Traverse County, including the City of Traverse City, and Elmwood Township in Leelanau County. Between 1980 and 1990, population in the TC-TALUS study area grew by approximately 17 percent, from 53,000 to 62,000. TC-TALUS projects that this growth will continue and estimates that population within the study area will increase to 109,781 individuals by 2015 — a 77 percent increase over the 25-year period. *This represents the medium growth forecast developed by TC-TALUS and is the forecast that corresponds to the travel demand forecasts reported in the Draft EIS and repeated in this Final EIS. The Draft EIS reported 124,000 as the TC-TALUS study area population forecast in the Purpose and Need section. The 124,000 represents the high growth population forecast for the TC-TALUS study area. The high growth forecast (124,000) was not part of the socio-economic forecasts used to generate the travel demand forecasting results used for this project.*

The 2015 TC-TALUS forecasts indicate that population in their study area will increase at an average annual rate of 2.3 percent. Conversely, the Michigan State Demographer projects population to increase from 64,273 in 1990 to 93,500 in 2015 in Grand Traverse County. This equates to an average annual increase of 1.5 percent. Currently, the U.S. Census Bureau estimates that population in Grand Traverse County grew by approximately 1.7 percent annually between 1990 and 1999 (U.S. Census Bureau, 2000). (Note that the TC-TALUS study area does not encompass all of Grand Traverse County and includes a portion of Leelanau County.)

To address the discrepancies between their projections and the Michigan State Demographer's, TC-TALUS conducted an independent evaluation to help determine the validity of their projections. To do so, they analyzed 1995 mid-decade census data. The mid-decade census estimates Grand Traverse County population to be 72,016. This is conceded by some township clerks to be low due to the fact that persons are not required by law to respond. The State Demographer mid-decade population estimate is 70,764. Additionally, TC-TALUS developed an estimate of 1995 population in Grand Traverse County by analyzing new residential building permits approved. The results of this analysis estimated the 1995 population at 73,781.

The State Demographer's estimates indicate that population in Grand Traverse County grew 1.9 percent per year between 1990 and 1995. Then from 1995 to 2015, the State Demographer projects the average annual growth between 1995 and 2015 to be 1.4 percent. Yet, based on the mid-decade census, population in Grand Traverse County grew on average at a rate of 2.3 percent per year. Based on the TC-TALUS estimate, population grew 2.8 percent per year in Grand Traverse County and at 2.2 percent per year in their study area. Based on this information, TC-TALUS believes their forecasts are, at a minimum, as reliable as the State Demographer's and has decided not to change their forecasts until official 2000 census data is available.

These population estimates and forecasts are summarized in Table 2.1-2. Additional information on this subject is included with the U.S. Environmental Protection Agency coordination information provided in Appendix C.

Table 2.1-2
Population Data

Area	1990 Population	1995 (Estimated) Population	Average Annual Growth Rate (%) 1990-1995	2015 (Projected) Population	Average Annual Growth Rate (%) 1990-2015	Average Annual Growth Rate (%) 1995-2015
TC-TALUS Study Area	61,881	69,104	2.2	109,781	2.3	2.3
Grand Traverse County	64,273					
Mid-Decade Census		72,016	2.3			
State Demographer		70,764	1.9	93,500	1.5	1.4
TC-TALUS		73,781	2.8			

In addition to population growth, employment is also projected to increase substantially within the TC-TALUS study area. The number of employed persons is projected to increase from 34,000 (1990 census) to 59,000 in the year 2015, representing a 74 percent increase over the 25-year period. As this projected growth occurs, traffic congestion on local roads will increase.

Future Traffic and Level of Service. Associated with the projected growth for the area, agricultural land is and will continue to be converted to light industrial, commercial, and residential uses. This will result in increased congestion on the roadways in the project area. For instance, the Grand Traverse Mall and the nearby Grand Traverse Crossings development located on South Airport Road have resulted in substantial traffic growth. Additionally, the construction and expansion of industrial parks and commercial uses east of the Boardman River along Hammond Road have created additional traffic demand for east-west mobility across the Boardman River.

MDOT and TC-TALUS have projected future travel demand for the TC-TALUS area for the year 2015. This was accomplished through the use of MDOT's travel demand model which incorporates projections for households, employment, and vehicle registration based on population forecasts developed by TC-TALUS. Table 2.1-3 lists the existing (1997) and projected (2015) AADT and levels of service on the east-west Boardman River crossings in MDOT's model. The 2015 volumes represent "No-Build" conditions, which include only existing plus committed transportation improvements and other low-cost, low-impact improvements to improve the efficiency of the roadway network in the project area. The modeling assumptions for this alternative include no major improvements to any of the Boardman River crossings and the closure of the Cass Road Bridge.

The information provided in Table 2.1-3 indicates that levels of service on the Boardman River crossings will degrade to LOS E or F by the year 2015 under No-Build conditions. Traffic on these crossings is projected to increase by 27 to 138 percent from existing levels by the year 2015. The two crossings adjacent to the Cass Road Bridge — South Airport Road and Beitner Road — are projected to have the greatest percent increase, 58 percent and 138 percent, respectively. At these levels of service, east-west mobility in the project area will be unacceptable.

Table 2.1-3
Existing and Projected Traffic Volumes and Levels of Service

River Crossing	EXISTING		YEAR 2015	
	1997 AADT	Peak Hour Level of Service	Projected 2015 AADT	Peak Hour Level of Service
Grandview Parkway/U.S. 31	30,000	D	38,000	E
Eighth Street	17,000	C	25,500	E
South Airport Road	29,500	D	46,500	F
Cass Road Bridge	3,500	D	Closed	---
Beltner Road	4,000	B	9,500	E

Source: MDOT and TC-TALUS Travel Demand Modeling Results (1998).

Note: Peak hour traffic is assumed to be 10 percent of the AADT with a 55/45 directional split.

After circulation of the Draft EIS, an issue raised regarding the travel demand forecasting conducted for this project was the use of old trip generation rates. TC-TALUS, although not a metropolitan planning organization (MPO), is like many of the smaller MPOs in the country, in that they use trip generation rates from the National Cooperative Highway Research Program (NCHRP) Report 187, entitled Quick-Response Urban Travel Estimation Techniques and Transferable Parameters. The trip generation process used in the travel demand forecasting conducted for this project is very similar to the program currently used by MDOT. While these rates can be classified as "old", that does not mean that the travel demand forecast results are unreliable or inaccurate. MDOT still utilizes the NCHRP data in many of its urban travel demand models because the equations still adequately represent urban area travel. Regardless of the trip generation process used, after trips are assigned to the network, the model is calibrated to ensure that results from the model (i.e., assigned volumes on network roadways) closely replicated known traffic volumes on these roadways. The TC-TALUS model was calibrated for the base year to match existing traffic counts.

After the TC-TALUS model was calibrated, the trip generation process was modified slightly to calculate person trips, rather than auto trips, and trips per dwelling unit based on average autos available, rather than simply using a consistent trip rate per dwelling unit across the entire area. Trip rates per auto available in a household have remained more stable over time than other variables, such as persons per household, and therefore offer a good means to predict travel. The results of this modification did not significantly change the overall trips generated in the study area

To forecast travel for future years also requires the use of trip generation rates. Typically, the base year rates are used to develop the future year forecasts. This is standard practice both nationally and within the State of Michigan, and this is the process that was used as part of the travel demand forecasting done for the TC-TALUS study area.

Instead of using the NCHRP Report 187 trip generation rates, it has been suggested that the Trip Generation Manual published by the Institute of Transportation Engineers be used. This manual details the number of trips produced by different land uses (e.g., golf courses, hotels, mobile home parks, etc.) based on the size of the facility or by the number of employees. While this manual has proved invaluable for site-specific calculations, it does not contain the data necessary for area wide travel demand forecasting. A travel demand model requires information on the number of dwelling units and employment by small geographic areas in order to generate trips for the entire area.

2.2 PROJECT GOALS

The purpose of this project is to replace the transportation service that was provided by the Cass Road Bridge and to address the east-west surface transportation flow constriction problem in the project area. Alternatives were evaluated to determine how well they meet the purpose and need defined for this project. To assist in this evaluation, a set of goals was developed by the project team, including the Citizen's Advisory Committee appointed for the project. These goals are outlined below.

1. Improve east-west circulation within the project area. For an alternative to meet the purpose and need for this project, it must improve levels of service on the Boardman River crossings adjacent to the Cass Road Bridge, while improving or maintaining levels of service on the other crossings, as compared to 2015 No-Build conditions.

2. Enhance vehicular, non-motorized user, and pedestrian safety.

3. Improve or maintain the existing quality of life in the Traverse City area by conforming with recommendations provided by the *Grand Traverse Bay Region Development Guidebook*, especially in regards to:

    - Natural resource protection;
    - Open space protection;
    - Land division;
    - Access;
    - Circulation;
    - Landscape design elements; and
    - Cultural resource protection.

4. Accommodate recreational linkages within the Boardman River valley.

5. Conform to funding limits through economically efficient and financially prudent design.

These goals provide the basis for the development and evaluation of alternatives to address the project purpose and need. Section 3 describes the alternatives developed for this project.

Section 3

ALTERNATIVES

Section 3
ALTERNATIVES

For this project, numerous alternatives were developed in an attempt to address the purpose and need as defined in Section 2. This section summarizes information provided in the Alternatives Section of the Draft Environmental Impact Statement (Draft EIS or DEIS) and describes the selection of the Recommended Alternative and the evaluation of new alternatives suggested for evaluation after circulation of the Draft EIS. This section is divided into four subsections: 3.1) Alternatives Selected for Evaluation in the Draft EIS; 3.2) Selection of the Recommended Alternative; 3.3) Alternatives Considered and Dismissed in the Draft EIS; and 3.4) Alternatives Evaluated after Draft EIS Circulation.

3.1 ALTERNATIVES SELECTED FOR EVALUATION IN THE DRAFT EIS

3.1.1 No-Build Alternative

The No-Build Alternative consists of maintaining the existing one-lane Cass Road Bridge until it is no longer safe to accommodate through traffic. No improvements addressing the bridge's structural and geometric deficiencies identified in Section 2 would be made. When typical maintenance is no longer sufficient to provide a safe surface for vehicular traffic, the structure will be closed. Realistically, the bridge will have to be closed by the year 2010. Additionally, no significant changes to the existing structure or the surrounding street pattern are included with this alternative.

As a result, the Cass Road Bridge will be closed to through public vehicular traffic. The roadway and bridge would serve jointly as a service drive for the Grand Traverse County Parks and Recreation Department and the City of Traverse City Light and Power Company. Grand Traverse County will be responsible for maintenance of the existing bridge and abandoned road right-of-way after the bridge is closed. Pedestrians visiting the Grand Traverse Nature Education Reserve will also use the bridge to access park amenities such as trails and parking areas.

As part of this alternative, typical low-cost, low-impact improvements would be made to improve the efficiency of the existing roadway network in the project area. These Transportation System Management (TSM) improvements would primarily consist of intersection improvements, traffic signal improvements and interconnection, access control, turn restrictions, and turn lanes.

3.1.2 Transportation System Management Alternative

The TSM Alternative includes improvements that maximize the efficiency of the present transportation system. These improvements can range from relatively minor expenditures with little or no construction to those involving major expenditures and construction. Improvements that would be included as part of this alternative to specifically address the purpose and need of the project include intersection improvements at the South Airport Road intersections with Barlow Road, Garfield Road, and Three Mile Road; at the Three Mile Road/U.S. Route 31/M-72 intersection; and at the Hammond Road/LaFranier Road intersection. Access control measures along South Airport Road between

Barlow Road and Three Mile Road would also be employed, including the use of right-in/right-out access, consolidation of access, provision of left-turn lanes, and the use of left-turn restrictions. As development occurs, these access control measures would also be used along Hammond Road and Three Mile Road. (See Figure 3.1-1.)

3.1.3 Hartman-Hammond Road Connector with Three Mile Road Alternative

The Hartman-Hammond Road Connector with Three Mile Road Alternative is one of the two build alternatives selected for evaluation in the Draft EIS. It consists of a new Boardman River crossing, a new roadway connecting Hartman Road to U.S. Route 31/M-37, and widening of segments of Hartman Road, Hammond Road, and Three Mile Road. As part of this alternative, the Cass Road Bridge would also be closed to through public vehicular traffic as described for the No-Build Alternative in Section 3.1.1.

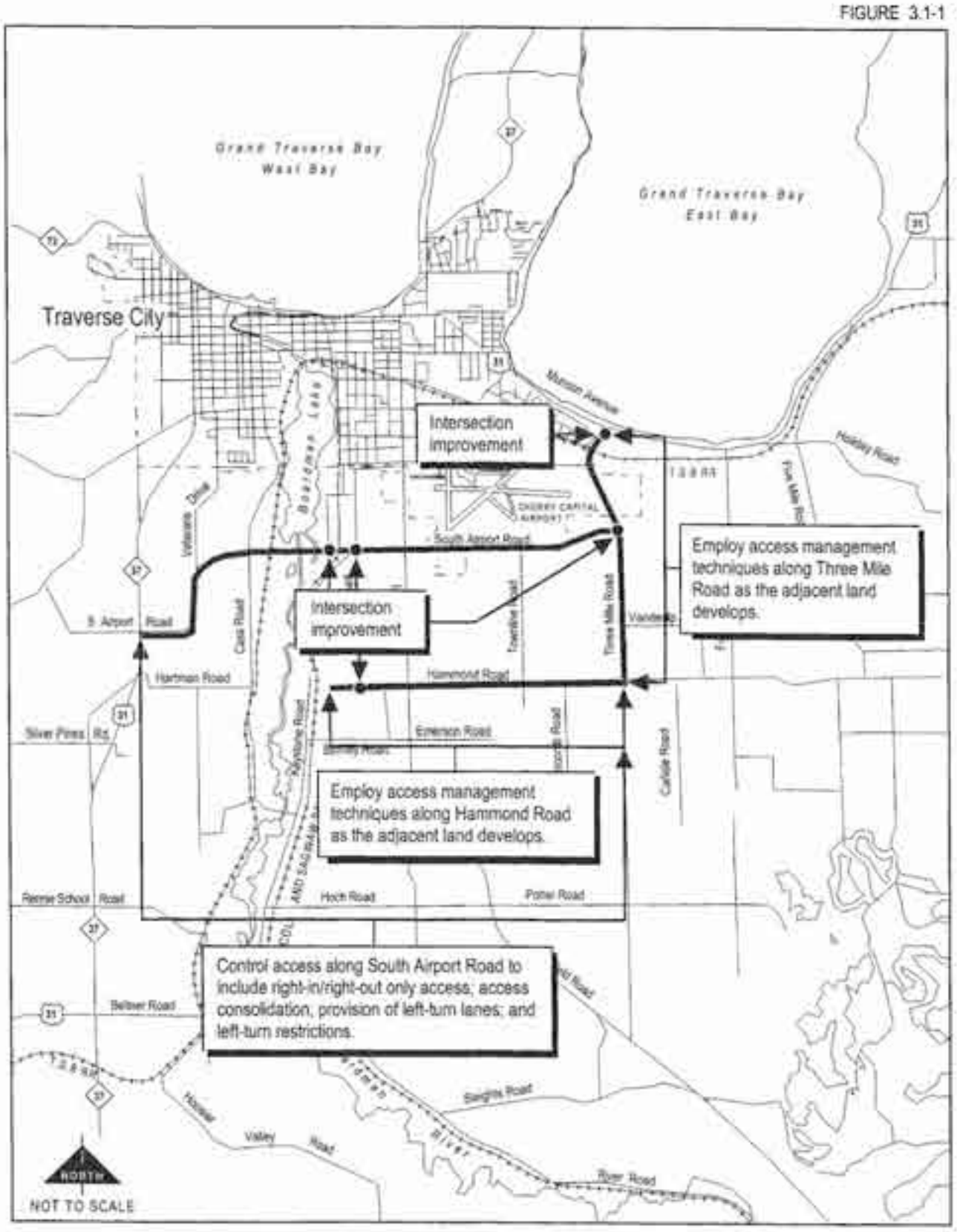
This alternative will provide an improved connection between U.S. Route 31/M-37 on the west and U.S. Route 31/M-72 on the east. As part of this alternative, Hartman and Hammond Roads would be connected via a new bridge across the Boardman River. West of Dracka Road, a new roadway would be constructed that would extend south of Hartman Road and connect with U.S. Route 31/M-37. West of LaFranier Road, this facility would consist of two through lanes in each direction. Between U.S. Route 31/M-37 and Cass Road, a four-lane boulevard and a five-lane cross section were evaluated. The existing four-lane cross section along Hammond Road, east of LaFranier Road, would be retained. Also as part of this alternative, Three Mile Road would be widened to four/five lanes between South Airport Road and U.S. Route 31/M-72, and Four Mile Road would be reconstructed, maintaining the existing two-lane cross section, between Hammond Road and U.S. Route 31/M-72. (See Figure 3.1-2.) This alternative also includes the typical, low-cost TSM improvements included with the No-Build Alternative. The Four Mile Road improvement would occur prior to the widening of Three Mile Road so that it could be used as a detour route while Three Mile Road is being improved.

The portion of this alternative between U.S. Route 31/M-37 and LaFranier Road was selected as the preferred alternative in the *Cass Road Bridge Replacement on the Hartman/Hammond Road Alignment Environmental Assessment* (Grand Traverse County Road Commission, 1997). Widening Four Mile or Five Mile Roads instead of Three Mile Road was also considered for this project. However, after evaluation Three Mile Road was determined to be the best option. (See Section 3.4.2 of the Draft EIS.)

3.1.4 South Airport Road Widening with Three Mile Road Alternative

The South Airport Road Widening with Three Mile Road Alternative is the second of the two build alternatives selected for evaluation in the Draft EIS. It consists of widening South Airport Road to six lanes between U.S. Route 31/M-37 and Garfield Road and to four lanes between Garfield Road and Three Mile Road. The Cass Road Bridge would be closed to through public vehicular traffic as described for the No-Build Alternative. The South Airport Road Alternative will provide an improved connection between U.S. Route 31/M-37 on the west and U.S. Route 31/M-72 on the east. The widening of Three Mile Road between South Airport Road and U.S. Route 31 and the reconstruction of Four Mile Road described as part of the Hartman-Hammond Connector Alternative would also be included with this alternative. (See Figure 3.1-3.) This alternative also includes the typical, low-cost TSM improvements included with the No-Build Alternative.

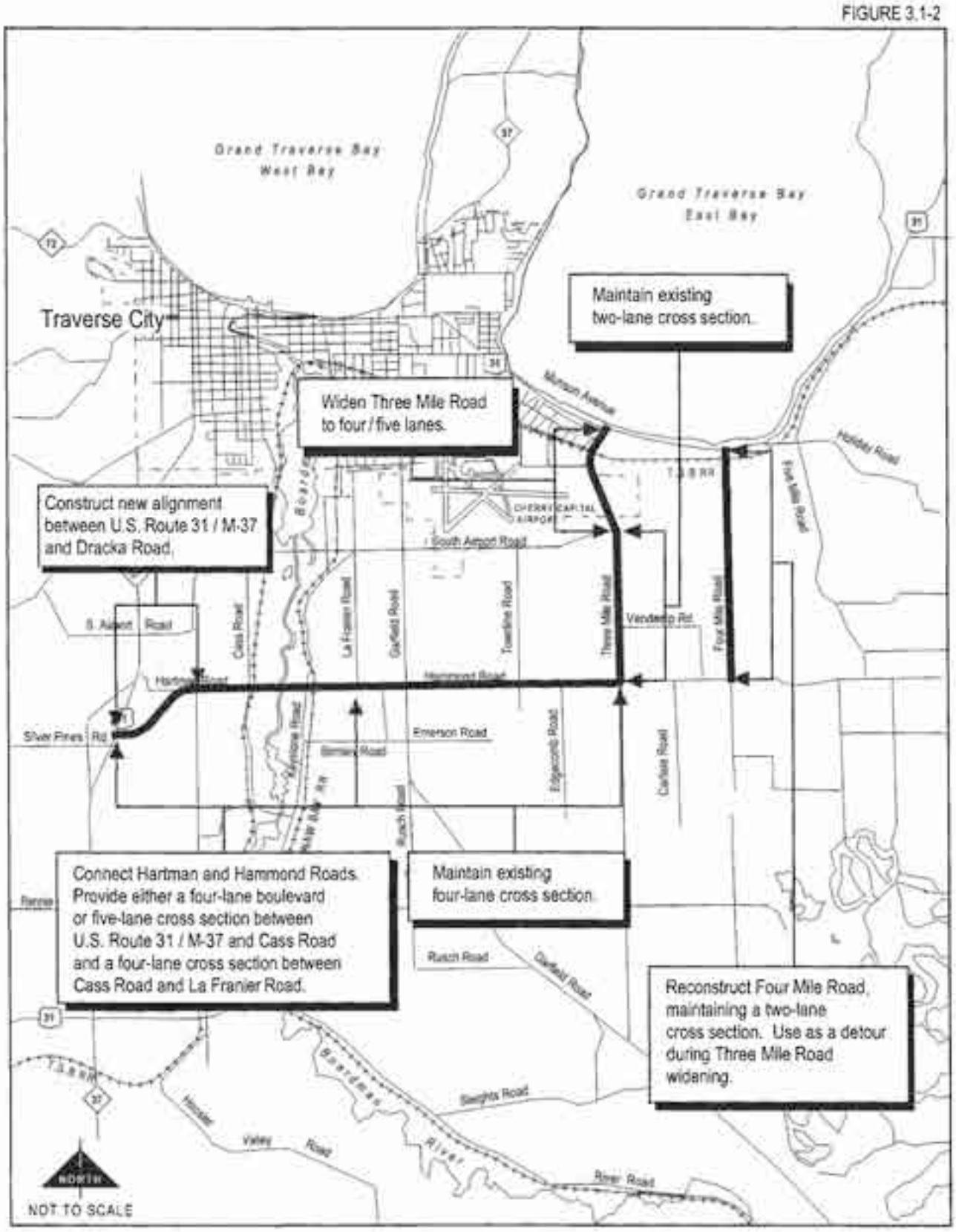
FIGURE 3.1-1



BOARDMAN RIVER CROSSING MOBILITY STUDY

TSM ALTERNATIVE

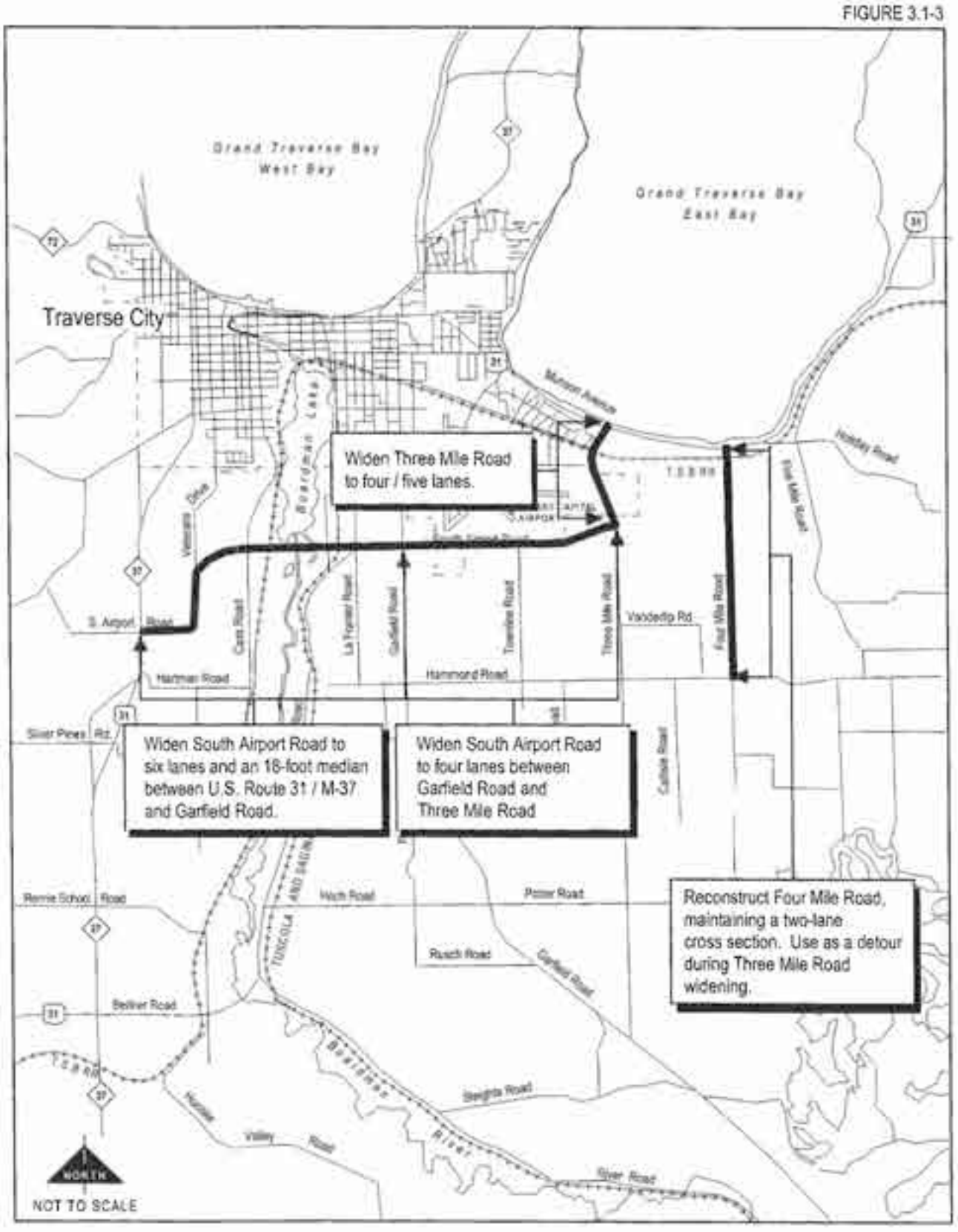
FIGURE 3.1-2



BOARDMAN RIVER CROSSING MOBILITY STUDY

HARTMAN-HAMMOND ROAD CONNECTOR
WITH THREE MILE ROAD ALTERNATIVE

FIGURE 3.1-3



BOARDMAN RIVER CROSSING MOBILITY STUDY

SOUTH AIRPORT ROAD WIDENING
WITH THREE MILE ROAD ALTERNATIVE

3.2 SELECTION OF THE RECOMMENDED ALTERNATIVE

3.2.1 Selection Rationale

Following circulation of the Draft EIS, public and agency comments have been received and addressed, suggested new or additional evaluation of alternatives has been conducted, and concurrence from the resource agencies on the alternatives carried forward has been received. Therefore, a Recommended Alternative (the Hartman-Hammond Road Connector with Three Mile Road Alternative), subject to resource agency concurrence, has been selected. This section describes the evaluation of the alternatives evaluated in the Draft EIS leading to the selection of the Recommended Alternative.

To assist in evaluating the transportation impacts of the project alternatives, Year 2015 travel demand forecasts developed by the Michigan Department of Transportation (MDOT) and the Traverse City Area Transportation and Land Use Study (TC-TALUS) were used to determine projected levels of service on the Boardman River crossings. The projected annual average daily traffic (AADT) and levels of service (LOS) for the Boardman River crossings are listed in Table 3.2-1 for each of the alternatives selected for evaluation in the Draft EIS.

Table 3.2-1
Existing and Projected Traffic Volumes and Levels of Service for Alternatives Selected for Evaluation in the Draft EIS
Annual Average Daily Traffic (Peak Hour Level of Service)

	ALTERNATIVE				
	1997	2015			
River Crossing	Existing	No-Build	TSM	Hartman-Hammond	South Airport Road
Grandview Pkwy/U.S. 31	30,000 (D)	38,000 (E)	38,500 (E)	37,500 (E)	39,000 (E)
Eighth Street	17,000 (C)	25,500 (E)	25,000 (E)	24,500 (E)	25,000 (E)
South Airport Road	29,500 (D)	46,500 (F)	43,000 (F)	26,500 (C)	47,500 (D)
Hartman-Hammond	---	---	---	27,000 (D)	---
Cass Road Bridge	3,500 (D)	Closed (---)	Closed (---)	Closed (---)	Closed (---)
Beitner Road	4,000 (B)	9,500 (E)	10,000 (E)	6,500 (C)	9,200 (E)

Source: MDOT and TC-TALUS Travel Demand Modeling Results (1998).

Note: Peak hour traffic is assumed to be 10 percent of the AADT with a 55/45 directional split.

As evaluated in the Draft EIS, neither the No-Build nor TSM alternatives meet the purpose and need for the project (i.e., they do not replace the transportation service provided by the Cass Road Bridge and they do not improve east-west mobility). Under the No-Build Alternative, projected levels of service on the east-west Boardman River crossings are either E or F. The TSM Alternative is not projected to improve the levels of service on these crossings when compared to the No-Build

Alternative. Therefore, it was concluded that these alternatives will not meet the purpose and need of this project in terms of improving east-west mobility. They were, however, selected for evaluation in the Draft EIS. The No-Build Alternative is always selected for evaluation in Draft EISs; it provides an option if other alternatives are determined to be infeasible or unacceptable and provides the baseline used to compare the other alternatives. The TSM Alternative was selected for evaluation because it would improve mobility to some extent and was considered a low-cost/interim solution to the mobility problems identified in the project area. The Grand Traverse County Road Commission will provide these types of improvements, as appropriate, as part of their overall operation of the county road system. Nonetheless, since feasible build alternatives have been identified that meet the project purpose and need, it has been concluded that neither the No-Build Alternative nor the TSM Alternative should be selected as the Recommended Alternative.

The remaining discussion regarding the selection of a Recommended Alternative focuses on the two build alternatives selected for evaluation in the Draft EIS — the Hartman-Hammond Road Connector with Three Mile Road and the South Airport Road Widening with Three Mile Road. The information is presented to summarize how each of these alternatives addresses the project goals outlined in Section 2.2.

Improve east-west circulation within the project area. Of the two build alternatives selected for evaluation, the Hartman-Hammond Connector Alternative is projected to have the greatest positive impact on east-west mobility. (See Table 3.2-1.) Compared to the No-Build Alternative, projected Year 2015 levels of service on South Airport Road and Beitner Road improve (from F to C on South Airport Road and from E to C on Beitner Road). The new river crossing is projected to operate at level-of-service D with this alternative. There are level-of-service benefits with the South Airport Road Alternative; however, they were not determined to be as great. The projected level-of-service on South Airport Road improves from F to D (compared to the No-Build) for this alternative; no other level-of-service improvements are projected for the river crossings analyzed.

Enhance vehicular, non-motorized, and pedestrian safety. Both build alternatives should result in improved vehicular safety since levels of service will be improved. Additionally, the Grand Traverse County Road Commission has committed to seek funding to construct pedestrian and bicycle paths along the build routes and along the Boardman River. Provision of such facilities should also result in enhanced safety.

Improve or maintain the existing quality of life in the Traverse City area. In general, the impacts to the natural environment associated with the Hartman-Hammond Connector Alternative are greater than those associated with the South Airport Road Alternative. (See Table 3.2-2.) However, the substantially greater number of residential and commercial displacements that would occur under the South Airport Road Alternative offsets this. Additionally, the Grand Traverse County Road Commission has indicated that if the Hartman-Hammond Connector Alternative is selected they will:

- donate excess right-of-way in the Boardman River Valley to the Grand Traverse Nature Education Reserve;
- assist in establishing an education program regarding wetland mitigation methods;
- encourage a corridor plan establishing visual and aesthetic standards along the route; and
- purchase access rights to reduce the potential for future driveways.

Quantitative Impacts To	South Airport Road Widening		Hartman-Hammond Connector				Three Mile Road Widening*	
			Five-Lane		Four-Lane Boulevard			
Aquatic Resources	0.0	(0.0)	160.3	(526.0)	171.3	(562.0)	153.6	(504.0)
Linear meters (feet) of stream enclosed or relocated								
Wetland Resources [1]	0.1	(0.2)	1.9	(4.8)	2.0	(4.9)	0.0	(0.01)[3]
Hectares (acres) of wetlands displaced								
Terrestrial Resources [2]	4.5	(11.2)	4.7	(11.7)	5.1	(12.6)	0.0	(0.0)
Hectares (acres) of woodlands displaced								
Agricultural Resources	0.0	(0.0)	2.3	(5.7)	2.9	(7.2)	0.0	(0.0)
Hectares (acres) of farmland displaced								
Additional Impervious Surface Added to Watershed	9.0	(22.3)	5.8	(14.4)	5.6	(13.8)	1.3	(3.1)
in Hectares (acres)								
Number of Residential Structures Displaced	31		16		17		3	
Number of Commercial Structures Displaced	25 [4]		1		1		1	
Number of Institutional Structures Displaced	1		0		0		0	
Number of Category B Noise Receptors Impacted	11		11		11		8 or 11	
Number of Sites of Environmental Interest	1		1		1		1	
Number of Historic Structures Impacted	0		0		0		4	

* The Three Mile Road Widening is part of the South Airport Road Widening and the Hartman-Hammond Connector Alternatives. Projected traffic along Three Mile Road is greater under the South Airport Road Widening. As a result, three additional noise impacts were identified.

Key:
1. Includes forested, emergent, scrub-shrub and riverine wetland categories.
2. Includes mixed hardwood and pine plantation.
3. Equals 250 square feet.
4. Includes 37 businesses.

Summary of Quantitative Impacts ***Table 3.2-2***

Boardman River Crossing Mobility Study

All of these measures will help lessen the impacts to the natural environment caused by the Hartman-Hammond Connector Alternative.

Accommodate recreational linkages within the Boardman River valley. With both alternatives, recreational linkages can be accommodated. The preliminary bridge design for the Hartman-Hammond Connector Alternative allows for wildlife passage and the planned Boardman Valley Trail.

Conform to funding limits through economically efficient and financially prudent design. Preliminary cost estimates developed for this project indicate that the Hartman-Hammond Connector Alternative will cost approximately $13 million less than the South Airport Road Alternative. Overall costs are estimated at $25.9 million for the Hartman-Hammond Connector Alternative and $38.9 million for the South Airport Road Alternative. These estimates include the widening of Three Mile Road. (Cost estimates have been escalated since issuance of the Draft EIS to reflect year 2000 dollars.)

Compared to the Hartman-Hammond Connector Alternative, the South Airport Road Alternative would displace 14 additional residential structures and 24 additional commercial structures. As a result, the South Airport Road Alternative is projected to cost an additional $13 million (or 50 percent more). The Hartman-Hammond Connector Alternative is projected to improve future levels of service on both South Airport Road (from F to C) and Beitner Road (from E to C), while the South Airport Road Alternative is projected to improve levels of service only on South Airport Road (from F to D). This clearly indicates that the Hartman-Hammond Alternative will be more effective at meeting the purpose of the project – to replace the transportation service provided by the existing Cass Road Bridge and to improve east-west mobility across the Boardman River. Therefore, it has been concluded that the Hartman-Hammond Road Connector with Three Mile Road Alternative should be selected as the Recommended Alternative. In summary, the primary reasons leading to this conclusion are:

- It replaces the transportation service provided by the Cass Road Bridge and is the alternative projected to provide the greatest improvement to east-west mobility.
- It will cost $13 million less than the South Airport Road Alternative.
- It conforms to development patterns planned for by the affected communities.

As part of this recommendation, the four-lane boulevard cross section between U.S. Route 31/M-37 and Cass Road should be included instead of the five-lane cross section. More detailed engineering information regarding the build alternatives is provided in Section 5; preliminary plans are provided in Appendix A.

3.2.2 Issues Raised Regarding the Evaluation of Alternatives

After circulation of the Draft EIS, some of the major issues raised regarding the evaluation of alternatives included:

- development of different land use scenarios;
- consistency with purpose and need; and
- transportation impacts of the Hartman-Hammond Connector Alternative.

The information provided below addresses these issues.

Different Land Use Scenarios. As part of the travel demand forecasting process, one set of year 2015 socio-economic forecasts was developed for all of the alternatives considered based on projected land use. It has been suggested that different land use scenarios should be generated for the No-Build and build alternatives to reflect the projected differences in the way land will develop with and without implementation of a build alternative. The different land use scenarios would then be used to develop different socio-economic forecasts for each alternative. The rationale for this approach is that implementation of a build alternative will lead to future development occurring in areas adjacent to the new transportation improvement or facility that might otherwise occur elsewhere or not at all. As a result, travel demand patterns would be different. Consequently, traffic congestion under the No-Build Alternative might be overstated if this approach were not used.

To evaluate this issue relative to this project and the Hartman-Hammond Connector Alternative, numerous interviews and coordination with local township planners were conducted. These local planning professionals conclude that development patterns in the area would be virtually the same whether or not the Hartman-Hammond Connector is constructed, particularly considering the limited amount of land still available and suitable for development in the project area.

This project is much smaller in size and scope than other projects in the country where the development of different land use scenarios for No-Build and build alternatives is now considered warranted. The Hartman-Hammond Connector Alternative is not a bypass or a beltline project where numerous miles of new highway and interchanges are proposed over new alignment. To illustrate this, consider the following "build" elements of the Hartman-Hammond Road Connector with Three Mile Road Alternative:

- Widening (addition of one through lane in each direction) of 3.1 kilometers (1.9 miles) of existing roadways along Hartman Road, Hammond Road, and Three Mile Road;

- 2.3 kilometers (1.4 miles) of new alignment consisting of the realignment of Hartman Road at the west end of the project and the connection of Hartman and Hammond roads, including the proposed bridge across the Boardman River;

- The proposed bridge included as part of the Hartman-Hammond Connector is located approximately 2.1 kilometers (1.3 miles) north of the existing Cass Road Bridge, closer to Traverse City, and is proposed as a replacement to the structurally deficient Cass Road Bridge; and

- The proposed bridge is consistent with the existing transportation network and local long-range plans.

The Garfield Township Planning Department does not believe there is a relationship between the potential for urban sprawl and the Hartman-Hammond Connector, since it connects two existing east-west roadways that presently terminate approximately 0.8 kilometers (0.5 miles) apart. To try to accurately predict the, at most, minor differences in development that would occur with and without implementation of the Hartman-Hammond Connector Alternative would not likely produce reliable results and would not noticeably change traffic forecasts if carried through the travel demand forecasting procedures. This issue is discussed further in Section 5.10, Secondary and Cumulative Impacts.

The use of the Disaggregated Residential Allocation Model/Employment Allocation Model (DRAM/EMPAL), as suggested, was also considered for this project. DRAM/EMPAL is a model used to forecast changes in employment and housing based on changes in accessibility. The output from DRAM/EMPAL is used as input into travel demand forecasting models, such as the one used by TC-TALUS for this project. Due to the significant amount of data required, this model is mainly used in large metropolitan areas. For example, the Southeast Michigan Council of Governments (SEMCOG) uses this model in the Detroit area. SEMCOG covers a region with a population of approximately 4.5 million people (1990). As stated in Section 2, the 1990 population in the TC-TALUS study area was 62,000. Since only minor differences in development are anticipated with and without implementation of the Hartman-Hammond Connector Alternative, the use of DRAM/EMPAL is not appropriate for the TC-TALUS study area.

Consistency with Purpose and Need. A wide variety of alternatives were considered in the Draft EIS and evaluation of these alternatives revealed that, with the exception of the Cross-Town Connector Alternative (See Section 3.3.2 in this document.), all of the alternatives considered have limited potential to divert traffic from Grandview Parkway/U.S. Route 31 and Eighth Street. Under No-Build conditions, the projected 2015 AADT on the Boardman River crossings analyzed is 120,000 vehicles. It is unrealistic to expect this local road project to resolve all of the constriction problems associated with the east-west surface transportation system in the Traverse City area.

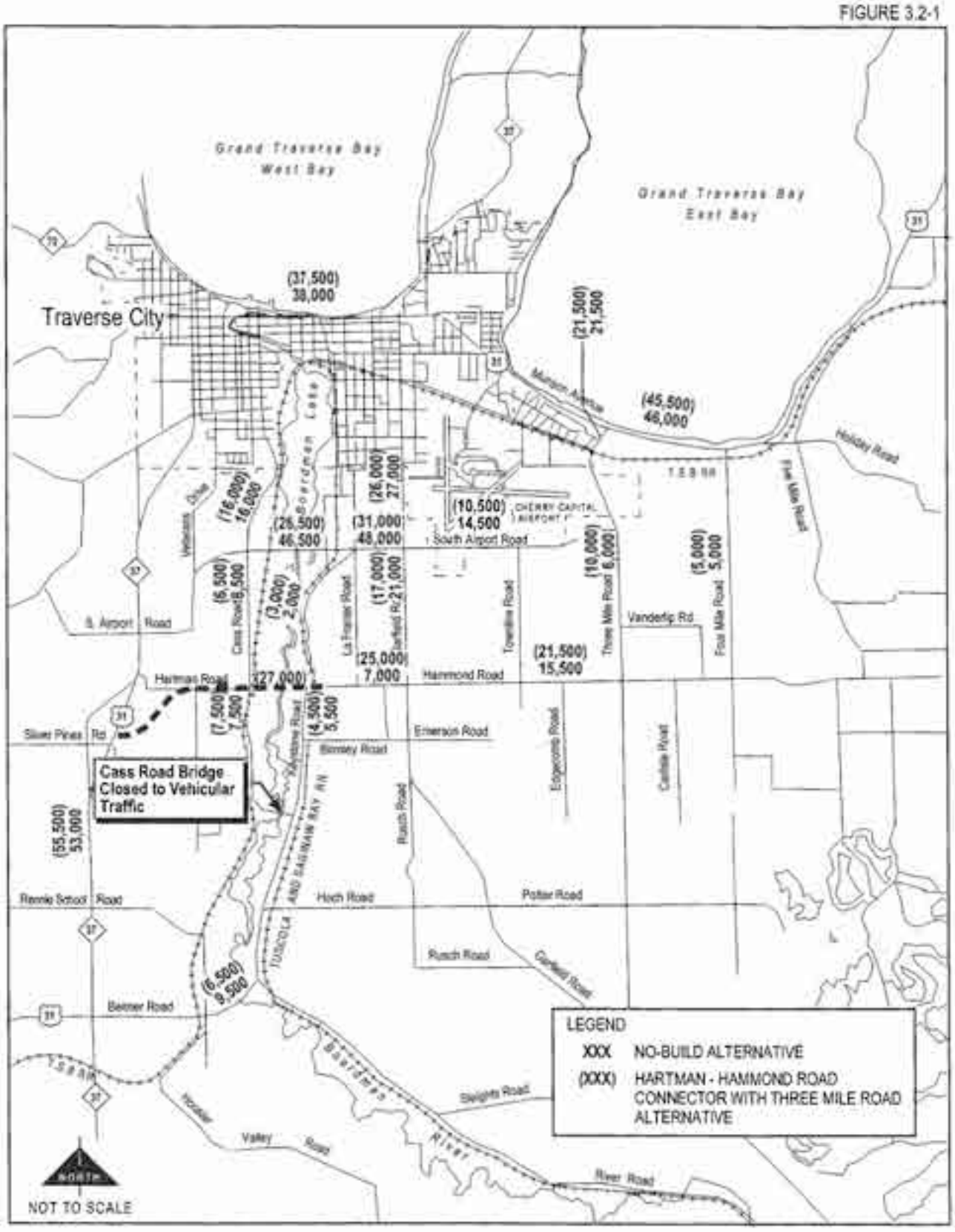
The crossing projected to carry the greatest volume of traffic is South Airport Road. It was concluded that improving the level of service on this crossing to an acceptable level, LOS D or better, improves east-west transportation flow. Results of the travel demand forecasting for this project show that with the closure of the Cass Road Bridge, most of the traffic will divert to South Airport Road, further exacerbating the congestion problems projected for this roadway. (See Table 3.3-1 in the following section and compare the Two-Lane Cass Road Bridge Alternative and the No-Build Alternative.)

Transportation Impacts of the Hartman-Hammond Connector Alternative. Traffic projections developed for this project indicate that this alternative, compared to the No-Build Alternative, will primarily divert traffic from South Airport Road and Beitner Road and not have a major impact elsewhere. Projected traffic volumes on Three Mile Road are up to 4,000 vehicles per day higher under this alternative compared to the No-Build Alternative. However, projected levels of service are also improved north of South Airport Road because the facility would be widened from two to four lanes. Figure 3.2-1 shows projected year 2015 AADTs on selected roadways in the project area for the No-Build and Hartman-Hammond Connector alternatives.

3.3 ALTERNATIVES CONSIDERED AND DISMISSED IN THE DRAFT EIS

Two Travel Demand Management (TDM) and five build alternatives were considered and dismissed in the Draft EIS. Information provided in the Alternatives Section of the Draft EIS is summarized in this section. The primary reason most of these alternatives were dismissed from consideration was that they are not projected to improve east-west mobility in the project area to the extent they would meet the purpose and need of the project. The evaluation of these alternatives focused on 2015 travel demand forecasts, developed by MDOT and TC-TALUS, for the east-west Boardman River crossings analyzed. The projected annual average daily traffic and levels of service for the Boardman River crossings for each of these alternatives are listed in Table 3.3-1. Existing (1997) data is also provided in this table.

FIGURE 3.2-1



BOARDMAN RIVER CROSSING MOBILITY STUDY

2015 PROJECTED ANNUAL AVERAGE DAILY TRAFFIC

Table 3.3-1
Existing and Projected Traffic Volumes and Levels of Service for Alternatives Considered and Dismissed in the Draft EIS
Annual Average Daily Traffic (Peak Hour Level of Service)

River Crossing	1997 Existing	2015 No-Build	2015 TDM Alternatives Village Center	2015 TDM Alternatives Growth Boundary	2015 Build Alternatives Two-Lane Cass Road	2015 Build Alternatives Four-Lane Cass Road
Grandview Parkway/U.S. Route 31	30,000 (D)	38,000 (E)	37,000 (E)	42,000 (F)	38,000 (E)	38,000 (E)
Eighth Street	17,000 (C)	25,500 (E)	24,000 (D)	27,000 (E)	25,500 (E)	25,000 (E)
South Airport Road	29,500 (D)	46,500 (F)	43,000 (F)	52,000 (F)	43,000 (F)	43,000 (F)
Cass Road Bridge	3,500 (D)	—	—	—	7,000 (C)	7,000 (A)
Beitner Road	4,000 (B)	9,500 (E)	18,000 (F)	7,000 (C)	10,000 (E)	10,000 (E)

River Crossing	2015 Build Alternatives Beitner/Keystone	Smart Roads w/Cass Road Bridge	Smart Roads w/out Cass Road Bridge	Cross-Town (2-Lane)	Cross-Town (4-Lane)
Grandview Parkway/U.S. Route 31	38,000 (E)	37,000 (E)	37,000 (E)	32,500 (E)	27,500 (D)
Eighth Street	25,500 (E)	23,000 (D)	23,500 (D)	20,500 (D)	17,000 (C)
Cross-Town Connector	—	—	—	20,500 (F)	34,500 (E)
South Airport Road	42,500 (F)	39,000 (E)	44,000 (F)	36,000 (E)	33,500 (D)
Cass Road Bridge	10,500 (E)	10,500 (E)	—	—	—
Beitner Road	11,600 (B)	11,900 (B)	12,500 (B)	3,000 (A)	3,000 (A)

Source: MDOT and TC-TALUS Travel Demand Modeling Results (1998).

Note: Peak hour traffic is assumed to be 10 percent of the AADT with a 55/45 directional split.
Existing and No-Build Alternative data are provided for comparative purposes only. The No-Build Alternative was selected for evaluation in the Draft EIS.

Combinations of the TSM, TDM, and build alternatives were considered and dismissed in Section 3.3.3 of the Draft EIS. Additionally, different alignments for the Hartman-Hammond Connector and the use of Four or Five Mile Roads instead of Three Mile Road for the build alternatives selected for evaluation were considered and dismissed in Section 3.4. No changes to the information provided in the Draft EIS in these two sections were required. The Draft EIS should be reviewed for further information on the dismissal of these alternatives.

3.3.1 Travel Demand Management Alternatives

Village Centers. This option consists of a growth management strategy whereby the majority of future growth for the area would be concentrated in seven village centers. These village centers are envisioned as mixed-use neighborhoods, developed around a commercial core with good access to the major transportation facilities in the area. Clustering development in this manner would increase the potential for additional pedestrian and transit trips. As a result, the number of trips on the roadway network could be reduced.

Urban Growth Boundary. This option consists of establishing a growth boundary encompassing the City of Traverse City. To evaluate the urban growth boundary, 75 percent of the growth that was originally projected to occur outside of the growth boundary was redistributed within the boundary. Concentrating the projected growth inside the growth boundary would shorten trip lengths and increase the advantages of pedestrian and transit trips, resulting in an overall reduction in vehicular travel demand.

While each TDM option improves the level of service projected for one Boardman River crossing in the project area, mobility across the river would not be improved to an acceptable level. Since neither of the TDM options will improve east-west mobility across the Boardman River nor will they replace the transportation service provided by the Cass Road Bridge, it was determined that these alternatives will not meet the purpose and need of the project.

3.3.2 Build Alternatives

The build alternatives considered and dismissed included improvements to east-west capacity over the Boardman River through rehabilitation or replacement of the existing Cass Road Bridge; expansion of an existing Boardman River crossing other than the Cass Road Bridge; or provision of a new Boardman River crossing. For those alternatives that did not include replacement or rehabilitation of the Cass Road Bridge, it would be closed as described in the No-Build Alternative. The build alternatives also included the typical, low-cost TSM improvements included with the No-Build Alternative.

Through reconstruction or rehabilitation of the existing Cass Road Bridge, widening of another Boardman River crossing, or construction of a new crossing, all of the build alternatives would replace the transportation service provided by the Cass Road Bridge. Therefore, the build alternatives were evaluated to determine if they would improve east-west levels of service across the Boardman River.

Additionally, the build alternatives that included improvements to the existing Cass Road Bridge would impact the Grand Traverse Nature Education Reserve and associated parking, trails, and nature areas. The Reserve is classified as a Section 4(f) property under USDOT Title 49 USC 303. Early on in the study process, the Grand Traverse County Parks and Recreational Commission had indicated their preference to close the existing Cass Road Bridge to through-motorized traffic. In fact, they had

supported a new alignment that went through the Reserve over the replacement of the Cass Road Bridge at its current location. (See Appendix C.)

When screening alternatives, it was deemed appropriate to avoid this 4(f) impact to the Reserve if possible. Typically when evaluating Section 4(f) impacts of various alternatives, impacts that "cut" through the middle of a 4(f) property are considered more severe than impacts that "clip" or "shave" the edge of a property because the former are usually more disruptive to the resource and more difficult to mitigate. This rationale clearly applies to this project as the Cass Road Bridge is located within the Reserve. Section 4(f) impacts were identified for the build alternatives carried forward in the Draft EIS. However, they are considered minor compared to the 4(f) impact associated with replacement of the Cass Road Bridge because these alternatives result in minor modifications at the edges of the affected properties, and the impacts can be mitigated.

The Recommended Alternative, the Hartman-Hammond Connector, was determined to be both prudent and feasible. Therefore, it was concluded that alternatives consisting of the replacement of the Cass Road Bridge should be dismissed since a prudent and feasible alternative exists.

A summary of the build alternatives considered and dismissed in the Draft EIS is provided below. Four of the five alternatives considered included the rehabilitation or replacement of the existing Cass Road Bridge.

Two-Lane Cass Road Bridge. This alternative consists of replacement or rehabilitation of the Cass Road Bridge to a two-lane structure across the Boardman River at or in the vicinity of the location of the existing structure. No major improvements to the surrounding roadway network would occur. The improved Cass Road Bridge is projected to accommodate 7,000 vehicles per day and operate at LOS C. However, the levels of service on the other Boardman River crossings are projected to be the same — E or F — as the No-Build Alternative. Based on this information, this alternative will not meet the purpose and need of the project. Additionally, the Section 4(f) impacts to the Grand Traverse Nature Education Reserve associated with this alternative precluded selection of this alternative for evaluation.

Four-Lane Cass Road and Bridge. This alternative consists of the widening of Cass Road to four lanes from the southern city limits of Traverse City to the Cass Road connection with Keystone Road. This would include the replacement of or rehabilitation and expansion of the existing Cass Road Bridge to four lanes. Similar to the Two-Lane Cass Road Bridge Alternative, this alternative will not improve the levels of service on the Boardman River crossings, except for the Cass Road Bridge. Therefore, this alternative will not meet the purpose and need of the project. The four-lane Cass Road Bridge is projected to accommodate approximately 7,000 vehicles per day, similar to the Two-Lane Cass Road Bridge Alternative, but with the additional capacity, it will operate at LOS A. The other crossings are projected to operate at LOS E or F. Additionally, the Section 4(f) impacts to the Grand Traverse Nature Education Reserve associated with this alternative precluded selection of this alternative for evaluation.

Beitner Road/Keystone Road Improvements. This alternative consists of widening Beitner Road, including the bridge over the Boardman River, to four lanes with a narrow median between U.S. Route 31/M-37 and Keystone Road; widening Keystone Road to four lanes and a median between Beitner Road and Hammond Road; and replacing or rehabilitating the Cass Road Bridge to provide two through lanes across the Boardman River. The level of service on the Beitner Road crossing is projected to improve (from E to B) compared to the No-Build Alternative. However, the Cass Road

Bridge widened to two lanes is projected to operate at LOS E, and the levels of service on the U.S. Route 31, Eighth Street, and South Airport Road crossings are projected to be the same as with the No-Build Alternative. Based on this information, this alternative will not meet the purpose and need of the project. Additionally, the Section 4(f) impacts to the Grand Traverse Nature Education Reserve associated with this alternative precluded selection of this alternative for evaluation.

Smart Roads. This alternative combines elements of the TSM and TDM alternatives and the Beitner Road/Keystone Road Improvements Alternative. It consists of TSM improvements along South Airport Road; most of the improvements included in the Beitner Road/Keystone Road Improvements Alternative; the extension of Hammond Road to Keystone Road; TDM strategies; and the addition of four new bus routes to the Bay Area Transportation Authority (BATA) transit system. The Section 4(f) impacts to the Grand Traverse Nature Education Reserve associated with this alternative precluded selection of this alternative for evaluation.

The Smart Roads Alternative without the Cass Road Bridge does not meet the purpose and need of the project because the projected level-of-service on South Airport Road remains F (compared to the No-Build Alternative). The projected level-of-service on Beitner Road, however, does improve from E to B. There is also a slight improvement to the level-of-service projected on Eighth Street. However, this only represents a diversion of approximately 2,000 vehicles per day from this crossing. The widened Beitner Road crossing is projected to accommodate an additional 3,000 vehicles per day.

With the Cass Road Bridge improvement, the Smart Roads Alternative is projected to improve levels of service on Eighth Street (from E to D), South Airport Road (from F to E), and Beitner Road (from E to B) when compared to the No-Build Alternative. This alone meets the first goal identified in the purpose and need section of the Draft EIS, which is "... to improve levels of service on the Boardman River crossings adjacent to the Cass Road Bridge, while improving or maintaining levels of service on the other crossings, as compared to 2015 No-Build conditions." However, this alternative includes the rehabilitation of the Cass Road Bridge to a two-lane facility and the widening of the Beitner Road Bridge from two lanes to four lanes. Yet, the levels of service projected for South Airport Road and on the Cass Road Bridge are E, typically evaluated as unacceptable. The marginal improvement to level-of-service in the project area, while meeting one of the goals in the Draft EIS, is considered insufficient to fully meet the purpose and need of the project.

Cross-Town Connector. This alternative consists of a new Boardman River crossing and the connection of existing roadways to provide a new continuous roadway connecting U.S. Route 31/M-37 on the west to Three Mile Road on the east. On the west end, the alignment would begin at the 14th Street/U.S. Route 31/M-37 intersection in Traverse City. It would proceed east along the existing 14th Street alignment until reaching the Tuscola and Saginaw Bay (T&SB) Railroad. The T&SB Railroad in this area is situated along the west and north sides of Boardman Lake. In the vicinity of the lake, the proposed Cross-Town alignment would generally run parallel to the railroad between the end of 14th Street and Woodmere Avenue. East of Woodmere Avenue, the proposed alignment would continue to proceed parallel to the T&SB Railroad to Garfield Road. At Garfield Road, approximately 3.0 kilometers (1.9 miles) west of Three Mile Road, the proposed alignment would join the existing Parsons Road alignment and would proceed on it until Three Mile Road. Three Mile Road intersects with U.S. Route 31/M-72 approximately 0.4 kilometers (0.25 miles) to the north. This section of Three Mile Road would be widened to five lanes as part of this alternative. Both a two-lane and a four-lane facility were evaluated for the Cross-Town Connector.

As a two-lane facility, levels of service compared to the No-Build Alternative are projected to improve on the Eighth Street (from E to D), South Airport Road (from F to E), and Beitner Road (from E to A) crossings, while remaining the same (LOS E) on the U.S. Route 31 crossing. However, the new crossing is projected to operate at LOS F, accommodating 20,500 vehicles per day. Since the new crossing would not operate at an acceptable level of service, it was determined that this alternative will not meet the purpose and need of the project.

As a four-lane facility, additional improvement to the levels of service on the east-west Boardman River crossings is projected. Levels of service are projected to improve at U.S. Route 31 (from E to D), Eighth Street (from E to C), South Airport Road (from F to D), and Beitner Road (from E to A). This is the only build alternative projected to improve levels of service on all of the Boardman River crossings in the project area. The new crossing, however, is projected to operate at LOS E, accommodating 34,500 vehicles per day.

The City of Traverse City had indicated that they would only approve a two-lane, 40 kph (25 mph) roadway on this alignment. As a two-lane facility, this roadway is projected to accommodate up to 20,500 vehicles per day and operate at LOS F. Information regarding the effectiveness of this alternative as a two-lane facility was presented to Traverse City council members. After considering this information, they directed that no further consideration be given to this alternative.

3.4 ALTERNATIVES EVALUATED AFTER DRAFT EIS CIRCULATION

After their review of the Draft EIS, the U.S. Environmental Protection Agency (EPA) and the Michigan Department of Environmental Quality (MDEQ) suggested that additional evaluation of alternatives, primarily consisting of combining alternatives previously considered, be provided in the Final Environmental Impact Statement. Information regarding this additional evaluation is provided in this section

Other alternatives were identified in public comments received after circulation of the Draft EIS. These are addressed in Section 7.3, Public Coordination.

3.4.1 Travel Demand Management Alternatives

Additional information was developed on the effectiveness of TDM measures as stand alone alternatives and in combination with other build alternatives after circulation of the Draft EIS. Travel demand forecasting results for the TDM alternatives presented in the Draft EIS indicate that there are limited improvements to levels of service on the east-west Boardman River crossings. Under the Village Center Alternative, compared to the No-Build Alternative, AADT on the Eighth Street crossing would be 1,500 vehicles lower, resulting in an LOS improvement from E to D. However, on Beitner Road, AADT is projected to increase 8,500 vehicles per day resulting in a level-of-service degradation from E to F. For the Growth Boundary Alternative, an additional 4,000 vehicles per day (compared to the No-Build Alternative) are projected on the Grandview Parkway/U.S. Route 31 river crossing, resulting in the level-of-service degrading to an F. On Beitner Road, 2,500 fewer vehicles per day are projected, with the level-of-service improving from E to C.

Additional analysis of the TDM alternatives as stand alone measures indicates that the number of deficient lane miles of road in the TC-TALUS network would increase under both of these alternatives. Therefore, it can be concluded that combining these TDM alternatives with build alternatives will result

in a system where the number of deficient lane miles in the network is greater than if the build alternative was implemented alone. TC-TALUS has conducted additional analysis of the TDM alternatives by modeling them with the South Airport Road, Hartman-Hammond Connector, and Smart Roads alternatives. The results are provided in Table 3.4-1 and confirm that there is no benefit to combining the build alternatives with the TDM measures. In general when the build alternatives are combined with the TDM alternatives, the projected levels of service degrade on South Airport Road and improve on either Beitner Road (for the Hartman-Hammond Connector and South Airport Road alternatives) or the Cass Road Bridge (for the Smart Roads Alternative).

The TDM alternatives evaluated in the Draft EIS are quite progressive in nature. However, they have been tested to have limited, and in some ways, negative impacts on the overall transportation network. This, coupled with the fact that the likelihood of implementation is limited, led to the dismissal of these alternatives.

Additional information regarding this additional evaluation of TDM alternatives is included with the U.S. EPA coordination information provided in Appendix C.

3.4.2 Transit Improvements

Transit was originally addressed in the *Cass Road Bridge Replacement on the Hartman/Hammond Road Alignment Environmental Assessment* (Grand Traverse County Road Commission, 1997). At that time, it was concluded that transit improvements have only limited potential to reduce the number of vehicles operating on area roadways. After circulation of the Draft EIS, the issue was reinvestigated. TC-TALUS interviewed an official with the Bay Area Transit Authority to gather information regarding four fixed bus routes that BATA is planning to implement.

Currently, existing ridership on BATA is 320,000 rides per year. This equates to the elimination of approximately 770 vehicle trips per day, assuming vehicle occupancy of 1.6 persons per vehicle. BATA estimates that half of its current ridership will switch from the current demand response system to the fixed route service. They also estimate that overall ridership could increase by approximately 140,000 rides per year. This increase equates to less than 350 vehicle trips removed from area roadways per day, indicating the limited potential for transit improvements to improve traffic congestion in Grand Traverse County.

Based on this information, improvements to transit service are not a viable solution to the problems addressed by this project. As documented in the Draft EIS, the levels of service on the east-west Boardman River crossings are projected to be either E or F unless a new crossing is constructed or capacity improvements to existing crossings are made. Regardless of the magnitude of transit system enhancements alone, the number of east-west river crossings in the Traverse City area will remain fixed. An enhanced transit system does not have the potential to remove enough vehicles from area roadways to noticeably reduce congestion on these crossings.

Additional information regarding this additional evaluation of transit improvements is included with the U.S. EPA coordination information provided in Appendix C.

Table 3.4-1
Comparison of Combined TDM and Selected Build Alternatives
2015 Annual Average Daily Traffic (Peak Hour Level of Service)

River Crossing	Village Center	Growth Boundary	Hartman-Hammond	South Airport Road	Smart Roads
Grandview Parkway/U.S. Route 31	37,000 (E)	42,000 (F)	37,500 (E)	39,000 (E)	37,000 (E)
Eighth Street	24,000 (D)	27,000 (E)	24,500 (E)	25,000 (E)	23,000 (D)
South Airport Road	43,000 (F)	52,000 (F)	26,500 (C)	47,500 (D)	39,000 (E)
Hartman-Hammond Bridge	---	---	27,000 (D)	---	---
Cass Road Bridge	---	---	---	---	10,500 (E)
Beitner Road	18,000 (F)	7,000 (C)	6,500 (C)	9,200 (E)	11,900 (B)

River Crossing	Village Center w/ Hartman-Hammond	Village Center w/ South Airport Road	Village Center w/ Smart Roads	Growth Boundary w/ Hartman-Hammond	Growth Boundary w/ South Airport Road	Growth Boundary w/ Smart Roads
Grandview Parkway/U.S. Route 31	40,000 (E)	40,500 (E)	40,000 (E)	36,500 (E)	36,500 (E)	38,000 (E)
Eighth Street	25,500 (E)	26,500 (E)	25,000 (E)	27,000 (E)	27,000 (E)	24,000 (D)
South Airport Road	30,000 (D)	53,500 (F)	42,500 (F)	33,500 (D)	54,000 (F)	46,000 (F)
Hartman-Hammond Bridge	31,500 (E)	---	---	30,500 (D)	---	---
Cass Road Bridge	---	---	9,000 (D)	---	---	7,000 (C)
Beitner Road	2,000 (A)	6,000 (C)	10,500 (B)	2,000 (A)	8,000 (D)	9,500 (B)

Source: MDOT and TC-TALUS Travel Demand Modeling Results (1998, 1999).

Note: Peak hour traffic is assumed to be 10 percent of the AADT with a 55/45 directional split.

3.4.3 Combined Beitner Road/Keystone Road and South Airport Road Widening Alternative

The combination of widening Beitner and Keystone Roads (without reconstructing the Cass Road Bridge) with the South Airport Road Widening with Three Mile Road Alternative was not considered in the Draft EIS. Based on the traffic modeling conducted, the Beitner Road/Keystone Road Improvements Alternative, which includes reconstruction of the Cass Road Bridge, is projected to improve the 2015 level of service on Beitner Road (from E to B) when compared to the No-Build Alternative. The levels-of-service on South Airport Road and the Cass Road Bridge are projected to remain unacceptable — F and E, respectively. The South Airport Road Alternative is projected to improve the 2015 level of service from F to D, when compared to the No-Build Alternative, while no improvement is projected on Beitner Road. These results indicate that a combination of the two alternatives will result in an overall improvement in levels of service on the river crossings compared to the individual alternatives.

TC-TALUS modeled a combination of these two alternatives without reconstruction of the Cass Road Bridge. The results are provided in the Table 3.4-2. As shown in the table, the combined alternative is projected to improve levels of service on both Beitner and South Airport Roads, compared to the No-Build Alternative.

Table 3.4-2
Comparison of the Combined Beitner/Keystone and South Airport Road Alternative
2015 Annual Average Daily Traffic (Peak Hour Level of Service)

	Alternative			
River Crossing	No-Build	Beitner/ Keystone	South Airport Road	Combined
Grandview Pkwy/U.S. 31	38,000 (E)	38,000 (E)	39,000 (E)	38,000 (E)
Eighth Street	25,500 (E)	25,500 (E)	25,000 (E)	25,000 (E)
South Airport Road	46,500 (F)	42,500 (F)	47,500 (D)	47,500 (D)
Cass Road Bridge	Closed (---)	10,500 (E)	Closed (---)	Closed (---)
Beitner Road	9,500 (E)	11,600 (B)	9,200 (E)	9,500 (B)

Source: MDOT and TC-TALUS Travel Demand Modeling Results (1998, 1999)

Note: Peak hour traffic is assumed to be 10 percent of the AADT with a 55/45 directional split.
The combined alternative consists of the Beitner Road/Keystone Road Improvements Alternative (without the reconstruction of the Cass Road Bridge) and the South Airport Road Widening with Three Mile Road Alternative.

The problem with this combined alternative, however, is that the magnitude of road widening needed to improve the level of service on South Airport Road to D would have major impacts to businesses and residences that border the road. This was ultimately one of the main reasons the South Airport Road Alternative was not selected as the Recommended Alternative. (See Section 3.2.) In addition, public comment on the Draft EIS has demonstrated that there is little support for widening South Airport Road. The potential social, economic and environmental impacts of the Beitner/Keystone Road

widening have been considered and, at a minimum, would include an additional Section 4(f) impact (to the Grand Traverse Nature Education Reserve) as a result of widening Beitner Road. This alternative is also likely to have greater secondary and cumulative impacts because it will promote development farther away from the urbanized area of Traverse City than either of the build alternatives selected for evaluation in the Draft EIS. Consequently, the combined alternatives would potentially meet purpose and need but would not be prudent.

Section 4

AFFECTED ENVIRONMENT

Section 4
AFFECTED ENVIRONMENT

The Boardman River Crossing Mobility Study project area, shown in Figure 1.1-2, is bounded on the north by U.S. Route 31/M-72 (Munson Avenue); on the east by Five Mile Road; on the west by U.S. Route 31/M-37; and on the south by Beitner Road. The Boardman River valley, which is a major focal point of the project area, is one of the most prominent natural features and is considered to be a valuable component of the Garfield Township open space system. The Mitchell Creek watershed, east of Keystone Road, is also identified as an important component of the overall Grand Traverse Bay ecosystem (Grand Traverse County Drain Commissioner's Office, 1995). The project area contains a mix of developed areas, open fields, woodlots and residual pockets of forested wetlands.

In the Draft Environmental Impact Statement (Draft EIS or DEIS), four project corridors were identified for study based on the build alternatives that had been carried forward. This included the east-west Hartman-Hammond Road corridor and the north-south Three Mile Road and Four Mile Road corridors, as well as the South Airport Road corridor. Subsequently, the Hartman-Hammond Road Connector with Three Mile Road Alternative was selected as the Recommended Alternative. Therefore, the affected environment relative to the South Airport Road corridor is not discussed in this section.

The Hartman-Hammond Road corridor extends from U.S. Route 31/M-37 on the west to Four Mile Road on the east. The Three and Four Mile Road corridors begin at Hammond Road and extend north to U.S. Route 31/M-72 (Figure 1.1-2). The corridors are a minimum of approximately 805 meters (2,640 feet) wide. Existing conditions are typically described from west to east along Hartman and Hammond roads and south to north along Three and Four Mile roads. Where appropriate, existing conditions outside of the corridors are described. Typically, these have some stated value to the community or some functional connection to the transportation issues described in Section 2, Purpose and Need.

This section of the Final Environmental Impact Statement (Final EIS or FEIS) describes existing conditions for the Recommended Alternative corridor (Hartman-Hammond Road, Three Mile Road, and Four Mile Road) organized by the following categories: Physical Environment; Ecological Environment; Land Use; Socio-economics; Cultural Resources; Visual and Aesthetic Resources; Air Quality; Noise; and Contaminated Sites and Sites of Environmental Interest.

This document has been prepared as a condensed Final EIS. As such it summarizes information from the Draft EIS which has not changed and focuses on the changes that have occurred since the Draft EIS was circulated. Additionally, this section discusses only those conditions relative to the No-Build and Recommended alternatives.

The subsections in this document are identical to those used in the Draft EIS. The Draft EIS can be referenced for additional information on any of the topics discussed in this section. The sections where information has changed since circulation of the Draft EIS are Sections 4.3 (Land Use) and 4.4 (Socio-

Economics). The remaining sections summarize or clarify the information presented in the Draft EIS. The Section 4 figures referenced are provided at the end of the text in this section.

4.1 PHYSICAL ENVIRONMENT

4.1.1 Geologic Resources

Physiography and Geology. The physiography (Figure 4.1-1) and geology of Grand Traverse County are primarily the result of glacial and hydrologic forces. The last glacier occurred approximately 10,000 years ago and formed the basic surface features of the Recommended Alternative's project corridors, which includes the Manistee moraine to the south of Hammond Road and outwash till and lake plains to the north (United States Geological Survey [USGS], 1990).

Topography. The Hartman-Hammond Road corridor between U.S. Route 31/M-37 and Cass Road has an average elevation of 235 meters (770 feet) above mean sea level (amsl). Between Cass and Keystone roads the corridor crosses the Boardman River valley and ascends to another plateau. The valley itself has an average elevation of 183 meters (600 feet) amsl (United States Department of Agriculture [USDA], 1990). Proceeding east along Hammond Road, between Keystone and Four Mile roads, elevations range from approximately 213 to 189 meters (700 to 620 feet) amsl.

Along Three and Four Mile roads, elevations are generally near 189 meters (620 feet) amsl.

4.1.2 Groundwater Resources

Groundwater in the area's glacial deposits generally flows north, or locally to stream valleys of the Boardman River (USGS, 1990) or Mitchell Creek (Grand Traverse County Drain Commissioner's Office, 1995) and eventually into Grand Traverse Bay. Depth to groundwater varies from 0 to over 60 meters (200 feet).

Municipal water is available in the project corridors within the City of Traverse City along U.S. Route 31/M-37, Cass Road, Garfield Road, Three Mile Road, and a portion of Four Mile Road near U.S. Route 31/M-37. The principal municipal water supply source is the East Arm of Grand Traverse Bay. Water for most residences along Hartman and Hammond roads is supplied by individual groundwater wells.

Groundwater Recharge and Discharge. Potential groundwater recharge areas within the project corridors include low to moderately sloping soils containing a high percentage of sand and/or gravel. Soils of this type are located west of the Boardman River between U.S. Route 31 and Cass Road, and east of the River between Keystone and Garfield roads, between Garfield and Townline roads, and at the intersection of Hammond Road and Three Mile Road (Grand Traverse County Drain Commissioner's Office, 1995).

East Bay Township has four municipal wells that supply water to several of its subdivisions. Two of the wells are located approximately 410 meters (1,350 feet) south of Hammond Road near Three Mile Road (Cherry Ridge wells). Two other wells are located approximately 762 meters (2,500 feet) south of Hammond Road on the Traverse City Junior High School East soccer fields. Based on the capacity

and water quality, it is believed that these wells are drawing from two different aquifers and are not sole source aquifers.

4.1.3 Soil Resources

The project corridors cross three soil associations: the Lupton-Roscommon association, the Emmet-Leelanau association, and the Rubicon-Grayling association (Figure 4.1-2).

The soil series within the Lupton-Roscommon association includes several muck soils that are classified as hydric. Hydric soils have a high water table and may require special engineering practices during construction to address soil wetness and instability. Other soils crossed within this association include loamy sands.

The predominant soils crossed within the Emmet-Leelanau association are loamy sands. These soils present few constraints to road construction other than protection from wind erosion. Soils in the drainageways have seasonally high water tables.

The soils potentially affected in the northern portion of the Three Mile Road corridor, within the Rubicon-Grayling association, include Croswell loamy sands and Rubicon sands. These soils are well-drained and highly susceptible to wind and water erosion.

4.1.4 Hydrology and Floodplains

The Hartman-Hammond Road corridor crosses the Boardman River and is located within its associated floodplain. The river drains about 764 square kilometers (295 square miles), but the system of dams and power generating plants attenuate its discharge to the magnitude of a creek.

The Hartman-Hammond Road corridor crosses the Boardman River floodplain downstream of the Sabin Dam in an area where the width of the historical floodplain varies between 300 meters (1000 feet) and 450 meters (1500 feet) (JJR, 1992). The floodplain is bordered on both sides by approximately 12-meter (40-foot) high bluffs rounded and flattened by progressive erosion.

The discharges for the Boardman River reach downstream of Sabin Dam are estimated to be 57 cms (2000 cfs) for the 100-year flood and 74 cms (2600 cfs) for the 500-year flood (Michigan Department of Environmental Quality [MDEQ], 1995).

The Three Mile Road corridor crosses Mitchell Creek and is located within its associated floodplain. Three Mile Road crosses the Mitchell Creek floodplain in the vicinity of South Airport Road. This crossing is approximately 300 meters (1000 feet) long. Additionally, there are two stretches along the east side of Three Mile Road, totaling approximately 915 meters (3,000 feet) in length, where the existing right-of-way is immediately adjacent to the floodplain limits.

4.1.5 Surface Water Quality

The project corridors cross the Boardman River and Mitchell Creek watersheds, and an unnamed tributary to East Arm Grand Traverse Bay. The tributaries crossed by the project corridors within

these watersheds are shown on (Figure 4.1-3). On this figure, the tributaries are numbered consecutively from west to east.

The Michigan Water Resources Commission has established by administrative rule intrastate water quality standards and use designation for the Boardman River. It is to be protected for recreational-total body contact, intolerant cold water species, industrial water supply, agricultural and commercial water supply, and other uses. The river water is to be protected for more than one use under these standards; the most restrictive individual standard of designated water use applies. Existing water quality data is limited for the study area. Regional studies conducted on the Boardman River by Gannon (1974), Humphrys (1968) and the Michigan Department of Natural Resources (MDNR), indicate that the water quality meet or exceed all standards established for the river (Natural Resources Commission, 1976).

The general water quality of the Boardman River has been described as excellent. Limited data collected by the Grand Traverse Regional Math, Science and Technology Center (1996-98) and the Grand Traverse Bay Watershed Initiative K-12 Water Quality Monitoring Program (1997) supports this general assumption. However, the Boardman River Watershed Report (Largent, 1991), indicates that sedimentation "is by far the major contributor to water quality degradation in the watershed." Studies by the MDNR (Alexander et al, 1983) report that sand bedload covers valuable spawning and rearing habitat and decreases food supplies for native fish. Field observations have indicated various sites within the project area that are experiencing serious soil erosion. These sites are contributing to the mass loading of sand to the impoundments and river. The reach of the river below Sabin Dam is heavily laded with sand.

A second source of water quality degradation to the Boardman River is heat. The Keystone Pond and Sabin Pond act as heat sinks, increasing the water temperature of the river. Brown trout begin to experience stress at temperatures greater than 67°F. Water temperature below the Sabin Pond frequently exceeds this limit.

The Boardman River. Within the project area, the Boardman River is located between a series of impoundments: Keystone Pond and Sabin Pond upstream (south) of the Hartman-Hammond Road corridor, and Boardman Lake downstream (north) of South Airport Road. These impoundments are used to supply Traverse City with hydroelectric power. The river flows north toward West Arm Grand Traverse Bay between these impoundments.

Boardman River Tributaries. Between U.S. Route 31/M-37 and Keystone Road, the Hartman-Hammond Road corridor crosses four tributaries to the Boardman River (Figure 4.1-3). These tributaries originate from groundwater seeps and wetlands. They are moderate to low gradient channels that range from 0.6 to 2.3 meters (2 to 8 feet) wide and up to 0.8 meters (2.5 feet) deep, with a cool temperature (14.2 degrees Celsius [57.5 degrees Fahrenheit]).

Tributary 1 (Miller Creek). This tributary is a designated trout stream (MDNR, 1990). Tributary 1 originates in several wetlands and groundwater seeps that drain the Manistee moraine west of the Boardman River. It empties into the Boardman River between Boardman Lake and the Sabin Dam. This tributary is a cool, clear fast-flowing stream with a well-developed riparian corridor consisting of interspersed forested wetlands and deciduous woods. Water quality is good and is similar to Tributary 2 (Jack's Creek) (Largent, 1998).

Tributary 2 (Jack's Creek). This tributary is a designated trout stream (MDNR, 1990). Like Tributary 1, Tributary 2 originates in several wetlands and groundwater seeps that drain the Manistee moraine west of the Boardman River. The North Branch of Tributary 2 is an intermittent stream and was dry during field inspection (JJR, 1995). The main branch of Tributary 2 is a cool, clear, fast-flowing stream. Field surveys identified a community of pollution intolerant aquatic organisms (including a high percentage of stoneflies, mayflies, and caddisflies) indicating good surface water quality.

Tributary 3. This tributary originates in an emergent wetland located on the west side of the Boardman River valley and eventually empties into an oxbow wetland associated with the Boardman River north of the Hartman-Hammond Road corridor.

Tributary 4. This tributary originates in groundwater seeps in the east portion of the Boardman River valley. The stream flows south, turns 180 degrees, and continues as a separate channel parallel to the Boardman River, and then angles west joining the river after a short, steep descent down the riverbank.

Mitchell Creek and Tributaries. Tributaries 5 through 11 are tributaries to Mitchell Creek and Mitchell Creek itself. Tributaries within the Mitchell Creek Watershed flow generally north converging near the South Airport Road/Three Mile Road intersection and form the main branch of Mitchell Creek. Stream flows within the tributaries range from swift to moderate. Stream widths range from 0.6 to 4 meters (2 to 12 feet), and water depths range from 10 centimeters (4 inches) to over the banks during flood flows. Bottom substrate within the streams is a mixture of sand and gravel with pockets of silty sediment. Riparian areas are well developed and are important components that aid in maintaining cool instream temperatures.

In general, tributaries within the watershed comply with state water quality standards; however, periods of temporary water quality impairment have been reported, including elevated levels of chloride, nutrients, and suspended solids resulting from nonpoint source stormwater inputs (Niehause et al., 1991).

East Arm Grand Traverse Bay

Tributary 12 (Baker's Creek). This stream flows north, draining Four Mile Road and upland areas to the east and discharges into the East Arm of Grand Traverse Bay. An assessment of surface water quality for this stream has not been conducted; however, water quality is expected to be similar to the quality within tributaries of Mitchell Creek.

4.2 ECOLOGICAL ENVIRONMENT

4.2.1 Terrestrial Resources

Upland Vegetation. In general, upland vegetation in the project corridors consists of fallow agricultural fields, mixed hardwood forests, evergreen plantations, and commercial and residential landscaping. Most of the land area within the project corridors has been cleared at one time for farming, timber production, or residential and commercial development. The vegetation communities in the project corridors are shown in Figure 4.2-1. Agricultural land use is discussed in Section 4.3.1. Wetland vegetation is discussed in Section 4.2.2.

Botanical surveys were conducted along the corridor between U.S. Route 31/M-37 and LaFranier Road in 1993 and 1995. The results of these surveys are found in Appendix B-1 of the Draft EIS. Field observations conducted in 1998 indicated no major changes to botanical resources within this section of the corridor.

Wildlife. Because the project corridors are interspersed with mixed hardwood forests, open fields and wetlands (described in Section 4.2.2), a variety of birds, mammals, reptiles, and amphibians are expected to inhabit the corridors.

Mixed hardwood forests and open fields are the preferred habitat by a variety of terrestrial wildlife, such as rodents, small mammals, and white-tailed deer. *The Atlas of Breeding Birds of Michigan* (Brewer et al, 1991) confirms 12 species that breed in the project area and identifies an additional 59 species as possibly residing or breeding in the area.

A variety of lowland wildlife uses the extensive wetland complexes adjacent to the Boardman River, its tributaries and the Mitchell Creek watershed. Some are permanent residents; others, like the white-tailed deer, retreat to these wetlands for winter protection, food, and refuge. These areas most likely serve as deer-yards. The MDNR, however, has not conducted recent inventories in this area of the Boardman River to verify the presence of deer-yards (Webb, 2000). In and along the river, several species of non-poisonous reptiles, such as the blue racer, common water snake, garter snakes, hognose snake, painted turtle and snapping turtle, can be observed. Lowland birds, including the mute swan, belted king fishers, red-winged blackbird, great blue heron, green heron, wood duck and mallard duck, are also well represented in the wetland areas.

Critical Wildlife Habitats. Wildlife corridors have been identified in the project area within the Mitchell Creek watershed (Figure 4.2-2). Because these areas serve as pathways that allow movement of wildlife from one habitat to another without undue stress associated with predation, mortality from vehicles, or other hazards associated with human interaction, they are considered "critical wildlife habitats" (Grand Traverse County Drain Commissioner's Office, 1995).

4.2.2 Wetland Resources

The majority of wetlands in the project corridors are associated with the streams and floodplains of the Boardman River and Mitchell Creek watersheds (Figure 4.1-3). Two types of wetlands occur along the corridors: palustrine and riverine. Palustrine wetlands occur where soils are saturated with surface or subsurface water. Riverine wetlands are those that occur within the flowing waters between the riverbanks.

Wetland Assessment Methodology. Wetland boundaries within the Boardman River watershed were identified through field investigations of site conditions, including examination of vegetation, soils, and hydrology pursuant to the Michigan Natural Resources and Environmental Protection Act (PA 451) Part 303 and the MDEQ rules and practices. Wetland boundaries were not flagged or surveyed. The boundaries shown on Figure 4.1-3 are approximate. Wetlands were classified using the Cowardin et al (1979) classification system. Functional assessments were completed on wetlands crossed by project corridors using the Wisconsin Department of Natural Resources (WDNR) Rapid Assessment Methodology for Evaluating Wetland Functional Values (WDNR, 1992). This method is derived from the Indicator Valuation Assessment (IVA) method developed by Hruby, Cesank, and Miller (1995).

The IVA method is based on the principle that the presence or absence of specific indicators reflects the degree to which a wetland performs a specific function. The presence or absence of these indicators can be more easily determined in the field rather than obtaining data on the performance of the function itself. Six functions performed by wetlands were evaluated. These functions included: floral diversity and wildlife habitat, fish and herpetile habitat, flood and storm water storage, non-point source pollution abatement, stream bank protection and aesthetic and recreational opportunities. Each wetland functional analysis requires the completion of a field data form that answers specific questions. The answers are summarized, scored and ranked as to Low, Medium, and High relative to that particular function.

Wetland boundaries within the Mitchell Creek watershed were estimated using existing information including soil surveys, aerial photography, National Wetland Inventory maps, topographical maps, and field reconnaissance in 1992, 1995, and 1998.

Palustrine Wetlands. The project corridors cross three types of palustrine wetlands including forested wetlands, scrub-shrub wetlands, and emergent wetlands, as described below.

Forested Wetlands. The majority of wetlands crossed by the Hartman-Hammond Road corridor are forested wetlands consisting of primarily white cedar swamps. These wetlands are located adjacent to Tributary 2, in the Boardman River valley, and border Tributaries 5 through 10 in the Mitchell Creek watershed. The Three Mile Road and Four Mile Road corridors cross a large forested wetland complex associated with Mitchell Creek.

Scrub-Shrub Wetlands. Scrub-shrub wetlands in the project corridors are typically smaller than 1 hectare (3 acres). The Hartman-Hammond Road corridor contains scrub-shrub wetland within the Boardman River valley and at the edges of forested wetlands along Hammond Road. Three Mile Road and Four Mile Road corridors cross scrub-shrub wetlands associated with Mitchell Creek and its tributaries. A large area of scrub-shrub wetland is located east of Three Mile Road within the clear zone of Cherry Capital Airport's east-west runway.

Emergent Wetlands. The Hartman-Hammond Road corridor crosses small pockets of emergent wetland at numerous locations. The largest areas of emergent wetland are located within the forested wetland complex of Tributary 2 and the west side of the Boardman River valley. An emergent wetland consisting of cattails and sedges forms the headwaters of Tributary 3 within the Boardman River valley and in an old oxbow immediately north of the proposed bridge.

An intermittent drainageway supporting wet meadow vegetation begins on the south side of Hartman Road, north of the Traverse Manor assisted-living facility, and flows to the southeast under Dracka Road into the forested wetland system south of the corridor. This drainageway has been excavated in two locations to create shallow farm ponds that are fringed with cattail and other emergent species. The largest wet meadow in the Hartman-Hammond Road corridor, 0.3 hectare (0.8 acre), is located in the Boardman River valley, east of the river.

The Three Mile Road and Four Mile Road corridors contain several emergent wetlands. Along Three Mile Road, emergent wetlands are associated with Mitchell Creek south of the Three Mile Road/South Airport Road intersection and at the formation of the East Branch of Mitchell Creek. Emergent wetlands within the Four Mile Road corridor are located within the stream channel of Tributary 12,

along hillside seeps east of Four Mile Road, and interspersed within the forested wetland complex west of the road.

Riverine Wetlands. The Hartman-Hammond Road corridor contains open water riverine wetland within the Boardman River. Streams and tributaries within the Three Mile and Four Mile Road corridors, as previously described under Section 4.1.5, Surface Water Quality, of this document, contain dispersed areas of open-water riverine wetland habitat.

Wetland Assessment. Functional assessments of the Boardman River valley in the vicinity of this project were evaluated. Generally the wetlands rated medium to high for the six functions evaluated. The high rankings were for water quality protection, groundwater, aesthetics and recreation. Fishery habitat ranked low in each wetland primarily because the wetlands are physically separated from the Boardman River by a berm. Tributaries into the wetlands exhibited relatively poor in-stream habitat for fisheries due to small channel morphology, low gradient, and organic bottom substrates (see Section 4.2.3 Aquatic Resources). The mixture of riverine, scrub-shrub, forest floodplain, and emergent marsh provides habitat for a wide variety of flora and fauna. The relative lack of development below the steep slopes of the Boardman River valley allows these wetlands to serve as open space with passive recreational value.

Several wetlands within the Mitchell Creek watershed, identified by the Mitchell Creek Watershed Protection Strategy (Grand Traverse County Drain Commissioner's Office, 1995) as being important to the regional ecosystem, exist within the project corridors and are identified on Figure 4.1-3. These "critical wetlands" display one or more of the following characteristics:

- include a non-fragmented area of at least 40 hectares (100 acres);
- are adjacent to or upstream of a watercourse exhibiting excellent cold water habitat;
- contain a plant community not commonly found within the watershed; and/or
- are contiguous to a critical wetland but do not meet the preceding criteria, and are adjacent to development that may degrade the critical wetland.

The project corridors in the Mitchell Creek watershed cross several critical wetland areas. These wetlands are riparian buffer zones for streams exhibiting excellent cold water habitat and are important natural areas supporting a diversity of wildlife. Application of critical wetland criteria to wetlands within the Boardman River watershed would result in the inclusion of wetlands adjacent to Tributary 1, Tributary 2, and the west side of the Boardman River valley, all within or adjacent to the Hartman-Hammond Road corridor (Figure 4.1-3).

4.2.3 Aquatic Resources

Aquatic resources within the project corridors were evaluated by conducting surveys of aquatic habitat and fish and aquatic macroinvertebrate communities, reviewing historical data, and consulting state and local agencies.

The Boardman River. The portion of the Boardman River crossed by the Hartman-Hammond Road corridor has been designated as a Second Quality Stream for trout and anadromous fish (MDNR, 1989). The impoundments associated with hydroelectric facilities downstream of Beitner Road (within the project area) have impaired trout habitat. Impoundments decrease river flow resulting in a gradual

increase in water temperature through each successive impoundment. This impact to water quality is discussed below. Outside of the project area, beginning at Beitner Road and heading south (upstream), 58 kilometers (36 miles) of the river have received recognition as a Blue Ribbon Trout Stream (MDNR, 1988).

Impoundments. Hydrologic characteristics of impoundments and past human activities influence the physical character of the stream. Keystone and Sabin ponds, located south of the Hartman-Hammond Road corridor, act as heat sinks by retaining and exposing large volumes of water to direct sunlight, resulting in increased water temperature within the reservoir. This warm water is released into the river, increasing downstream water temperatures and directly impacting the resident aquatic community. Summer temperatures in the river within the Hartman-Hammond Road corridor may reach 24° C (75° F). At this temperature, resident trout populations are stressed. Historically, the Boardman River was channelized within the project corridor to improve flow between Sabin Pond and Boardman Lake. This activity impacted aquatic habitat by limiting river/floodplain interaction and reducing valuable aquatic habitat such as large woody debris.

Erosion. Erodible soils compose much of the watershed, predisposing aquatic habitat to degradation by erosion and sedimentation. The Boardman River Watershed Report (Largent, 1991) indicates sedimentation is the major contributor to water quality degradation in the watershed and identifies numerous sites exhibiting moderate to severe erosion within the project corridors. Erosion of soils can lead to increase in turbidity and release of excess nutrients. Contaminants that have adhered to soil in the water can affect water quality. Studies by the MDNR (Alexander et al, 1983) suggest that sand bedload has adversely impacted spawning and rearing habitat and decreased food supplies for native fish.

Fisheries. Correspondence with an MDNR fisheries biologist, review of MDNR Fisheries Division reports, and qualitative field surveys of the Boardman River and several tributaries within the Hartman-Hammond Road corridor were conducted to assess the aquatic resource. The MDNR Fisheries Division previously conducted electrofishing surveys of the Boardman River within the Hartman-Hammond Road corridor. In the survey report, the MDNR states "in general, this stretch of river was very unproductive for resident fish" (MDNR, 1987). The collection for this section of river totaled seven fish: including two small brown trout and five northern pike.

Trout Unlimited reports heavy angler activity within the Hartman-Hammond Road corridor river segment during the summer emergence of the mayfly (*Hexagenia limbata*) (Marek, 1991). It is anticipated, however, that the activity is the result of a temporary migration of trout to this river section from downstream locations and not from the resident river population. The river serves as a migratory route for anadromous fish species seeking tributaries containing spawning habitat. Angler activity within this river section increases during these migrations (Hay, 1998).

Two mottled sculpin and three immature lampreys were incidentally captured from pockets of organic sediment near the river edge during the aquatic macroinvertebrate survey of the river within the Hartman-Hammond Road corridor (JJR, 1995).

Aquatic Habitat. Within the Hartman-Hammond Road corridor, the MDNR concluded during 1987 surveys that a vigorous resident trout population is unlikely to become established, due to increased water temperatures, lack of instream cover and spawning substrate, and pike predation. Field surveys

of the Boardman River within the Hartman-Hammond Road corridor also confirm MDNR observations (JJR, 1995). In contrast to the river channel upstream from the impoundments, channel sinuosity within the Hartman-Hammond Road corridor was low, a result of past channelization activities. Impairments to aquatic habitat include lack of instream cover and structural complexity of the river bottom. The riverbank is crowned with berms that appear to be spoil piles resulting from river channel dredging. These berms crest approximately 3 meters (10 feet) above the surface of the river and prevent the river channel from direct interaction with the floodplain. A thin strip of shrubby riparian vegetation was observed on the crest of the upper stream bank. Coontail (*Ceratophyllum spp.*), the most abundant instream vegetation, was found in scattered aggregations along the river bottom.

Bottom substrate consisted of 90 percent sand with scattered pockets of organic debris and silt. Flow was swift, and maximum depth was greater than 2 meters (6 feet). Water in the river channel was lightly stained, but clear, with visibility to the bottom. Areas of moderate to severe erosion of the riverbank were observed in 1995 and 1998.

Aquatic Macroinvertebrates. Aquatic macroinvertebrate surveys of the Boardman River within the Hartman-Hammond Road corridor indicated the presence of fingernail clams as the dominant invertebrate fauna of the Boardman River. Damselfly (*Caloptryx*) and mayfly (*Siphlonurus*) were abundant, as well. Suitable habitat for the hexagenia mayfly, a seasonally important food source for insectivorous fish, was identified; however, none were collected (JJR, 1995).

Boardman River Tributaries. The Hartman-Hammond Road corridor crosses several small tributaries to the Boardman River including Tributary 1 (Miller Creek), Tributary 2 (Jack's Creek), and two small unnamed streams (Figure 4.1-3). A description of the aquatic resources associated with each stream follows.

Tributary 1 (Miller Creek) and Tributary 2 (Jack's Creek). Qualitative assessments were not conducted in Tributary 1. Qualitative assessments of Tributary 2 were conducted at three locations including the north branch, at a plunge pool below Cass Road, and at a footbridge crossing within the Boardman River valley (Figure 4.1-3). MDNR fisheries biologist have observed evidence of spawning by anadromous fish species including coho salmon (*Onchorynchus kisutch*), chinook salmon (*Onchorynchus tshawytsha*), and steelhead trout (*Onchorynchus mykiss*) in Tributary 2 (Hay, 1998). During the aquatic macroinvertebrate survey in Tributary 2, fingerling brook trout (*Salvelinus fontinalis*) were incidentally collected from a plunge pool downstream of Cass Road. Resident fish species within the tributaries probably include brook trout, brown trout (*Salmo trutta*), creek chub (*Semotilus atromaculatus*), rainbow darter (*Etheostoma caeruleum*), greenside darter (*E. blennioides*), mottled sculpin (*Cottus bairdi*), blacknose (*Rhynichthys atratulus*) and longnose dace (*R. cataractae*), and common *shiner (Notropis cornutus*).

Although no field survey was conducted on Tributary 1 for this project, resident fish and macroinvertebrate communities are probably similar to those of Tributary 2. Accumulation of woody debris at the confluence of Tributary 1 with the Boardman River inhibits migration of anadromous salmonids into this stream; therefore, its contribution to the anadromous fishery resource of the Boardman river is limited (Hay, 1998).

The aquatic macroinvertebrate community within the main stream of Tributary 2 was dominated by amphipods (*Gammarus*). Net spinning caddisflies (*Parapsyche* and *Diplectrona*), stoneflies

(*Amphinemoura*), blackflies (*Simulium*), and mayflies (*Siphlonurus*) were abundant. The north branch of Tributary 2 was dry; consequently, an aquatic macroinvertebrates survey was not conducted. Overall, the aquatic macroinvertebrate community was rated good.

Water clarity within the mainstream of Tributary 2 was excellent with visibility to the bottom and flow was swift. Maximum water depths ranged from approximately 0.8 meter (2.5 feet) at the base of the plunge pool downstream of Cass Road to 0.5 meters (1.5 feet) at the footbridge. Average temperature and dissolved oxygen levels were 13°C (55°F) and 10 mg/L, respectively. Bottom substrate at the footbridge was composed of 70 percent sand and 30 percent gravel with pockets of fine, particulate organic matter, and 60 percent sand and 30 percent gravel within the plunge pool. Undercut banks and root tangles are extensive in certain areas along the stream and are valuable aquatic habitats for fish and aquatic macroinvertebrates. The culvert at Cass Road is not at grade with the existing stream course and impairs access of anadromous and resident fish species to spawning habitat upstream of Cass Road.

Aquatic resources within Tributary 1 are likely to be rated slightly less than Tributary 2. Sedimentation and an improperly installed culvert at Cass Road are known sources of habitat degradation and fragmentation (Largent, 1998).

Tributaries 3 and 4. These tributaries are small, low-gradient streams draining wetlands and seeps within the Boardman River valley. The streams exhibited similar fisheries, aquatic macroinvertebrate communities, and aquatic habitat.

Fish communities within these tributaries have not been studied by the MDNR; however, species likely to inhabit these areas include central mudminnow (*Umbra limi*), brook stickleback (*Culea inconstans*), creek chubs, and other minnow species.

The aquatic macroinvertebrate communities were observed to be composed primarily of amphipod (*Gammarus*) and isopod (*Lirceus*). Mayfly (*Paraleptophlebia*) was common. In general, diversity and abundance of aquatic macroinvertebrates were low.

Water clarity was excellent, with visibility to the bottom. Flow was moderate to slow. Maximum depths were approximately 0.6 meter (2 feet) in Tributary 3 and 20 centimeters (8 inches) in Tributary 4. Average temperature and dissolved oxygen levels for both streams were 15.7°C (60°F) and 8.9 mg/L, respectively. In both tributaries, bottom substrate composition progressed from organic muck near its source to coarse sand. In-stream vegetation was comprised of duckweed and watercress.

The Mitchell Creek. The MDNR (1992 and 1993) and others in 1992, 1995, and 1998 have conducted aquatic resource assessments within Mitchell Creek and its tributaries. Quality of aquatic habitat in tributaries crossed by the project corridors ranges from fair to good (MDNR, 1992 and 1993). Degradation of aquatic habitat via sedimentation has occurred in the tributaries and is clearly evident in Mitchell Creek adjacent to Three Mile Road from Parsons Road to U.S. Route 31/M-72. The following is a description of the aquatic resources within these streams as reported by previous studies. Ratings of stream quality reported in this document are based on assessments of stream quality within the project corridors.

Lower Mitchell Creek. Mitchell Creek separates into the East Branch and Lower Branch east of the South Airport Road/Three Mile Road intersection. These branches generally flow northward towards

East Arm Grand Traverse Bay before becoming a single confluence south of the Three Mile Road/U.S. Route 31 intersection.

Qualitative assessment of the Lower Branch of Mitchell Creek between Aero Park Drive and U.S. Route 31/M-72 was conducted in 1998. Aquatic habitat within this section of the creek was observed to be fair. Sedimentation, selective removal of streambank vegetation and improper installation of culverts are the primary sources of aquatic habitat degradation. Stream flow is moderate to swift with an interspersion of runs, short riffles and deep pools. The majority of the substrate is composed of sand and with the remainder consisting of cobble, large stone, woody debris, silt and organic material. The aquatic macroinvertebrate community is fair consisting of caddisflies (Neophylax), blackflies (Simulium), mayflies (Stonenema and Baetis), amphipods (Gammarus) and dobsonfly (Chauloides). The fishery resource within this section is good. Brown trout congregate in deep pools located within this section of the creek and are visible from the streambank. Mottled sculpin, longnose dace and minnows were also observed. The creek supports spring and fall runs of salmonids including steelhead in the spring and Coho and Chinook salmon in the fall. Although limited by lack of public access, seasonal angler activity does occur in this section of the creek (Hay, 1998).

Tributary 5 (Upper West Branch of Mitchell Creek). MDNR surveys rated the overall stream quality as fair. Composition of the stream bottom is fine sand, which does not support as diverse an aquatic macroinvertebrate community as cobble or gravel substrates.

Tributary 6. The overall quality of aquatic resources within this tributary has been rated excellent. Adult trout and spawning redds have been observed, and the diversity and abundance of aquatic macroinvertebrates are high. Bottom substrate consists of gravel, cobble, and woody debris (Grand Traverse County Drain Commissioner's Office, 1995).

Tributary 7 (Upper Mitchell Creek). The quality of aquatic resources within this section of Mitchell Creek is excellent. Brown trout, Coho, and Chinook salmon spawn in this section of the stream (Grand Traverse County Drain Commissioner's Office, 1995). Well-developed riparian areas, diverse bottom substrate, and high groundwater input allow the stream to support a diverse and abundant community of macroinvertebrates containing several species that are sensitive to water quality degradation.

Tributary 8 (Sleder's Creek). Aquatic resources have been rated fair. Natural erosion, construction activities, and erosion at the Hammond Road crossing have contributed a large amount of sediment that has impaired bottom substrate. Low diversity of aquatic macroinvertebrates was observed during aquatic resource assessments (Grand Traverse County Drain Commissioner's Office, 1995).

Tributaries 8 and 9 (Black Creek and Vanderlip Creek). Aquatic resources within these streams have been rated good. Some sediment accumulation has occurred, but aquatic macroinvertebrate communities do not appear to be impaired. The source of sediment appears to be the result of erosion at locations where Hammond Road crosses the streams.

Tributary 10. A dense, shrubby riparian zone and a stream channel that flows underground intermittently characterize this stream. Aquatic resources within the Hartman-Hammond Road corridor have been rated good and sections downstream of the corridor have been rated excellent (MDNR, 1994).

Tributary 11 (Fourmile Creek). Aquatic resources within this stream have been rated good (Grand Traverse County Drain Commissioner's Office, 1995). The stream flows through the heart of a large cedar swamp, and the stream bottom consists of unconsolidated organic material, sand, and muck.

East Arm Grand Traverse Bay.

Tributary 12 (Baker's Creek). An assessment of aquatic resources has not been conducted for this tributary located east of Four Mile Road; however, field observations indicate aquatic resources are similar to what has been reported for Tributary 11. Low base flow and lack of spawning substrate probably limit the fishery value of the stream.

4.2.4 Wild and Scenic Rivers/Coastal Zone Management

The National Wild and Scenic River System (PL 90-542, 1968) is a federal program that designates and preserves certain rivers with outstanding natural, cultural or recreational features. A total of 113 kilometers (70 miles) of the Boardman River and its tributaries have received Wild and Scenic River designation. This designation does not apply to the river or tributaries within the project corridor (Boardman River Management Plan Committee, 1975).

The MDNR administers the state Natural Rivers Act (PA 231, 1970), which identifies and protects free flowing stretches of designated rivers through the use of local and state zoning regulations. The Natural River District of the Boardman River begins at the north boundary of the Grand Traverse Nature Education Reserve (Boardman River Management Plan Committee, 1975), which is located within the southern portion of the Hartman-Hammond Road corridor, and proceeds upstream (or to the south) away from the project corridor.

Michigan's Coastal Management Program, administered by the MDEQ Land and Water Management Division, is a federally approved program under the Coastal Zone Management Act of 1972 (as amended through PL 104-150, The Coastal Zone Protection Act of 1996). One of the purposes of Michigan's program is to ensure that environmental permits are secured for projects that would affect resources associated with Michigan's coastal areas. The Boardman River Crossing Mobility Study project area contains coastal resources protected by Michigan's program. Natural resources associated with the Boardman River from Grand Traverse Bay to Sabin Dam, specifically, are included in Michigan's program (Cunningham, 2000).

4.2.5 Threatened and Endangered Species

There are no known occurrences of state or federally listed threatened or endangered species within the project corridors (Appendix C); however, six protected species are known to occur elsewhere in the Boardman River Watershed: the bald eagle, osprey, common loon, red-shouldered hawk, loggerhead shrike, and wood turtle. The MDNR Traverse City field office has received citizen reports of bald eagles and osprey within the project area, but the observations are of migrants and do not reflect resident populations (Odum, 1991).

4.3 LAND USE

4.3.1 Agriculture

Although a significant portion of the project area historically has been in agricultural production, most of the cultivated land has been converted to other uses or allowed to lie fallow. Some areas designated as prime farmland or unique farmland remain undeveloped within the project area, however, most of these areas are planned to be developed for commercial or residential use. Prime and unique farmland is shown on Figure 4.3-1. Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, forage, fiber, and oilseed crops (USDA, 1983). Unique farmland is defined as land other than prime farmland that is used for the production of specific high-value food and fiber crops (USDA, 1978). No land in the project corridors is enrolled under Part 361, Farmland and Open Space Preservation, of the Natural Resources and Environmental Protection Act (PA 451 of 1994, as amended). (See Appendix C.)

Hartman-Hammond Road Corridor. This corridor passes through a rural, low-density, residential landscape, particularly west of Cass Road. The Pine Brook Farm, an apple and cherry orchard, is located at the west end of the corridor bordering both sides of Hartman Road. Other farmland, shown in Figure 4.3-1, is located northeast of the Hartman Road/Dracka Road intersection. These farmlands are considered to be Statewide and Locally Important Farmlands by the USDA, Natural Resources Conservation Service (Appendix B-1).

Fruit trees in the Pine Brook Farm orchard south of Hartman Road have matured past their most productive years. *Garfield Township's Comprehensive Land Use Plan* (1999) identifies this parcel for a future planned unit development (PUD) indicating that long-term use of this parcel for agriculture is unlikely. Similarly, the agricultural property north of Hartman Road is planned for medium residential land use in the Township's Future Land Use Map. With the exception of the southeast corner of Hartman Road and North U.S. Route 31, all land south of Hartman Road is zoned A1 Agricultural. With the exception of the parcel on the northeast corner of the same intersection, all the land north of Hartman Road is zoned R1A Rural Residential. This land is identified for medium residential development in the Township's Future Land Use Map. Land use planning and zoning documents and maps are further discussed and illustrated in Section 4.3.7 and in the Draft EIS.

Three Mile Road and Four Mile Road Corridors. No land is being actively farmed adjacent to Three Mile Road or Four Mile Road between Hammond Road and U.S. Route 31/M-72. The USDA Important Farmlands map shows small pockets of prime farmland west of Three Mile Road in Section 19 of East Bay Township and both east and west of Four Mile Road just north of Hammond Road in Sections 16 and 17. This area contains a small area of unique farmland as well. A new subdivision is currently under construction on the east side of Four Mile Road near Hammond Road. No prime or unique farmland is designated within the Three Mile Road corridor north of the South Airport Road intersection.

4.3.2 Residential

Hartman-Hammond Road Corridor. Hartman Road, between U.S. Route 31/M-37 and Cass Road, is closely bordered by single-family residences, and the road corridor conveys a strong rural residential character. Traverse Manor, a small assisted-living retirement center, is built on a hill west of Dracka

Road. It is located approximately 213 meters (700 feet) south of Hartman Road and 213 meters (700 feet) west of Dracka Road. The facility is entered from Dracka Road and is isolated from the surrounding houses. Several residential parcels east of Dracka Road, were under active construction in spring of 2000.

Single-family residences similar to those on Hartman Road are also located within the corridor next to Keystone Road and on the north and south sides of Hammond Road west of LaFranier Road.

Three Mile Road and Four Mile Road Corridors. Three Mile Road, between Hammond and South Airport roads, also has a rural character, although different from that of Hartman Road. Here residences are sited among low-lying pockets of forested wetland and open space. A new small twenty-four unit apartment building has recently been built east of Three Mile Road and north of Vanderlip Road. It shares an entrance from Three Mile Road with two new office buildings.

Woodcreek, a new affordable housing development advertised as an "eco-community" is located southwest of the intersection of South Airport and Three Mile roads. Expected to contain more than 250 units, it offers many of the natural features associated with Mitchell Creek, such as 15.8 hectares (39 acres) of forested wetlands, ponds, and creeks, as amenities.

Just north of South Airport Road on Three Mile Road, the residential character becomes more suburban, with smaller lots. Residential density is greatest in this section of the corridor and is particularly concentrated north of Parsons Road.

North of Parsons Road, houses are interspersed with small professional offices, commercial developments and community institutions such as East Bay Elementary School located just south of Business Park Drive on the east side of Three Mile Road.

On the east side of Three Mile Road at Mitchell Creek Drive, north of Parsons Road, the Mitchell Creek Apartments (57 units) were built approximately 15 years ago. Small-scale residential development continues to within 91 meters (300 feet) of U.S. Route 31/M-72. Like Hartman Road, many of these smaller houses are located relatively close to the road. North of Mitchell Creek Drive, Mitchell Creek parallels Three Mile Road on the east side and is crossed by driveways servicing two houses and one business.

A new 250 senior housing unit is being planned as part of a small mixed-use development on a 32-hectare (80-acre) parcel east of the Three Mile/Hammond Road intersection across from Carlisle Road. The full development is planned to include senior residential, assisted living, and full care living facilities in addition to professional offices. North on Four Mile Road, small residential lots line most of the road between Hammond Road and U.S. Route 31/M-72. Residential development is limited along Four Mile Road due to the extensive forested wetland areas that border the road, particularly on the west side. East of Four Mile Road, the steep slopes of the moraine closely approach the road edge, minimizing development opportunities next to the road.

In addition to individual residential lots, two small subdivisions anchor the north and south ends of Four Mile Road. On the east side of Four Mile Road near Hammond Road, just north of Belanger's Septic Service, a new PUD, Waterview Ridge, is under construction. Construction plans include 44 houses and 24 senior units. Further north, immediately south of the railroad tracks, there is a small

residential development to the west at Pine and Oak drives. This area comprises the Village of Chartwell and will become the far eastern portion of the Village Center described in East Bay Township's Comprehensive Plan later in this section.

4.3.3 Institutional

Hartman-Hammond Road Corridor. A number of schools and churches are located in or near this corridor (Figure 4.3-1). Sabin Elementary School and the Bible Baptist Church are located on the north and south sides of Hartman Road, respectively, at the intersection of Hartman and Cass roads. Sabin Elementary School houses approximately 310 students between kindergarten and sixth grade and is served by six buses each morning and afternoon. Attendance for the year 2000 is projected to be 318 children. Playground areas for the school are located west and north of the school building. Vehicle entrance into the school is from Cass Road. As is typical of school bus routing design, buses exit right onto Cass Road. Vehicle access to Bible Baptist Church is also from Cass Road south of the church.

The Traverse City School Bus System operates a centrally based program for the Traverse City Intermediate School District. All buses (120 daily) that serve the district are housed in a depot that is located approximately 0.8 to 1 kilometer (0.5 to 0.75 mile) south of Hartman Road on Cass Road. The buses pick up and deliver children throughout the Traverse City area including along Three, Four, and Five Mile roads, and as far away as Acme Township. Buses typically operate between 7:30 and 9:45 a.m. and between 3:30 and 4:00 p.m.

Currently, because buses are limited to crossing the Cass Road Bridge only when empty, a significant amount of travel time and mileage is accrued transporting students west of the Boardman River east to Traverse City Junior High School East (TCJHSE), which serves the student population south of Hartman Road. Sabin Elementary School acts as the one "feeder" school west of the Boardman River that sends students to TCJHSE. Under present conditions, buses transporting students from west of the Boardman River must travel north and cross at South Airport Road or travel Hartman Road west to US31/M-37 south to Beitner Road crossing the river east of Chum's Corner and traveling north on Keystone Road (Derrigan, 1998; Fite, 1998).

The Living God Christian School is situated south of Hammond Road on the north side of Birmley Road between Keystone and Garfield roads. The school, housed in the Church of the Living God, offers classes for pre-kindergarten through sixth grade and is served by two buses from the Traverse City school bus system. Enrollment for 1998 included 147 students; 1999 attendance estimates are expected to be equivalent or slightly higher. The school's capacity is 175 students. Two-thirds of the students use an alternative means of transportation rather than take the bus (Sattler, 1998; Fite, 1998).

The Traverse City Christian School, which serves seventh through twelfth grades, opened a new location in 1998. Originally located on Keystone Road south of Hammond Road, it relocated to a new building on the south side of Emerson Road approximately 0.4 kilometer (0.25 mile) east of Garfield Road. Since its establishment in 1995, enrollment has grown from 56 students to 129 students in 1998. The school's preference is to limit growth to 50 or fewer new students per year; projected enrollment for 1999 was 180 students. The new school building was designed to accommodate 300 students and can be expanded to increase capacity up to 600 students. The former location became Traverse Bay

Christian School's building, which had 70 students in Grades K through 6 in 1998 (Derrigan, 1998; Fite, 1998).

On Hammond Road between LaFranier Road and Three Mile Road, no institutional land use occurs.

Three Mile Road and Four Mile Road Corridors. A number of schools are also located near the Hammond Road/Three Mile Road intersection. Traverse City Junior High School East and Cherry Knoll Elementary School are located just south of Hammond Road on the east side of Three Mile Road. TCJHSE has 1,250 students with 18 buses entering the facility each morning and afternoon. The school's capacity is 1,500 students, but enrollment is expected to increase by only 100 students in the next five years. TCJHSE exits as a right turn onto Hammond Road. Cherry Knoll Elementary School, between TCJHSE and Hammond Road, had approximately 310 students in 1998. Six buses serve the school and its special education programs (Chesney, 1998; Derrigan, 1998).

The new St. Elizabeth Ann Seton Middle School, located south of East Bay Town Hall on the west side of Three Mile Road, opened in July 1998 and serves 325 to 350 middle school students (Grades 6 through 8). Like Cherry Knoll Elementary School across the street, the school grounds are entered and exited from Three Mile Road with buses making both left and right turns (Oosterhouse, 1998). In addition, a new charter elementary school (The Grand Traverse Academy), entered from the north side of Hammond Road, is located just east of Three Mile Road. This school opened on October 1, 2000 with 275 students and is intended to accommodate 1,000 elementary students. None of the students will be bussed.

Although the parochial schools are served by the public school bus system, bus ridership is low, particularly for middle and elementary school students (20 to 30 percent) (Oosterhouse, 1998). An informal survey showed that, out of the 1,000 students attending area Catholic schools, the majority of students are driven by their parents. This same pattern is evident in many other non-public school student populations, and an across-the-board generalization possibly applies for any non-public elementary or middle school in the Intermediate School System (Oosterhouse, 1998).

East Bay Elementary School, located on the east side of Three Mile Road, south of Aero Park Drive, serves a student population of approximately 295 students and, like Cherry Knoll School to the south, offers special education classes. Six regular and six special education buses stop at East Bay School. The special education programs at East Bay Elementary School, combined with those at Cherry Knoll Elementary School, result in buses entering and exiting onto Three Mile Road at non-standard times.

The Northwest Michigan Human Services Agency is located across the street from East Bay Elementary School, with parking access to Three Mile Road and Aero Park Drive. Farther north on Three Mile Road, the Grand Traverse Fire Department is located on the northwest corner of Parsons and Three Mile roads.

The northwest corner of Hammond and Four Mile roads is planned as the future site of the Seventh Day Adventist Church; the northeast corner will house the East Bay Calvary Church. The Kingdom Hall of Jehovah's Witness is currently located on the west side of Four Mile Road south of the railroad tracks between Pine and Oak drives.

4.3.4 Commercial, Office, and Industrial

Hartman-Hammond Road Corridor. An unoccupied commercial building (as of November 1999) is part of the Hartman Hills Office Complex built on the crown of a hill overlooking U.S. Route 31/M-37 on the southeast corner of the Hartman Road and U.S. Route 31/M-37 intersection. The complex is entered from Hartman just as the road turns east. Michigan Department of Transportation (MDOT) field offices and a financial services business, Farm Credit Services, share a professional office building adjacent to the vacant commercial building. With the exception of the Grainery, a small bed and breakfast just east of Dracka Road on the south side of Hartman Road, there is no other commercial, office or industrial development until the Hartman Road/Cass Road intersection. East of Cass Road, a concentrated industrial area stretches north-south between Cass Road and the Boardman River valley almost from the Cass Road Bridge to north of South Airport Road.

One of the light industries located in the immediate area near the Hartman Road/Cass Road intersection is Eagle Picher Automotive (who recently acquired Carpenter Enterprises, Ltd.), located in a small industrial park on Cass-Hartman Court directly east of the intersection between Hartman and Cass roads. Carpenter Enterprises, Ltd. had recently acquired the building that contained Tower Automotive facility prior to Carpenter being acquired by Eagle Picher. Tower Automotive relocated to an industrial park on Hammond Road. With this acquisition, Eagle Picher Automotive owns seven of the 10 properties on Cass-Hartman Court and three of the six buildings. A profile of the firms in Cass-Hartman Court is listed in Table 4.3-1.

Table 4.3-1
Businesses Located in Cass-Hartman Court

Company Name	Approximate No. Full-time Employees	Type of Business
Hallmark Construction	7	General contracting
K.B. Cook Co.	17	Tool and die, metal stamping
Sonny's Body Shop	5	Auto body repair
Eagle Picher Automotive (formerly Carpenter Enterprises, Ltd.)	300+	Machining automobile parts

Much of Eagle Picher Automotive work requires round-trip transfer of machined parts to CRM, Inc. for finishing. CRM, Inc. is located on South Airport Road near Garfield Road. A representative of Carpenter Enterprises, Ltd., indicated in 1999, that 40, possibly as high as 50, trucks per day enter and exit the property. Most of these are among the largest manufactured truck tractor-semitrailers, which, often fully loaded, are not able to make the tight turn west onto Hartman Road as the intersection is currently designed. As a result, dispatchers route U.S. Route 31/M-37 southbound freight traffic from Cass-Hartman Court north on Cass Road to South Airport Road, then west to U.S. Route 31/M-37 (Kopriva, 1998). Currently there is no traffic signal at the Hartman Road/Cass Road intersection to facilitate turning west or at the Hartman Road/U.S. Route 31/M-37 intersection to facilitate southbound turns.

Moving east, Greiger's Archery, Crafts and Ceramics, a small home-based business, is located on the east side of Keystone Road, at the base of the hill leading to Hammond Road. Beginning at the crest of the hill on Hammond Road east of Keystone Road are four light industrial business parks that have developed between LaFranier and Townline roads. These four complexes dominate the industrial profile of the area. Concentrated immediately west and east of Garfield Road, they include North Star Park, Garfield-Heidbreder Industrial Park, Peninsula Business Park South, and Traversefield Enterprise Place (Figure 4.3-1). Representative companies for each of these industrial parks are listed in Table 4.3-2.

Table 4.3-2
Hammond Road Industrial Parks and Representative Businesses

Industrial Park	Businesses
North Star Park	· Beaver Distributors · Home Acres Building Supply · Jantech, Inc. · Martin Electric · Northland Tool Corporation · United Parcel Service · Windemuller Electric, Inc. · United States Post Office
Garfield-Heidbreder Industrial Park	· Bay Area Tool · Camtech, Inc. · Fastner Products · Midwest Air Products · Norcom, Inc. · Page Components · Quality Dial, Inc. · Record/Eagle Printing & Distributing Center · Selcraft Products · Tenneco Packaging · Tower Automotive · Traverse City Products · Universal Electric Products
Peninsula Business Park South	· B&R Supply · Indoor Sports Center · McCardel Culligan
Traversefield Enterprise Place	· Advantage Electric Services · GTP Industries · Pinnacle Molded Plastics · Tenneco Corrugating

Land within Traversefield Enterprise Place is protected by a Grand Traverse Regional Land Conservancy (GTRLC) conservation easement. The protected 4.68-hectare (11.56-acre) property lies

north of Hammond Road and 0.4 kilometer (0.25 mile) east of Garfield Road, and includes both wet meadows and a swamp. Restrictions control further property division, land use, and surface and water alterations (GTRLC, 1998). With the exception of gas station/Quick Marts at major intersections, and Lead Screws International, Inc. on Precision Drive just west of Three Mile Road, there are few other independent businesses along Hammond Road outside of these industrial park locations.

Three Mile Road and Four Mile Road Corridors. Meadowlands Industrial Park, a small 14 lot industrial site condominium project is under construction (April 2000) on a 16-hectare (40-acre) parcel west of Three Mile Road at the intersection of Vanderlip Road. Building construction on individual lots is expected to begin by mid-summer. This is near two new small office buildings on the east side of Three Mile Road that share an entrance driveway with a new twenty-four unit apartment building. A self-storage unit is situated on the east side of Three Mile Road approximately 0.6 kilometer (0.4 mile) north of Vanderlip Road.

Further north on Three Mile Road, smaller businesses operate at the intersection of Three Mile Road and Aero Park Drive (southwest corner: Grand Traverse Canvas Works) and Business Park Drive (southeast corner: State Farm Insurance). The State Farm offices are just north of East Bay Elementary School at the entrance to Peninsula Business Park East.

As described previously in Section 4.3.2, land use between Parsons Road and U.S. Route 31/M-72 along Three Mile Road is a mixture of residential, professional office, institutional, and commercial. A dental office for Mark Davey, DDS, is located just north of the Parsons Road intersection before Mitchell Creek Drive on the east side of Three Mile Road. North of Pine Grove Road, on the west side, a professional photographer (Michael Cole) operates a home-based commercial studio.

Swanson Leasing fronts Three Mile Road on the east side, adjacent to Mitchell Creek. The U.S. Route 31/Three Mile Road T-intersection is bordered on the west by a Total gas station and on the east by a small take-out food business, Great Lakes Submarine. The parking lot to the south of the building is shared with the American Automobile Association (AAA), whose offices extend along U.S. Route 31/M-72 east of Great Lakes Submarine.

Commercial land use on Four Mile Road is primarily concentrated near Hammond Road and at the U.S. Route 31 intersection. On the west side of Four Mile Road, near Hammond Road, north of the future site for the Seventh Day Adventist Church, there is a small professional office building. Belanger's Septic Service is located approximately 61 meters (200 feet) north of this entrance on the east side of the road. A shop and storage area for a construction-based business is located approximately 488 meters (1,600 feet) south of Pine Drive.

Further commercial operations are limited to north of the railroad tracks. On the west side of the road is a small, vacant strip commercial center with one active business (a golf and ski shop). The remaining floor space in this small mall has been vacant for a number of years. A gas station is located on the southeast corner of Four Mile Road and U.S. Route 31/M-72, with parking for the Pebble Brook Fun Park on U.S. Route 31/M-72 immediately to the south.

Additional Commercial, Office, and Industrial Considerations.

Truck Traffic. To better understand truck traffic in the area of Cass-Hartman Court and Hartman Road, an informal telephone survey was conducted of selected industries that presently use the Cass Road corridor. Table 4.3-3 lists the industries contacted and briefly describes daily truck loads entering and exiting the respective properties in 1998.

Table 4.3-3
Cass Road Corridor Truck Survey

Company and Address	Number of Trucks/Day; Comments
Eagle Picher Automotive (formerly Carpenter Enterprises, Ltd.) Cass-Hartman Court	40 (50); typically large truck tractor-semitrailers, fully loaded
K. B. Cook Company Cass-Hartman Court	17-21; usually smaller trucks; occasional steel deliveries in truck tractor-semitrailers
Hallmark Construction Company Cass-Hartman Court	2-3 truck tractor-semitrailers, some smaller trucks and/or trailers pulling construction equipment
Molon Excavating Company 2160 Cass Road	12 maximum; typically a mix of tandem axles, dump trucks and truck tractor-semitrailers
Sara Lee Corporation 2314 Sybrandt	50-70 minimum to a seasonal high of 80-100 truck tractor semitrailers
Integrity Iron and Metal Company 2676 Cass Road	5 truck tractor-semitrailers plus 45-50 smaller trucks handling smaller loads
Cornillie Concrete 2900 Cass Road	9 large cement trucks make multiple trips, up to as many as 30 from the site; local agricultural customers pick up sand and gravel using a variety of vehicles from pickup trucks to one-tons.
United Waste Systems 2294 Cass Road	(Information not obtained)
Pepsi-Cola 2550 Cass Road	15

Virtually all truck traffic in this corridor that needs to travel south of Traverse City moves north to South Airport Road and travels west to reach U.S. Route 31/M-37. Route-limiting factors that were cited included:

- the absence of traffic lights at the intersections of Cass and Hartman roads and Hartman Road and U.S. Route 31/M-37;

- the short road interval between Cass-Hartman Court and Hartman Road;
- the long wait times at existing traffic signals; and
- the traffic congestion on South Airport Road.

Shopping Centers. Several major shopping centers are in close proximity to the Hartman-Hammond Road corridor. They include Grand Traverse Mall and Grand Traverse Crossing on South Airport Road near U.S. Route 31/M-37, and Cherryland Mall on the northwest corner of the Garfield Road/South Airport Road intersection (Figure 4.3-1). Grand Traverse Mall and Grand Traverse Crossing create major traffic convergence points in west Garfield Township.

Grand Traverse Mall, a conventional regional shopping center, is the largest of the three centers, containing 100 stores, four department stores, 14 eateries, and a nine-screen movie theater complex. The mall draws up to 8 million customers annually from 20 northern Michigan counties extending from Lake Michigan on the west, Lake Huron on the east, Ludington on the south, and north to the Straits. Peak customer counts in 1997 were approximately 840,000 people in August and 980,000 in December. The low was approximately 545,000 in January 1997. The total number of cars visiting the mall in 1997 ranged from approximately 197,000 in January to a high of roughly 313,000 in August. In 1997, 70 percent of the traffic entered the mall parking lots from South Airport Road (Gianquitti, 1998).

Grand Traverse Crossing has approximately 30 stores, most of which are mass volume retailers. Three restaurants front the mall. The first stores opened in September 1996. Expansion plans for the Grand Traverse Crossing PUD include a 162-unit townhouse development (Byrnes, 1998; Fite, 1998).

Cherryland Mall, located in the northwest corner of the Garfield Road/South Airport Road intersection, was built in two phases in 1975 and 1977 (Fowler, 1998) and has recently been reconfigured.

4.3.5 Recreation

Recreational activities in the Traverse City area include a range of sports and outdoor activities, from golf to skiing to birding, that take advantage of the variety of seasons and the facilities available to the local population. Within the beauty of this regional context, the Boardman River valley runs north-south between Hartman and Hammond roads. Next to Grand Traverse Bay itself, the Boardman River is one of the most dominant and valued natural landscape features in Traverse City and is highly valued as both an ecological and recreational corridor. As a result of its position relative to the east-west project corridors, the Boardman River valley is central to the proposed actions of this project.

The northernmost end of the Grand Traverse Nature Education Reserve, the Traverse Area Recreational Trail, and the George and Ada Reffitt Nature Preserve, located within the Three Mile Road corridor, are other recreational land uses of particular concern to this study. The following section describes a number of active and passive recreational areas and facilities, including those noted above, that are located within or near the project area and the Boardman River valley (Figure 4.3-1).

Grand Traverse Nature Education Reserve. Within the Boardman River valley, the Grand Traverse Nature Education Reserve preserves many landscape ecological features in a natural outdoor educational setting. Located approximately 4 kilometers (2.5 miles) south of Traverse City, the Reserve began in 1969 when Consumers Power Company (now Consumers Energy) transferred 97

hectares (240 acres) of its Boardman River property to Grand Traverse County with the stipulation that it be used for public recreation purposes. Formally dedicated as a protected area in 1976 by the County Board of Commissioners, the Reserve is currently greater than 162 hectares (400 acres) and follows more than 3.9 kilometers (2.4 miles) of the Boardman River. The ecosystems contained within its boundary represent a majority of the natural systems found in the Traverse City area. The Reserve serves as an extremely popular recreational and educational destination. The northern boundary of the Reserve property was recently extended farther north after inclusion of a 5-hectare (13-acre) parcel donated to the GTRLC. The new northern boundary lies approximately 152 meters (500 feet) south of the centerline of the Hartman-Hammond Road corridor.

Representative ecosystems found within the Reserve include a bog, marsh, pond, cedar swamp, upland deciduous forest, and pine forest in addition to the Boardman River and its associated creeks. Two dams in the Reserve create two impoundments, Sabin and Boardman ponds, which are also focal points on the property. The Reserve contains more than 8 kilometers (5 miles) of developed trails and boardwalks, more than 0.8 kilometer (0.5 mile) of paved trails, and picnic areas, barrier-free fishing platforms, and many scenic overlooks.

The existing Reserve trail system is part of the larger proposed Grand Traverse County Master Trail Plan. A number of studies have recommended that the Boardman Valley Trail system be developed on both sides of the Boardman River in this area to connect downtown Traverse City to the Reserve (Harsch, 1988; OCBA, 1991). No funds are currently set aside for construction of the Riverwalk between the Reserve and the YMCA (Schreiner, 2000). When completed, the Riverwalk trail connections between Boardman Lake and the Reserve are expected to increase the Reserve's usage (GTCPR, 1997).

Traverse Area Recreational Trail (TART). The TART trail crosses Three Mile Road on the north side of the Tuscola and Saginaw Bay (T&SB) Railroad at Parsons Road. This trail system is a 12-kilometer (7.5-mile) east-west "rails to trails" route that includes a 2.4-meter (8-foot) wide asphalt path. This route parallels Grandview Parkway/U.S. Route 31 from East Traverse Highway (M-72) and connects southeast to Parsons Road via the old railroad bed just east of Franklin Street in downtown Traverse City. The trail crosses Three Mile Road just south of the Parsons Road intersection and follows the old rail bed east past Four Mile Road. Plans for the trail include extending it around East Arm Grand Traverse Bay, past Five Mile Road to Bunker Hill Road. Ultimately, it is expected to connect downtown Traverse City with the Grand Traverse Resort in Acme Township and the Boardman Riverwalk trail system. Uses include hiking, jogging, walking, roller skating, and cross-country skiing. No motorized use is permitted on the trail (OCBA, 1991).

George and Ada Reffitt Nature Preserve. Immediately south of the railroad, set back from Three Mile Road, is the entrance to the George and Ada Reffitt Nature Preserve, created in 1992 through land donation by Ronald and Donna Reffitt and now protected by the GTRLC. Totaling 21 hectares (52 acres), the property includes 823 meters (2,700 feet) of Mitchell Creek and a large wetland habitat that supports the wood turtle, a species listed as Special Concern in Michigan. The preserve is located just south of Traverse City State Park and the TART trail. The bulk of the property extends east and south behind East Bay Elementary School and the Cherry Capital Airport clear zone on the east side of Three Mile Road. The preserve has a good trail system that is widely used by the local community (GTRLC, 1997; Fleming, 1998).

Traverse City State Park. One of three state parks in Grand Traverse County, Traverse City State Park is a 17-hectare (42-acre) urban park with 0.4 kilometer (0.25 mile) of beach front on East Arm Grand Traverse Bay. It is a fully developed park 3.2 kilometers (2 miles) from downtown Traverse City between Three and Four Mile roads adjacent to both sides of U.S. Route 31/M-72. The park offers picnic areas, playgrounds, a beach house, and 341 campsites complete with facilities in a wooded site that backs up to the beach front (MDNR, 1998). Attendance at the park averages approximately 200,000 people annually. Most people (approximately 80 percent) visit the park in July and August (Newman, 1998).

Natural River Designation. Effective February 1976, most of the Boardman River, including the location of the existing Cass Road Bridge, was designated by the State of Michigan as a Natural River pursuant to Public Act 231, 1970 (Boardman River Management Plan Committee 1975). The Boardman River Natural River District begins at the former northern boundary of the Grand Traverse Nature Education Reserve and extends upstream to the headwaters in Kalkaska County. The river is designated as Country-Scenic between the Reserve and Brown Bridge Dam, and Wild and Scenic from that point upstream to the headwaters (Boardman River Management Plan Committee, 1975). The portion of the Boardman River within the project corridor does not have Natural River or Wild and Scenic River designation.

4.3.6 Utilities

Many utility lines, including electric, gas, water, sewer, telephone, and cable are located within the project corridors. Other types of utilities (e.g., cable, fiber optic, telephone) are also expected to occur within most of the existing road rights-of-way.

Hartman-Hammond Road Corridor. City sewer and water or septic systems and domestic wells serve residential development along this corridor. Sanitary sewer, however, exists along U.S. Route 31/M-37 south to the southern limit of the project area. Sanitary sewer and water lines extend to the Cass-Hartman Industrial Park on Cass Road, the North Star Industrial Park/Garfield Place on Garfield Road, and the ice arena on Hammond Road at Carlisle Road. Sewer and water lines parallel Garfield Road to the southern limit of the project area. Electric transmission lines are located in the Boardman River valley (46 kV), along Keystone Road (69 kV), and along Hammond Road (12.4 kV). Electric distribution lines are located along nearly all of the roads in this corridor.

Three Mile Road and Four Mile Road Corridors. Residential development along the Three Mile Road corridor is served primarily by city sewer and water. Sanitary sewer exists along Three Mile Road from the Traverse City Junior High School East to U.S. Route 31/M-72. Sewer and water extensions are currently planned for Four Mile Road and the intervening section of Hammond Road. Electric distribution lines parallel most of Three Mile and Four Mile roads, and an electrical substation (or relay yard) is located on the northwest corner of Oak Drive and Four Mile Road.

4.3.7 Zoning and Land Use Planning

Zoning. With few exceptions, land uses in the project area generally reflect the zoning categories shown on the Garfield or East Bay Township zoning maps (Garfield Township, 2000; East Bay Township, 1999). Figures 4.3-2 and 4.3-3 show current zoning for the two townships. Garfield and

East Bay Townships' published Zoning Ordinances provide a detailed explanation of the zoning classifications (Garfield Township, 1999; East Bay Township, 1999).

Comprehensive Land Use Plans. Many land use plans and studies have been conducted that include areas within the project corridors. This section of the Final EIS updates information on several plans developed by local planning commissions which are intended to influence future land use decisions within the project area.

The East Bay and Garfield Townships Combined Future Land Use Map (Haugen, 1998). The Garfield and East Bay Townships Combined Future Land Use Map (CFLUM) indicates proposed land uses between the south side of South Airport Road and the southern boundary of the Hartman-Hammond Road corridor from just west of U.S. Route 31/M-37 to just east of the Supply Road/Hobbs Highway intersection. The mapped area is bounded on the south by the Consumer's Energy utility easement corridor. A copy of the map was included in the Draft EIS.

The CFLUM was originally generated to enable the township planners to more clearly understand the overall development patterns planned for the area surrounding the Hartman-Hammond Road corridor between U.S. Route 31/M-37 and the east side of East Bay Township. It allows the viewer to easily visualize the larger land use patterns intended in the townships' comprehensive land use plans. The CFLUM does not, however, replace the individual township's authority in specific planning decisions. Both Garfield and East Bay townships have updated their land use plans since the Draft EIS was issued in 1999. Consequently, the focus of this section of the Final EIS is on the most recent plans. A more detailed discussion of the CFLUM is presented in Section 4 of the Draft EIS.

Garfield Township Comprehensive Land Use Plan (1999). Garfield Township extends south and west from the Traverse City boundary and contains the western portion of the Hartman-Hammond Road corridor. As shown in Figure 4.3-4, Garfield Township's Future Land Use Map taken from the Garfield Township Comprehensive Land Use Plan, identifies land uses that essentially follow current uses in the corridor. At the U.S. Route 31/M-37 intersection with Hartman Road, the plan identifies a small Professional Office area on the southeast corner. Professional Office land use consists of areas that permit service-related businesses and other institutions having relatively low traffic volumes. It is considered to be a suitable buffer between residential and commercial land uses.

East of U.S. Route 31/M-37, a large planned development is proposed on the south side of Hartman Road. Given the existing landscape character here, future development should be designed to protect viewsheds associated with the area and protect the north face of the Manistee moraine from intense urbanization. Clustering buildings, and preserving open fields in the viewsheds are considered essential components of developing this area. Overall densities should remain within the rural residential allowances of approximately 2 units per hectare (1 unit per acre). In this PUD area, the Township's Comprehensive Plan also indicates that non-residential uses should reflect the development density characterized by the office building west of U.S. Route 31/M-37 in the southwest quarter of the northwest quarter of Section 28 (Garfield Township, 1999).

On the south side of Hartman Road between the proposed PUD and Dracka Road, land is designated as Rural Land, where a density of approximately 2 units per hectare (1 unit per acre) is considered appropriate if structures require on-site sewage treatment and water supply. Agricultural uses are encouraged for as long as possible on Rural Lands, and community sanitary sewer and water services

are not expected in the forseeable future. Large parcel Rural Lands are considered particularly suitable for cluster development, particularly where development space is limited by topography such as hillside areas that are more difficult to build on and not easily accessible to sewer and water services. Further bonus densities for conservation of open space that protects high value resource areas and biodiversity are possible. East of Dracka Road on the south side of Hartman Road, allowable residential density increases to Moderate Residential, or 5 to 15 dwelling units per hectare (2 to 6 units per acre), development densities which are more suited to water and sewer service.

As would be expected, the Sabin Elementary School property at the northwest corner of Hartman and Cass roads is identified as Schools. Land east of Cass Road to the river valley is Industrial. According to the Comprehensive Plan, suitable uses include manufacturing, wholesale distribution, warehousing and related activities such as retail distribution of products made or inventoried on site that generate minimum noise, glare, air and water pollution, dust or fire or safety hazards. The adjacent river valley is Stream Environment/Wetland, a land use category designating areas unsuited for development or only low levels of development or where mature vegetative canopy is of particular value to the township. Development occurring in these areas must use "considerable care" to inventory and protect existing vegetation and/or define plans for minimal removal of existing plants.

The Moderate Residential density land use classification continues between the eastern boundary of the river valley and Keystone Road. East of Keystone Road, Medium Density residential development is proposed for the south side of Hammond Road for approximately 0.8 kilometer (0.5 mile) before a 5-kilometer (3-mile) stretch of Industrial land use begins. Within the industrial land use in this section are scattered areas of natural preserve that consist of wetlands and small stream corridors that are part of the Mitchell Creek watershed.

Land north of Hammond between Keystone and Garfield roads is also identified for PUD development with a proposed mix of public, semi-public, residential, institutional, and health-oriented land uses. This PUD extends north from Hammond Road to just south of South Airport Road. The northwest corner of Hammond and Garfield roads is designated for General Business use, and the northeast corner for Local Business. The Local Business category is designed to provide convenient day-to-day shopping and service for adjacent residential areas with minimum impact to the surrounding area.

Moderate residential densities are also proposed for the remaining land east to Townline Road and the East Bay Township border on the south side of Hammond Road. This section also contains "critical wetland" areas southeast of Garfield and Hammond roads and in the southwest corner of the intersection of Hammond and Townline roads (Grand Traverse County Drain Commissioner's Office, 1995). Further east of Traversefield Enterprise Place, on Hammond Road's north side, Mitchell Creek watershed critical area wetlands are interspersed in an area designated as Rural Land where development is appropriate at a density of $\pm$ 2 units per hectare (1 unit per acre).

East Bay Township Comprehensive Plan (1999). East Bay Township's Comprehensive Land Use Plan map is shown in Figure 4.3-5. Much of what is described in the Comprehensive Plan (and summarized in the following discussion) defines new growth planned for the Township. In the Hammond Road corridor between Townline and Three Mile roads, industrial land use is projected for the north side of the road for approximately 1.1 kilometer (0.7 mile). Corresponding land uses south of Hammond include from west to east, a short section of industrial land 305 meters (1,000 feet), followed by low to medium residential density increasing to medium to high density immediately west of the village center

boundary proposed for the Hammond/Three Mile Road intersection. This area is identified as Neighborhood Commercial on the Comprehensive Land Use Map.

The village center boundary extends north on Three Mile Road for approximately 488 meters (1,600 feet). North of this point a short section of industrial land use west of Three Mile Road is followed by a high density residential area north to the South Airport Road intersection. Between South Airport and Parsons roads, areas of medium to high density residential land use are divided by Cherry Capital Airport property. North of Parsons this residential land use gives way to the only section of Regional Commercial land use designated for the Township. It extends primarily east on U.S. Route 31/M-72 to the Township boundary.

East of Three Mile Road and north of the village center boundary, residential land use progressively decreases in density to the Cherry Capital Airport property line. North of the airport property to Parsons Road, Peninsula Business Park East marks a section of industrial land use. North of Parsons, a mixed residential-commercial area is designated for regional commercial use. These land use categories are discussed in greater detail in the following paragraphs.

As part of the preparation for the newly-released *East Bay Township Comprehensive Plan*, a thirty-two member study team, formed from the community, aided the Planning Commission in developing the goals, objectives and implementation strategies outlined in the plan. Each broad goal statement, crafted to define community preferences for the township, 25 years hence, is supported by several underlying objectives. Briefly, the goals include:

- maintaining the community's rural as well as diversified residential character;
- preserving the township's valuable natural features;
- expanding utilities in a rational and sequential manner to protect groundwater;
- strengthening existing neighborhoods and avoiding developmental sprawl;
- maintaining large tracts of unfragmented agricultural land;
- creating sustainable recreational assets that preserve and maintain the township's natural features;
- encouraging growth and job creation that is attractive, rational, supported by adequate infrastructure, and compatible with the area's natural features;
- expanding the roadway network and transit service "in accord with the township's land use objectives consistent with its aesthetic standards;" and
- integrating the township's planning activities with regional decision making processes to better manage growth and establish consistent land use policies (East Bay Township, 1999).

The plan discussion clearly shows that the community recognizes the growth pressures being placed on the township and understands the need to create a vision that controls and directs growth appropriately and preserves the township's important natural features and rural character. The following paragraphs briefly summarize the key points of the plan and the recommended implementation strategies.

Growth Boundary. The Township intends to concentrate most growth in the area north of the 91-meter (300-foot) wide Consumers Energy east-west utility easement (Orttenburger, 1998), and the 1999 Comprehensive Plan clearly identifies this corridor as the southern border of the Township's proposed growth boundary (Figure 4.3-5). Based on the plan, this focuses growth in the northwestern third of the Township adjoining Traverse City and Garfield Township in an area that encompasses

approximately 3,195 hectares (7,900 acres). Controlled growth will be encouraged within the boundary whereas conservation of natural features and rural character will be promoted on remaining Township land.

Village Center. The village center concept presented in the Township's plan (Figure 4.3-6) concentrates residential and commercial development in a pedestrian-scale village center at the intersection of Hammond and Three Mile roads, near development pressure points from the north and west toward Traverse City. Achieving this centralized, higher density development is central to the Township's goals of preserving important natural features and promoting efficient, pedestrian-scale development. It is intended that the wetlands associated with Mitchell Creek will act as a controlling buffer and help maintain the northern village center boundary. Although bisected by what the plan considers to be future regional arterials in both Hammond and South Airport roads, the Township is committed to creating a pedestrian-scale atmosphere that minimizes conflicts with these two corridors. Controlling roadway access is recognized as important to achieving this objective as is cooperative planning between all necessary Township and County agencies to achieve the plan as described.

As can be seen on the plan, the village center becomes the new growth point in the township, with progressively less dense land use functions radiating from this point. Because of its role as a buffer between the village center and Traverse City to the northwest, protection of the Mitchell Creek wetlands are recognized as an important component to the success of the plan. In addition, appropriate access controls on Hammond Road are also recognized as necessary to achieving a distinct "village" identity. As part of the implementation strategy, the plan also recommends continuing to employ utilities as another growth management tool.

Natural Area Preservation. Much of the Township area with this designation is already in public ownership. Based on the plan, large privately owned tracts in this area may be developed at low intensities in ways that limit impacts to natural features. Conservation easements, overlay zones for unique resource areas and avoiding public utility and road extensions are all recommended techniques to control growth. The plan recommends cluster or low impact development that preserves at least 8 hectares (20 acres) of natural areas for every 0.4 hectare (1 acre) developed and using the Township's PUD mechanism to implement development in a manner consistent with the Comprehensive Plan, including the creation of project-specific performance measures to assess potential impacts.

Mitchell Creek Protection and Transition District. The Township has established this district to protect Mitchell Creek-associated ecosystems, wildlife corridors, and water quality while permitting low intensity development where feasible that is designed to be compatible with the watershed's sensitive natural features. Recommended land uses include single family residential clusters in densities of 2-7 units/hectare (1-3 units/acre), office parks or clean industrial uses. This area is identified as a transition zone between the more urbanized northern section of the Township and the Hammond-Three Mile Road Village Center. The Mitchell Creek Watershed Protection Strategy forms the underlying principles of the formation of this district. Key points of the Mitchell Creek Watershed Development Plan are outlined in more detail in the Township's Comprehensive Plan. Three and Four Mile road frontage will be maintained in as natural a state as possible. Defined performance standards, required for each project, will maintain the natural features of the site and the buffering properties of the district. Standards will include features such as 61-meter (200-foot) wide stream corridors, accurate wetland delineation, storm water detention and treatment, dedicated 30-meter (100-foot) wide scenic easements from all county roads and implementation assurances such as performance bonds and deed restrictions.

The county road easement restrictions will include non-motorized trail connections to promote alternative transportation methods.

Agriculture. Although limited high quality agricultural lands remain in production, agriculture contributes to the community's rural character and farming remains an important part of the local economy. The purpose of this designation is to promote continued agricultural use and minimize conflicts with more intense land uses. Permitted gross densities of up to 2 units/hectare (1 unit/acre) will be allowed in areas suitable for development. Incentives to encourage preservation of agricultural lands may include Transferable Development Rights. The overall goal is to preserve a minimum of 50 percent of the Townships agricultural lands. Performance measures to assess possible development impacts may include buffering zones, road connections to minimize farm vehicle conflicts, and minimum parcel sizes for active farming.

Residential Densities. Generally, progressively higher residential densities are concentrated in progressively smaller areas surrounding the Hammond-Three Mile Road Village Center. In all cases, conservation clusters that promote the preservation of open space and significant natural features will be encouraged. Important to the success of higher density residential development, is environmentally-sensitive design and the establishment of pedestrian-scale, walkable neighborhoods near commercial and recreational support services. Recommended densities are:

- Very Low Density ($\leq$ 1 unit/acre) on 2,029 hectares (5,013 acres). Not served by large-scale public utility systems, possible small neighborhood commercial nodes.
- Low to Medium Density (1-3 units/acre) on 2,003 hectares (4,950 acres). Surrounds the Village Center west, south, and east, small neighborhood commercial nodes.
- Medium to High Density (3-5 units/acre) on 465 hectares (1,148 acres). Complementary mixed-use development, proximate to commercial and recreational services, includes a northwest tract of the Village Center extending from Three Mile to Hammond Road.
- High Density (5-8 units/acre) on 137 hectares (338 acres). Complementary mixed-use development, good infrastructure support, good access to commercial and recreational services, higher densities may be considered.

Commercial Land Use. A total of 70 hectares (172 acres) of neighborhood commercial land use are planned for the village center. The design should be at a scale and in a form that encourages pedestrian accessibility and minimizes pedestrian-auto conflict. Eighty-eight hectares of regional commercial land use (218 acres) are planned along U.S. Route 31 in Sections 8 and 9 of the Township to provide goods and services for the larger Grand Traverse region. Maintaining smooth traffic access and preserving views of the bay are important criteria.

Industrial Land Use. A total of 110 hectares (272 acres) of land allocated to industrial use are planned northwest of the village center extending west along Hammond Road from the village center to Townline Road. This section also wraps north around the western village center boundary and extends north along the west side of Three Mile Road for approximately 305 meters (1,000 feet). A second smaller area, Peninsula Business Park East, lies east of Three Mile Road north of and adjacent to the Cherry Capital Airport boundary east of the road. Industrial uses with minimum environmental impact will be promoted in the Township. According to the Comprehensive Plan, site development plans submitted for industrial development should include provision for transportation and utilities and should ensure adequate area control and management through zoning regulations and deed restrictions.

Transportation Changes. The plan recognizes the importance of maintaining the efficient functioning of arterial roadways and lessening their visual impact as population and jobs in the township continue to grow through the planning period and increase local traffic. In part, this will be accomplished by incorporating greater building setback distances (e.g., 30.5-meter [100-foot] wide setback from the road centerline for all buildings and enforcing access and driveway controls for new construction).

The Township's Potential Transportation Routes Map (Figure 4.3-7) identifies Hammond Road east of Three Mile Road, and Three and Four Mile roads as potential future arterial routes. In addition, the plan recommends a new roadway connection between Hammond and Supply roads at the junction of High Lake Road to divert traffic from Hammond Road east of Four Mile Road and encourage Three and Four Mile roads as north-south connections between Hammond Road and U.S. Route 31. This recommendation responds to MDOT's proposed improvement of U.S. Route 131, including an interchange at Supply Road, from the Manistee River to Kalkaska. The Township believes these improvements would likely make this the preferred route from U.S. Route 131 into the Traverse City area and increase future traffic loads on these roads, thus leading the Hartman-Hammond Road corridor to become an "arterial beltway" between U.S. Route 31/M-37 on the west and High Lake/Supply roads and U.S. Route 131 on the east.

Figure 4.3-8, the Township's Existing Transportation Map, identifies this traffic circulation pattern, at least from the Hammond/Three Mile Road intersection as a local arterial. It includes Three Mile Road, Hammond Road east of Three Mile to High Lake Road, High Lake Road, and Supply Road. It also extends this designation on Three Mile Road south to Garfield Road and includes Garfield Road both east and west of Three Mile Road to the Township line. U.S. Route 31 is the only regional arterial identified in the existing transportation plan. West of Three Mile Road, Hammond Road is considered a principal collector road. The plan also identifies the Hartman-Hammond Road corridor as the most likely route to meet the Township's needs for an east-west connector. This has already been identified as an important need in the Township by the Traverse City Transportation and Land Use Study (TC-TALUS) Long Range Transportation Land Use Plan.

Components of the east-west circulation problem defined by the Township's Comprehensive Plan include:

- almost doubling the population in the next twenty years;
- approximately 35,000 east-west vehicle trips in the Township;
- the requirement for an improved east-west transportation corridor that returns traffic to U.S. Route 31;
- topographic features in the Township that limit east-west corridor options;
- a Township and County desire to limit sprawl and preserve existing natural and cultural landscape features;
- traffic management of the U.S. Route 31/Three Mile Road intersection;
- aesthetic control of new development along the Bay; and
- limited Township ability to influence the final road solution.

Given the proposed population growth in Grand Traverse County through the planning period, the Township's Comprehensive Plan states that a connection between Hartman and Hammond roads is highly probable. However, even if the connection is not made, the function of Hammond Road as an arterial will continue. As a result, the Future Land Use Plan, briefly summarized in the previous

paragraphs incorporates the corridor, approximately 85 percent of which lies east of Three Mile Road, as a regional arterial and seeks to limit destination land uses that may foster congestion. The plan recommends both access management techniques and methods to preserve the rural nature of the corridor as important to achieving the Township's vision for growth. Using the village center to concentrate growth in the western portion of the Township will also help to consolidate land use patterns. Based on the plan, the Township intends to discourage commercialization of Hammond Road east of Three Mile Road. Alternative transportation linkages such as pedestrian and bicycle trails are also intended to offset motorized transportation demand.

Implementation Strategies. The final section of the Comprehensive Plan discusses fifteen recommended implementation strategies to achieve the goals and objectives of the plan. In general priority the top ten include:

- refine sewer and water policy to guide development;
- prepare a sub-area plan for the Hammond – Three Mile Road Village Center;
- prepare corridor plans for Hammond, Three Mile and Supply roads;
- evaluate and revise the Zoning Ordinance to conform with the plan;
- tailor preservation techniques to meet the unique needs of important natural areas;
- inventory key natural and cultural features;
- improve public understanding of growth management benefits;
- develop non-motorized connections;
- broaden cooperative economic development activities; and
- preserve important viewsheds.

These strategies and their applicable goals and objectives are discussed in detail in Chapter 9 of the Comprehensive Plan.

Miller Creek Area Study (Design 3, 1997). The Development Concept map of the study illustrates an implementation scenario using the Garfield Township Comprehensive Plan guidelines (Figure 4.3-9). It concentrates office and retail convenience development in a confined area bounded by U.S. Route 31/M-37, the existing Hartman Road, and a new Hartman Road boulevard extension; it designates the area immediately east of U.S. Route 31/M-37 and south of the new Hartman Road for large lot rural residential development. More dense residential land use is sited further east, with an emphasis on cluster development.

The remainder of Hartman Road, to Sabin Elementary School and the Cass Road intersection, is proposed for various residential densities. Convenience Commercial land use is also proposed in the tradition of the neighborhood grocery store. The Miller Creek Development Concept buffers Sabin Elementary School's west side with a Miller Creek greenway easement that includes the Leggett Natural Area.

Hammond/3 Mile Area Study (Design 3, 1998). This plan, as shown on Figure 4.3-10, more clearly identifies commercial nodes at the intersections of LaFranier and Garfield roads with further office and service commercial development on Townline Road between Hammond and South Airport roads. This plan also shows industrial development extended east from Traversefield to Townline Road. On the south side of Hammond Road, open space areas following the creekshed are intermixed with various

residential densities and recreational trail systems including one which parallels Hammond Road. This is a continuation of a proposed trail system that also follows Hartman Road.

Grand Traverse Bay Region Development Guidebook (1992). In 1991-92, representative members of the five counties around Traverse City, the County Planning Commissions, Planning Departments and County Boards of Commissioners came together out of a belief that new development in the region is necessary but should be accomplished in ways that complement and enhance the natural environment. The group's efforts produced a document titled, *Grand Traverse Bay Region Development Guidebook* (Planning and Zoning Center, 1992). This document includes design and planning recommendations to help manage and direct the growth in Grand Traverse County while protecting the region's valued natural resources. Intended to be used and promoted by the local townships, cities, and villages in the Traverse City area, this document is frequently used as a primary reference for proactively managing growth in the region. A companion document, *Grand Traverse Bay Region Sample Regulations* (Planning and Zoning Center, 1992), is also available.

The goals in the Development Guidebook include protecting the rural, small town, and neighborhood character of the region and the surrounding natural and scenic landscape, which are perceived as valuable resources to the region's economic health and overall quality of life. Early in the document, the Steering Committee recognizes the critical connection between an individual's experience of the Traverse City landscape and the roads that are traveled between home, work, school, shopping, or recreation. Called "landscape (or view) corridors," the Development Guidebook identifies most state highways in the Traverse City region as view corridors important to the overall regional experience of those who visit or live in the area. Landscape corridors within the Boardman River Crossing Mobility Study project area include U.S. Route 31/M-37 north into Traverse City from Chum's Corners and the M-72 corridor south of the west and east arms of Grand Traverse Bay.

The Development Guidebook also incorporates a set of development ethics, called "guidelines ethics," that lay the foundation for the proposed design concepts. The guidelines ethics emphasize the following key principles:

- Unique and sensitive lands and the quality of the region's water resources must be protected from over- or poorly designed development.
- Development must be implemented in a way that preserves the rural visual character of the landscape and avoids creation of a more urban character.
- The quality of the region's natural resources must have increased protection through partnerships between all involved members of the community to eliminate their loss through misuse, degradation or over-consumption.
- Preservation of the rural landscape, including important viewsheds and open space as well as village and neighborhood character, must be encouraged through a variety of methods including incentives and regulations.
- Protection of the natural character of the environment, recognized as important to the tourist industry of the region, will require that all governmental units work together using compatible approaches to achieve mutual protection goals.

Of the many design recommendations that include both written and graphic guidelines, several discuss traffic circulation, natural resource protection, and preservation of open space. Examples of visual depictions are shown in Figures 4.3-11 and 4.3-12.

4.4 SOCIO-ECONOMICS

4.4.1 Demographics

Historical Population Data. The Traverse City area has experienced rapid population growth over the past 10 to 20 years. Based on U.S. Bureau of Census data for 1970 to 1990 and State Demographer projections for 1996, the population in Grand Traverse County grew 84 percent (from 39,175 to 72,072 people) between 1970 and 1996. Within this approximate 25 year span, the most significant portion of the growth, 40.1 percent, occurred between 1970 and 1980. There was a 17.1 percent population increase between 1980 and 1990 and 12.1 percent growth between 1990 and 1996 (Northwest Michigan Council of Governments [NWMCOG], 1998).

Garfield and East Bay Township populations grew at an even greater rate than that of the county. In Garfield Township, the population increased 149 percent (7,352 people) between 1970-96, while East Bay Township's population grew 187 percent (6,276 people). Like the county's growth pattern, the major growth spurts for the townships occurred between 1970 and 1980, when they grew 78 and 85 percent, respectively. Over the same time period (1970-96), Traverse City's population declined 16.7 percent (3,008 people), reflecting at least in part, the closing of the state hospital (Dillenbeck, 1999) and the outward migration from the city that was typical throughout the country (NWMCOG, 1998).

Over a shorter time period and on a larger scale, the 1997 *Grand Traverse County Master Plan* describes a population growth rate of 9.3 percent for the 13-county region around Traverse City between 1987 and 1992. The state average for the same time period was 2.5 percent (Grand Traverse County Planning Commission [GTCPC, 1996]). From 1990 to 1996, the county grew 12.1 percent (Office of the State Demographer, 1997). TC-TALUS reports similar growth patterns between 1980 to 1990 (16.7 percent) for the geographical area included in their long-range plan (TC-TALUS, 1995). Their study area incorporates the northern portion of Grand Traverse County and the southeastern portion of Leelanau County.

Population Projections. The TC-TALUS long-range mid-level population estimates project an increase in the TC-TALUS study area population to approximately 109,781 by the year 2015. The TC-TALUS study area includes the City of Traverse City, and the Townships of Acme, Blair, East Bay, Elmwood (Leelanau County), Garfield, Green Lake, Long Lake, Peninsula and Whitewater.

Data gathered for individual townships by TC-TALUS for analysis in their transportation long-range plan predicts more dramatic growth for Garfield Charter and East Bay townships than the TC-TALUS study area overall. Based on their statistics, Garfield Township's population is expected to grow by 104 percent from 1990 to 2015. This is an increase of 10,986 people. Similarly, East Bay Township's population is expected to increase by 7,698 people over the same period, an increase of 93 percent from 1990.

For Grand Traverse County (different boundaries than the TC-TALUS study area), the County's Master Plan projects an annual increase in population of approximately 3 percent (i.e., from 2,300 to

2,600 additional people living in the county each year). Using these annual growth projections, the Master Plan predicts that Grand Traverse County will double its population by 2020. On the basis of this prediction, the county will rank second in the state by the year 2020 in terms of the rate of population growth; it is currently ranked ninth.

The Northwest Michigan Council of Governments and the State Demographer's Office project a 36 percent population growth for Grand Traverse County to 99,600 people between their 1997 and 2020 estimates (NWMCOG, 1998).

Population projections prepared by TC-TALUS can not be directly compared to the Grand Traverse County, the Northwest Michigan Council of Governments or the State Demographer's Office projections because the TC-TALUS study area is different than the County boundaries. In order to gain additional confidence of the TC-TALUS projections, TC-TALUS staff researched Grand Traverse County residential building permit data between 1990 and 1995. The research shows that 3,803 new residential building permits were issued during the five-year period. This figure does not include permits issued in Green Lake Township and apartment permits issued by the Grand Traverse County Construction Code Office. Using a conservative figure of 2.5 persons per household, an estimate of the new residents in Grand Traverse County is 9,508 persons. This figure combined with the 1990 Census figure of 64,273 yields an estimated 1995 population of 73,781 persons. This is approximately 4 percent higher than the State Demographer's estimate of 70,764.

On August 20, 1998, the TC-TALUS Board of Directors voted not to revise the socio-economic forecasts until the year 2000 Census population data is available. The Board felt that the TC-TALUS socio-economic forecasts were sufficiently accurate at this point in time.

Households. Based on data from the Grand Traverse County Master Plan, approximately 30,000 new households will be established in the county by 2020 representing an annual growth rate of approximately 4 percent. This translates to over 52,000 households, with single-family homes for upper and middle-income families the fastest growing housing market segment.

In addition, between 1998 and 2020, the county projects housing costs in the area will rise faster than family income levels. Based on plan data, only 13 percent of the county's families can afford the price of a new home built in the Grand Traverse County area (GTCPC, 1996). In 1998, the Grand Traverse County Economic Development Corporation estimates that a working family, earning average income, has sufficient means to purchase affordable housing in the range of $80,000. Typical housing costs for the area, however, were $100,000 to $120,000 in 1998, with the price of an average new home ranging as high as $200,000 (Blakenship, 1998). In response, the county's long-range plan has identified housing affordability as a significant issue (GTCPC, 1996).

The County Master Plan reports that typical household size has declined from 3.26 people per household in 1969 to 2.6 people in 1996. Continuing this trend, the number of people per household is expected to drop to 2.53 people by 2020. Fewer people per household and an increasing population may cause the housing growth rate to outpace the population growth rate (GTCPC, 1996). For example, data from the Michigan Agricultural Statistics Service documents a 110 percent increase in the number of households for the county between 1970 and 1990, whereas the population increased 64 percent for the same period (Michigan Agricultural Statistics Service, 1998).

In contrast, household projection data from TC-TALUS is mixed for East Bay and Garfield townships for the period from 1990 to 2015. Projections for the number of households in Garfield Charter Township show a 107 percent increase (4,518 to 9,335) at a time when the population is expected to grow 104 percent; however, East Bay Township, with similar population increases (7,698 people or 93 percent), projects only a 72 percent growth in households.

Environmental Justice. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, dated February 11, 1994, directs each federal agency to develop a strategy to address environmental justice concerns in its policies. The purpose of the Executive Order is to avoid disproportionately high adverse impacts to minority populations and low-income populations with respect to human health and the environment.

Based on data gathered for the *Grand Traverse County Master Plan* and the *Housing Needs Study, Traverse City Region* (Haugen, 1999), a total of 15 government-financed, insured, or subsidized apartment complexes that provide a mix of family and elderly housing are located in the county. Six of these complexes are located within the project area: one complex is located in Garfield Township north of South Airport Road near Veterans Drive; four complexes are located in Garfield Township south of South Airport Road between LaFranier Road and Garfield Road; and one complex is located in East Bay Township near the intersection of Hammond Road and Five Mile Road.

Aging Populations. By 2020, the percentage of the population younger than 16 or older than 65 is expected to rise from 37 to 40 percent, with the median age increasing to 40.8 years. This is slightly higher than the national median of 39.2. Ten years ago, the county was slightly below the published median age (GTCPC, 1996). Traverse City is considered a popular retirement location, and there is concern that the percentage of older people in the population will continue to increase due to a higher influx of retirees and "empty nesters."

State Equalized Value. Growth is also reflected through increased property valuation created by new development and investment. The state equalized value (SEV) for property in Grand Traverse County grew approximately 38 percent for the period between 1990 and 1994, or about 8.3 percent per year. Based on this measure, both Garfield and East Bay townships are among the fastest growing communities in the county. Together with Peninsula, Long Lake, and Acme townships, they represent close to 60 percent of Grand Traverse County's total SEV. While Traverse City continued to hold the greatest SEV in 1996, these five townships are growing more rapidly, shifting the economic base to the outlying area around the city proper (GTCPC, 1996).

4.4.2 Economics

Background. In 1950, Traverse City developed a long-range planning strategy to move all industry off bayfront property into specifically identified industrial parks. Park Drive, on the east side of Boardman Lake, became the city's first industrial park and remains active today. Since then this pattern has continued. Currently Traverse City Light and Power's bayside plant on the west side of the city is the last remaining industrial operation on the waterfront. Plans are in place for its decommissioning and removal by 2009 (Traverse City Planning Commission, 1994).

Employment Base. More than 60 percent of all employees in the five- county area around Traverse City (approximately 30,000 to 40,000 people) work in the immediate Traverse City area. These

counties include Leelanau, Kalkaska, Benzie, and Antrim, as well as the outlying areas of Grand Traverse County (Blakenship, 1998; Grand Traverse County Chamber of Commerce, 1998). Based on the 1990 census, 81 percent of those employed in Grand Traverse County drive to work alone (Michigan Information Center, 1996).

According to the Traverse City Area Chamber of Commerce, the largest employers in the Traverse City area are in the medical, educational, tourism, food processing, and industrial sectors. Today, most industry in the Traverse City area is service or light-manufacturing related. Manufactured products are typically small and include plastics, electronics, precision tooling, and metal fabrication.

Currently, industrial growth is active and evenly split between existing companies and new companies coming into the region whose owners are attracted by the quality of life and work afforded by the region, the available trained work force, and lower land costs. A majority of businesses are family owned, with some limited development of large multi-national corporations (Blakenship, 1998). Long term, however, the overall percentage of total employment in manufacturing in the county is expected to decline as commercial and professional services continue to grow, driven by continuing population gains and increases in tourism (GTCPC, 1996). In 1994 there were 424 incorporations in the county as compared to the Michigan state median of 68.

Typically, average pay scales in the Grand Traverse County area are below national averages, and a number of jobs are seasonal, although this is improving. In 1990, the per capita income in the County was $16,987 versus a national average of $18,666. In 1993, this difference decreased to approximately $1,000 (Traverse City Area Chamber of Commerce, 1997). The median household income in 1990 was $29,034 compared to a state median income of $31,020 (Michigan Information Center, 1996). Median household income for East Bay and Garfield Townships were $31,382 and $26,603, respectively in 1993.

To address the dichotomy between average salaries and affordable housing, coordinated plans are being developed by Traverse City, the surrounding townships, and the Traverse Bay Economic Development Corporation to market the region's skilled and reliable work force and create more year-round job opportunities with improved pay rates and benefits. Based on the county's long-range plan, future employment growth is expected to focus on commercial and professional services rather than manufacturing (GTCPC, 1996).

Higher paying manufacturing jobs are expected to continue to decline from 17 percent of the private sector jobs to 9 percent in 2020 in Grand Traverse County. Increasing job opportunities in construction, general services, and wholesale and retail positions will offset this loss, and modest shifts toward new manufacturing opportunities are also occurring.

Based on information from the Traverse Bay Economic Development Corporation (Blakenship, 1998), large sections of Hammond Road and Three Mile Road have been planned as an industrial/commercial corridor for the last ten years. This pattern is clearly demonstrated in the Garfield and East Bay townships' Future Land Use maps described in Section 4.3.7.

Newer business parks such as Traversefield Enterprise Place are filling rapidly and occupancy projections have been adjusted to reach capacity in 2000, rather than 2003 as originally anticipated. Sections of the U.S. Route 31/M-37 corridor south of Hartman Road have further

industrial/commercial development potential, and the area's first high-end office park is targeted for 121 hectares (300 acres) in Acme Township near the amenities offered by Grand Traverse Resort (Blakenship, 1998).

Cherry Capital Airport Master Plan. The Terminal Area Master Plan (Edward Just Associates, 1996) recommends construction of a new terminal within airport property south of Runway 10/28 and north of South Airport Road. As a result of the terminal relocation, the main access to the airport would be relocated from its current location to South Airport Road near Townline Road. The report also recommends that planning and design begin in 2004, so the new facility may be operational by 2008. Justification for the new structure includes projections that double, by 2015, the total annual enplaned passengers and associated parking needs, as well as the jet airline operations. The increased number of enplaned passengers is expected to range from a low projection of 291,000 to a high of 336,000. Total airline operations are projected to increase 30 to 60 percent in the same period.

The location of the proposed new terminal complex assumes several points:

1. enhanced access from Three Mile Road by its widening to five lanes;
2. compatibility with the regional surface transportation plan including a Hammond Road upgrade;
3. expanding the existing terminal area for general aviation;
4. upgrades to Townline Road leading to the new terminal complex and widening South Airport Road to four-lanes;
5. opportunity for viable development of office park, light industrial, and/or aviation-related facilities on site; and
6. a main entrance boulevard approach through at least a 91-meter (300-foot) greenbelt buffer.

Upgrades and widening of existing roads surrounding the airport are only indirectly referenced in the draft Environmental Assessment for proposed terminal development at Cherry Capital Airport (Landrum and Brown, 1999).

Grand Traverse County Master Plan. The County's Master Plan anticipates significant economic expansion and low unemployment through the planning period. The County's plan promotes improved economic prosperity for residents, including better health care, greater social equity, and improved quality of life. In keeping with this emphasis, the goals of the Master Plan seek to encourage growth in a defined framework that controls the undesirable risks of growth, such as increased traffic and congestion or loss of valuable natural resources. The plan also emphasizes the continued importance of preserving the region's rural character and scenic resources in support of the continued success of the tourist industry (GTCPC, 1996).

4.5 CULTURAL RESOURCES

In accordance with the provisions of the National Historic Preservation Act of 1966 (as amended) (16 U.S. Code 470 *et seq*) (NHPA), the Grand Traverse County Road Commission and MDOT have considered the impact of the Boardman River Crossing Mobility Study project on area archaeological and above-ground (i.e., architectural) resources. As directed by the NHPA, the State Historic Preservation Office (SHPO) has commented on the project, and, as recommended by the SHPO, cultural resources surveys for the study area were conducted to identify those resources either listed on or eligible for listing on the National Register of Historic Places (NRHP).

Between July 1996 and December 1998, cultural resources investigations were conducted in the Boardman River Crossing Mobility Study area (Robertson, et al 1996; Robertson, et al 1997; Robertson and Benison 1998; Robinson and Weir 1998; Weir and Robinson 1998; Weir, et al 1998). These investigations included survey and NRHP assessments for archaeological and above-ground resources. All cultural resources investigations were conducted in accordance with MDOT work specifications for archaeological and above-ground resources investigations, the Michigan SHPO requirements, and the Secretary of the Interior's Standards and Guidelines. Work was conducted by cultural resource professionals who meet or exceed these standards

4.5.1 Archaeological Resources

Two prehistoric lithic sites (20GT100 and 20GT101) were located in the Recommended Alternative corridor; the SHPO determined that neither site is eligible for listing on the NRHP (Appendix C, SHPO letters dated August 16, 1996 and October 20, 1998).

4.5.2 Above-Ground Resources

The above-ground resources survey identified 53 pre-World War II properties (148 total structures) in the Recommended Alternative corridor. Of these properties, the SHPO determined that two districts and four individual structures meet the criteria for listing on the NRHP (Appendix C, SHPO letter dated September 14, 1998). Each NRHP-eligible site is listed below and shown on Figure 4.5-1.

Historic Districts

- *Sleder Meat Packing Plant, 200 Hammond Road East.* Contributing buildings in this historic district include the barn and chicken coop (constructed ca. 1890), the silo (ca. 1920), and the original slaughterhouse and meat packing plant (ca. 1940).

- *Black Family Historic District.* This historic district consists of Edwin Black's farmstead (759 Hammond Road East), John Black's farmstead (780 Hammond Road East), and School #4 (also known as the Black School, corner of Hammond and Three Mile roads).

Historic Structures

- *4273 Three Mile Road* (ca. 1941).
- *4283 Three Mile Road* (ca. 1940).

- *4314 Three Mile Road* (ca. 1938).
- *4340 Three Mile Road* (ca. 1946).

The four NRHP-eligible structures are houses along Three Mile Road. The structure at 4340 Three Mile Road is a ranch-style house; the other three are extant round-log houses.

4.6 VISUAL AND AESTHETIC RESOURCES

4.6.1 Regional Landscape Character

In conjunction with Grand Traverse Bay and Old Mission Peninsula as background, the visual matrix of Michigan native plant communities, interspersed with agricultural fields, orchards, commercial and industrial facilities, and residential communities, provides Traverse City with a strong and unique sense of place. It is a landscape that the community recognizes is closely tied to the success of the local tourism and agricultural industries, two key components of the regional economy.

The Recommended Alternative corridor traverses the lower north face of the Manistee moraine east across the Boardman River valley to Three Mile Road. Overall, the landscape has a compelling sense of openness and rural character. Typically, low-density residential development is interspersed with active and fallow agricultural land, small plots of mixed hardwood forests or evergreen plantations, recreational areas, and wetlands.

Hills and terraces on either side of the Boardman River valley create expansive views from Hartman and Hammond roads to Grand Traverse Bay approximately 5.5 kilometers (3.4 miles) to the north, and a more vivid landscape than what is seen from local roads closer to Traverse City.

Hammond Road has the strongest sense of openness due in part its wider right-of-way. Commercial development is presently limited, and the cluster of industrial parks near Garfield Road does not significantly impact the open character of the visual landscape in the Hammond Road corridor.

Just north of the intersection with Hammond and Four Mile roads, long views of the East Arm Grand Traverse Bay are again visible from the corridor.

North on Three Mile Road, where the road gently descends through forested wetlands, there is less open land and longer stretches of road where mature trees create a stronger sense of enclosure. Between Parsons Road and U.S. Route 31/M-72, a more urban sense of community has developed, amidst a more human-scale perspective. Heavier vehicular traffic at the intersection of Three Mile Road and U.S. Route 31/M-72 conflicts with the more intimate sense of neighborhood fostered by the existing residential landscape.

Significant portions of the forested wetlands of the Mitchell Creek watershed are located between Three and Four Mile roads.

4.6.2 Viewsheds

Important views showing the Hartman-Hammond Road corridor character are depicted in Figures 4.6-1a and 4.6-1b. The highest point in the project area, and one of the most expansive views in the

corridor (Viewshed B1), is located on U.S. Route 31/M-37 approaching the existing Hartman Road/U.S. Route 31/M-37 intersection from the south. At this point at the crest of the moraine, the rolling, intermittently forested landscape and long views of Grand Traverse Bay to the north are clearly visible and effectively establish the entry experience into the Traverse City area from the southwest. Further north, the landscape character loses the sense of space that is so striking.

Another important viewshed (B4) is offered from the hilltops of the Manistee moraine overlooking the Boardman River before the landscape descends to the valley floor. Most striking is the view from the east side of the valley looking west from the western terminus of Hammond Road. Here the higher elevation, approximately 224 meters (735 feet), provides long views back to Hammond Road near Dracka Road more than a mile west.

Although not as expansive, views from Hammond Road near Elmbrook Golf Course (Viewsheds B6 and B7) are also important components of the visual landscape experience that makes up the valued character of Traverse City. In this area, rolling terrain is crossed by active farm fields, dotted with barns and small wetlands, and interspersed by mature woodlots.

Viewsheds C1 and C2 (Figure 4.6-2) show the rural village atmosphere, where houses are nestled among trees, along Three Mile Road. Viewshed C3 illustrates the character of the Lower Branch of Mitchell Creek. Viewsheds D1, D2 and D3 (Figure 4.6-3) show the rural residential character of Four Mile Road that is interspersed with a large wetland complex.

4.7 AIR QUALITY

4.7.1 Regulatory Setting

Under the authority of the Clean Air Act and the 1990 Clean Air Act Amendments (CAAA) [42 U.S. Code 7401 *et seq.*], a set of primary and secondary Ambient Air Quality standards for six criteria pollutants (carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide) was established. (Michigan's Ambient Air Quality Standards are identical to the Federal standards.) Generally, when levels of pollutants do not exceed the annual average standards and do not exceed the short-term (one-, eight-, and 24-hour) standards more than once per year, an area is considered in attainment of the National Ambient Air Quality Standards (NAAQS). The project area is in attainment for all six of the pollutants covered by the NAAQS.

Transportation sources produce carbon monoxide (CO), nitrogen oxides (NO_x), and hydrocarbons (also known as volatile organic compounds or VOCs). Nitrogen oxides and VOCs are precursors to ozone. Particulate matter (PM) is emitted primarily by stationary fuel-burning sources – power plants and industrial sources – and to a small extent by transportation sources.

4.7.2 Existing Ambient Air Quality

Monitoring Data. The MDEQ maintains a network of monitoring stations which sample ambient air concentrations and provide data to assess the impact of control strategies. Recently, ozone and $PM_{2.5}$ monitoring stations have been added in Grand Traverse County. No violations of the NAAQS were recorded at these stations in 1999 (MDEQ, 1999).

Carbon Monoxide Microscale Analysis. Carbon monoxide is considered a site-specific pollutant that is usually of concern on a local or microscale basis. Automobiles and trucks are major sources of CO emissions, and the highest concentrations of CO are generally found immediately adjacent to roadways. To assess the effects of this project on local CO levels, a microscale air quality analysis was conducted at receptor sites located near major intersections and in the vicinity of the Grand Traverse Nature Education Reserve and Sabin School. Ozone, which results from a chemical interaction between NO_x and VOCs, is not a concern at the microscale level. It is considered a regional pollutant and is analyzed as part of the State Implementation Plan development and conformity process. Therefore, no microscale analysis of ozone or NO_x and VOCs was conducted.

Microscale CO concentrations were estimated through the use of computerized mathematical models (MOBILE5a and CAL3QHC). Using these models, worst case CO levels were calculated for the peak one-hour and eight-hour time periods, corresponding to the averaging periods of the federal and state ambient CO standards. Default background CO concentrations of 3.0 and 1.5 ppm were used for the one-hour and eight-hour analyses, respectively. For future year analyses (in Section 5.7), no rollback was used to adjust the background concentrations.

Maximum existing one-hour CO concentrations were estimated to range from 3.6 to 18.7 ppm for the receptors analyzed in the Recommended Alternative corridor. The eight-hour concentrations were estimated to range from 1.7 to 7.4 ppm. These estimated concentrations are below the NAAQS one-hour and eight-hour standards of 35.0 and 9.0 ppm. The highest existing CO concentrations were estimated at the Three Mile Road/U.S. Route 31 intersection. More information regarding the results of the microscale CO analyses for the existing and future conditions is presented in Section 5.7.

4.8 NOISE

4.8.1 Regulations

Noise impacts for this project were evaluated in accordance with Federal Highway Administration (FHWA) noise assessment guidelines. The Federal Aid Highway Act of 1970 established the requirement that noise control be a part of the planning and design of all federally-aided roadways. The FHWA has developed guidelines for conducting noise studies and has established noise abatement criteria for different land use activity categories. These guidelines are set forth in 23 CFR 772.

4.8.2 Noise Assessment Guidelines

Traffic noise levels for this project were estimated for existing and future conditions using the computer simulation model, STAMINA 2.0, which is based on the FHWA Highway Traffic Noise Prediction Model. All noise levels discussed are for the peak traffic hour (L_{eq} in dBA).

Fifty-eight receptor sites in the Recommended Alternative corridor were identified using aerial photographs and field review. Structures that would be displaced by the build alternatives were not assessed for potential noise impacts. Of the 58 receptors identified, 47 fall under FHWA activity category B, which includes single-family residences, churches, schools, hotels, and libraries. The other 11 receptors fall under activity category C, which encompasses developed lands, properties, and activities not included in categories A (lands on which serenity and quiet are of extraordinary significance) or B.

4.8.3 Estimated Existing Noise Levels

The estimated existing (1997) noise levels at the 58 receptors analyzed range from 48.9 dBA (at the Grand Traverse Nature Education Reserve) to 69.1 dBA (along Three Mile Road) during the peak hour. Under existing conditions, the noise abatement criterion of 67 dBA is exceeded at six category B receptors. At an additional five category B receptors, existing noise levels approach (between 66.0 and 66.9 dBA) the noise criterion.

The existing estimated noise levels for all of the receptors analyzed in the Recommended Alternative corridor are listed in Appendix B-2.

4.9 CONTAMINATED SITES AND SITES OF ENVIRONMENTAL INTEREST

A database review, performed to the level of a Phase I Environmental Site Assessment (ESA), was conducted to identify Recognized Environmental Conditions that may affect road expansion (JJR, 1999). Recognized Environmental Conditions are areas where there is a presence or likely presence of hazardous substances or petroleum products under conditions that indicate an existing release, a past release, or a material threat of a release into structures on a property or into the ground, groundwater, or surface water of a property. The database review followed the American Society for Testing and Materials (ASTM) *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (Standard E1527-97). Figure 4.9-1 shows the location of areas where Recognized Environmental Conditions may be present.

The Phase I ESA conducted for this project encompassed the portion of the Hartman-Hammond Road corridor where new road construction is proposed (i.e., between U.S. Route 31/M-37 and LaFranier Road). Through this assessment, one area was identified where Recognized Environmental Conditions may be present. That area is the former Tower Automotive Company at 1974 Cass-Hartman Court. Tower Automotive Company is listed on the State of Michigan Leaking Underground Storage Tank (LUST) site list. Based on a review of the local topography and surface waters, a release from this site would be carried eastward, toward the Boardman River.

Field observations of the Hartman-Hammond Road corridor also revealed evidence of uncontrolled dumping at the base of the drop-off into the Boardman River floodplain. In addition to inert material, trash included several old, empty 55-gallon drums, the former contents of which could not be determined from observation. Vegetative undergrowth did not appear to be stressed. Although not considered an area of Recognized Environmental Conditions, it is possible that hazardous wastes were deposited in this area.

The Phase I ESA also included a review of the Three Mile Road corridor where road widening is proposed (i.e., between approximately 198 meters (650 feet) south of South Airport Road and U.S. Route 31/M-72). An area of potential Recognized Environmental Conditions identified in this corridor is Total Petroleum Station No. 2577 at 896 Munson Avenue. It is listed in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) database and the State of Michigan LUST sites list. Because of the remediation underway at the site, the station is also listed as a Resource Conservation and Recovery Information System (RCRA) Small Quantity Generator (less than 1,000 kilograms [2,205 pounds] but more than 100 kilograms [226 pounds] of hazardous waste per month and less than 1 kilogram [2 pounds] of acutely hazardous waste per month). The

quantities of hazardous waste generation and accumulation areas make the potential for a release affecting the Three Mile Road right-of-way unlikely; however, widening of the intersection of U.S. Route 31/M-72 and Three Mile Road may disturb soils potentially contaminated with fuel products.

A Phase 1 ESA for Four Mile Road was not prepared as part of this study because the proposed area of excavation will occur only within the existing paved road area and will not require expansion of the right-of-way.

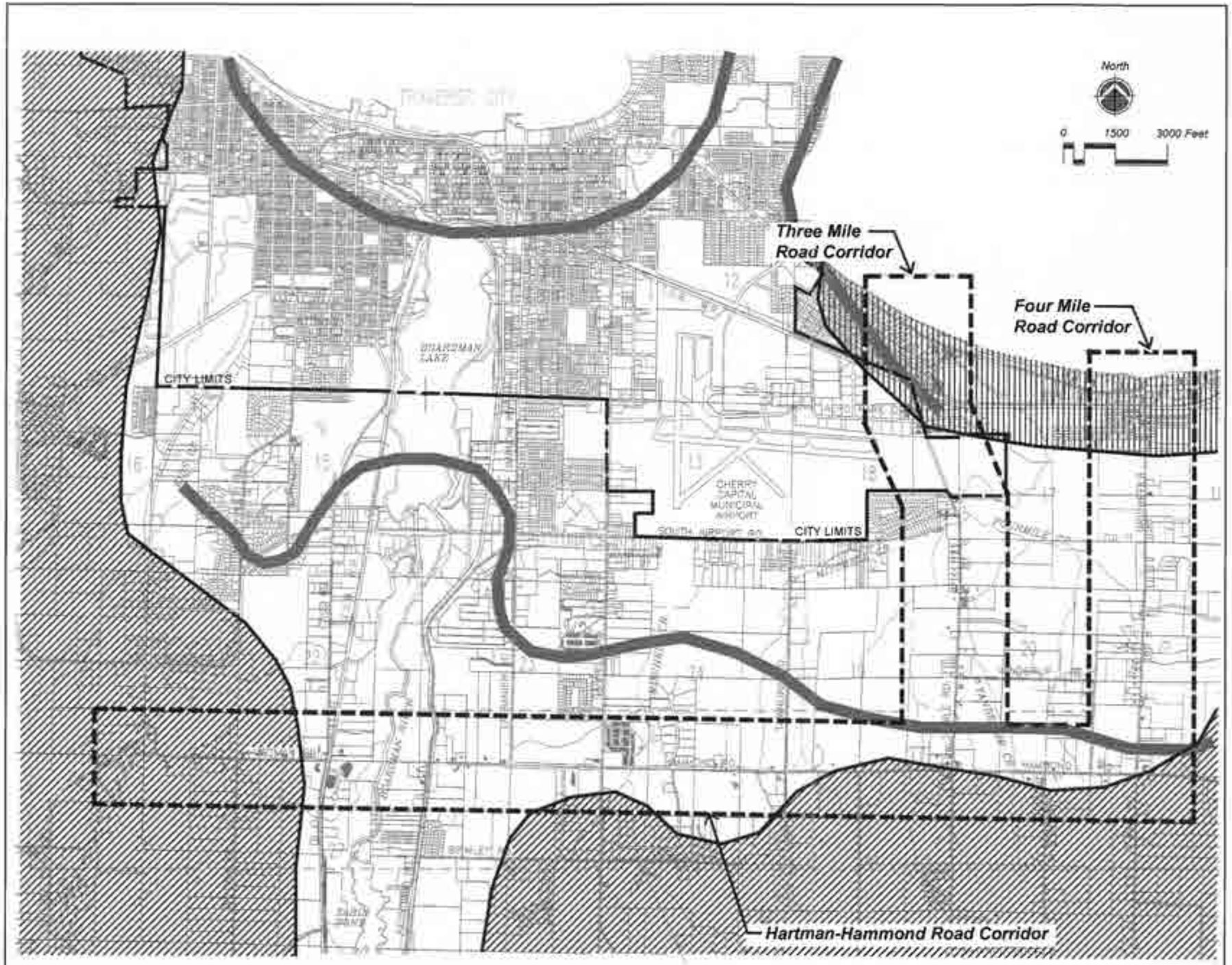


Figure 4.1-1

Project Area Physiography

Legend

- Lacustrine sand and gravel
- Peat and muck under lacustrine sand
- End moraines of course-textured till
- Traces of former shorelines

Source: Quaternary Geology of Southern Michigan, 1982

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

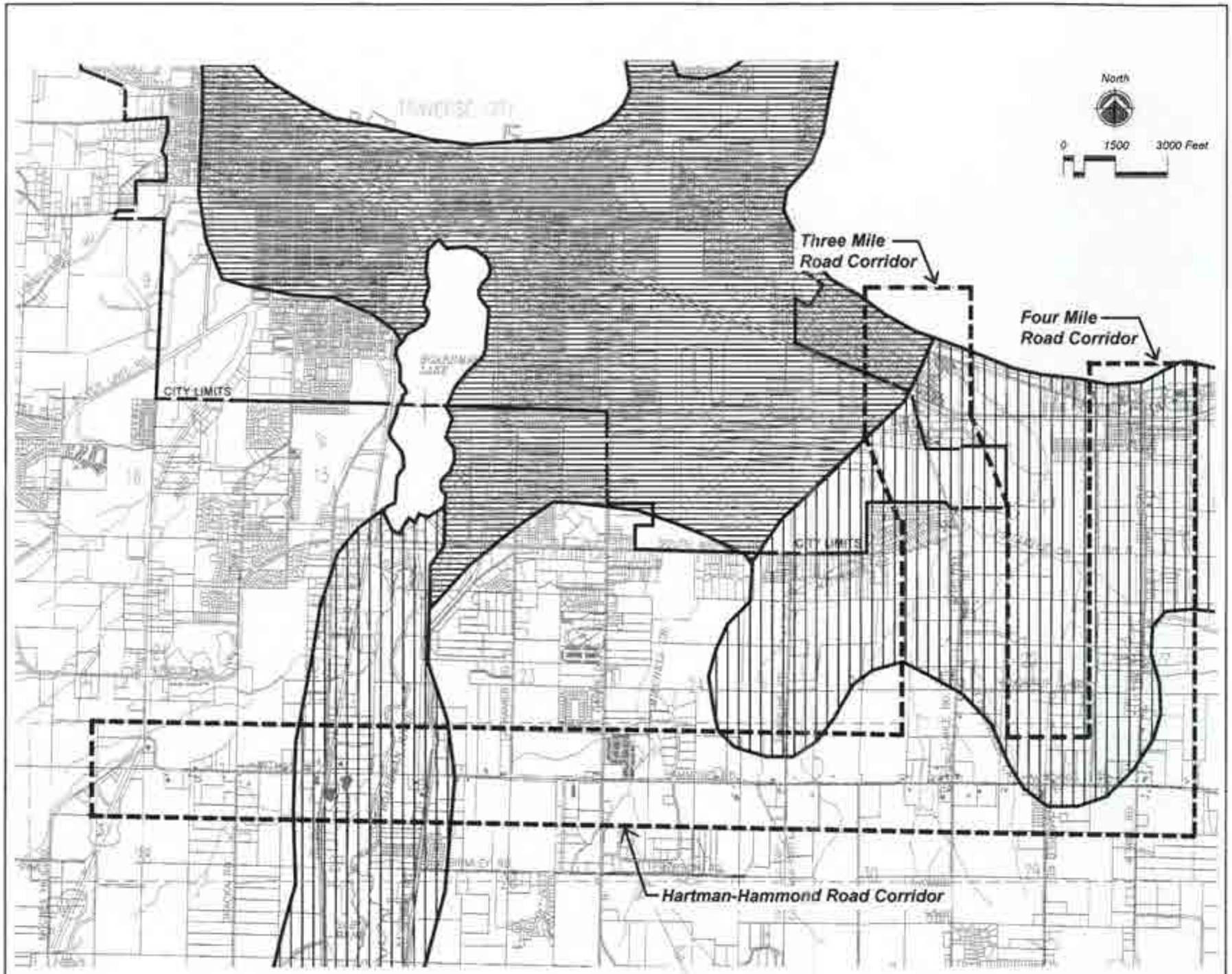


Figure 4.1-2

Soil Associations

Legend

- Emmet-Leelanau association
- Rubicon-Grayling association
- Lupton-Roscommon association

Source: USDA SCS, August 1990

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

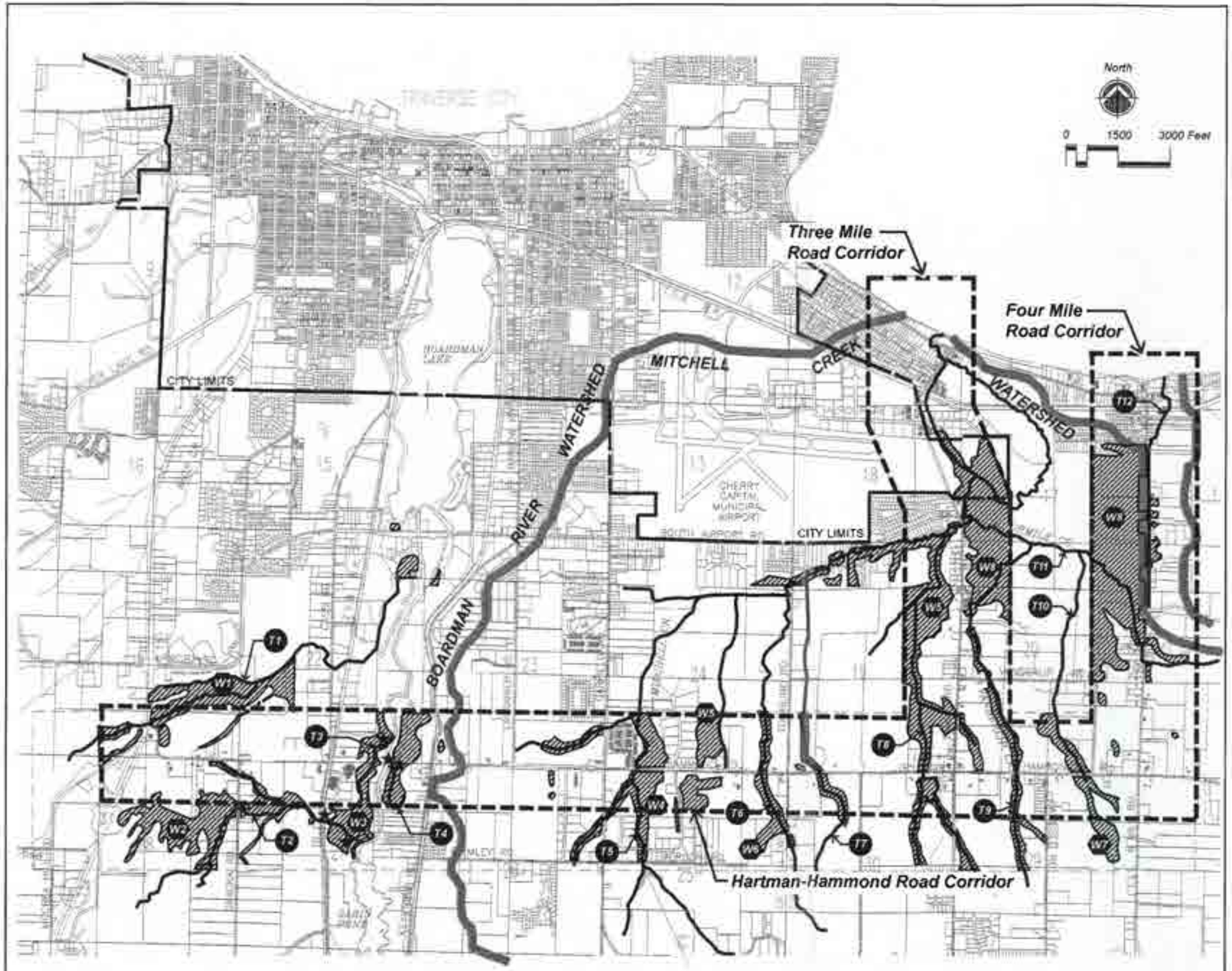


Figure 4.1-3

Streams and Wetlands

Legend

- Boundary of major watersheds
- Wetlands [1]
- Critical wetlands
- ★ Qualitative assessment of surface water quality and biological communities
- Perennial Stream
- Intermittent Stream

Tributaries:

T1	Miller Creek
T2	Jack's Creek
T3	Unnamed Tributary
T4	Unnamed Tributary
T5	Upper West Branch of Mitchell Creek
T6	Upper Mitchell Creek
T7	Sleder's Creek
T8	Black Creek
T9	Vanderlip Creek
T10	Unnamed Tributary
T11	Fourmile Creek
T12	Baker's Creek

Source: JJR Incorporated, 1995, 1998
Grand Traverse County Drain Commissioner's Office, 1995

Note:
(1) Wetland boundaries are approximate and based on interpretation of NWI maps, field survey and aerial photography.

BOARDMAN RIVER CROSSING MOBILITY STUDY
Grand Traverse County, Michigan

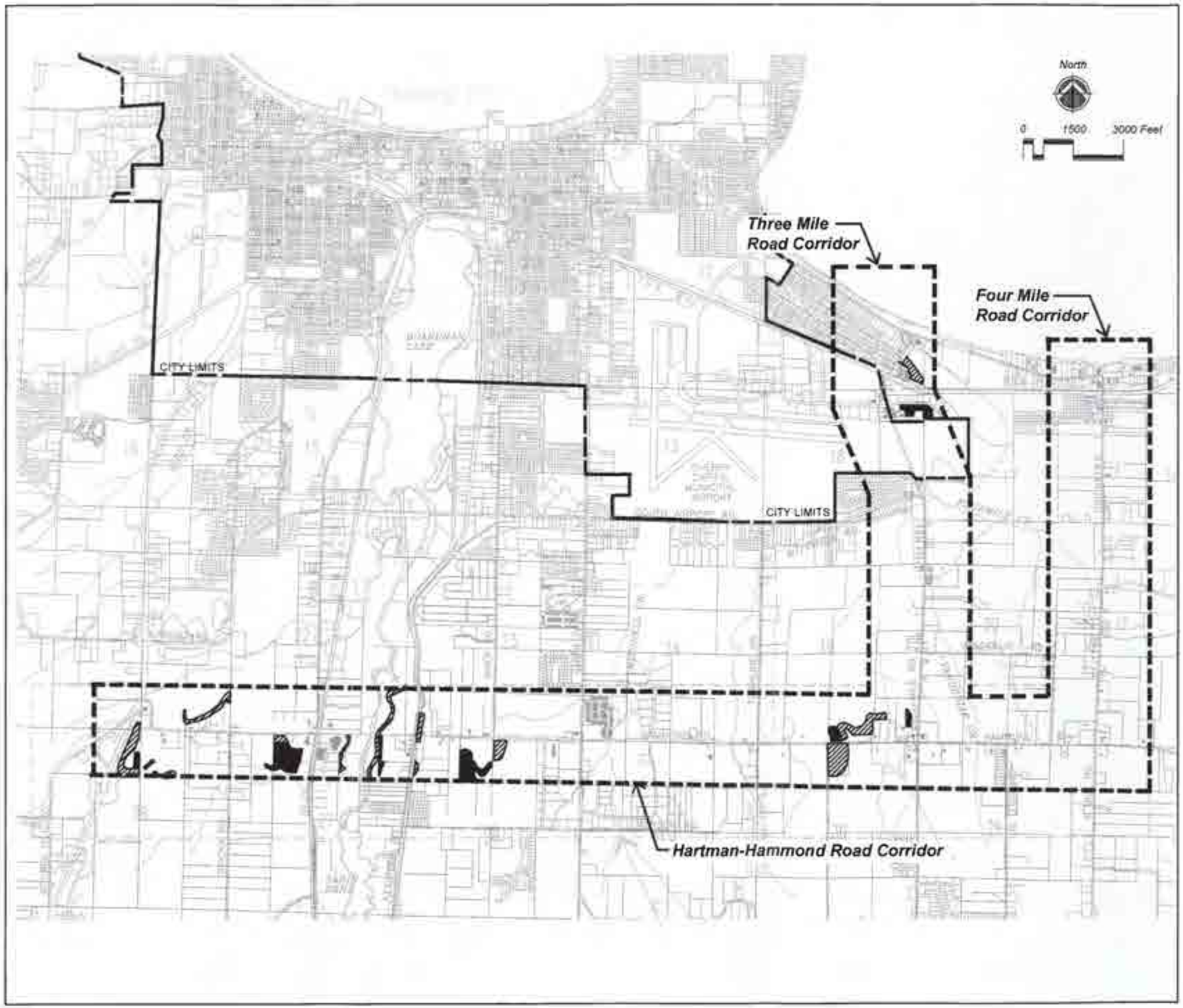


Figure 4.2-1

Terrestrial Resources

Legend

Mixed Hardwood Forest

Evergreen Plantation

Note: See Figure 4.1-3 for Wetland Resources

Source: 1995 Aerial Photography

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

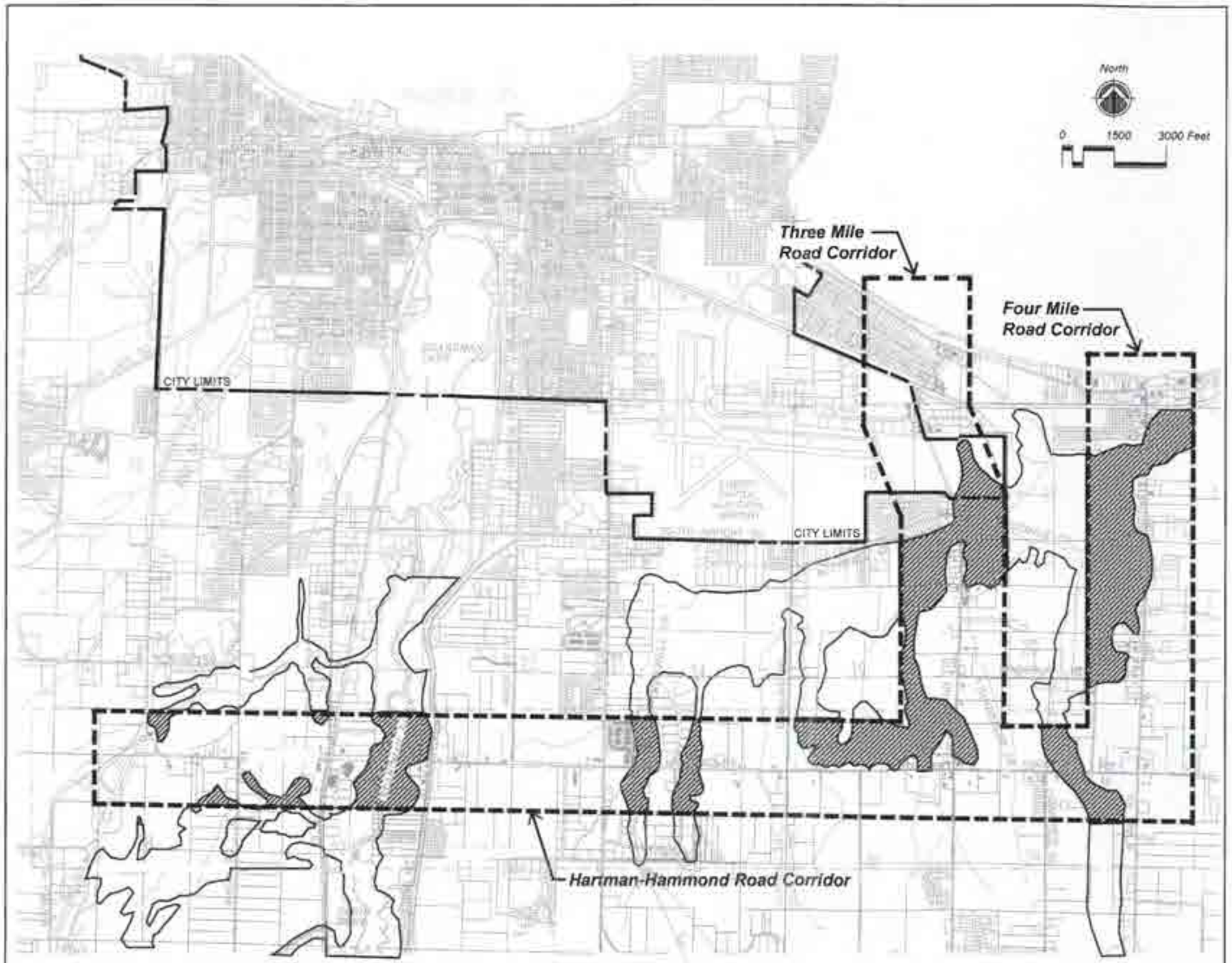


Figure 4.2-2

Critical Wildlife Habitats

Legend

Wildlife corridors within project corridor

Wildlife corridors outside project corridor

Source: JJR Incorporated, 1995, 1998
Grand Traverse County Drain Commissioner's Office, 1995

BOARDMAN RIVER CROSSING MOBILITY STUDY
Grand Traverse County, Michigan

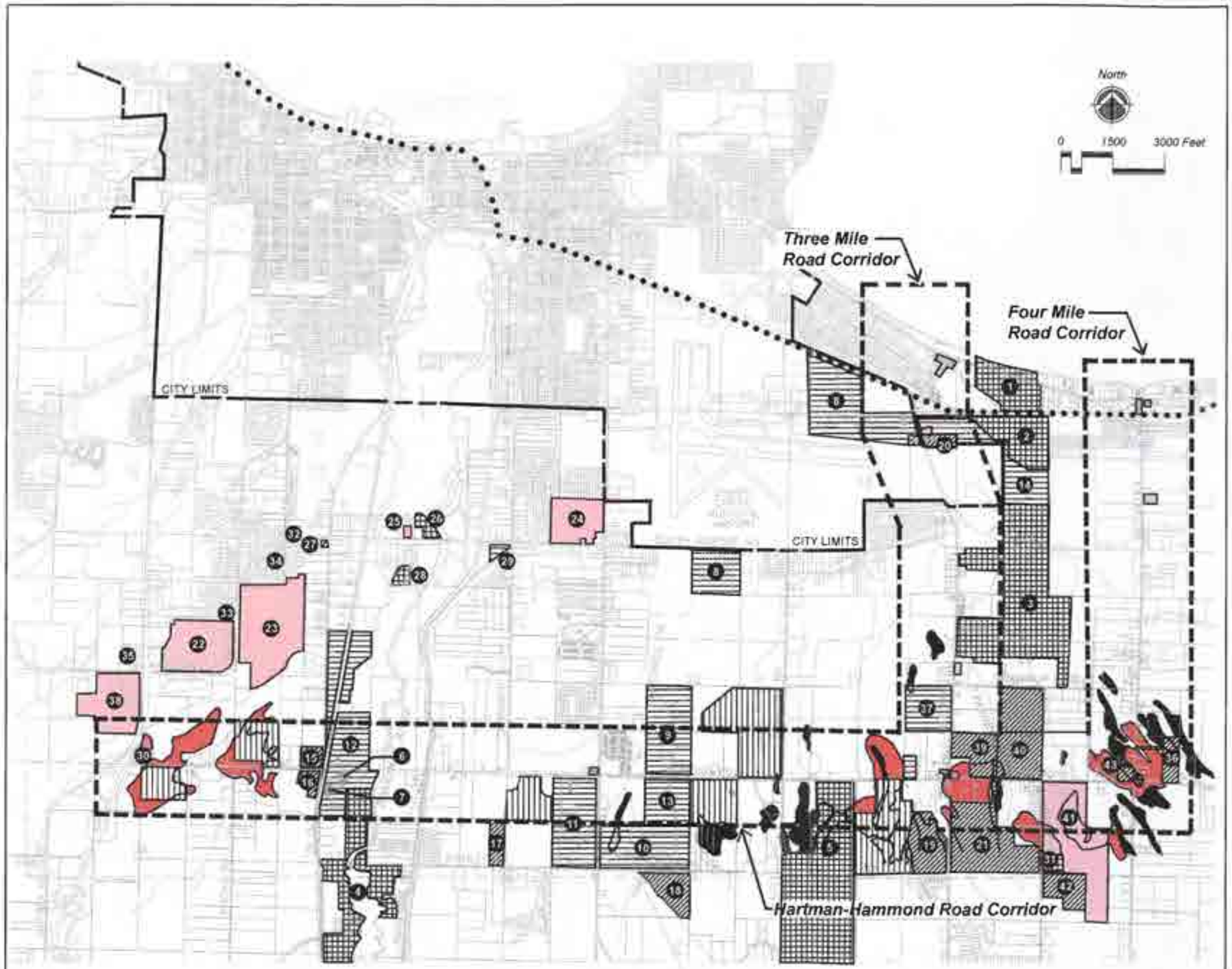


Figure 4.3-1

Selected Existing Land Uses

Legend

Recreational/Natural Area
1 Traverse City State Park
2 George and Ada Reflett Nature Preserve
3 Mitchell Creek Golf Course
4 Grand Traverse Nature Education Reserve
5 Elmbrook Golf Course
26 Medalie Park
28 YMCA
31 I.C.E. Arena

Industrial
6 Eagle Picher Automotive
7 Eagle Picher Automotive
8 Airport Industrial Park
9 Traversefield Enterprise Place
10 Garfield-Heidbreder Industrial Park
11 Grand Traverse Commerce Park
12 Cass-Hartman Court
13 Peninsula Business Park South
14 Peninsula Business Park East
29 United Technological Automotive
37 Meadowlands Industrial Park

Institutional
15 Sabin Elementary School
16 Bible Baptist Church
17 Living God Christian School
18 Traverse City Christian School
19 Parochial Middle School
20 East Bay Elementary School
21 Traverse City Junior High School East
27 Bay Area Transit Authority (BATA)
32 Church of Christ
33 Faith Church
34 College Terrace Wesleyan Church
35 First Christian Church
36 East Bay Calvary Church
39 Grand Traverse Academy
40 Seton Village
42 Resurrection Life Church
43 Seventh Day Adventist Church

Active Farmland/Orchard

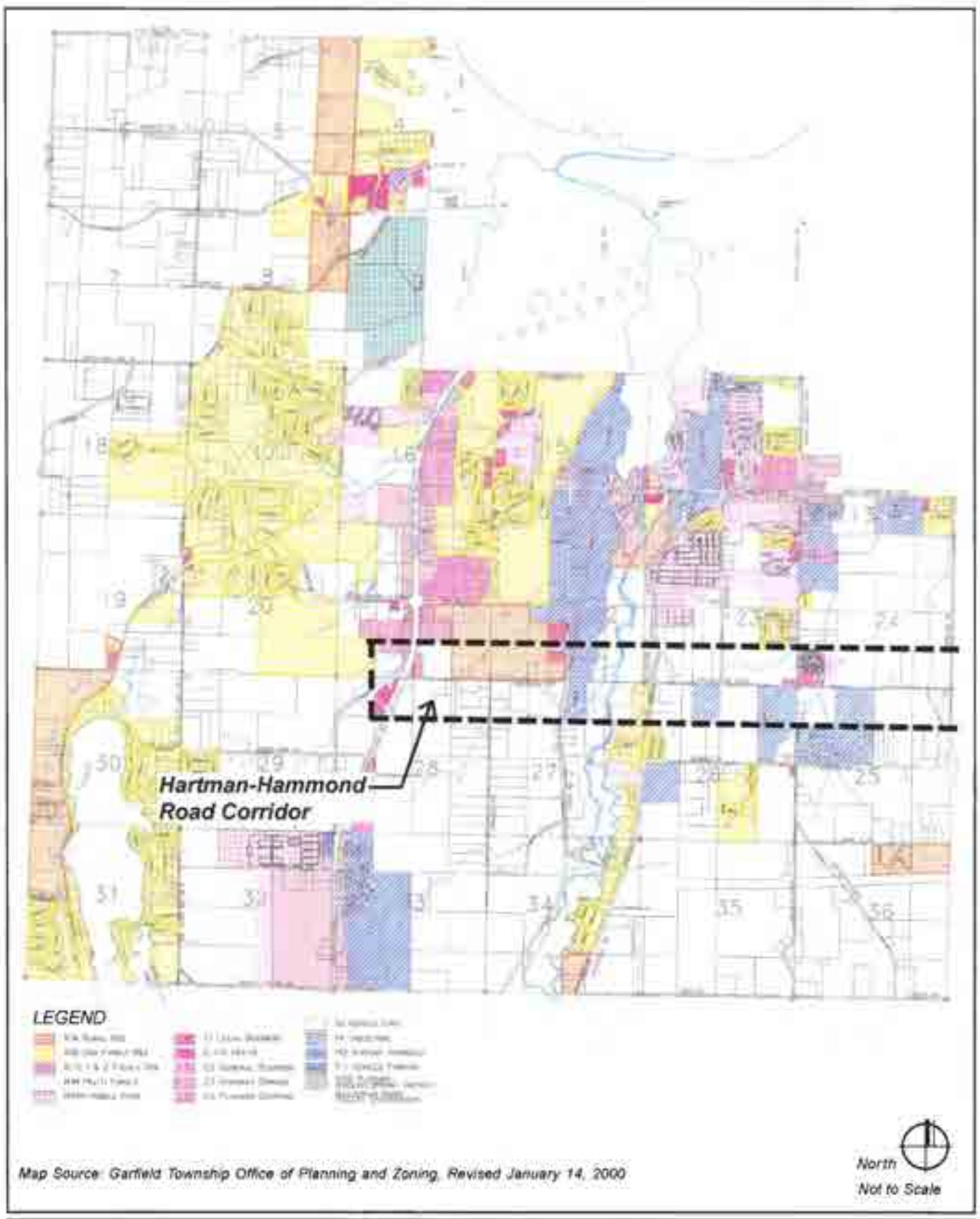
Unique Farmland
Boundary
Prime Farmland

Commercial
22 Grand Traverse Mall
23 Grand Traverse Crossing
24 Cherryland Mall
25 Logan's Landing
30 Hartman Hills Market
38 Sam's Club PUD
41 Village of Chartwell PUD

TART Trail

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

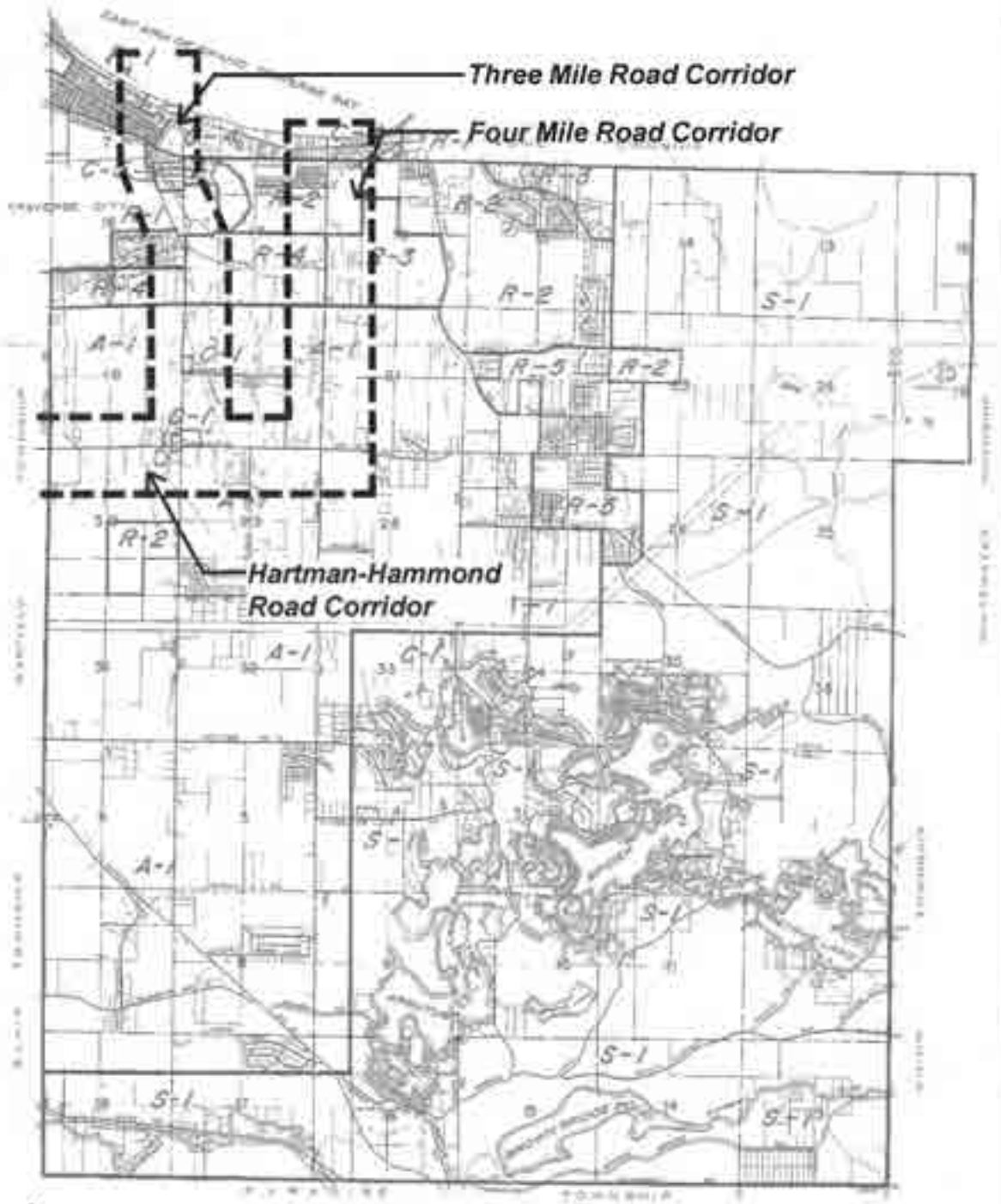


Map Source: Garfield Township Office of Planning and Zoning, Revised January 14, 2000

Garfield Township Zoning District Map — **Figure 4.3-2**

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan



Legend

R-1	Residential One	C-1	Local Business
R-2	Residential Two	C-4	Tourist Commercial
R-3	Residential Three	C-5	Professional Office
R-4	Residential Four	I-1	Industrial-One
R-5	Rural Residential	A-1	Agricultural
		S-1	Lake and River Environment

North

Not to Scale

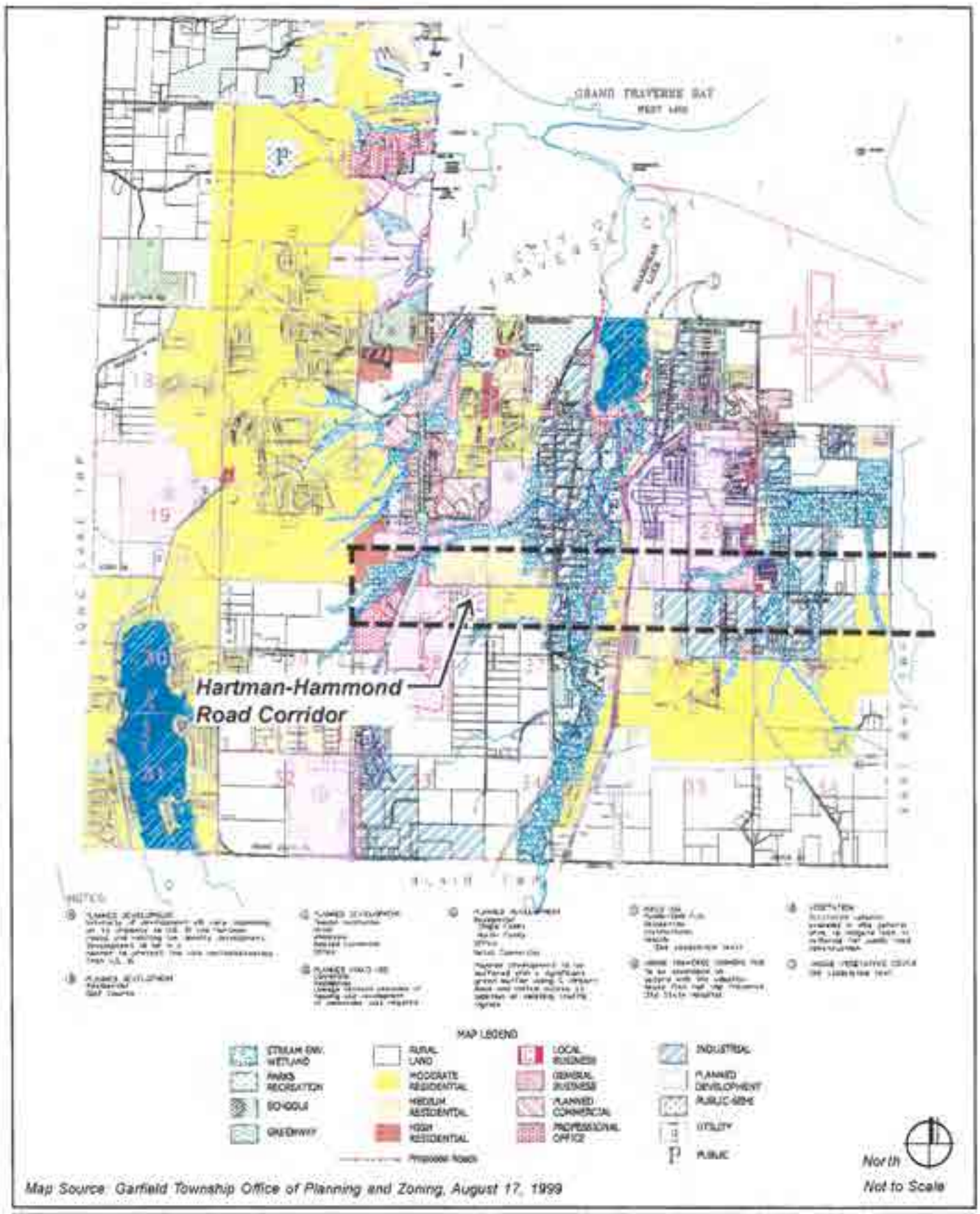
Map Source: East Bay Township Office of Planning and Zoning, January 1998
Updated Graphic Based on 1999 Updates.

East Bay Township Zoning District Map

Figure 4.3-3

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

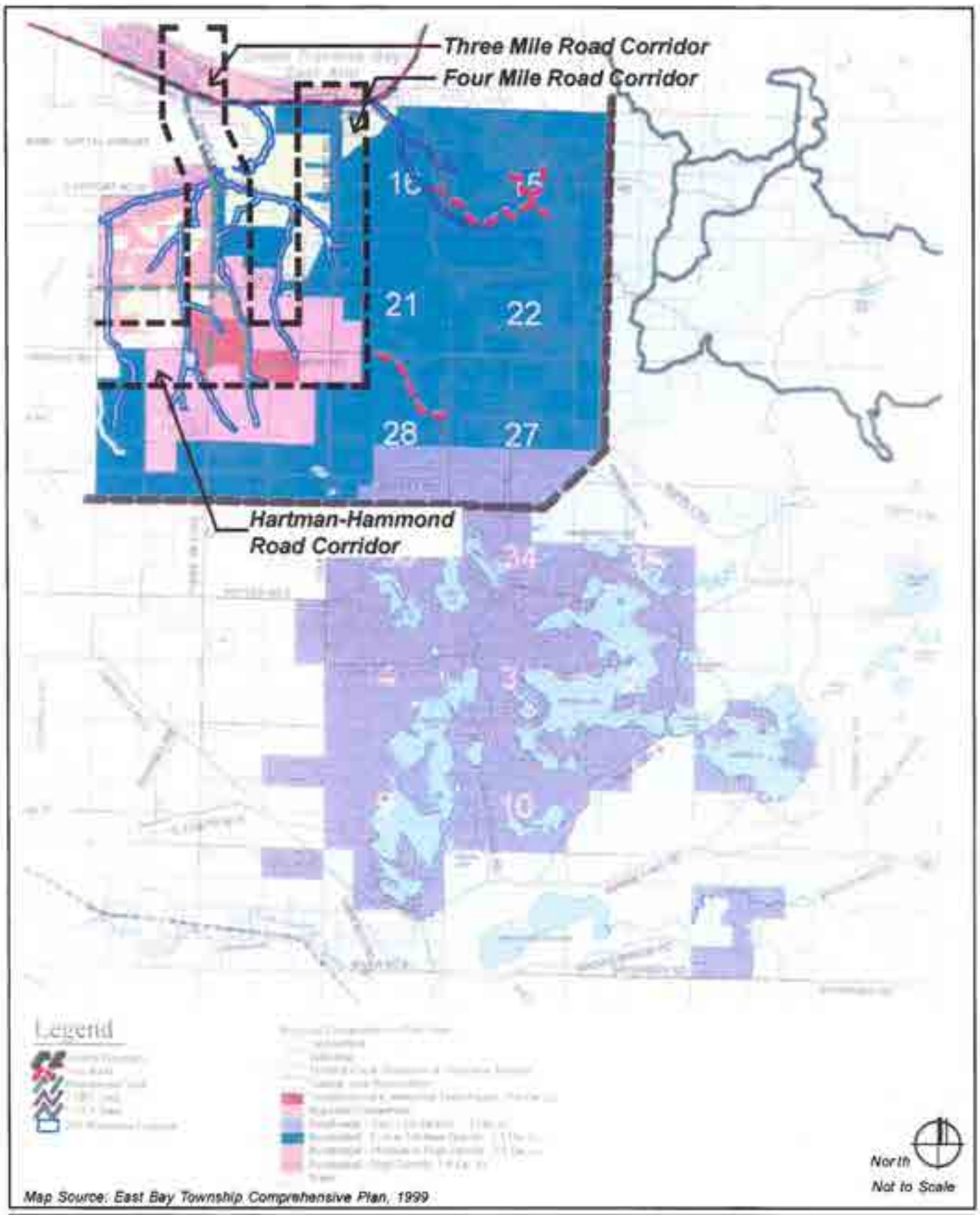


Map Source: Garfield Township Office of Planning and Zoning, August 17, 1999

Garfield Township Comprehensive Land Use Plan — **Figure 4.3-4**

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan



Map Source: East Bay Township Comprehensive Plan, 1999

East Bay Township Comprehensive Land Use Plan — **Figure 4.3-5**

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

Conceptual Rendering of Village Center at Hammond and Three Mile Road

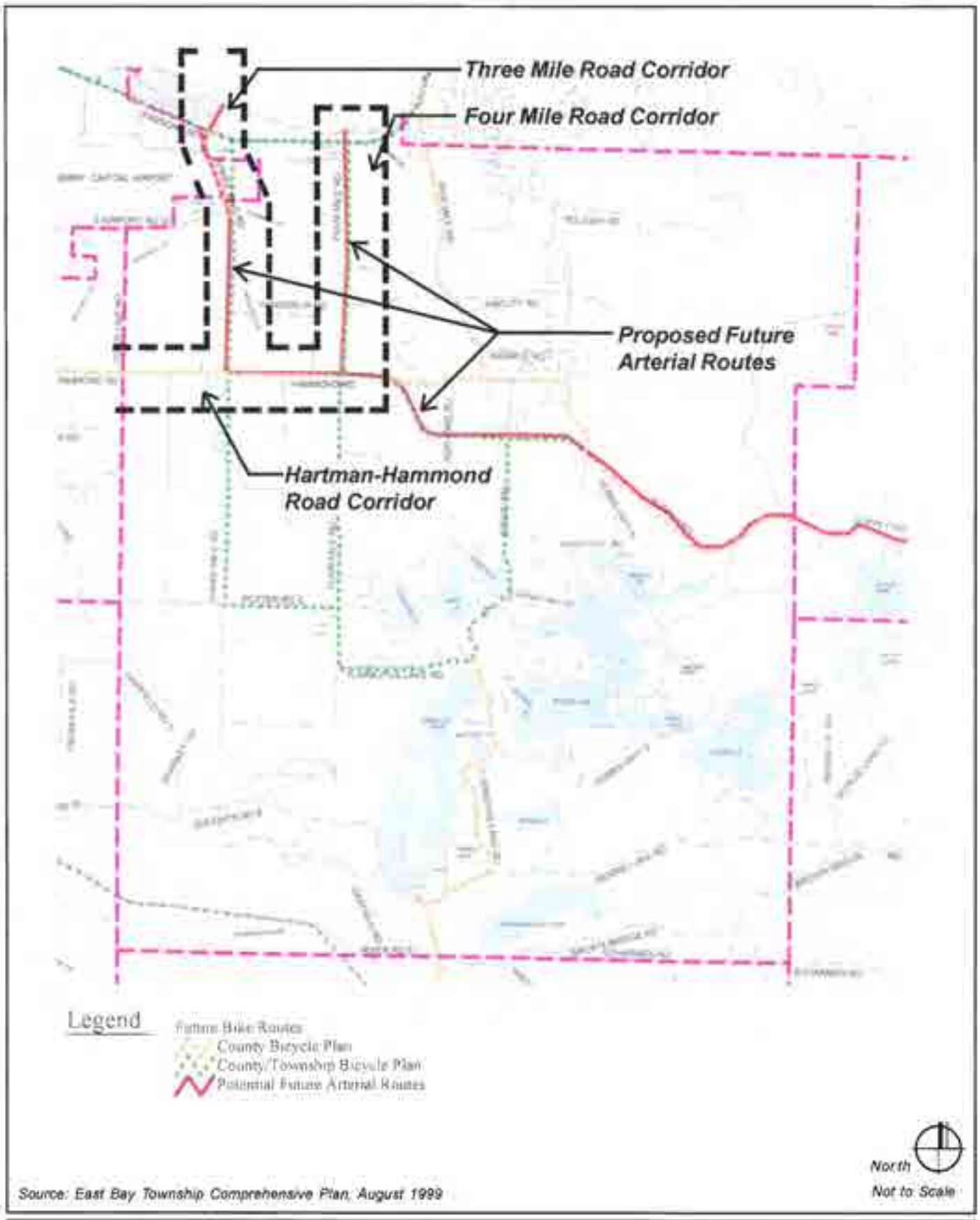
Source: East Bay Township Comprehensive Plan, August 1999

North

Conceptual Rendering of Village Center — Figure 4.3-6

BOARDMAN RIVER CROSSING MOBILITY STUDY

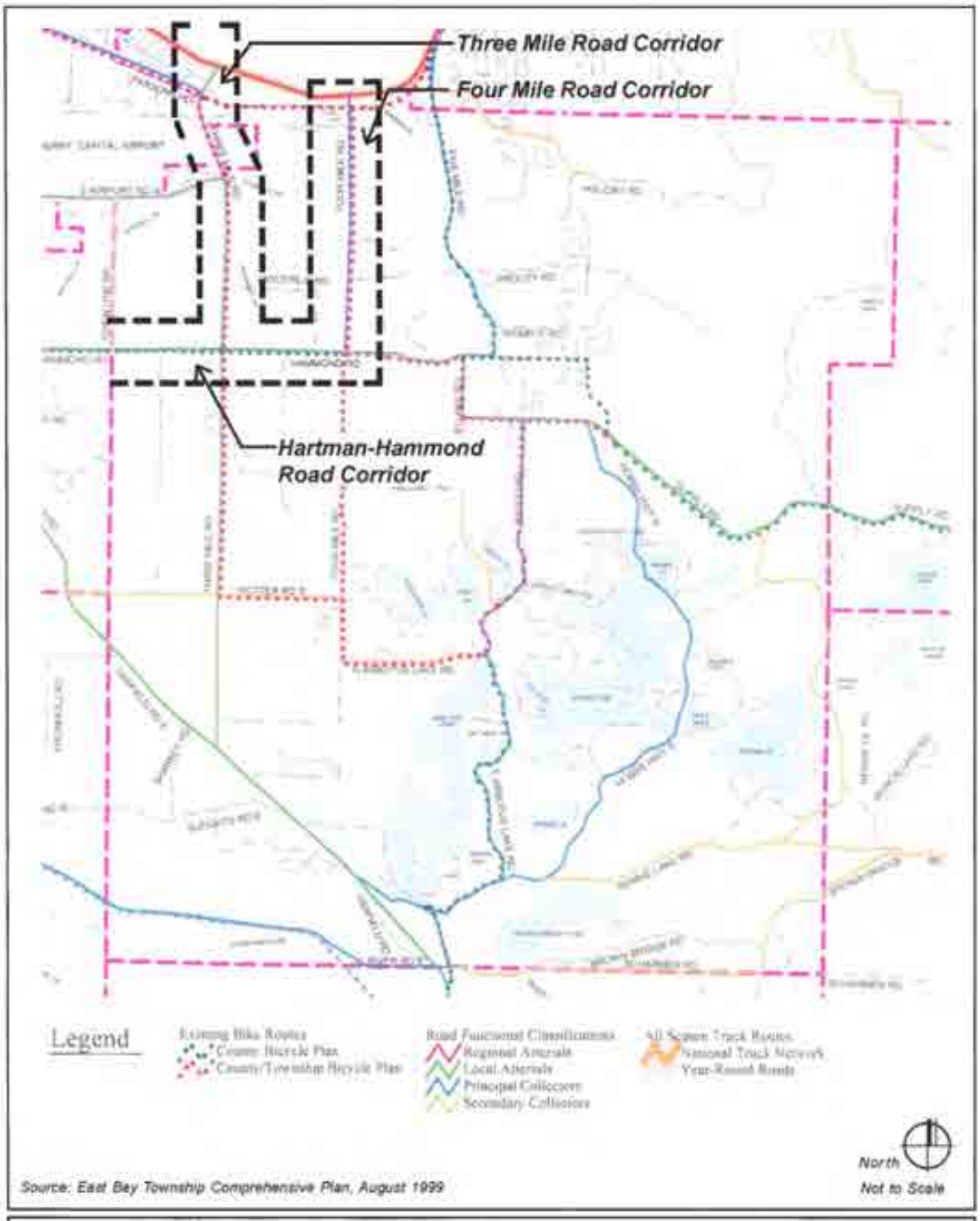
Grand Traverse County, Michigan



Potential Transportation Map - East Bay Township **Figure 4.3-7**

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan



Source: East Bay Township Comprehensive Plan, August 1999

Existing Transportation Map - East Bay Township **Figure 4.3-8**

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

Garfield Township: Miller Creek Area Study *Figure 4.3-9*

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

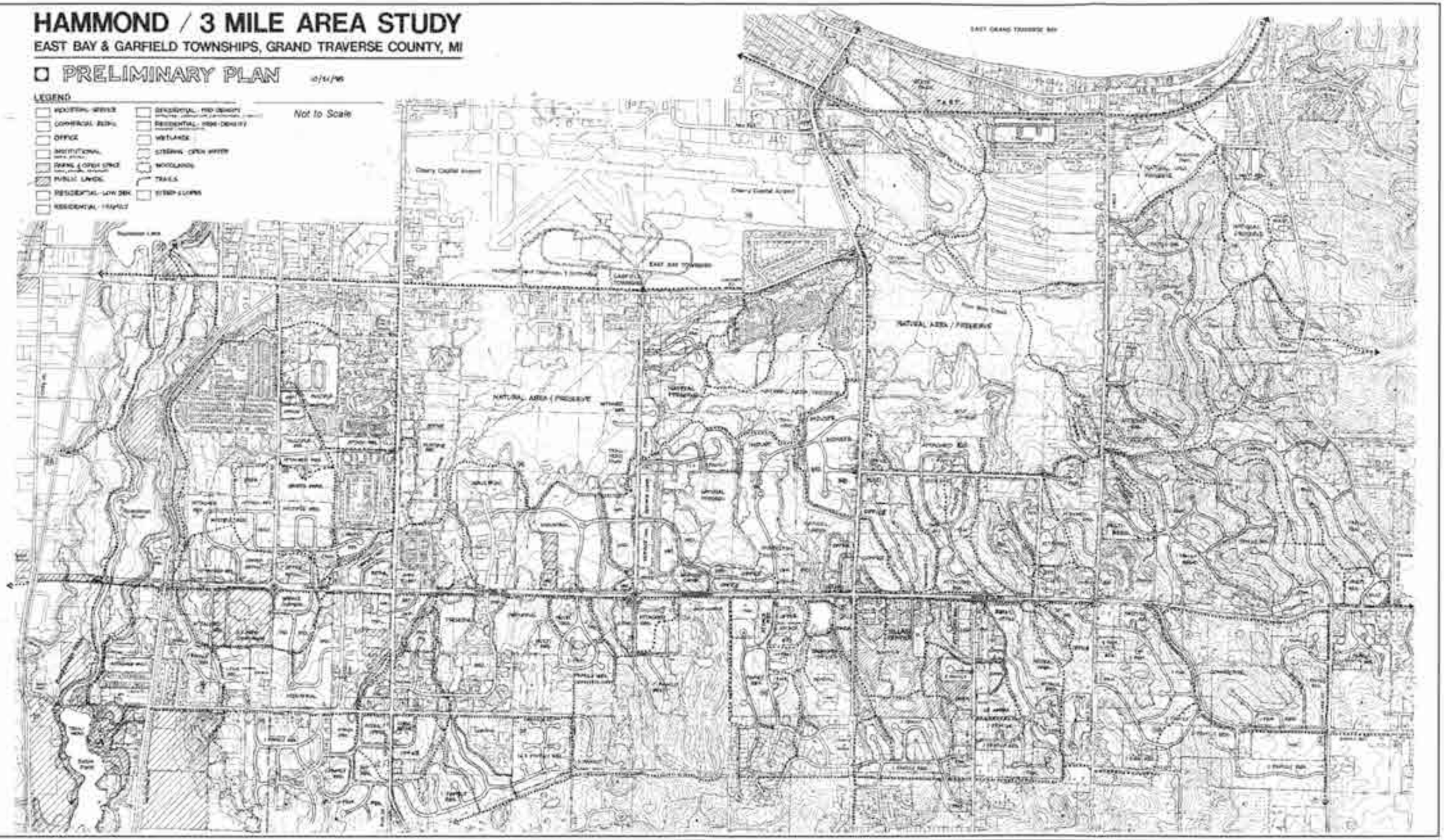
HAMMOND / 3 MILE AREA STUDY

EAST BAY & GARFIELD TOWNSHIPS, GRAND TRAVERSE COUNTY, MI

☐ PRELIMINARY PLAN 10/11/96

LEGEND

Not to Scale

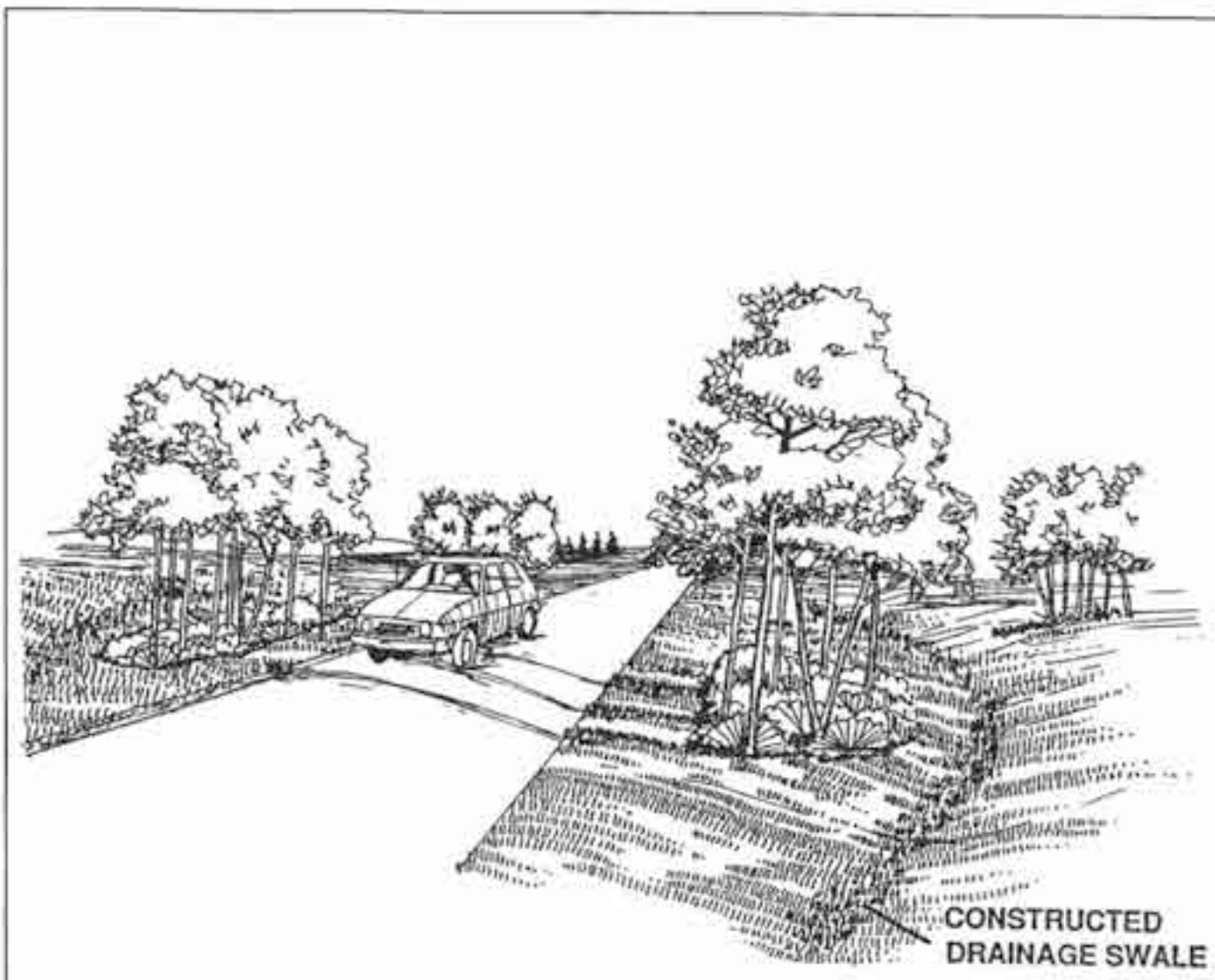


East Bay and Garfield Townships: Hammond/3 Mile Area Study

Figure 4.3-10

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan



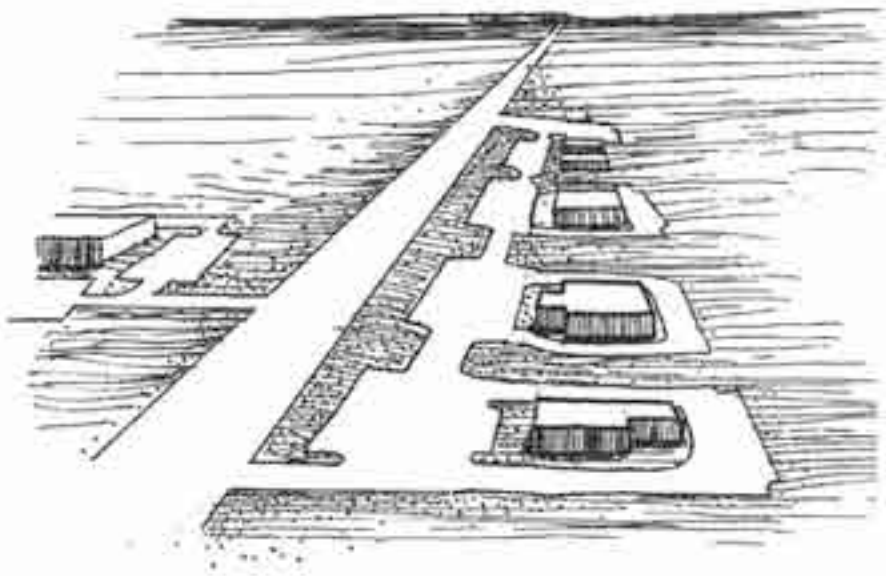
Design for surface flow of stormwater runoff. On-site retention of stormwater helps prevent flooding, can lead to more affordable development costs, and can lower taxpayer contributions to stormwater system maintenance.

Source: Planning and Zoning Center, Inc. 1992

Stormwater Management Design Recommendations *Figure 4.3-11*

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan



SHARED ACCESS DRIVE LIMITS
NUMBER OF TURNING CARS
FROM MAIN ROAD

PARKING BEHIND BUILDING

Frontage roads, rear service drives, alleys and shared driveways are all better design alternatives. They simplify roadside visual character, minimize conflicts and hazards, and increase road carrying capacity. Placing the parking behind the building increases greenspace and makes fewer and smaller signs more practical.

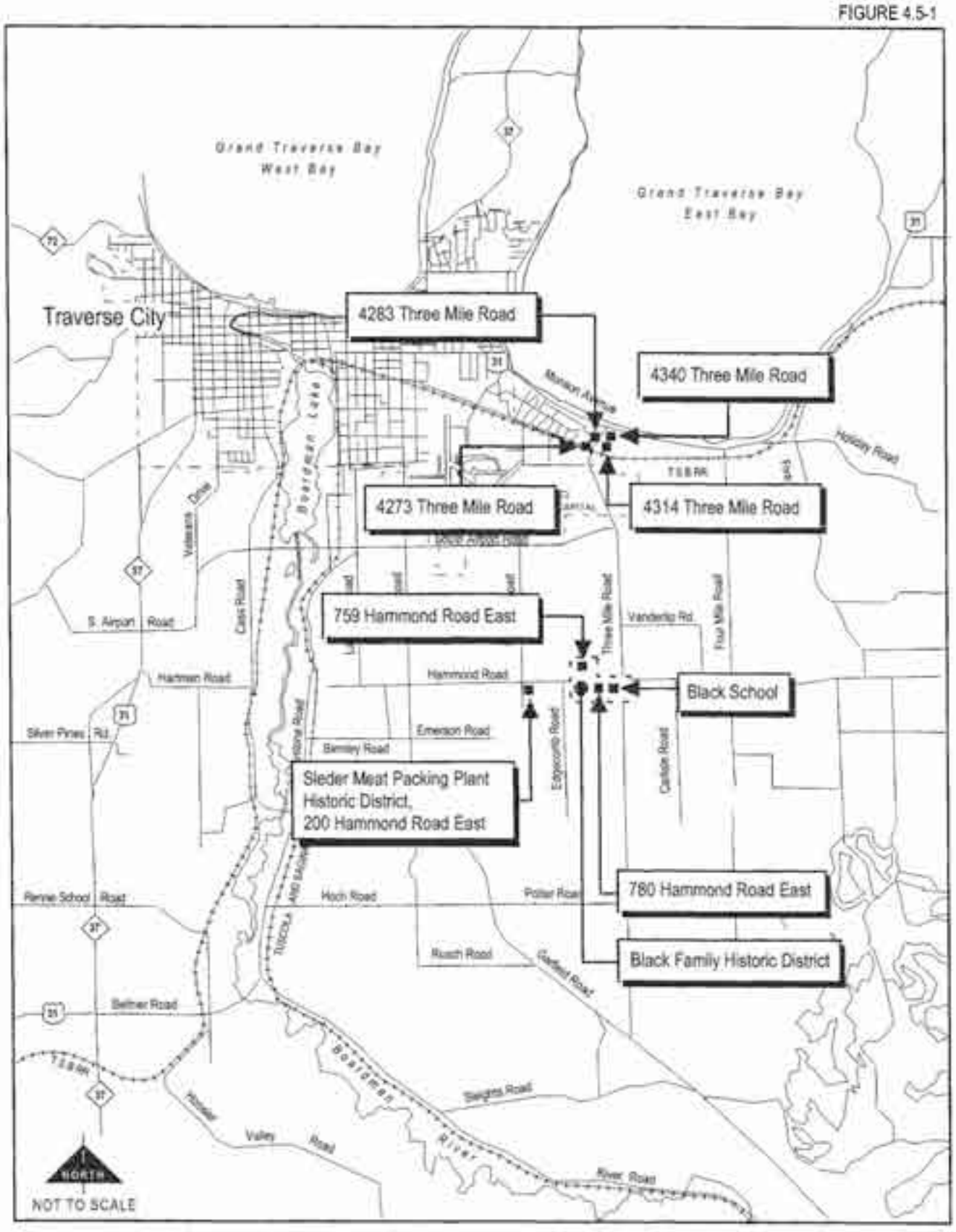
Source: Planning and Zoning Center, Inc. 1992

Access and Parking Design Recommendations *Figure 4.3-12*

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

FIGURE 4.5-1



BOARDMAN RIVER CROSSING MOBILITY STUDY

SITES ELIGIBLE FOR THE NATIONAL REGISTER OF HISTORIC PLACES

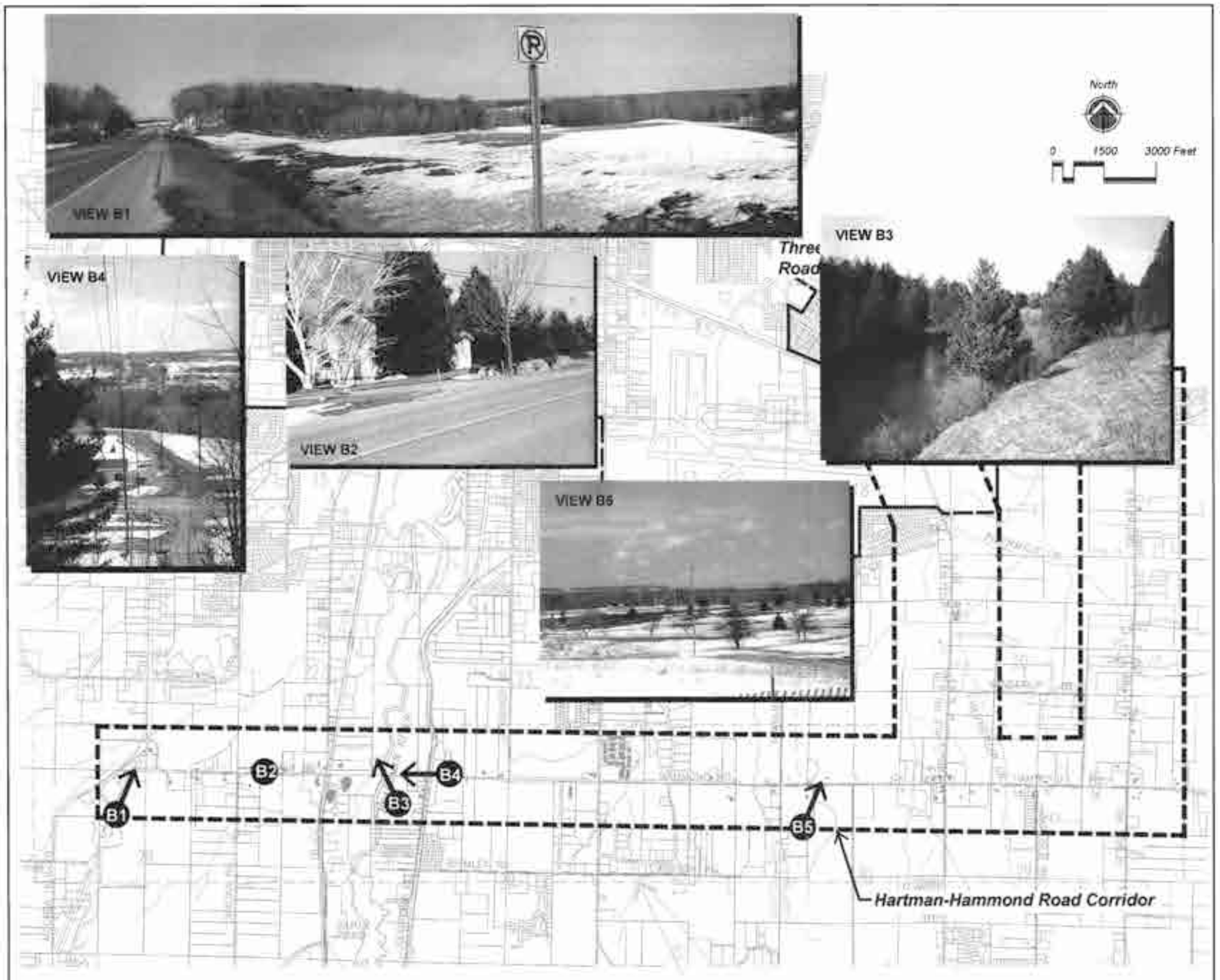


Figure 4.6-1a

Character Views - Hartman-Hammond Road Corridor

Legend

B1 - US-31: North to Grand Traverse Bay

B2 - Hartman Road: Rural Residential Character

B3 - Boardman River Valley

B4 - Hammond Road: West to Hartman Road

B5 - Elmbrook Golf Course: Northeast across Hammond Road to Grand Traverse Bay

Photographs taken in 1998

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

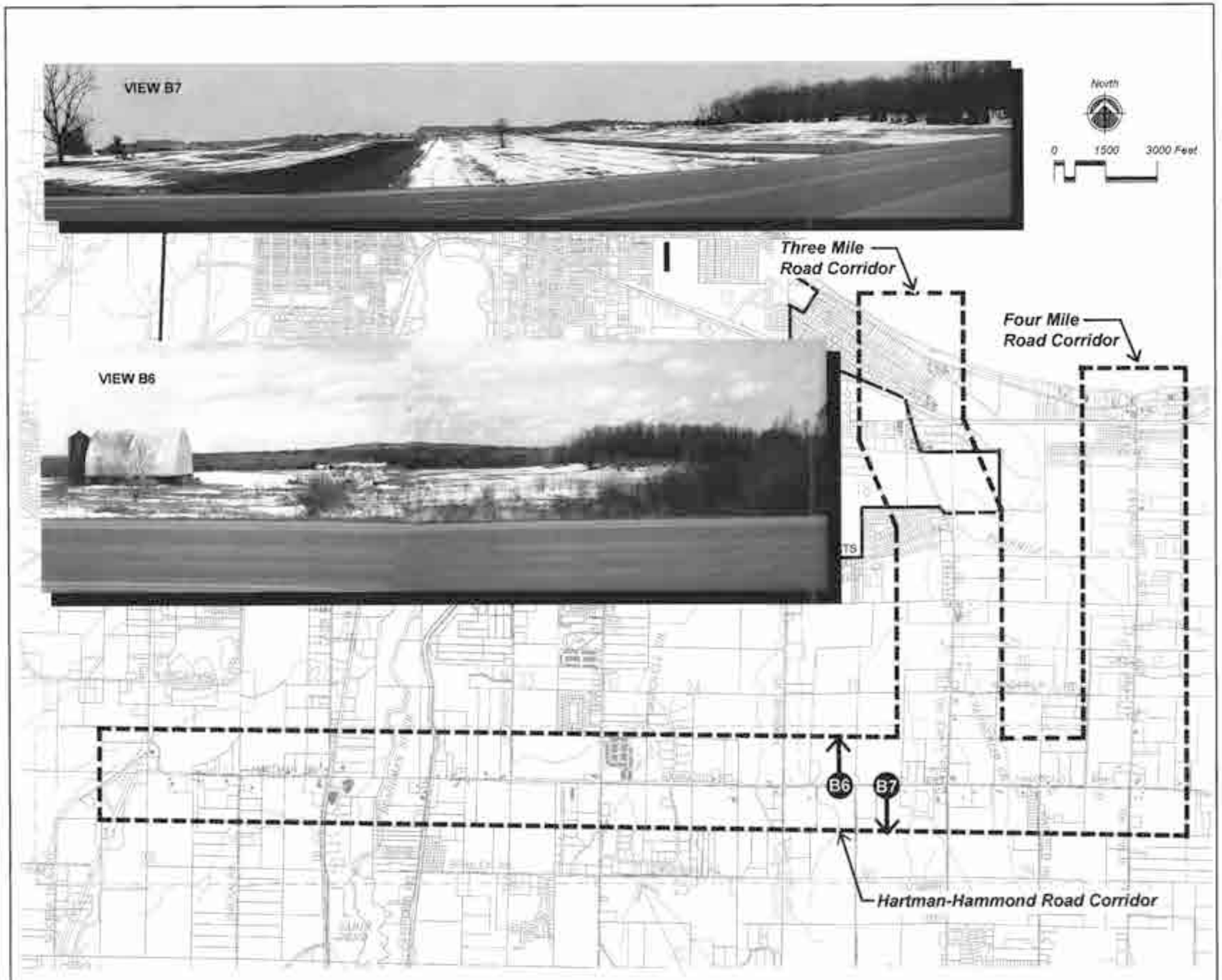


Figure 4.6-1b

Character Views - Hartman-Hammond Road Corridor

Legend

B6 - Hammond Road: North to Old Mission Peninsula

B7 - Hammond Road: South to the Manistee Moraine

Photographs taken in 1998.

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

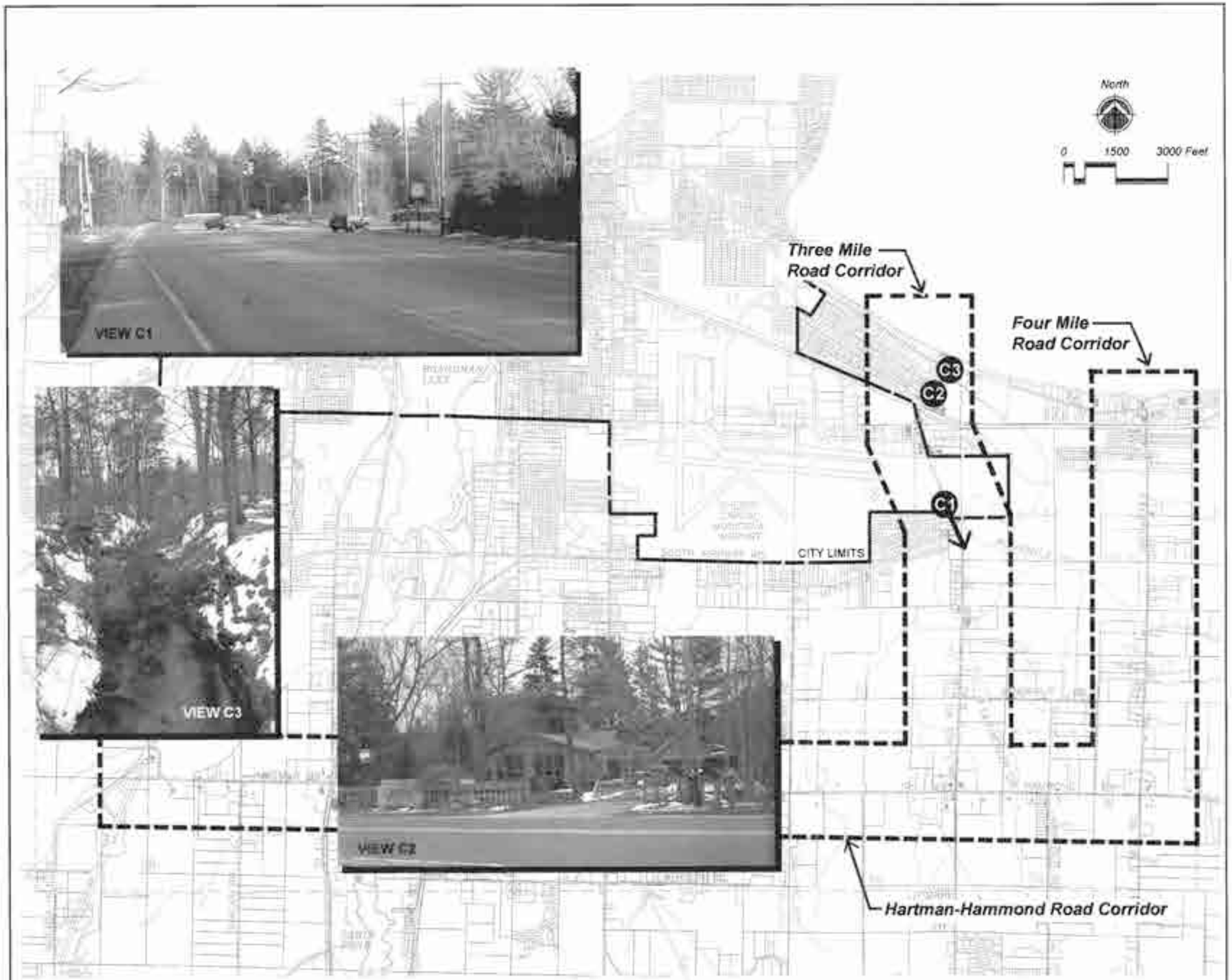


Figure 4.6-2

Character Views - Three Mile Road Corridor

Legend

C1 - Three Mile Road: South to forested wetlands associated with Fourmile Creek

C2 - Three Mile Road: Rural Residential Character

C3 - Three Mile Road: Main Branch of Mitchell Creek

Photographs taken in 1998.

BOARDMAN RIVER CROSSING MOBILITY STUDY
Grand Traverse County, Michigan

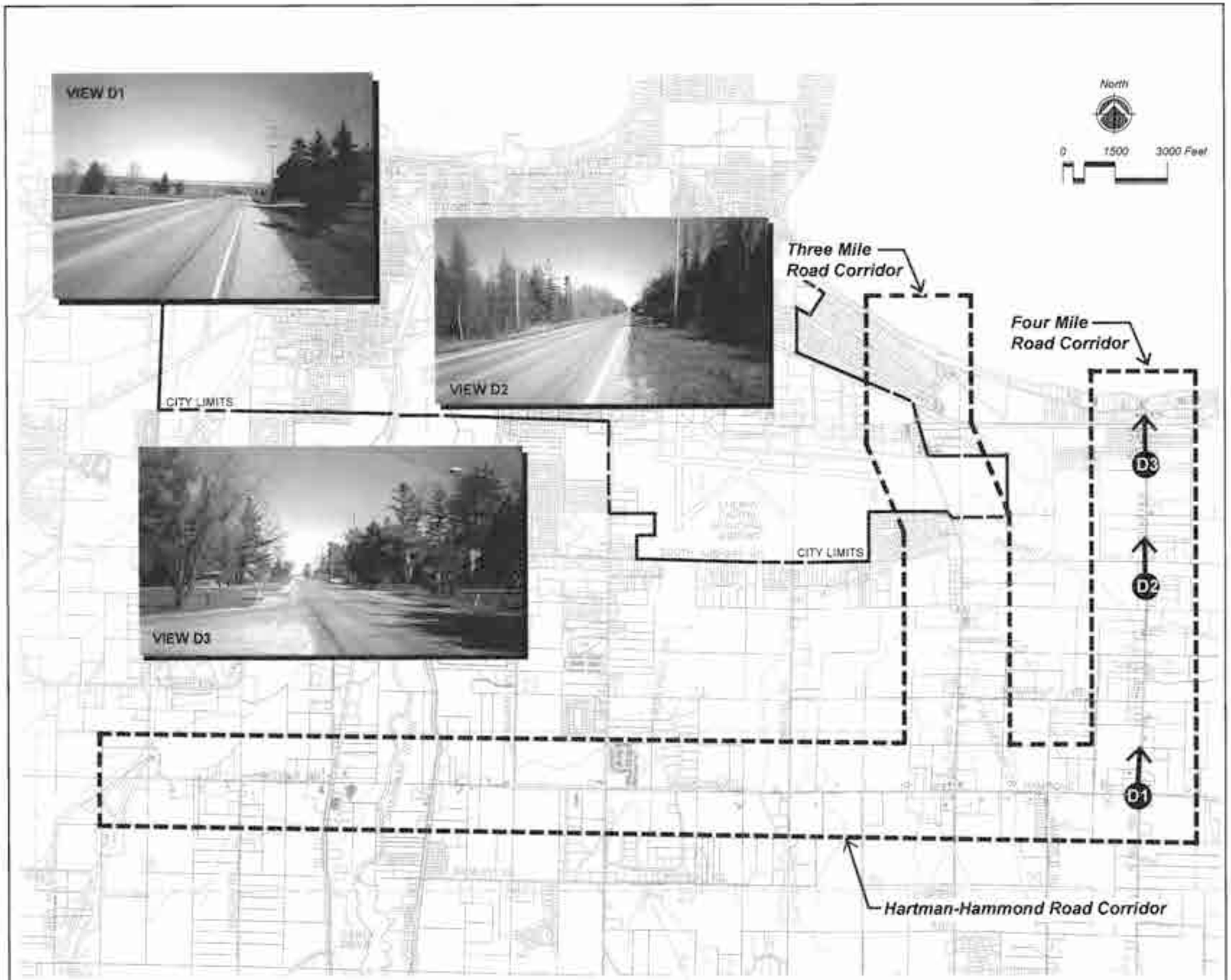


Figure 4.6-3

Character Views - Four Mile Road Corridor

Legend

D1 - Four Mile Road: North to the East Arm of Grand Traverse Bay

D2 - Four Mile Road enclosed by Forested Wetlands

D3 - Four Mile Road at Pine Drive: North to the East Arm of Grand Traverse Bay

Photographs taken in 1998

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

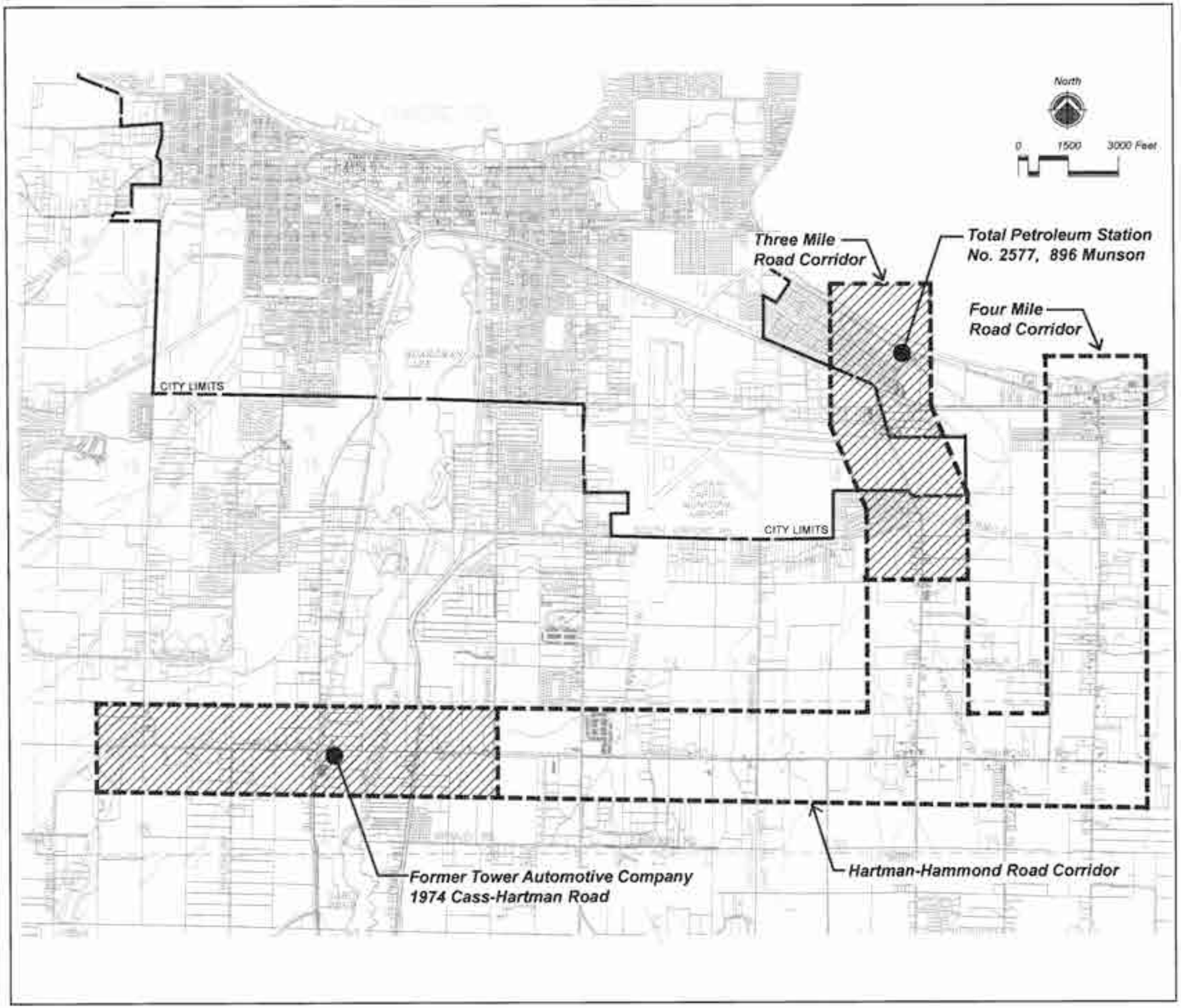


Figure 4.9-1

Study Areas and Sites of Potential Recognized Environmental Conditions

Legend

Phase I Environmental Site Assessment Study Area (JJR, 1999)

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

Section 5

ENVIRONMENTAL CONSEQUENCES

Section 5
ENVIRONMENTAL CONSEQUENCES

Section 5 addresses the potential impacts of the No-Build and Recommended alternatives on the social, economic, and environmental setting of the project area. These include both direct, predictable impacts and those that are more indeterminate and not as easily recognized. The latter are grouped into the general categories of indirect, secondary, and cumulative impacts.

Potential direct impacts are described in subsections 5.1 through 5.9. Each of these subsections is titled to conform with those used in Section 4 to describe the Affected Environment. Within the subsection discussions, environmental impacts and possible mitigation efforts are assessed. Subsection 5.10 describes secondary and cumulative impacts. Because secondary and cumulative impacts may affect a larger area than direct impacts, a more holistic approach is used to describe the impacts.

This document has been prepared as a condensed Final Environmental Impact Statement (Final EIS or FEIS) and focuses on the impacts of the Recommended Alternative relative to the No-Build Alternative. Much of the information from the Draft Environmental Impact Statement (Draft EIS or DEIS) remains unchanged. The sections that have changed the most from the Draft EIS are Sections 5.1.5 (Surface Water Quality) and 5.10 (Secondary and Cumulative Impacts). There have also been more minor changes in Sections 5.1.4 (Hydrology and Floodplains), 5.3 (Land Use), 5.4 (Socio-economics), 5.5 (Cultural Resources), and 5.8 (Noise).

A description of the No-Build and Recommended alternatives is provided below. With the exception of secondary and cumulative impacts, projected impacts of the Recommended Alternative are discussed for those areas where roadway construction is proposed (i.e., between U.S. Route 31/M-37 and LaFranier Road on the Hartman-Hammond Connector and between South Airport Road and U.S. Route 31/M-72 on Three Mile Road). Impacts assessed on Four Mile Road relate to the removal and replacement of the road sub-base and pavement surface (within the limits of the existing paved area) and the increased traffic as a result of the detour.

No-Build Alternative. The No-Build Alternative assumes the closure of the Cass Road Bridge without replacement. It also assumes that the Grand Traverse County Road Commission (GTCRC) will continue to perform routine and standard road maintenance and improvements on roads under their jurisdiction. These activities would take place as normally scheduled. As part of this alternative, typical low-cost, low-impact improvements will be made to improve the efficiency of the existing roadway network in the project area. This alternative is used as the baseline to assess the impacts associated with the Recommended Alternative.

Recommended Alternative. The Hartman-Hammond Road Connector with Three Mile Road Alternative involves:

- realigning and widening Hartman Road to four lanes between U.S. Route 31/M-37 and Cass Road;

- building a new four-lane bridge across the Boardman River to connect Hartman and Hammond roads;
- widening Hammond Road to four lanes to LaFranier Road;
- widening Three Mile Road to four/five lanes; and
- reconstructing Four Mile Road.

Typical sections of the Recommended Alternative are shown on Figures 5-1 through 5-3; preliminary plans are provided in Appendix A.

Roadway Design. Between U.S. Route 31/M-37 and Cass Road, a four-lane boulevard with an open drainage system is proposed. This segment will consist of two lanes in each direction with a 12-meter (40-foot) median. A 2.4-meter (eight-foot) shoulder will be provided along the outside edge of pavement; a 1.2-meter (four-foot) shoulder will be provided along the inside edge of pavement. From the west, the roadway will narrow to a four-lane section at Cass Road. The drainage system will remain open with 2.4-meter (eight-foot) paved shoulders along the outside edge of pavement. This will be the typical section between Cass Road and LaFranier Road. Between LaFranier Road and Three Mile Road, the existing four-lane cross section will be retained.

Three Mile Road will be widened to four/five lanes from 198 meters (650 feet) south of South Airport Road to U.S. Route 31/M-72. Between South Airport Road and Aero Park Drive, the typical section will consist of two through lanes in each direction with 2.4-meter (eight-foot) shoulders. North of Aero Park Drive, a continuous 3.6-meter (12-foot) center turn lane will be provided with a closed (curb and gutter) drainage system.

Four Mile Road will be reconstructed between Hammond Road and U.S. Route 31/M-72, retaining the existing two-lane cross section. It is anticipated that the work on Four Mile Road will occur prior to Three Mile Road widening so that it may be used as a detour during the Three Mile Road construction.

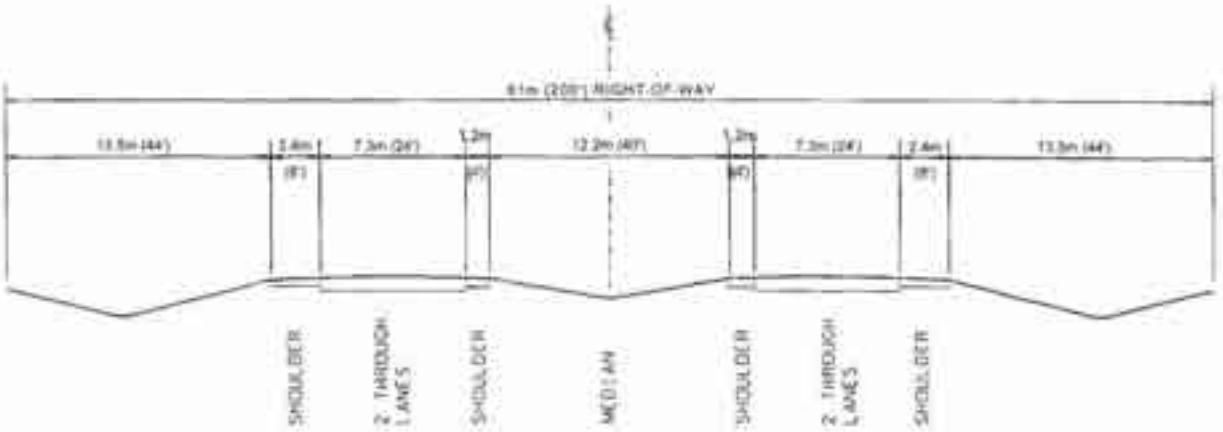
At-grade intersections will be provided at all the existing cross-streets along the Hartman-Hammond Connector and along Three Mile Road. Separate left turn lanes can be accommodated between U.S. Route 31/M-37 and Cass Road within the proposed median. Left turn lanes should also be provided at Keystone and LaFranier roads by widening the roadway at these intersections. Separate right turn lanes should be provided at intersections where traffic signals are warranted. These locations are likely to be U.S. Route 31/M-37, Cass Road, Keystone Road, and LaFranier Road. Along Three Mile Road, left turn lanes should be provided at South Airport Road and north of Aero Park Drive, where a center turn lane is proposed.

Potential locations for traffic roundabouts can be examined during final design.

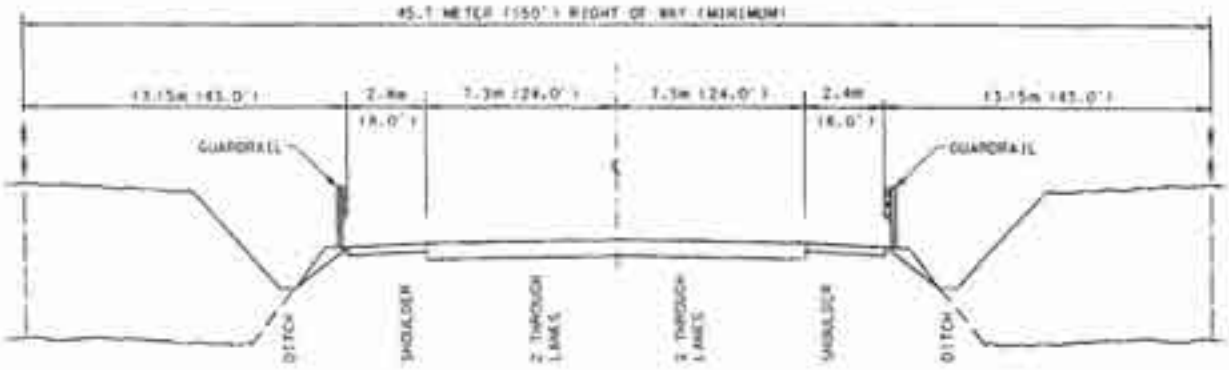
Bridge Design. The bridge cross section includes two through lanes in each direction and 2.4-meter (eight-foot) outside shoulders. A 0.9-meter (three-foot) parapet will be located at the outside edges of the bridge for a total bridge width of 21 meters (70 feet). The paved shoulders will be carried across the bridge to allow the passage of pedestrians and bicycles.

The recommended span length for the bridge has been designed to provide adequate horizontal clearance for the river flood flows and other features. Analysis of the river hydraulics revealed that the required bridge span is less than 30 meters (100 feet). In addition to the passage of floodwaters, it is

FIGURE 5-1



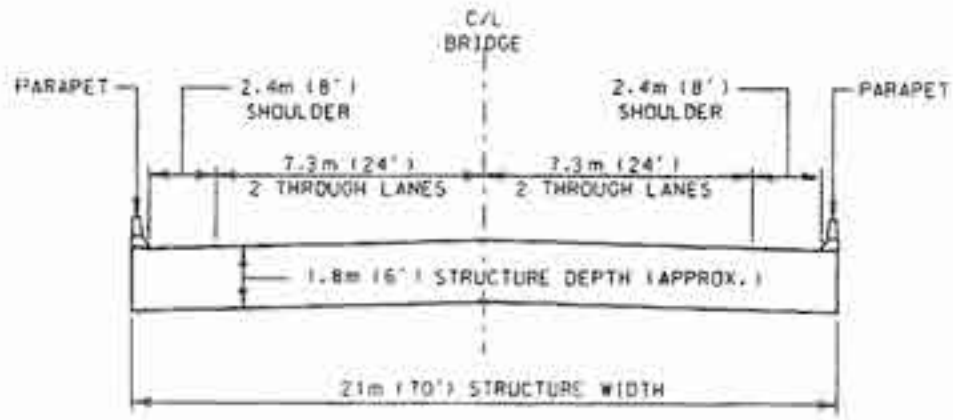
TYPICAL SECTION
HARTMAN-HAMMOND CONNECTOR
(FOUR-LANE BOULEVARD)
(U.S. ROUTE 31/ M-37 TO CASS ROAD)



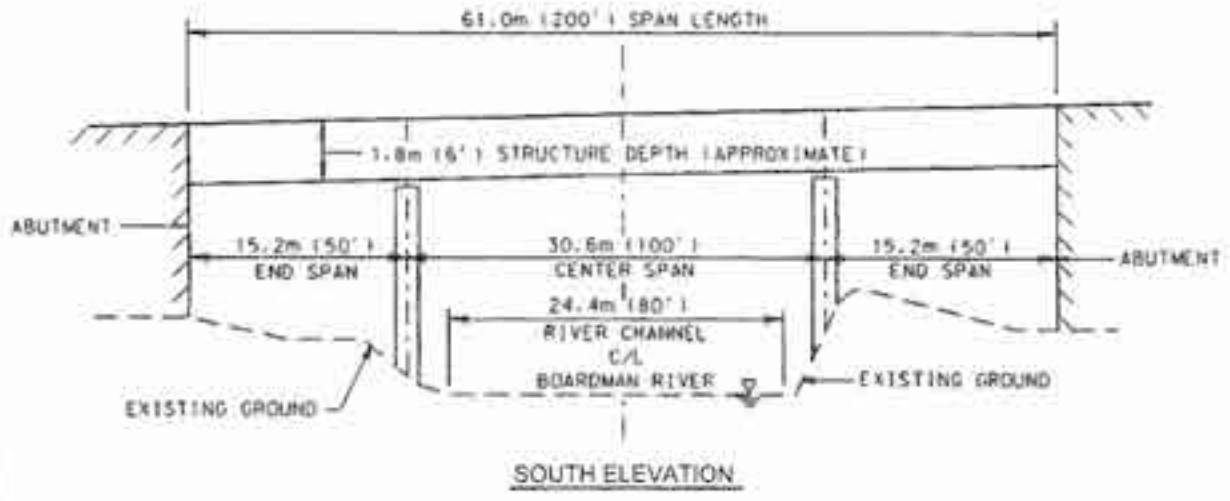
TYPICAL SECTION
HARTMAN-HAMMOND CONNECTOR
(CASS ROAD TO LAFRANIER ROAD)

BOARDMAN RIVER CROSSING MOBILITY STUDY
TYPICAL SECTIONS
RECOMMENDED ALTERNATIVE

FIGURE 5-2



TYPICAL BRIDGE SECTION

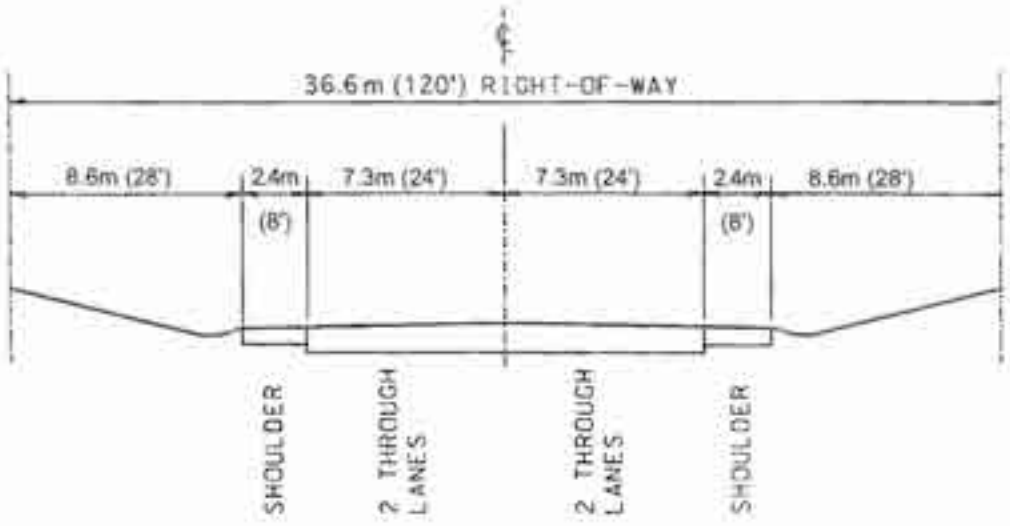


SOUTH ELEVATION

BOARDMAN RIVER CROSSING MOBILITY STUDY

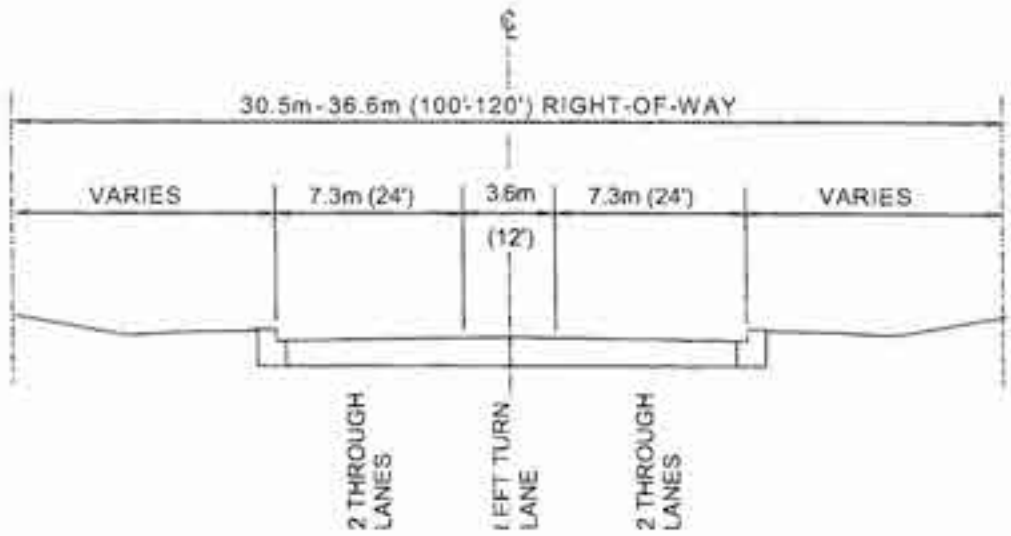
TYPICAL BRIDGE SECTIONS
RECOMMENDED ALTERNATIVE

FIGURE 5-3



TYPICAL SECTION
THREE MILE ROAD
(SOUTH AIRPORT ROAD TO AERO PARK DRIVE)

NOTE: The cross-section would widen to five lanes at the South Airport Road intersection



TYPICAL SECTION
THREE MILE ROAD
(AERO PARK DRIVE TO U.S. ROUTE 31/M-72)

BOARDMAN RIVER CROSSING MOBILITY STUDY
TYPICAL SECTIONS
RECOMMENDED ALTERNATIVE

recommended that provisions for other features be provided beneath the structure. Space beneath the structure will be preserved to accommodate the planned Boardman Valley Trail. Doing so will also preserve wildlife corridors and reduce wetland fill. The proposed 61-meter (200-foot) three span bridge will accommodate the river channel beneath the 30-meter (100-foot) center span and preserve open space on both sides of the river beneath the two 15-meter (50-foot) end spans. The exact structure type and other design details will be determined as part of the final design for this project.

Right-of-Way. Approximately 17 hectares (41 acres) of additional right-of-way will be required along the segments of the Recommended Alternative where widening is proposed. Along the Hartman-Hammond Connector between U.S. Route 31/M-37 and Cass Road, 61 meters (200 feet) of right-of-way will be required. Between Cass Road and LaFranier Road, 46 meters (150 feet) of right-of-way will be required. In most cases, these widths will be adequate to contain the roadway. Where extensive cut and fill will be required, the cut and fill slopes extend beyond this right-of-way limit. The locations of the right-of-way lines and slopestake lines are shown on the exhibits in Appendix A. In locations where the slopestake line extends outside of the standard right-of-way line, the slopestake line will provide a more accurate representation of the actual right-of-way required.

Along Three Mile Road, the recommended right-of-way width varies from 30 to 37 meters (100 to 120 feet). This width will be adequate to contain the proposed roadway.

Design Speed. In developing the preliminary plans for the Hartman-Hammond Connector, a 110 kph (70 mph) design speed was used. Slight modification to the proposed design may be required to maintain this design speed. It is anticipated that the posted speed limit on the Hartman-Hammond Connector will be 45 or 50 mph. The posted speed limit on Three Mile Road will be 35 mph.

Access Control. Uncontrolled access to the Hartman-Hammond Connector would have an undesirable effect on safety and capacity. As much as possible, access to the route should be confined to the at-grade intersections. However, access must be maintained to each parcel. If in the future parcels are acquired and subdivided, consolidation of access points along the route will follow local guidelines. (See Section 5.10.3) Along Three Mile Road, most of the land adjacent to the route is developed. No major changes in access along this portion of the Recommended Alternative are anticipated unless parcels redevelop.

Costs. The estimated right-of-way and construction costs for the Recommended Alternative is $25.9 million in 2000 dollars.

5.1 PHYSICAL ENVIRONMENT

5.1.1 Geologic Resources

Impacts. In general, impacts to local topography from construction of the Recommended Alternative will have minimal impact to geologic resources. As a result of the geologic history of the region, bedrock geology is located far beneath the land surface and will not be affected for the most part.

No-Build Alternative. No impact to geology or topography is expected to occur as a result of the No-Build Alternative.

Recommended Alternative. Direct impacts to topography resulting from cut and fill activity required to construct this alternative will include approximately:

- 1.7 hectares (4.2 acres) of cut along a wooded bluff immediately east of the proposed Hartman-Hammond Connector/U.S. Route 31 intersection;
- 2.9 hectares (7.1 acres) of cut 305 meters (1,000 feet) west of Dracka Road;
- 3.2 hectares (8.0 acres) of cut along the existing Hartman Road between Dracka and Cass roads;
- 5.1 hectares (12.7 acres) of cut into a wooded bluff between Keystone Road and LaFranier Road (at this location a cut slope is proposed to transition the new road from the elevation of Keystone Road to the elevation of LaFranier); and
- 2.2 hectares (5.5 acres) of fill proposed between Cass and Keystone roads within the Boardman River valley to accommodate the approach and abutment for the proposed bridge. The height of the fill will vary from 5.5 meters to 10.7 meters (18 feet to 35 feet).

Three Mile Road and Four Mile Road are located in glacial lake plain exhibiting little topographical relief; therefore, no impact to bedrock geology is expected to occur as a result of these road changes. Minor cut and fill activities will be necessary along Three Mile Road to construct the proposed widened cross section. Any excess cut material not used as fill will be disposed properly off-site in an approved upland location (i.e., not disposed of in a wetland). Impacts to streams and wetlands are discussed in other sections of this document. Cut and fill activities necessary to reconstruct Four Mile Road will involve removal of up to 2 meters (6 feet) of organic soils and replacement with stone and other non-organic materials. Similar to other waste material generated by the project, this material will be disposed of in an approved manner indicated by State and local regulations. Road reconstruction along Four Mile Road will occur within the limits of the existing pavement.

Mitigation. All direct impacts to topography will be long-term and permanent. Several techniques will be considered during final design to lessen the amount of cut and fill required by each alternative. First, where impacts to topography are unavoidable, maximizing slopes (2:1 max.) can be used to avoid excessive cut. Second, retaining walls can be employed to further reduce the amount of cut and fill, especially in the vicinity of the Boardman River. Third, medians can be narrowed through cut areas to reduce the amount of cut necessary. Prolonged exposure of soil will be minimized during construction through phasing of the project, temporary seeding, and soil erosion and sedimentation control measures. In highly erodible areas and along steep slopes, erosion control matting will be used. These mitigative measures combined with the previous selection of alternative alignments that follow existing road alignments help minimize topographic and geologic resource impacts.

The following is a list of the mitigation measures that will be carried out in accordance with permit requirements if the Recommended Alternative is carried forward:

1. Construction operations will be confined to the right-of-way limits or acquired easements.

2. Areas disturbed by construction activities will be stabilized and vegetated to control erosion as soon as possible during the construction period.

3. Special attention will be given to protecting the natural vegetative growth from unnecessary removal or siltation outside the project's slope stake line.

4. The integrity of any agricultural drainage or field tile system encountered by this project will be maintained, as practicable and feasible.

5. Steep slopes that are disturbed by construction will be stabilized immediately with erosion control fabric or other acceptable erosion control methods.

5.1.2 Groundwater Resources

Impacts. Direct impacts that permanently impair the function of groundwater discharge and recharge areas are primarily associated with portions of proposed impervious road surface that cover these areas. Groundwater resources are also vulnerable to temporary, direct impacts such as contamination at water wells, septic fields and sewer lines during construction.

Potential impacts to sole source aquifers are a concern for transportation projects because they are the sole or principal source of drinking water for an area. No sole source aquifers, however, occur in the State of Michigan at this time (Kukuk, 1999). Consequently, no impacts to sole source aquifers from this project are expected to occur.

No-Build Alternative. No impacts to groundwater resources are expected to occur as a result of the No-Build Alternative.

Recommended Alternative. Depth to water bearing groundwater deposits ranges from 16 meters to 46 meters (51 feet to 150 feet) in the project corridors; consequently, no impact to existing aquifers is likely to occur from construction of the Recommended Alternative. The addition of fill and new impervious road surface will cause long-term impairment of groundwater discharge within wetland areas and seeps at the base of bluffs and in the floodplain of the Boardman River valley where construction occurs. Constructing the Hartman-Hammond Connector portion of the Recommended Alternative will add approximately 5.6 hectares (13.8 acres) of new paved surfaces. In addition, soils such as Kalkaska loamy sand, Leelanau-Kalkaska loamy sand, and Emmet sandy loam, which exhibit a high capacity for groundwater recharge, will be covered in some areas by impervious road surface. The amount of additional pavement resulting from road construction represents less than 0.01 percent of the surface area of the Boardman River Watershed; therefore, direct impacts to the overall groundwater infiltration rates for this watershed from the Recommended Alternative are expected to be very minor.

Three Mile Road widening will follow the existing road alignment as much as possible, limiting direct impacts to groundwater resources and reducing the amount of additional impervious surface. Approximately 1.3 hectares (3.1 acres) of additional paved surface will result from the proposed widening. The amount of additional pavement resulting from road construction is relatively minor given the character and size of the watershed and is not expected to negatively affect groundwater

infiltration rates. Reconstruction of Four Mile Road will occur within the limits of the existing pavement; therefore, no impacts to groundwater resources are expected.

Mitigation. Using retaining walls, 2:1 slopes, and/or a reduced median width where infringement on wetlands, seeps, and discharge areas is likely to occur can minimize impacts to groundwater resources. Identifying and protecting water wells and sewer lines within the right-of-way will also occur prior to construction. The design of the proposed Hartman Road boulevard between U.S. Route 31 and Cass Road includes grassy, depressed medians and swales which will allow for greater infiltration of surface water for improved groundwater recharge where suitable soils exist.

5.1.3 Soil Resources

Impacts. In general, direct impacts to soil resources from road construction projects consist of disturbance, exposure, soil erosion, soil compaction, and covering with impervious surfaces such as concrete or asphalt. Sandy soils are subject to wind erosion and clayey soils on steep slopes are subject to erosion from surface water runoff. Impacts to soils associated with prime and unique farmland are discussed in Section 5.3.1.

No-Build Alternative. No impact to soil resources is expected to occur from the No-Build Alternative.

Recommended Alternative. The Hartman-Hammond Connector portion of the Recommended Alternative will directly impact a total of 27.7 hectares (68.4 acres) of soil resources, including construction easements not included in the proposed right-of-way. The potential for soil erosion is a concern particularly where grading cuts are proposed, for example, along the proposed Hartman-Hammond Connector Alternative at U.S. Route 31/M-37 and at Keystone Road.

Direct impacts as a result of the proposed Three Mile Road widening include disturbance to approximately 6.2 hectares (15.4 acres) of soil. A hydric (wetland) soil, Keston muck, will be disturbed by the widening of the Three Mile Road culvert at the Mitchell Creek crossing approximately 122 meters (400 feet) south of the South Airport Road intersection. No other hydric soils will be affected by Three Mile Road widening.

Four Mile Road reconstruction will require removal of the existing road pavement and organic soils beneath the pavement. Stone will replace the organic soils, and the road will be repaved according to GTCRC standards.

Mitigation. Implementing an approved soil erosion and sedimentation control plan will control erosion within the limits of work for road construction. The GTCRC must prepare an erosion and sedimentation control program that meets the requirements of the Michigan Water Resources Commission, to ensure compliance with Michigan's Soil Erosion and Sedimentation Control Act (Part 91 of PA 451 of 1994). In addition to the state act, the federal government has promulgated regulations under the National Pollution Discharge Elimination System (NPDES) that require construction sites disturbing more than 2.0 hectares (5.0 acres) of land to obtain a NPDES construction permit. NPDES requirements include having a Certified Storm Water Operator complete documentation of weekly inspections or after a rainfall event that results in runoff of the site. Corrective measures must be implemented immediately after problems are identified. In Michigan, verification of compliance with PA 451 would satisfy the federal requirement.

A specific soil erosion and sedimentation control plan that complies with requirements of appropriate agencies will be developed for this project in conjunction with final construction plans.

5.1.4 Hydrology and Floodplains

Impacts. Each of the alternatives was evaluated to determine if any of the activities associated with each would impact identified floodplain limits in the project area.

No-Build Alternative. The No-Build Alternative will not impact floodplain limits within the project area.

Recommended Alternative. The HEC-2 hydraulic simulation, performed for evaluation of the proposed new Boardman River crossing, shows that up to 500-year flood flows will be contained within the channel and will not overflow the banks. The historical floodplain is no longer subject to inundation by floods and can be considered as a terrace. Therefore, no floodplain impacts are expected.

Additional analysis since the circulation of the Draft EIS indicates that widening Three Mile Road will not impact the Mitchell Creek floodway. Impacts to the floodplain limits are expected to be minor.

Mitigation. Since no floodplain impacts are anticipated, no mitigation is proposed.

5.1.5 Surface Water Quality

Direct impacts to three Boardman River tributaries and Mitchell Creek will result from stream enclosure and or relocation to accommodate the Recommended Alternative. Other direct impacts include additional storm water runoff from new roadway and expanded roadway pavement. Storm water runoff contributes sediment and other pollutants to stream courses during significant wet weather events. In an effort to adequately identify and address the potential impacts to surface water quality from storm water runoff and respond to concerns expressed by the U.S. Environmental Protection Agency (EPA) (see Section 7), an estimation of pollutant loading was conducted.

Impacts to aquatic habitat and surface water quality will result from construction activity within the stream channel. Impacts to aquatic habitat include impairment or loss of stream bottom as a result of stream enclosure and sedimentation from disturbance of stream bank during construction and re-vegetation. Loss of stream bottom may result in a decrease in the local population of aquatic invertebrates and fish due to migration to areas containing a natural stream bottom. Short term increases in turbidity and sedimentation may result in temporary displacement of intolerant species of fish and aquatic invertebrates.

Direct Physical Impacts to Surface Waters.

No-Build Alternative. There will be no direct impacts to surface water quality from selection of the No-Build Alternative.

Recommended Alternative. The Hartman-Hammond Connector portion of this alternative crosses Tributary 2, the Boardman River, and Tributaries 3 and 4 (see Section 4.1.5 for a description of these waterways and Figure 4.1-3). Tributary 1 (as described in Section 4) will not be affected by the

Recommended Alternative. This alternative will enclose 34.1 linear meters (112 linear feet) of the northernmost branch of Tributary 2 in a culvert. The proposed size of culvert will be determined during final design. At the proposed enclosure location, Tributary 2 is intermittent and work will be scheduled during low flow or dry periods to minimize impacts. Because Tributary 2 is intermittent, surface water quality is unlikely to be affected if construction activity occurs during low flow or dry periods as is typically a permit condition.

The Recommended Alternative will cross over the Boardman River via a new bridge. The proposed bridge abutment and piers are planned to be located outside of the river channel (see Figure 5-2). Direct impacts to the Boardman River, however, will consist of temporary and minor increases in turbidity and short-term increases in sediment load derived from construction activities in and adjacent to Boardman River tributaries. Appropriate soil erosion and sedimentation control will be required as discussed below under Mitigation.

Impacts to Tributary 3 will consist of the enclosure of approximately 45.7 linear meters (150 linear feet) of stream channel. Stream substrate is highly organic and unconsolidated and increases in turbidity are likely to occur during construction. Direct impacts to Tributary 4 will consist of the enclosure of the stream in two locations. The first location is at the confluence of the stream with the Boardman River, where 45.7 linear meters (150 linear feet) will be enclosed. Another 45.7 linear meters (150 linear feet) of enclosure will occur at the base of the steep slope. Bottom substrate within this stream consists of coarse sand that is less likely to stay suspended; therefore, increases in turbidity are expected to be short-term and minor.

The Three Mile Road widening will potentially impact the water quality of Mitchell Creek at three locations. A total of 153.6 linear meters (504 linear feet) of stream length will be relocated or enclosed as a result of the Three Mile Road widening. Other impacts can generally be described as short-term impacts associated with construction activity including inadvertent erosion and sedimentation, the potential for accidental spills, and streambank impacts due to stream relocations, culvert replacements, and bridge construction.

One impact location of impact is approximately 122 meters (400 feet) south of the South Airport Road/Three Mile Road intersection. At this location, Mitchell Creek is currently crossed by Three Mile Road. The proposed road widening will require this culvert crossing to be extended on the east side of the road and will result in local, temporary increases in turbidity caused by disturbance of stream banks and bottom sediments.

The second stream impact involves relocating approximately 115.8 meters (380 feet) of the Lower Branch of Mitchell Creek (which parallels the east side of Three Mile Road), approximately 15.2 meters (50 feet) farther to the east. During stream relocation, construction activities may contribute pollutants from soil erosion and sedimentation and/or inadvertent spills, impairing surface water quality within and downstream of the work area. The specific configuration of the new stream channel section will be determined during final design; however, new streambank slopes are expected to be more gently sloped compared to the current situation to enhance establishing streambank vegetation.

The third stream impact location is at the existing crossing of the East Branch of Mitchell Creek. The existing culvert will be replaced with a bridge to accommodate widening of Three Mile Road. The removal of the culvert will temporarily disrupt approximately 31 linear meters (100 linear feet) of the

stream bottom and may increase sedimentation downstream; however, proposed plans to replace the culvert with a bridge will improve stream conditions for migratory fish species and allow colonization of the stream bottom by aquatic macroinvertebrates.

The new right-of-way may encroach on Mitchell Creek approximately 164.6 meters (540 feet) north of Parsons Road. The stream channel will not be directly impacted during construction; however, streambank stabilization will be necessary to prevent migration of the stream towards the new road. This issue will be considered in greater detail during final design.

Four Mile Road reconstruction work is planned to occur within the limits of existing pavement and therefore impacts to the adjacent stream (Tributary 12, see Figure 4.1-3) should be avoided. The low base flow and narrow channel of the stream renders it highly susceptible to degradation from excessive sedimentation. Mitigation measures are described below to minimize potential impacts to Tributary 12.

Storm Water Runoff Impacts to Surface Water Quality.

No-Build Alternative. No additional impacts to surface water quality from the existing Hartman Road is expected under the No-Build scenario. Traffic levels on Three Mile Road, however, are anticipated to increase under the No-Build Alternative, but additional impacts to surface water quality are not expected to be of concern.

Recommend Alternative. The objective of this section is to provide an estimate of pollutant loading from the Recommended Alternative and the potential impacts of those pollutants to the Boardman River and Mitchell Creek.

To estimate the loading of various pollutants, a statistical approach computerized by the Federal Highway Administration (FHWA), Publication No. FHWA-RD-88-006 (April 1990), was used. This program expands upon the widely used databases and models developed by the Nationwide Urban Runoff Program (NURP) (U.S. EPA, 1983) and the FHWA pollutant-loading studies. The program was designed to estimate storm water runoff pollutants directly entering into receiving waters from roads. Pollutant concentrations were reported as Event Mean Concentrations, which represent the average pollutant concentration present in the total volume of runoff from a storm event.

The greatest potential impact on aquatic biota is from toxicants rather than nutrients or solids. Heavy metals considered in the mass loading calculations (lead, copper, and zinc) are indicated by available data to be the dominant toxic pollutants. The mass loading computes the runoff concentration of a specific toxicant that is exceeded once in three years. Concentrations are then compared to the Acutely Toxic Value (continuous exposure) and the Threshold Effect Level (96-hour exposure), specified by U.S. EPA criteria and the Aquatic Chronic Value (continuous exposure) of the Michigan Water Quality Standards Rule 57.

Mean Annual Loading (lbs./yr.) was calculated for each contaminant and each watershed (or subwatershed) impacted by construction of the Recommended Alternative. The calculated mass loading was reduced by the proposed treatment of the storm water through open swales and detention basins. Mass Loading was back calculated to Event Mean Concentrations (mg/l) for direct discharge to the receiving water and total in-stream concentration by factoring the stream's base flow. These

concentrations were then compared with State of Michigan and U.S. EPA water quality standards, when available, for the protection of aquatic life.

The model results indicate that storm water runoff from the Recommended Alternative will not exhibit long-term impacts on Jack's Creek, Tributaries 2 and 3, or Mitchell Creek. Mass loading and in-stream concentrations of total suspended solids and nutrients fall below state and federal standards and will not contribute to long-term degradation of the streams. Heavy metals concentrations were evaluated relative to the U.S. EPA Acute Toxicity Level and the Threshold Effect Level and were found to be well below both critical values.

Chemical Oxygen Demand (COD) may cause a short-term depression of in-stream dissolve oxygen levels at the point of discharge for the three tributaries. This will not be a problem in Jack's Creek. The steep gradient and turbulent flow of Jack's Creek over cobble and gravel will replace the oxygen debt over a short distance. COD may cause a short-term depression in the dissolved oxygen levels of Tributary 3. This stream originates from wetland seeps along the steep slopes of the valley and flows for approximately 0.8 kilometer (0.5 mile) before discharging into the Boardman River. The low gradient, slow flow and short distance of this stream result in lower ambient dissolved oxygen levels. The substrate consists of unconsolidated organic material that supports a marginal aquatic resource consisting mostly of tolerant aquatic species. These species are capable of tolerating this short duration of oxygen depression. COD may also impact Tributary 4. This very small stream originates from wetland seeps and flows for only 0.4 kilometer (0.25 mile) before discharging into the Boardman River. Like Tributary 3, the substrate consists of unconsolidated organic and sand material that supports a marginal aquatic resource tolerant aquatic species capable of tolerating this short duration oxygen depression.

COD is not of concern in Mitchell Creek because the estimated concentration of the discharge is 0.05 mg/l, which will not adversely depress ambient dissolved oxygen concentration during wet weather events. The results of this assessment are summarized below. Detailed descriptions of results and comparisons to regulatory standards are presented in (Appendix B-3).

Tributary 2 (Jack's Creek). The subwatershed of this creek drains 294.2 hectares (727 acres). The Recommended Alternative adds 3.4 hectares (8.4 acres) of impervious surface or 1.2 percent of the total subwatershed area.

Storm water runoff as a result of the Recommended Alternative will not adversely impact Jack's Creek. Mass loading and in-stream concentrations of total suspended solids and nutrients fall below state and federal standards and will not contribute to degradation of Jack's Creek. Heavy metals concentrations were evaluated relative to the U.S. EPA Acute Toxicity Level and the Threshold Effect Level and were found to be well below both critical values. COD may cause a minor depression of in-stream dissolved oxygen levels at the point of discharge into the stream. The dissolved oxygen concentration of cold water streams typically falls within the range of 6 to 8.5 mg/l. The turbulent flow of Jack's Creek over cobble and gravel will replace the oxygen debt over a short distance. Wet weather events in this region statistically last for 5.8 hours, so the impact will be short term and minor.

Tributary 3 (Unnamed Tributary). The subwatershed of this tributary drains 47.3 hectares (117 acres). The Recommended Alternative adds 2.0 hectares (5.0 acres) of impervious surface or 4.3 percent of the total subwatershed area.

Storm water runoff as a result of the Recommended Alternative will not seriously impact water quality or the aquatic life of Tributary 3. Mass loading and in-stream concentrations of total suspended solids and nutrients fall below state and federal standards and will not contribute to degradation of the tributary. Heavy metals concentrations were evaluated relative to the U.S. EPA Acute Toxicity Level and the Threshold Effect Level and were found to be well below both critical values. COD may impact this very small stream with a depression of in-stream dissolved oxygen levels at the point of discharge. This stream originates from wetland seeps and flows for approximately 0.8 kilometer (0.5 mile) before discharging into the Boardman River. The substrate consists of unconsolidated organic material. This substrate supports a marginal aquatic resource consisting mostly of tolerant aquatic species that are capable of tolerating this short duration oxygen depression. Wet weather events in this region statistically last for 5.8 hours, so the impact will be short term and minor.

Tributary 4 (Unnamed Tributary). The subwatershed of this tributary drains 35.6 hectares (88 acres). The Recommended Alternative adds 1.3 hectares (3.3 acres) of impervious surface or 3.7 percent of the total subwatershed area.

Storm water runoff as a result of the Recommended Alternative will not seriously impact water quality or the aquatic life of Tributary 4. Mass loading and in-stream concentrations of total suspended solids and nutrients fall below state and federal standards and will not contribute to degradation of the tributary. Heavy metals concentrations were evaluated relative to the U.S. EPA Acute Toxicity Level and the Threshold Effect Level and were found to be well below both critical values. Similar to Tributary 2 and 3, COD may impact this very small stream with a depression of in-stream dissolved oxygen levels at the point of discharge. This stream also originates from wetland seeps and flows for approximately 0.4 hectare (0.25 mile) before discharging into the Boardman River. The substrate consists of unconsolidated organic and sand material. This substrate supports a marginal aquatic resource of mostly tolerant aquatic species that are capable of tolerating this short duration oxygen depression. Wet weather events in this region statistically last for 5.8 hours, so the impact will be short term and minor.

Mitchell Creek. The watershed of Mitchell Creek drains 3,804 hectares (9,400 acres). The Recommended Alternative will add 3.4 hectares (8.3 acres) of impervious surface or 0.09 percent of the total area.

Storm water runoff as a result of the Recommended Alternative (specifically, Three Mile Road widening) will not adversely impact Mitchell Creek. Mass loading and in-stream concentrations of total suspended solids and nutrients fall below state and federal standards and will not contribute to degradation of Mitchell Creek. Heavy metals concentrations were evaluated relative to the U.S. EPA Acute Toxicity Level and the Threshold Effect Level and were found to be well below both critical values. COD is not of concern in Mitchell Creek because the estimated concentration of the discharge is 0.05 mg/l, which will not adversely depress ambient dissolved oxygen concentration during wet weather events.

Mitigation. Techniques planned to minimize or avoid impacts to streams during construction include: 1) minimizing areas cleared adjacent to stream courses; 2) minimizing wetland disturbances; 3) maximizing the angle of slope on fill areas to limit construction activity and encroachment of stream floodplains and wetlands to the extent feasible; 4) implementing and monitoring appropriate soil erosion and sedimentation control measures in accordance with the Soil Erosion and Sedimentation Act; 5)

careful handling of equipment and fuel oils; and 6) scheduling construction activities in stream channels during low flow conditions when the possibility of bank failure and impairment of fish migrations is low.

The results of the storm water runoff analysis (see Appendix B-3) indicated that Best Management Practices (BMPs) incorporated into the final design will ensure that surface water quality is not significantly impacted. The use of vegetated swales adjacent to the road and treatment with detention and/or extended wetland basins will reduce contaminants below state and federal standards for aquatic life. These mitigating measures have already been successfully implemented along Hammond Road, protecting the quality of several small tributaries of Mitchell Creek. Discharge of storm water from detention basins at a rate comparable to predevelopment discharge will minimize the issue of peak flows. New construction of roadside ditches will be lined with soil erosion control matting, seeded and mulched within 152 meters (500 feet) from any stream. Placement of check dams in drainage ditches with slopes of four percent or more will occur at the appropriate spacing on slopes.

An NPDES Permit will be required for construction related disturbances over 0.4 hectare (1.0 acre). The Michigan Department of Environmental Quality (MDEQ), which administers this federal program in Michigan, also requires issuance of a Soil Erosion and Sedimentation Control Permit (PA 451 of 1994, as amended, Part 91).

Proposed activities below the ordinary high water mark of any river or stream will require permits under Sections 401 and 404 of the Federal Water Pollution Control Act (FWPCA) of 1972. Section 401 requires certification from the Michigan Water Resources Commission that any discharges of dredge and fill materials comply with provisions of the FWPCA. A Section 404 permit will be required for any activities that place dredge or fill materials in any navigable water or wetlands.

Under the Michigan Natural Resources and Environmental Protection Act (PA 451, as amended) Part 301, Inland Lakes and Streams, the MDEQ requires the issuance of a permit for most construction activities proposed below the ordinary high water mark of any inland lake or stream. These activities include, but are not limited to, placement of fill material, dredging, construction of structures, and the relocation of an existing stream.

Under PA 451, as amended, Part 303, Wetlands Protection, the MDEQ requires the issuance of a permit for the following activities proposed within a state regulated wetland: 1) to place fill material; 2) to dredge or remove soil or minerals; 3) to construct, operate or maintain any use or development; and 4) to drain surface water.

5.2 ECOLOGICAL ENVIRONMENT

5.2.1 Terrestrial Resources

Impacts. Construction activities such as excavating, clearing, filling, and grading can result in the direct loss of terrestrial resources. Impacts include both loss of wildlife habitat and death of individual animals that are unable to relocate quickly to undisturbed areas at the time of construction.

No-Build Alternative. There will be no direct impacts to terrestrial resources resulting from the No-Build Alternative.

Recommended Alternative. The Hartman-Hammond Connector portion of the Recommended Alternative will remove approximately 5.1 hectares (12.6 acres) of woodland. Most of the affected woodland is characterized as mixed hardwood forest in four locations. A relatively small area of evergreen plantations east of U.S. Route 31/M-37 is included in the total woodland impact.

Approximately 1.8 hectares (4.4 acres) of critical wildlife habitat (as defined in Section 4.2.1) within the Boardman River valley will be directly impacted as a result of this alternative. Construction of the proposed bridge will create a temporary disturbance that will likely cause animal movement to refuge areas north and south of the construction zone. Wildlife will be permanently displaced from habitat used for road pavement and embankments and temporarily displaced from adjacent habitats due to construction noise and activity. Wildlife species sensitive to human activity and noise may permanently relocate to less-developed habitats within the river valley. Construction activity will also result in some wildlife mortality, especially the smaller, less mobile animals such as rodents, young nesting birds, reptiles and amphibians. Displaced wildlife will initially increase population densities in similar habitats near the road right-of-way, but competition and other factors will eventually result in a leveling off to pre-construction densities.

Impacts to terrestrial resources from Three Mile Road widening will consist of removing more than 25 mature trees (primarily black oak and white pine) on adjacent properties between U.S. Route 31/M-72 and Parsons Road. Given the close proximity of these trees to the existing road and urban development, the impact to wildlife habitat from the proposed tree removal is expected to be minor. Tree removal, however, does represent an aesthetic impact to the overall landscape character. Four Mile Road reconstruction will not require tree removal.

Mitigation. Impacts to terrestrial resources can be further minimized through design refinements that reduce cross section width, maintain existing hydrologic conditions, control and treat storm water runoff, and protect existing vegetation within the right-of-way. The proposed bridge crossing of the Boardman River will be designed in a manner that maximizes the span across the river. Bridge abutments will be set at least 15.2 meters (50 feet) from the riverbank to accommodate wildlife movement within the river valley. The bridge design will be further examined during development of engineering plans.

5.2.2 Wetland Resources

Impacts. Construction activities such as clearing, excavating, filling, and grading can result in the direct loss of wetland resources. Fill required for roadbed construction will directly eliminate wetland habitats upon which it is placed, potentially affecting surface water and groundwater flows. Additional roadway pavement may also increase the rate of runoff from precipitation and snowmelt into adjacent wetlands. This could contribute to alteration of the hydrologic condition of a wetland resource.

No-Build Alternative. There will be no direct impacts to wetland resources from the No-Build Alternative.

Recommended Alternative. Construction of the Hartman-Hammond Connector portion of this alternative will fill approximately 2.0 hectares (4.9 acres) of wetland. This will result in loss of wetland habitat and potential impacts to adjacent wetlands from alteration of surface water drainage patterns. A total of four wetland areas in two wetland complexes will be filled.

Wetland Complex 2 is a large forested wetland complex associated with Tributary 2 on the southern boundary of the proposed right-of-way between U.S. Route 31/M-37 and Cass Road. The Hartman-Hammond Connector portion of the Recommended Alternative crosses the tip of a finger shaped portion of this wetland complex approximately 244 meters (800 feet) west of Dracka Road at the head of the north branch of Tributary 2. Approximately 0.2 hectare (0.5 acre) of forested wetland will be filled in this area. This wetland complex provides important water quality protection for Tributary 2.

Wetland Complex 3 consists of three wetland areas located in the Boardman River valley. The Hartman-Hammond Connector portion crosses wetlands within this complex on the west and east sides of the river. Because of the large size and location of these wetlands, these resources are part of an important wildlife corridor. The area of impact on the west side of the river includes 0.8 hectare (2.0 acre) of forested wetland and 0.2 hectare (0.6 acre) of scrub-shrub wetland under the existing electric transmission lines. On the east side of the river, 0.7 hectare (1.8 acre) of forested wetland will be filled. These wetlands provide important wetland functions including water quality benefits, wildlife habitat, and groundwater discharge.

Widening of Three Mile Road south of South Airport Road will fill 23 square meters (250 square feet) of emergent wetlands. No wetland impacts will result from relocation of the Lower Branch of Mitchell Creek or construction of a bridge over the creek. Reconstruction of Four Mile Road will be contained within the existing roadbed and will not directly impact adjacent wetland resources.

Mitigation. Mitigating measures include efforts to avoid and/or minimize adverse impacts from project construction and operation, and create new wetlands to compensate for unavoidable wetland losses.

In addition to proposed wetland construction as mitigation for unavoidable wetland impacts (Appendix B-4), a number of other mitigation measures will be considered during final design as described below. Specific location and extent of other mitigation opportunities are not known at this time but will be determined during final design and will respond to permit requirements.

- bridging rather than filling wetland areas;
- minimizing wetland fill by lowering the road grade closer to the wetland elevation and maximizing steepness of road fill side slopes;
- using grassy swales adjacent to the road to filter runoff;
- creating small wetland stormwater detention basins to store and filter runoff;
- directing stormwater into infiltration basins to reestablish groundwater flow;
- using culverts or coarse aggregate under the road to replicate previously existing surface and groundwater patterns between areas separated by the highway; and,
- planting native grasses, shrubs and tree species after construction as replacement habitat.

Efforts to minimize increases in surface runoff, alteration of groundwater hydrology, sedimentation, and construction-related fugitive dust will also minimize wetland impacts. Prior to construction, a Soil Erosion and Sedimentation Control Plan will be prepared to ensure that impacts to watercourses and wetlands will be minimized.

With implementation of the Recommended Alternative, a wetland mitigation plan is needed to determine appropriate quantities and types of wetland creation necessary to compensate for unavoidable wetland loss. Appendix B-4 contains an updated Conceptual Wetland Mitigation Plan that was previously included as a preliminary document in the Draft EIS for this project study. The updated plan responds to comments and requests for additional information made by regulatory agencies as part of their review of the Draft EIS. The plan indicates the creation of approximately 3.8 hectares (9.5 acres) of wetland as mitigation for the Recommended Alternative wetland impacts. The location of two potential wetland mitigation sites is shown on Figure B-1 in Appendix B-4. A summary of the wetland impacts and the amount of mitigation proposed is provided in Table 5.2-1.

Table 5.2-1
Wetland Impacts and Mitigation Proposed

Wetland Type	Impacts hectares* (acres)	Mitigation Proposed hectares* (acres)
Forested	1.7 (4.3)	3.5 (8.6)
Scrub-Shrub	0.2 (0.6)	0.4 (0.9)
Emergent	0.004 (0.01)	0.006 (0.02)
TOTAL	**2.0 (4.9)**	**3.8 (9.5)**

* Hectares rounded to the nearest tenth except for emergent.

5.2.3 Aquatic Resources

Impacts. Potential impacts to aquatic resources may occur from changes in aquatic habitat, hydrology and/or water quality, which in turn alter the existing aquatic community. Activities such as grading and excavation can disturb and alter stream habitat structure and contribute sediment and other pollutants to the channel. Sediment loading from streambank erosion adversely impacts benthic habitat by silting over the substrate used by macroinvertebrates and fish. Stream channelization decreases stream sinuosity and reduces habitat diversity and quality. Stream channelization combined with enclosure can result in scouring, erosion and further siltation of benthic substrate both for the reach of stream that is channelized and for some distance downstream, especially in combination with elevated flood flow velocity and volume. Stream relocation typically includes alteration and replacement of stream habitat components, which may or may not resemble the existing stream habitat. Stream enclosure via a culvert can also adversely affect bottom substrate and serve as a barrier to migratory fish. Depending on the time and duration of construction and the location of a culvert, runs of migratory fish species can be adversely impacted.

No-Build Alternative. There will be no direct impacts to aquatic resources as a result of the No-Build Alternative.

Recommended Alternative. The Hartman-Hammond Connector will enclose 34.1 linear meters (112 linear feet) of seasonal aquatic habitat within the intermittent stream channel of the north branch of Tributary 2. Because of the intermittent hydrologic regime of the stream and the small area of enclosure, direct impacts to fish, aquatic macroinvertebrates, and aquatic habitat will be minimal.

Tributaries 3 and 4 will be directly impacted by the Hartman-Hammond Connector. Approximately 45.7 linear meters (150 linear feet) of Tributary 3 and 91.4 linear meters (300 linear feet) of Tributary 4 will be enclosed. Because of the small size, low biodiversity, and abundance of aquatic resources within these tributaries, impacts to aquatic resources will be localized and minor. Construction activities associated with in-stream structures will displace macroinvertebrates and fish at the immediate stream crossing. Fish are highly mobile and will migrate to other reaches of the stream during construction.

Direct impacts to aquatic resources within the Boardman River as a result of this alternative will be limited and associated with local increases in turbidity from exposed, eroding soils and possible accidental spills during construction. In general, the aquatic macroinvertebrates found in the river are moderately tolerant organisms and resistant to levels of nonpoint source pollutants commonly associated with storm water runoff. Consequently, impacts to the Boardman River aquatic community from the Recommended Alternative will be minor. The ecosystem of the river within the corridor reviewed is buffered from nonpoint source pollutants in storm water runoff by the river's hydrology and floodplain wetlands.

Widening Three Mile Road south of South Airport Road will involve the enclosure of an additional 7.3 linear meters (24 linear feet) of Mitchell Creek stream bottom. At this location, aquatic habitat within the creek is fair, exhibiting heavy sedimentation. Aquatic macroinvertebrate and fish communities at this location are moderately impaired, and direct impacts are expected to be minor. Relocation of the Lower Branch of Mitchell Creek near U.S. Route 31/M-72 will directly impact a total of 115.8 linear meters (380 linear feet) of stream channel containing significant aquatic habitat consisting of several deep holes that serve as refuge areas for migratory salmonids and resident trout. Direct impacts to aquatic habitat will include loss of in-stream structure, riparian cover, and several deep pools that serve as refuge areas for migratory and resident fish species. Increases in turbidity will likely cause the displacement of fish populations and aquatic macroinvertebrates to less favorable areas downstream. Sedimentation of gravel and cobble areas will likely impact the diversity and composition of aquatic organisms downstream of the construction area.

Reconstruction of Four Mile Road will be contained within the existing limits of pavement and will not directly impact adjacent aquatic resources unless an accidental spill or uncontrolled erosion occurs during construction.

Mitigation. Mitigation for impacts to aquatic resources associated with the construction and operation of the Recommended Alternative will be accomplished by complying with the federal and state statutes that address hydrology, floodplains, surface water quality, wetlands, and inland lakes and streams. Measures to protect aquatic resources typically protect aquatic habitat or water quality, thereby protecting the organisms residing in the aquatic environment. Protective measures implemented by the GTCRC that minimize erosion and protect water quality from construction activities and road runoff will minimize the impacts of siltation on the stream habitat affected by the project. In addition to

protective measures required by regulations, other mitigative measures will be taken by GTCRC to ensure aquatic resource impacts are minimized, including:

- preparing and implementing an approved Soil Erosion and Sedimentation Control Plan that includes storm water BMPs during both construction and operation phases (e.g., grassy swales with check dams, detention basins, wetlands, sediment traps, retention basins);
- constructing stream crossings during low flow periods, which are also periods where impacts to movements of migratory fish species would be minimal;
- replanting riparian vegetation removed during construction to the extent feasible;
- minimizing the area of stream enclosure during final design;
- installing open bottom box or arch culverts in those streams with high quality fish resources (e.g., Mitchell Creek); and
- enhancing stream morphology, bottom substrate and riparian corridors following stream relocation to the extent feasible.

5.2.4 Wild and Scenic Rivers/Coastal Zone Management

Impacts. No impacts to wild and scenic rivers will result from the No-Build Alternative or the Recommended Alternative. None of the stream sections that would be impacted by the Recommended Alternative have been designated or are being considered for federal or state designation as a wild and scenic river.

The proposed bridge crossing of the Boardman River, associated with the Recommended Alternative, will affect resources such as wetlands and soils that are of concern to the Michigan Coastal Management Program. Therefore, environmental permits required by the MDEQ Land and Water Management Division (including the Inland Lakes and Streams Permit, the Wetlands Permit, and the Soil Erosion and Sedimentation Control Permit, as previously described under Section 5.1.5 Surface Water Quality) will be reviewed by the Michigan Coastal Management Program prior to approval (Cunningham, 2000).

5.2.5 Threatened and Endangered Species

Impacts. Based on the information obtained from federal and state agencies as well as field observations, no impacts to federal- or state-listed Threatened or Endangered species are expected as a result of implementing the Recommended Alternative or the No-Build Alternative. Coordination with the federal and state agencies responsible for protecting Threatened and Endangered species has been ongoing during the EIS preparation process.

5.3 LAND USE

5.3.1 Agriculture

Impacts. Based on the federal Farmland Protection Policy Act (PL 97-98), farmland is evaluated and classified as "prime," "unique," or "of statewide or local importance." Under the act, federally funded action that results in the conversion of farmland to non-agricultural uses, such as the relocation and widening of Hartman Road, must be evaluated for the adverse effect of such activities on farmland preservation. This assessment is coordinated through the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS), who, using a numerical rating, determines the level of impact a selected site may have on existing farmland. The highest possible score is 260. Those locations that score the highest are considered the most suitable for protection. Alternatives must be considered for federal projects that would affect farmland locations that score 160 or higher. Sites that score less than 160 points do not, by law, require further consideration for protection through consideration of alternatives (7 CFR Part 658).

No-Build Alternative. Because the No-Build Alternative does not involve physical alteration of the landscape, no direct impacts are expected to occur to active farmland within the project area as a result of this alternative. Impacts to the 2020 agricultural landscape under the No-Build Alternative are discussed in greater detail in Section 5.10 Secondary and Cumulative Impacts. No land enrolled in the farmlands protection program under Part 361 of the Natural Resources and Environmental Protection Act (PA 451 of 1994, as amended) will be directly affected by this alternative.

Recommended Alternative. The Hartman-Hammond Connector will directly impact agricultural land, irreversibly converting a portion of farmland to roadway. The proposed re-alignment of Hartman Road crosses three active agricultural parcels including the southeast corner of the existing orchard at Pine Brook Farm. East of the river valley, several parcels along Hammond Road lie fallow, although they are zoned for agricultural use. The amount of active farmland lost to construction of a four-lane boulevard is approximately 2.9 hectares (7.2 acres). No existing farm structures will be displaced by this alternative. Temporary impacts to the farmland properties include access needs for construction equipment and crews.

The Farmland Conversion Impact Rating (Form AD-1006) for the Hartman-Hammond Connector Alternative is 125.7 for the four-lane boulevard (Appendix B-1). No land enrolled in the farmlands protection program under Part 361 of the Natural Resources and Environmental Protection Act (PA 451, as amended) will be affected by this alternative.

No active farmland will be impacted by widening Three Mile Road north of South Airport Road intersection area or reconstruction of Four Mile Road.

5.3.2 Residential

Impacts. Scaled drawings of alignment rights-of-way were overlaid with updated structure information taken from recent aerial photographs (1995), field reconnaissance (spring and summer 1998 and fall 1999), and updated plat maps. All structures within the proposed limits of grading, within the proposed right-of-way, or within 6.1 meters (20 feet) of the limits of grading or right-of-way were identified as displacements. Structures and properties for which existing access would be prohibited by

the rights-of-way were also considered displacements. Landlocked and small parcels created as a result of the proposed rights-of-way were also noted. This method was also used for land uses described in subsequent sections.

No-Build Alternative. The No-Build Alternative does not involve physical alteration of the landscape; therefore, this alternative will not have a direct impact on existing residences. However, residential expansion is expected to occur through the planning period. The probable 2020 residential growth scenario projected for the next 20 years in current planning documents is discussed in greater detail in Section 5.10 Secondary and Cumulative Impacts.

Recommended Alternative. The Recommended Alternative will displace 20 residences. One of these residences is also assumed to be a business based on a sign posted on the property that describes the structure as Greiger's Archery, Crafts and Ceramics. Another home business, the Grainery Bed and Breakfast, will not be displaced, but will lose property fronting Hartman Road as a result of the Recommended Alternative. Of the 20 residences directly impacted, three are located on Three Mile Road. Several other residences located adjacent to existing Three Mile Road will lose portions of their front lawns, fencing, and/or mature trees as a result of road widening.

Activity related to resurfacing Four Mile Road will occur within the existing roadway and is not expected to cause long-term impacts to private property. Temporary impacts will include short-term property access restrictions during road construction.

Mitigation. Actions to minimize relocation impacts will be in compliance with Michigan PA 31 of 1970, Michigan PA 227 of 1972, and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. All eligible residences located on the project will be provided with relocation assistance and services through the Michigan Department of Transportation's Relocation Assistance Program. The program is realistic and will provide orderly, timely, and efficient relocation of the displacees on this project. A conceptual relocation plan for this project is included in Appendix B-5.

5.3.3 Institutional

Impacts. Institutional land uses include schools and educational facilities, churches, government buildings, health care facilities, prisons, police and fire stations, and other publicly owned facilities. Impacts to such facilities from the Recommended Alternative may include displacement and loss of lawn areas, setback frontage, and parking spaces.

No-Build Alternative. Because the No-Build Alternative does not involve physical alteration of the landscape, no direct impacts to existing institutions will occur within the project area as a result of this alternative. The number of institutions (e.g., schools and churches), however, is expected to grow as the population in the area increases. The effects of this population growth on landscape patterns are discussed in greater detail in Section 5.10 Secondary and Cumulative Impacts. There is no direct or indirect institutional property loss associated with the No-Build Alternative.

Recommended Alternative. Five institutional properties within the project corridors of the Recommended Alternative may lose property through right-of-way acquisition; however, no institutional buildings will be displaced by this alternative. Affected institutions include Sabin

Elementary School and the Bible Baptist Church, located immediately west of the Hartman Road/Cass Road intersection. The boulevard portion of the Recommended Alternative will narrow back to a five-lane cross section at this intersection to minimize impacts. The proposed right-of-way may extend approximately 13.7 meters (45 feet) onto school and church property, assuming the existing centerline of Hartman Road is used as the centerline of the new right-of-way. Final design has not been completed for this alternative; therefore, precise property impacts can not be determined.

The school grounds located near the northwest corner of Hartman and Cass roads are used by physical education classes and do not constitute a Section 4(f) use (see Section 6). The school's playground area is located on the north side of the school away from Hartman and Cass roads.

The church grounds located at the southwest corner of Hartman and Cass roads are landscaped and provide a buffer from the intersection. The church sanctuary is located on the south side of the church complex away from the road intersection. Widening Hartman Road may displace several mature trees on the church property.

Three Mile Road widening will affect other institutional facilities, including East Bay Elementary School, the Northwest Michigan Human Services Agency, and the Grand Traverse Fire Department. The proposed Three Mile Road right-of-way will extend approximately 6.7 meters (22 feet) onto East Bay Elementary school property and displace approximately eight parking spaces. The school borders the east side of Three Mile Road, south of Aero Park Drive. This property is not classified as a Section 4(f) resource. The proposed right-of-way will also extend approximately 5.5 meters (18 feet) onto the Northwest Michigan Human Services Agency property located south of Aero Park Drive and the Grand Traverse Fire Department located at the northwest corner of the Parsons Road/Three Mile Road intersection. In addition, as many as 10 parking spaces at the agency will be displaced and a storm water detention area may be displaced by road widening.

Mitigation. No institutional properties will require relocation assistance. Potential mitigation for partial loss of property, parking impacts, landscaping, and other property uses will need to be developed with input from each institution potentially affected.

5.3.4 Commercial, Office, and Industrial

Impacts. Commercial structures include a range of building uses and sizes, from gas stations and mini-marts to large shopping centers. Potential impacts to commercial, office, and industrial properties from the Recommended Alternative include building displacements, loss of setback frontage, loss of parking spaces, and access restrictions during construction.

No-Build Alternative. Because the No-Build Alternative does not involve physical alteration of the landscape, no direct impacts to commercial, office or industrial land uses will occur as a result of this alternative. However, like institutions that provide service to the community, current planning documents project growth and change of these land uses over the next 20 years as the region's population continues to increase. Impacts of this growth are discussed in greater detail under the No-Build Alternative in Section 5.10 Secondary and Cumulative Impacts.

Recommended Alternative. One commercial (the Grainery Bed and Breakfast) and three industrial properties within the Recommended Alternative will lose property through right-of-way acquisition,

and two small commercial businesses (Greiger's Archery, Crafts and Ceramics, and the Great Lakes Submarine) will be displaced by this alternative.

The three industrial parcels crossed between Cass Road and the Boardman River include a vacant parcel, property belonging to Louie's Wholesale Meats, and Eagle Picher Automotive (formerly Carpenter Enterprises, Ltd., and before that, Tower Automotive). Under the current circulation and parking lot design within the Eagle Picher Automotive property, one lot is located northwest of the existing building with an access drive along the building's north side leading to loading docks near the back entrance. This access drive and an undefined number of parking spaces are likely to be removed under the Recommended Alternative.

Further east on Keystone Road, below the western extension of Hammond Road, a small home-based business called Greiger's Archery, Crafts and Ceramics will be displaced. The property is not registered as a commercial property with the Garfield Township offices.

Road widening along Three Mile Road will displace one of the 11 commercial properties bordering this road. Great Lakes Submarine located near the southeast corner of Three Mile Road and U.S. Route 31/M-72 intersection will be displaced. Of the remaining commercial businesses, several are likely to lose parking capacity and/or 50 percent or more of their frontage on Three Mile Road. Among the affected businesses are a dental office, an insurance agency, a professional photographer, and the Total Gas Station. The Swanson Leasing Company access drive and parking lot will be affected by relocating Mitchell Creek farther to the east to accommodate a widened Three Mile Road. No business will be displaced along Four Mile Road. Temporary access restrictions that may be required during construction will be discussed with individual businesses prior to roadwork.

Mitigation. All eligible businesses located on the project will be provided with relocation assistance and services through the Michigan Department of Transportation's Relocation Assistance Program. The program is realistic and will provide orderly, timely, and efficient relocation of the displacees on this project. A conceptual relocation plan for this project is included in Appendix B-5.

5.3.5 Recreational Lands

Impacts. Recreational resources potentially affected by this project include: 1) Grand Traverse Nature Education Reserve; 2) Traverse Area Recreational Trail (TART); and 3) George and Ada Reffitt Nature Preserve. All of the potential impacts to recreational lands are relatively minor and can be mitigated.

No-Build Alternative. Because the No-Build Alternative does not involve physical alteration of the landscape, no direct impacts are expected to occur to recreational lands within the project area as a result of this alternative. Impacts to recreational lands that occur as part of the area's population growth are discussed in greater detail in Section 5.10 Secondary and Cumulative Impacts under the No-Build Alternative.

Currently, Cass Road bisects the Grand Traverse Nature Education Reserve between Sabin and Keystone Ponds as part of the Boardman Dam. As part of their long range plan, the Grand Traverse County Road Commission is proposing to close the Cass Road river crossing at the dam to through vehicular traffic within the next 5 to 10 years. The road will be closed to all vehicular traffic except

service vehicles from a point approximately 560 meters (1,850 feet) west of the existing bridge to a point 30 meters (100 feet) east of the structure. According to the Grand Traverse County Parks and Recreation Department, the proposed road closure benefits the Reserve. According to the County Parks Director, the proposed Cass Road closure will "enhance the facility due to the elimination of traffic through the Reserve..." (Schreiner, 1995). The closure of Cass Road Bridge is also considered part of the Recommended Alternative.

Recommended Alternative. The centerline of the Hartman-Hammond Connector will be located approximately 152 meters (500 feet) north of the Grand Traverse Nature Education Reserve's new northern boundary. The proposed Riverwalk through the valley connecting the Reserve to the YMCA and Medalie Park on South Airport Road will be accommodated by the proposed bridge design. At least 15 meters (50 feet) on both sides of the Boardman River will remain unobstructed by the bridge abutments or piers to allow wildlife and pedestrian movement under the bridge. Both the Garfield Township Open Space and Recreation Facility Plan (Harsch, 1988) and the Grand Traverse County Master Trail Plan (OCBA, 1991) incorporate this proposed crossing in their respective plan recommendations. The Recommended Alternative includes development of a pedestrian trail under the bridge that will connect the YMCA trails to the north with the Grand Traverse Nature Education Reserve trails to the south.

Widening Three Mile Road will displace approximately 4.5 meters (15 feet) of the TART trail and displace approximately 149 square meters (1,600 square feet) of the George and Ada Reffitt Preserve. The effect of these impacts is expected to be minor at these locations. The TART trail will continue to cross Three Mile Road at its existing location, where a pedestrian crossing signal is installed. The impact to the Reffitt Preserve property is minor, since the impact occurs along Three Mile Road and the actual trail marker is set back further from the road. The preserve property next to Three Mile Road is upland and includes a small gravel parking lot; public parking is discouraged by a posted "No Parking" sign. These facilities are Section 4(f) resources and are discussed further in Section 6.4.

Mitigation. Enhancing the George and Ada Reffitt Preserve entrance with landscaping that is compatible with the preserve's mission should be considered to minimize the property displacement impact of widening Three Mile Road. Retaining the signalized pedestrian crossing, as is currently installed, to assist TART trail users cross Three Mile Road will also mitigate road widening impacts.

5.3.6 Utilities

Impacts. The analysis of potential impacts to utilities from the alternatives is based on information obtained from a review of utility maps, conversations with local planners, and "windshield surveys." A more thorough analysis is needed prior to the beginning of any construction work.

No-Build Alternative. Because the No-Build Alternative does not involve physical alteration of the landscape, no direct impacts will occur to existing utilities in the project area as a result of this alternative. East Bay Township's long range plans intend to use utilities as a means to control and direct growth. Maps and accompanying text that describe planned extensions to support the Townships' Comprehensive Plan are discussed in greater detail in Section 5.10 Secondary and Cumulative Impacts.

The No-Build Alternative does not require relocation or extension of any utilities in the project area. In addition, no adverse impacts to the Boardman Hydroelectric Dam (operated by Traverse City Light and Power Company) or the nearby substation, owned by Consumers Energy, are anticipated by the Cass Road Bridge closure. Maintenance vehicles required to service the dam and substation, that meet current weight restrictions for the bridge, will be permitted to cross after it is closed to public use.

Recommended Alternative. Numerous overhead and underground utility lines will be crossed by the Recommended Alternative. The 69 kV electric transmission line located within the proposed right-of-way east of Keystone Road, for example, will need to be relocated to accommodate short-term earthwork and long-term road use.

Widening of Three Mile Road will most likely require relocation of overhead electric distribution lines, water, sewer, and gas distribution lines. No utility relocations appear to be required to reconstruct Four Mile Road.

Mitigation. Overhead electric and telephone lines and underground gas, electric, telephone, sewer, and water lines that would be crossed by the Recommended Alternative will be protected or relocated as appropriate prior to construction. GTCRC will coordinate with both private and public utility companies to ensure that services will not be disrupted during project construction.

5.3.7 Zoning and Land Use Planning

Impacts. Several figures in Section 4 illustrate current zoning and future land use plans for the two affected townships. These maps, coupled with a review of local plans and meetings with local planners provide the basis for analyzing whether the alternatives are compatible with existing zoning and land use plans. These plans are further discussed in Section 5.10 Secondary and Cumulative Impacts.

No-Build Alternative. By its nature, the No-Build Alternative should be representative of data found in zoning or comprehensive land use planning documents. However, several existing planning documents reference the Hartman-Hammond bridge crossing of the Boardman River. In part, this is because it is the nature of long range plans to anticipate future changes that may be influential on land use in order to adequately prepare for projected changes. For example, the *East Bay and Garfield Township Combined Future Land Use Map* (1998) illustrates a new bridge across the Boardman River valley that connects Hartman and Hammond roads near the location included in the Recommended Alternative. Both discussions with, and written documentation from, local officials has provided assurance that, although referenced, current comprehensive long range plans for each township are independent of a bridge crossing using the Hartman-Hammond corridor. Long range growth scenarios for the 2020 No-Build Alternative are discussed in greater detail in Section 5.10 Secondary and Cumulative Impacts.

Recommended Alternative. Current zoning along the Hartman-Hammond corridor is likely to be affected by a combination of proposed land uses shown in local master plans, future economic conditions, and the realignment of Hartman Road and its connection to Hammond Road.

The *Garfield Township Comprehensive Land Use Plan* and the *Miller Creek Area Study Development Concept* show proposed land uses along the corridor and indicate a trend away from agricultural uses toward rural, moderate, and medium density residential development. Proceeding east from U.S. Route 31/M-37, the Hartman-Hammond Connector portion of the Recommended Alternative crosses

land designated for Planned Development. The *Miller Creek Area Study* provides a conceptual level illustration of the proposed Planned Development and a realigned Hartman Road as part of a "Hartman/Hammond Regional Arterial." The proposed Hartman-Hammond Connector included in the Draft EIS and as part of the Recommended Alternative generally follows the same proposed realignment of Hartman Road shown in the *Miller Creek Area Study Development Concept* (Figure 4.3-9). The development concept shows a boulevard cross section for Hartman Road; however, the boulevard option proposed in this Final EIS will narrow to a five-lane cross section just west of the Hartman Road/Cass Road intersection to minimize impacts in the vicinity of Sabin Elementary School and Bible Baptist Church. The land use scenarios described in Garfield Township's planning documents will occur independent of construction of the Hartman-Hammond corridor. This is discussed in further detail in Section 5.10.

The *Hammond/3 Mile Area Study* (Figure 4.3-10) shows the continuation of Hartman Road across the Boardman River valley on approximately the same alignment as proposed in this document. New residential development, retail, and office uses are shown in the *Hammond/3 Mile Area Study* west of LaFranier Road.

Based on the information contained in the updated comprehensive plans for Garfield and East Bay townships, the Recommended Alternative is compatible with recently projected uses for Hartman, Hammond, Three Mile, and Four Mile roads. For example, land use development concepts depicted in the *Miller Creek Area Study* and the *Hammond/3 Mile Area Study* are not dependent on the proposed Recommended Alternative and are likely to be constructed regardless of whether activity on this alternative moves forward. This is supported by population and land use trends observed by local planners over the past twenty years and reviewed as part of this study.

The widening of Three Mile Road and the reconstruction of Four Mile Road within the existing right-of-way is compatible with the 1999 *East Bay Township Comprehensive Plan* referenced in Section 4.3. This section of Three Mile Road was identified as being at or near capacity in the 1995 Traverse City Transportation and Land Use Study (TC-TALUS) Long Range Plan (1995). These improvements will help address this issue. Details of the Comprehensive Land Use Plans for the townships are further discussed in Section 5.10.

Mitigation. Additional coordination with local planning authorities in Garfield and East Bay townships and Grand Traverse County will be necessary if the Recommended Alternative is carried forward. Reducing the width of the proposed right-of-way may be an option in certain areas to minimize impacts to existing businesses and residences and planned developments. Other land use control techniques such as controlled access along portions of the Recommended Alternative have been proposed by the GTCRC and will be further considered as part of right-of-way acquisition and final design. These types of growth management techniques are discussed in more detail in the townships' comprehensive land use plans.

5.4 SOCIO-ECONOMICS

5.4.1 Environmental Justice

Impacts. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, dated February 11, 1994, directs each federal agency to

develop a strategy to address environmental justice concerns in its policies. The purpose of the Executive Order is to avoid disproportionately high adverse impacts to minority populations and low-income populations with respect to human health and the environment.

None of the government-financed, insured, or subsidized apartment complexes identified in Section 4.4.1 will be affected by the Recommended Alternative. No other populations of low-income or minority households are known to be located in close proximity to the Recommended Alternative. Therefore, no disproportionately high adverse impacts to low-income or minority populations are anticipated as a result of the project.

5.4.2 Socio-economics

Impacts. The socio-economic impact analysis presented in this section of the document focuses on direct or potentially immediate changes in population, housing, community cohesion, economics or business development, employment, and/or tax base as a result of implementing an alternative. Potential long-term, secondary, or cumulative socio-economic impacts are discussed later in this document in Section 5.10.

No-Build Alternative. The No-Build Alternative is not likely to affect population projections for the area or prohibit future economic growth in the immediate future. Not addressing current and anticipated future traffic congestion on east-west routes through the Traverse City area is most likely to result in increased driving time, stop-and-go conditions, and increased accident rates for motorists traveling in the project area. More school bus and truck traffic is likely to travel north and south on Cass and Keystone roads to access the existing South Airport Road bridge (technically, culverts) over the Boardman River to continue east-west travel, and traffic congestion is likely to increase on collector streets as the local population seeks relief from the congestion by finding alternate routes. As noted above, new developments planned along the Hartman-Hammond corridor could be constructed without the Recommended Alternative.

The No-Build Alternative would not require any residences, businesses or community facilities to be relocated. Consequently, socio-economic impacts from the No-Build Alternative would be limited to the inconvenience of traffic congestion and the hidden costs (additional fuel and labor time) of transporting goods and services within the Traverse City area. Plans such as *East Bay Township's Comprehensive Plan* recognize the existing growth pressures and have been written to incorporate growth and access management controls on local roads. These goals are discussed in more detail in Section 5.10.

Recommended Alternative. This alternative is not expected to affect Garfield Township's population or number of households due to the limited number of residential and business displacements and opportunities for relocation within the Township. At least five of the residences impacted by this alternative are located on large lots and could be moved within the affected parcel.

This alternative will benefit existing and planned industrial development on or near Hammond Road by providing a direct route to and from U.S. Route 31/M-37 for the transport of parts, supplies, and products. Southbound truck traffic from the Cass-Hartman Court industrial park, for example, is routinely routed north to South Airport Road due to the difficulties in turning left onto Hartman Road,

and then left onto U.S. Route 31/M-37 without a signalized intersection. The proposed Recommended Alternative cross section will better accommodate truck turning movements at existing intersections.

Tax base loss from the Hartman-Hammond Connector portion of the Recommended Alternative is estimated to be approximately $0.7 million (1998 assessed value).

Displacement of three single-family residences and the Great Lakes Submarine shop from widening Three Mile Road will not adversely affect local population, economic conditions, employment levels, or community cohesion. Remaining residences and businesses along Three Mile Road, however, may experience increased difficulty accessing their properties with a four/five-lane road. Residences bordering this road at times have difficulties making left turns into and out of their driveways. The proposed four/five-lane road may make left turns across on-coming traffic even more difficult at peak travel times; however, other motorists will benefit from the extra lanes and more easily pass turning motorists.

Four Mile Road reconstruction is not expected to have any adverse impacts to socio-economic conditions of the Traverse City area. Residents bordering Four Mile Road, however, will experience short-term access restrictions during road reconstruction and traffic increases during construction activities on Three Mile Road.

Tax base loss from the widening of Three Mile Road is estimated to be approximately $0.2 million (1998 assessed value).

Mitigation. Mitigation for adverse socio-economic impacts will be developed in conjunction with affected property owners during final design and right-of-way acquisition.

5.5 CULTURAL RESOURCES

5.5.1 Archaeological Resources

Impacts.

No-Build Alternative. No impacts to archaeological resources will occur as a result of the No-Build Alternative being implemented.

Recommended Alternative. No prehistoric archaeological sites eligible for the National Register of Historic Places (NRHP) were identified within the Recommended Alternative corridor. Therefore, the Recommended Alternative will have no impact on significant archaeological resources.

5.5.2 Above-Ground Resources

Impacts.

No-Build Alternative. No impacts to above-ground resources will occur as a result of the No-Build Alternative being implemented.

Recommended Alternative. Since release of the Draft EIS, the State Historic Preservation Office (SHPO) has determined that the widening of Three Mile Road associated with the Recommended Alternative will have an adverse impact on four historic properties:

- 4273 Three Mile Road
- 4283 Three Mile Road
- 4314 Three Mile Road
- 4340 Three Mile Road

The Draft EIS documented adverse impacts to only one historic property (4314 Three Mile Road). (See Sections 4.5 and 5.5.2 of the Draft EIS for more information.)

The Three Mile Road widening will require an additional 7.5 meters (25 feet) of right-of-way from the historic properties at 4273 Three Mile Road, 4283 Three Mile Road, 4314 Three Mile Road, and 4340 Three Mile Road. While none of the historic structures will be displaced, the widening will reduce the setback at these four addresses from 23 meters (75 feet) to 15 meters (50 feet). The SHPO has determined that the road widening and reduction in setback constitutes an adverse impact because it will diminish the integrity of the properties' location, setting, and feeling (36 CFR 800.5(a)(1)).

Mitigation. Prior to widening Three Mile Road, the four NRHP-eligible properties on Three Mile Road will be photographed and a report will be created to document the development of recreational housing in the Traverse City area. Original photographs and reports will be submitted to the SHPO and appropriate local archives designated by the SHPO. A copy of historic information collected for the specific properties at 4273 Three Mile Road, 4283 Three Mile Road, 4314 Three Mile Road, and 4340 Three Mile Road will also be provided to individual landowners.

Landscaping removed as a result of the Three Mile Road widening will be replaced as negotiated with the individual landowners. The privacy fence at 4314 Three Mile Road will be relocated or replaced to reduce visual and noise intrusions.

5.6 VISUAL AND AESTHETIC RESOURCES

Impacts. The visual environment is experienced as an integrated whole rather than a series of individual objects. Because of this integrated way of viewing, a transportation project that changes the visual resources that exist within a chosen transportation corridor can alter the visual experience of the regional landscape. One approach used to evaluate the impacts of build alternatives on the visual resources of an area is based on the methodology described in the *Visual Impact Assessment for Highway Projects* (USDOT, 1981). Based on this report, the views of the road by the surrounding community (neighbors) and from the road by the driving public (users) are both critically important to a project's overall acceptance. Pleasure driving on scenic roads remains a favorite recreational activity, and the visual quality of the views from a road contributes to the identity of a place. To visitors, often views from the road are the first clues to a community's image and local character when the road serves as a significant gateway (or entry) to a town center. The critical assessment thus becomes how disruptive the proposed roadway will be to existing scenic resources and whether the projected impacts to visual resources can be appropriately mitigated.

Evaluating the impact of a road project on the visual resources of the affected environment include assessing the overall project aesthetics as well as the overall visual character of the project's surrounding landscape. Project aesthetics consider whether design details such as landscaping, guard rails and road signage are visually consistent and support the total visual effect, as well as the visual relationships between a road project and its immediate surroundings. It is important to question whether the project will contrast too strongly with its immediate environment, whether it will block existing views, or whether its characteristics enhance the quality of the environment.

Secondly, assessing visual character recognizes the fact that one's visual understanding of the environment is seen through the visual attributes of objects such as form, line and texture. The integration of these elements introduces visual characteristics such as scale, dominance, diversity and continuity. Visual character is an attribute that, while only descriptive in nature, may carry strong public preference for an established character.

Finally, evaluating visual quality characterizes the level of excellence of the visual experience and incorporates both viewer and visual resource components. Both urban and natural landscapes may have high visual quality as judged by indicators of visual relationships such as vividness, intactness and unity. *Vividness* is the memorability or visual power of landscape components as they combine in distinctive patterns. *Intactness* refers to the visual integrity of the landscape (natural or man-made) and the absence of jarring elements. *Unity* describes the visual coherence and compositional harmony of the landscape as a whole. In order to be of high visual quality, a landscape must score high in all three visual components (USDOT, 1981).

No-Build Alternative. The No-Build Alternative will not directly impact visual quality; however, increased traffic congestion on local roads as predicted under the No-Build scenario is expected to have an overall impact on the area. Similarly, under the No-Build Alternative, the conversion of agricultural property to residential development is likely to continue within the project area. Since the issuance of the Draft EIS, for example, construction of a new housing development has occurred near Hartman and Dracka roads. Given the prosperous economy and attractiveness of Grand Traverse County to new residential development, the visual character of project area is likely to change even under the No-Build Alternative.

Recommended Alternative. As previously described in Section 4.6, the Hartman-Hammond Connector portion of the Recommended Alternative will cross a vivid rural landscape particularly along Hartman Road. It also traverses a section of the Boardman River valley that appears pristine although the crossing is sited in an area that has been historically disturbed by agriculture, electrical transmission lines and dredging to channel the river. The proposed crossing is not located within the Grand Traverse Nature Education Reserve, although the northern boundary of the Reserve was recently extended closer to the proposed bridge. As is obvious from the descriptions in many of the public documents, the high viewer sensitivity to the natural resources of the valley increases the importance of visual resource issues in this area.

The intersection with U.S. Route 31/M-37 at the western end of the corridor is one of three locations where significant earthwork will be necessary to create a smooth grade transition over existing topography. Here the proposed roadway profile will create a 3- to 4-meter (10- to 16-foot) deep cut with steep side slopes through the existing hills that are shown in View B1 in Figure 4.6-1a. This intersection location is part of an important gateway corridor into Traverse City. From this point the

west arm of Grand Traverse Bay can be seen in the distance, and Grand Traverse Mall and the South Airport Road intersection are at the bottom of the hill. This intersection is also visually important as a transition point from moving north down into the lowland lake plain to turning east and traveling the north face of the Manistee Moraine. Finally, it is also a visually important transition point in terms of changing land use. North of this point U.S. Route 31/M-37 has become a commercial/office corridor. Land use to the east along the proposed realigned Hartman Road is planned for medium density housing and cluster development. Because of the important location of this intersection, the final design of this intersection will influence the extent of visual impact.

Between U.S. Route 31/M-37 and the descending approach to Cass Road and the Boardman River valley, the construction of a wider Hartman Road will add a more obvious built element to a rural residential area. Both road user and neighbor sensitivity is likely to be high in this section of the corridor.

In the areas of steep slopes on the east and west sides of the valley, there will be a significant amount of cut and fill activity to minimize the slope of the road on the bridge approach. The extensive alteration of the valley's existing landform is necessary to create a smooth grade transition between the upper and lower plateaus east of Cass Road and west of LaFranier Road. Because of the proposed grade change, particularly between Keystone and LaFranier roads, it will be necessary to excavate a maximum 20-meter (65-foot) deep cut into the hill east of Keystone Road in order to minimize the steepness of the proposed roadway. The initial stages of the east and west approach, where the road corridor drops into the valley, offer the greatest potential to direct and even enhance forward views by enclosing them on either side with the steep cuts into the hillside. This type visual change – created by a transition point in the landscape (from the upper plateau to the valley below) – heightens user awareness of the surrounding visual character. These points should be used to advantage to enhance views from east and west from the upper plateaus at the valley edge. Retaining walls that may be needed in the areas of these steep slopes have the potential to effect the quality of the visual experience of this approach and should be evaluated during final design.

Within the valley itself, the Recommended Alternative crosses approximately 488 meters (1,600 feet) between the plateaus. It is planned that the crossing will be elevated on an earthen embankment approximately 6 to 11 meters (18 to 35 feet) above the valley floor. At the river, the proposed bridge will be approximately 61 meters (200 feet) long, and 21 meters (70 feet) wide, and the abutments will be setback over 15.2 meters (50 feet) from the river edge. A three span bridge is currently proposed. The visual impact of the proposed Boardman River crossing bridge and associated abutments is likely to be perceived as high for those who have previously recreated within the Boardman River valley and who will be more aware of the valley character before the project implementation.

Currently the surrounding landscape in this area is one of moderate visual character and quality. The physical remnants of the historical agricultural and construction activity in the valley disturb the continuity and coherence of the visual experience. However, the dominant presence of the river and the natural vegetation override the jarring effects of this interference to create a visual experience that remains memorable, coherent, and vivid. Because of this, the bridge connection between Hartman and Hammond roads has the potential to be a disruptive visual feature in the landscape. First, the physical bulk of the bridge and the earthen embankments will close long views north and south along the river and intrude on the visual character of the natural area. Second, the new road and bridge will interfere with the valley's sense of place and the ability of the viewer to feel as though they can "get away"

although relatively near a dense urban area. Further consideration will be given to bridge design details during preliminary design to ensure that the bridge fits into the landscape as well as possible.

Although the physical presence and activity of the Cass-Hartman Industrial Park is noticeable from the valley, many people from the greater Grand Traverse community feel very strongly about preserving the existing natural resources within the valley and its visual character. The Recommended Alternative will cross a portion of the valley - between the Grand Traverse Nature Education Reserve to the south and Boardman Lake to the north - that is critical to the eventual connection of the proposed Boardman Riverwalk trail. The portion of the valley to be crossed by the Recommended Alternative is currently private property, although local residents walk and cross-country ski through the area. The project's mitigating measures discussed under Section 5.3.5 (Recreational Lands) support recreational use and habitat preservation in the valley and contribute to the importance of maintaining and/or enhancing the visual character and quality of the overall outdoor experience in this section of the valley.

Within the eastern portion of the Recommended Alternative, the mature white pines and oaks bordering Three Mile Road combined with the narrow two-lane road, existing residences, businesses and institutional buildings located close to the road edge, contribute to the village character of Three Mile Road. The tree canopy provides a sense of enclosure, establishing a coherent scale between the physical elements of the road and adjacent buildings. Widening Three Mile Road will eliminate a number of these mature trees and disturb the balance that exists between the existing road and the surrounding landscape.

The most important visual feature of this section is the termination point of Three Mile Road at U.S. Route 31/M-72 with Traverse City State Park and the East Arm of Grand Traverse Bay visible across the street. Because the visual character of the existing intersection is low for both users and neighbors with its high traffic volumes and lack of integrated land use development on the corners, there is an opportunity to improve the visual quality of the intersection. With the open water directly visible to northbound motorists, the widening of this intersection to five lanes emphasizes the natural focal point of the park and the Bay across the street.

Since resurfacing Four Mile Road will be done within the existing roadway, there will be no visual impacts as a result of this action, other than temporary construction related visual and aesthetic impacts.

Mitigation. Because of the differing visual character of each area crossed by the Recommended Alternative, appropriate mitigation strategies may be different or used to different emphasis. For example, separation of the opposing traffic lanes by a boulevard creates an opportunity to reduce the visual scale of the widened Hartman Road by giving the impression of two narrower roads versus one wide road. Planting the median with native vegetation creates a vegetated strip that appears more natural and is more visually integrated with the surrounding environment. Within the Boardman River valley as well as other areas where the road crosses a more rural or natural environment, all areas disturbed by construction should be re-vegetated with plant species native to the Traverse City area to soften the contrast with adjacent areas that have not been disturbed. This will help screen the long range view of the proposed bridge and adjacent support embankments, and will soften close range views of areas of cut and fill. This is particularly important within the valley where the importance of the visual character of the surroundings is heightened by pedestrian trail use. Construction scars are significantly more glaring when viewed on foot than when viewed in a car at 45 miles per hour.

Other details of the roadway design, though subtle, will also help mitigate the visual scale of the new road. For example, paved shoulders such as seen on Hammond Road east of Townline Road enlarge the sense of scale of the road whereas turf grass shoulders will have the opposite effect. In addition, although a wider right-of-way may seem more intrusive, it allows flatter side slopes next to the road blending it more smoothly into the surrounding environment with a stronger sense of continuity. In areas such as between Keystone and Hartman roads where the cut is too great to allow flatter side slopes, the design of the retaining walls and choice of materials may help mitigate the visual impacts of these steep slopes.

Other design details such as safety barriers or guard rails are also physical elements in the landscape where careful choice can be important in creating visual coherence and harmony in an area. These types of design details will be important mitigating strategies for the bridge within the Boardman River valley. In addition, the bridge design and selection of materials are also important elements that influence the visual character and quality of the overall landscape. While lowering the bridge into the valley may minimize visual exposure from a distance, it also creates the need for a design that integrates the structure within the natural environment in order to be less jarring to the recreational users in the valley. Choice of facing materials as well as the bridge structure design will offer important mitigating opportunities.

5.7 AIR QUALITY

5.7.1 Conformity

No portion of this project is within a designated nonattainment area for any of the air pollutants for which the U.S. EPA has established standards. Accordingly, a conformity determination under 40 CFR Part 93 ("Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Funded or Approved Under Title 23 U.S. Code or the Federal Transit Act") is not required.

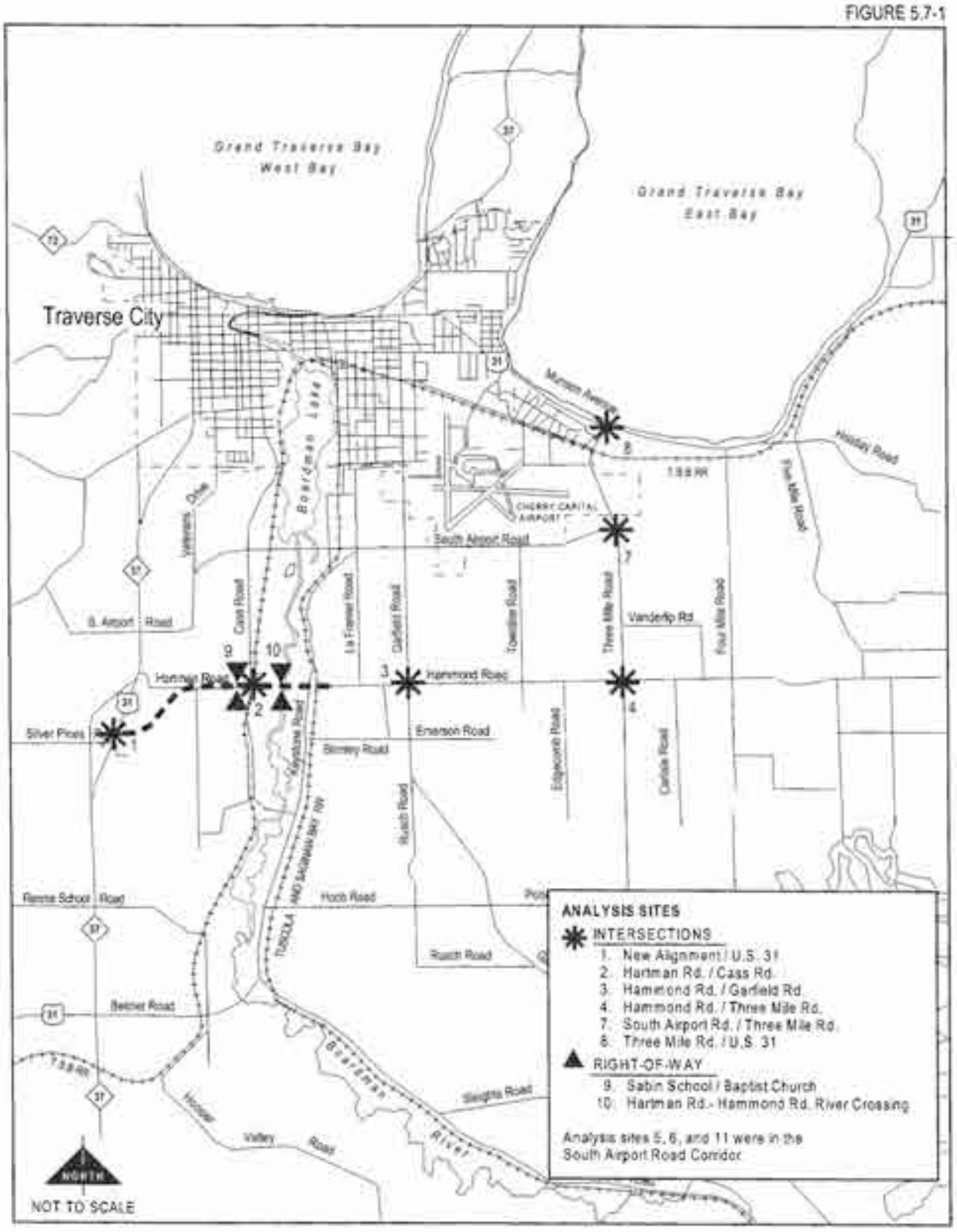
5.7.2 Carbon Monoxide Microscale Analysis

The carbon monoxide (CO) microscale dispersion analysis conducted for this project is consistent with the latest mobile source emissions factors issued by the U.S. EPA known as MOBILE5a and Conformity Regulations dated November 11, 1993 (40 CFR Part 93). The CAL3QHC model, Version 2.0 (U.S. EPA, 1992), is the intersection model used for this analysis.

Carbon monoxide concentrations were calculated for "worst case" receptors for the years 1997 (existing), 2003 (first year of operation), and 2015 (design year). A "worst case" receptor is typically defined as a location nearest the roadway segment with the highest traffic volumes and lowest average speeds on the project route and nearest to a high volume crossroad where an individual is likely to be found for the time extent in the National Ambient Air Quality Standards (NAAQS). For this project, back-of-curb and edge of right-of-way receptors were identified as "worst case" receptors in the areas where the microscale analyses were conducted. Figure 5.7-1 shows the CO analysis locations.

Results of the carbon monoxide analyses indicate that projected CO concentrations at the analysis sites are higher under the Recommended Alternative than the No-Build Alternative. However, no violations of the one-hour (35.0 ppm) or eight-hour (9.0 ppm) NAAQS will occur. Projected future one-hour CO

FIGURE 5.7-1



BOARDMAN RIVER CROSSING MOBILITY STUDY

MICROSCALE CARBON MONOXIDE DISPERSION ANALYSIS SITES

concentrations are all below 17.0 ppm. Future eight-hour CO concentrations are projected to be below 7.0 ppm. (See Tables 5.7-1 and 5.7-2.)

Table 5.7-1
Maximum One-Hour CO Concentration at Selected Receptors (in ppm)

Receptor Location	Alternative				
	Existing	No-Build		Recommended	
	1997	2003	2015	2003	2015
Intersections					
1. New Alignment/U.S. Route 31				13.9	17.0
2. Hartman Road/Cass Road	6.0	5.6	5.7	9.5	12.4
3. Hammond Road/Garfield Road	12.6	9.9	10.7	9.7	11.3
4. Hammond Road/Three Mile Road	10.0	10.0	10.0	10.4	11.4
7. South Airport Road/Three Mile Road	8.9	8.2	7.7	11.4	9.7
8. Three Mile Road/U.S. Route 31	18.7	14.7	13.8	12.9	13.7
Right-of-Way Edge					
9. Sabin School/Baptist Church	3.6	3.6	3.8	4.9	5.5
10. Hartman-Hammond River Crossing				3.7	3.9

Note: Analysis sites 5, 6, and 11 were located in the South Airport Road corridor.

Table 5.7-2
Maximum Eight-Hour CO Concentration at Selected Receptors (in ppm)

Receptor Location	Alternative				
	Existing	No-Build		Recommended	
	1997	2003	2015	2003	2015
Intersections					
1. New Alignment/U.S. Route 31				5.6	6.8
2. Hartman Road/Cass Road	2.6	2.5	2.5	3.9	5.0
3. Hammond Road/Garfield Road	5.1	4.1	4.2	4.0	4.6
4. Hammond Road/Three Mile Road	4.1	4.1	4.1	4.3	4.7
7. South Airport Road/Three Mile Road	3.7	3.5	3.3	4.7	4.0
8. Three Mile Road/U.S. Route 31	7.4	5.9	5.6	5.2	5.5
Right-of-Way Edge					
9. Sabin School/Baptist Church	1.7	1.7	1.8	2.2	2.4
10. Hartman-Hammond River Crossing				1.8	1.8

Note: Analysis sites 5, 6, and 11 were located in the South Airport Road corridor.

While projected CO concentrations under the Recommended Alternative are higher than under the No-Build Alternative at most of the sites analyzed, this does not necessarily indicate a degradation in air quality in the project area. Carbon monoxide microscale analyses are conducted to determine if a project will result in violations of the NAAQS. Therefore, the sites analyzed are all within the Recommended Alternative corridor, where traffic volumes are projected to increase. Subsequent analysis would reveal that under the Recommended Alternative, projected CO concentrations in other areas (e.g., along South Airport Road where traffic will divert to the new crossing) would be lower than under the No-Build Alternative.

5.7.3 Mitigation

No violations of the National Ambient Air Quality Standards are projected for this project. Therefore, no air quality mitigation measures are required for the roadway improvements.

During construction the contractor must comply with all federal, state, and local laws and regulations governing the control of air pollution. Adequate dust-control measures will be maintained so as not to cause detriment to the safety, health, welfare, or comfort of any person or cause any damage to any property or business.

All bituminous and portland cement concrete proportioning plants and crushers will meet the requirements of the Michigan Air Pollution Control Commission. For any portable bituminous or concrete plant or crusher, the contractor must apply for a permit-to-install from the Permit Section, Air Quality Division, of the MDEQ. Dust collectors must also be provided on all bituminous plants. Dry, fine aggregate material removed from the dryer exhaust by the dust collector must be returned to the dryer discharge unless otherwise directed by the project engineer.

5.8 NOISE

Impacts.

No-Build Alternative. Compared to existing conditions, projected noise levels will approach or exceed the noise abatement criteria at 11 additional Category B receptors (3, 17, 19, 157, 158, 164, 165, 168, 178, 182, and 184) under the No-Build Alternative. Projected noise levels at the receptors analyzed in the Recommended Alternative corridor range from 52.5 dBA to 69.6 dBA. No receptors are projected to experience a noise increase of greater than 4.0 dBA.

Recommended Alternative. Compared to existing conditions, project noise levels will approach or exceed the noise abatement criteria at 18 additional Category B receptors (6, 7, 8, 10, 12, 15, 16, 17, 19, 20, 157, 158, 164, 165, 168, 178, 182, and 184) under the this alternative. Additionally, noise levels are projected to increase by more than 10 dBA at three Category B receptors (2, 15, and 20) and two Category C receptors (13 and 14). Projected noise levels at the receptors analyzed range from 55.0 dBA to 70.1 dBA.

In the Draft EIS, the two Category C receptors (13 and 14) where noise levels are projected to increase by more than 10 dBA were incorrectly listed as receptors where the noise abatement criteria would be exceeded. The above paragraph was modified and is now correct.

Additionally, existing and projected noise levels were estimated for an area near the northern boundary of the Grand Traverse Nature Education Reserve. At this location, noise levels are projected to increase from 48.9 dBA (existing) to 55.0 dBA (2015) with the Recommended Alternative. The projected noise level is lower than the 57 dBA noise abatement criterion that applies to activity category A land uses, such as the Reserve, and the increase from existing levels is less than 10 dBA. Based on these estimates, it was determined that no significant noise impact would result at the Reserve under the Recommended Alternative.

Receptor locations are shown on Figure 5.8-1. Noise analyses results for all receptors analyzed are provided in Appendix B-2.

Mitigation. Although projected noise levels at certain receptors exceed the FHWA criteria for the No-Build and Recommended alternatives in the year 2015, no noise mitigation is proposed for this project.

The typical method of mitigating traffic noise impacts is to construct a noise barrier in the form of an earthen berm and/or vertical wall. Typically, noise abatement is only provided for zoned residential land uses and publicly used, or non-profit, institutional structures, such as hospitals, libraries, schools, and churches. Noise mitigation would not be effective for most of the impacted receptors because maintaining access to these properties will require "breaks" in the barrier, which will limit its effectiveness. Noise mitigation would also not be economically feasible for this project because the impacted receptors are dispersed throughout the corridor, requiring an individual barrier for most of the impacted receptors.

Federal guidelines also allow for the insulation of public use or non-profit institutional structures, and in extreme cases, homes could be provided with air conditioning and insulation. However, predicted noise levels are not great enough to justify air conditioning or insulation as a noise abatement measure.

Construction noise would be minimized by the use of mufflers on construction equipment. Air compressors would meet federal noise level standards and would, if possible, be located away from or shielded from residences and other sensitive noise receptors. Under normal circumstances, construction activity will be typically confined to the hours between 7:00 a.m. and 6:00 p.m. on weekdays. Therefore, critical time periods in which sleep or outdoor recreation would occur would not be subject to noise intrusion from construction activities.

5.9 CONTAMINATED SITES AND SITES OF ENVIRONMENTAL INTEREST

Impacts. Phase I Environmental Site Assessment (ESA) studies were conducted for the Recommended Alternative (JJR, 1999), except for the Four Mile Road Reconstruction which is not expected to disturb soils beyond the limits of the current pavement. A brief summary of the study results is provided below.

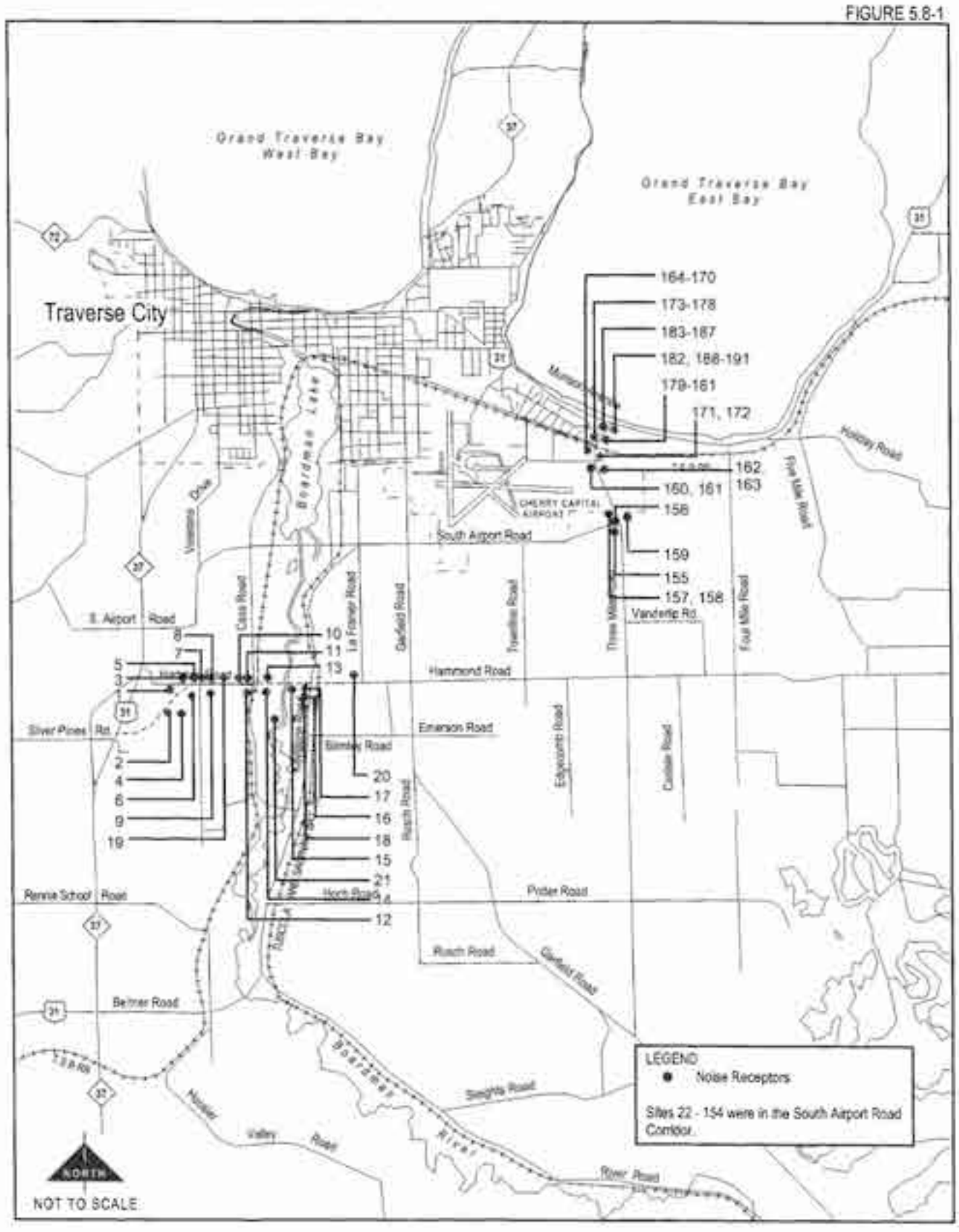
No-Build Alternative. The No-Build Alternative will have no impact to existing contaminated sites or sites of environmental interest.

Recommended Alternative. The proposed right-of-way for the Hartman-Hammond Connector appears to run adjacent to and/or through the former Tower Automotive property. Consequently, there is a potential to disturb contaminated soils.

Widening Three Mile Road may disturb soils at Total Petroleum Station that are contaminated with fuel products. Remediation is underway at this site; however, specific designs for the intersection improvement need to address this potential and identify proper means of soil excavation and disposal.

Mitigation. Soil testing should be conducted as a mitigation measure prior to any construction work at sites of environmental contamination to determine the best approach to excavate and dispose of soils determined to be hazardous waste.

FIGURE 5.8-1



BOARDMAN RIVER CROSSING MOBILITY STUDY

NOISE RECEPTOR LOCATIONS

5.10 SECONDARY AND CUMULATIVE IMPACTS

Assessing the causative role of transportation projects in long-term changes to environmental, land use, and socio-economic conditions is a complex and multi-faceted process made difficult by the fact that transportation is only one of a number of factors affecting the environment and land development (WisDOT, 1996). Other factors such as the local economy, property values, planning and zoning controls, public utilities, environmental regulations, and individual land ownership preferences, along with transportation improvements, also affect land use changes. In addition, the level of integration between land use decisions and transportation improvements influences the efficiency with which the transportation infrastructure of a region supports the number of trips generated by a particular development pattern. Since transportation supply, land use, accessibility and travel demand ebb and flow in a dynamic system, predicting the influence that a specific transportation project may have on changing land use patterns is often difficult and rarely precise. Also, because there is often disagreement as to whether the predicted changes are beneficial, it is important to develop an analysis framework to guide the assessment.

5.10.1 Framework

The context used to frame the assessment of the potential secondary and cumulative impacts of the No-Build and Recommended alternatives was developed based on the review of a number of documents that included:

- *Considering Cumulative Effects Under the National Environmental Policy Act* (Council on Environmental Quality, 1997);
- *Land Use in Environmental Documents: Indirect and Cumulative Effects Analysis for Project-Induced Land Development* (WisDOT, 1996);
- *The Economic Impact of Highway Bypasses on Communities* (WisDOT, 1998);
- *Impacts of Highway Facility Improvements on Travel and Regional Development – Wisconsin TransLinks 21* (WisDOT, 1994);
- *Transportation and Land Use – Description and Review of Alternative Policies for Departmental Consideration – Wisconsin TransLinks 21* (WisDOT, 1993)
- *The Impact of Various Land Use Strategies on Suburban Mobility* (Middlesex Somerset Mercer Regional Council, 1991); and
- *Secondary and Cumulative Impact Assessment in the Highway Project Development Process* (FHWA, 1992).

The underlying framework of the analysis is important to understanding the land development patterns likely to occur in the reasonably foreseeable future <u>without</u> the proposed transportation changes. This is the No-Build Alternative. Knowing this, it is then easier to contrast the reasonably foreseeable future with the Recommended Alternative. The contextual background for the assessment is summarized in the following paragraphs and is followed by a discussion of each alternative.

Transportation Improvements and Long-term Development Impacts. Based on documented growth trends in the Traverse City area, industrial, commercial, and residential growth will continue in the foreseeable future regardless of whether proposed transportation system improvements are implemented. However, public comment has shown that some believe developmental sprawl will be promoted by the Recommended Alternative; others have raised concerns that potential transportation-related development will pull business and commercial traffic from Traverse City to more outlying areas. Although this is the fear of some in the Traverse City area, because local jurisdictions have been forward thinking in their long-range planning decisions, this is not likely to be the case.

The discussion in Section 4.3.7 shows that the greater Traverse City community recognizes that control of negative growth effects lies primarily with local units of government with jurisdiction over land planning decisions. The comprehensive land use plans and zoning ordinances developed by the local jurisdictions will help control potential secondary and cumulative land use impacts where there is opportunity for development.

Although the availability of a convenient transportation system is often cited as a direct cause of businesses and residences shifting away from an urban center, sprawl development is not necessarily driven solely by transportation projects. The reality of influencing relationships is less straightforward. For example, if given the opportunity, many home buyers prefer to own a single-family home and as much land as possible. In fact, in many communities, large residential lot zoning, e.g. one dwelling unit per 10 acres, is seen as a method for preserving open space. Therefore, the historical population shift out of our cities is likely in part due to the development community responding to buyer preferences (WisDOT, 1994).

Discussion in WisDOT's publication, *Impacts of Highway Facility Improvements on Travel and Regional Development* (1994), suggests that the development-inducing impact of additional transportation capacity is the most important impact to assess. However, the ability to separate the influences of transportation supply, land use, accessibility and travel demand in the development cycle is extremely difficult. Research has shown that, in areas where availability of developable land is high and zoning and planning controls to restrict development are marginal, the development-inducing influence of new transportation improvements is likely to have greater impact. On the other hand, impacts may be marginal in areas where, like the Traverse City region, transportation accessibility is already high (WisDOT 1994).

Economic Impacts of Highway Bypasses. Although township planning documents clearly define the character of the development proposed for land remaining in the Hartman-Hammond corridor, some have raised concerns that further commercial development in the corridor will relocate business away from downtown Traverse City. In response to similar concerns, the Wisconsin Department of Transportation (WisDOT) published a study in 1998 that assessed the economic impacts of highway bypasses on seventeen Wisconsin communities constructed since 1980. Although not a highway bypass project, the Recommended Alternative does provide an alternative means of east-west travel around an urban center, establishing the relevance of the Wisconsin study to this project.

The Wisconsin study evaluated empirical and anecdotal data including economic data, traffic counts, anecdotal reports, newspaper articles and site visits, and compared the findings against communities of equivalent size that had a state highway through the community. Overall, communities generally view the bypass as beneficial. The key project findings included little adverse impact on overall economic

activity for most communities, average traffic levels on old routes close to or higher than pre-bypass levels, and very little retail flight. The primary benefits identified by the study included better overall traffic flow and congestion relief, elimination of trucks and seasonal traffic from local streets, and improved community access.

Travel Growth Trends. Increased population and development density in the region is likely not the only cause of worsening road congestion in the Traverse City area. Since 1960, travel growth trends nationally have shown decreasing vehicle occupancy (number of people per vehicle) and a significant increase in the number of vehicle miles traveled (VMT) independent of increases in highway lane mileage. For example, Wisconsin studies, completed as part of TransLinks 21, their 21st century transportation plan, show the state data mirroring national trends. Between 1960 and 1990, their studies have shown a 138 percent increase in personal VMT and a 401 percent increase in commercial VMT. These trends appear to be independent of additional highway capacity. For example, WisDOT reports that, in southeast Wisconsin, highway lane mileage increased only 5 percent between 1985 and 1992.

The single largest factor responsible for this VMT increase was an increase in vehicle trip length. Other factors cited in both national and Wisconsin data include an increased number of person trips per capita, decreased vehicle occupancy, increased population and a shift from alternative transportation modes such as carpooling, public transportation, walking and/or bicycling to the automobile. In fact, Wisconsin studies showed that by 1990, nearly 75 percent of all work commutes were in single occupancy vehicles, up from 62 percent in 1980, whereas alternate public transportation modes decreased as the mode of choice by over 25 percent (WisDOT, 1994). Underlying conditions that contribute to this data include:

- Improved economic activity: Higher employment leads to more commuters on the road and greater economic well-being results in higher mileage spent in non-work-related trips;

- Decline in vehicle operating costs: Declining costs of inflation-adjusted gasoline prices and improved vehicle fuel economy serve as a disincentive to conserve vehicle miles;

- Peak "baby-boom" drivers: Heaviest driving years are approximately between the ages of 35 and 54. The absolute numbers of baby-boomers entering their peak driving years has increased travel demand statistics (although this statistic should begin to decline); and

- Suburbanization trends: Suburban development has been designed in a non-grid, low-density, single-use development pattern resulting in greater distances between residence and employment, longer wait times for alternative transit modes making them less desirable, and longer work trip lengths that become too far to walk. All of these outcomes force increased use of the automobile.

WisDOT also cites other factors, such as the number and size of households and an increase in the women's trip-making rate as more women entered the workforce, further contributing to increased VMT (WisDOT, 1994).

Historic Land Use Development Patterns. Because historic zoning practices have separated land uses, new roads that serve them typically maintain reliance on the automobile to meet community

transportation needs. These historical development patterns – low-density, single use development in separate residential, commercial and industrial areas – have encouraged automobile use and congestion, and aggravated transportation issues for those who are not able to drive. Current planning efforts promoting village centers and mixed-use development, and encouraging integrated transportation options versus historical sprawl patterns, will help reduce dependency on the automobile. However, it is likely that the car will remain the primary mode of travel.

Induced/Diverted Traffic. Reports in the literature have documented a phenomenon called "induced" traffic as an unintended consequence of transportation improvements (Cuyahoga 1998; SACTRA, 1994; and Chen, 1998). Sometimes called "generated" traffic, it includes additional travel, which would not have otherwise occurred, that results from a transportation improvement (Cuyahoga, 1998). A 1994 lead report by the Standing Committee on Trunk Road Assessment (SACTRA) found that induced traffic typically matters most in situations similar to those in this study such as roads constructed in and around urban areas or river crossings where access points to the other side are limited. Common characteristics include a congested road network; travel behavior with a high potential to change; and transportation improvements with the potential to largely reduce travel time. Local conditions such as congestion on South Airport Road and at the Cass Road Bridge; access-limiting weight restrictions on the Cass Road Bridge; and diverting traffic in the Cass Road corridor north or south in order to travel east on Hammond Road are all applicable to the phenomenon.

The ways in which people change their travel decisions in response to improved road conditions can include adding new trips, or changing their route, their mode of travel (e.g., switch from bus to private vehicle), their place of residence or workplace, or the number of trips they take. In addition to induced traffic, WisDOT's 1994 report considers some of these changed travel patterns to be "diverted" traffic, which also contributes to the sometimes short-term relief of traffic congestion. These changes in travel demand may not manifest themselves immediately but over an extended time period as individuals alter their travel patterns. The travel demand forecasting used for the analysis of alternatives for this project accounts for diverted traffic; it does not predict induced travel.

5.10.2 Existing Context

The proposed project is set in an area of northern Michigan that attracts many short-term visitors and permanent residents from within and outside the state. Because of the area's valued natural resources, including Grand Traverse Bay, Old Mission and Leelanau peninsulas, and large tracts of state forest land, the Traverse City region has become an important destination for many people. Tourists, retirees, an active workforce, and many new businesses value the amenities and quality of life offered by the natural setting of the area.

Natural Environment Conditions. Sections 4.1 and 4.2 of the Draft EIS detail the natural environment that gives much of the Traverse City region its distinctive character. These undeveloped areas are valuable for providing important wildlife habitat, groundwater recharge areas that sustain local watersheds, high-quality cold water streams that support resident and migratory game fish, and many recreational opportunities for tourists and residents.

Increasingly, these natural areas are facing development pressure. The influence of the rapid increase in the amount of impervious surface covering land in the local watersheds has had a long-term impact on the aquatic habitat and the surface water quality of these important natural resources.

Socio-economic Conditions. The numerous socio-economic statistics detailed in Section 4.4 support the historical and continued expansion of the region. Coupled with the increasingly congested traffic conditions that accompany this continued growth, travel in the region, particularly east-west mobility across the Boardman River, will continue to deteriorate without transportation improvements. As levels of service on local roads worsen, traffic conflicts and travel times increase, and road safety and business efficiency degenerate. These depreciating conditions, while initially serving as a growth constraint, may redirect further economic development out of the immediate Traverse City area. Eventually the leisure market is also likely to lose market share, as the area reaches capacity and summer tourists visit elsewhere. In addition to traffic conditions and the existing transportation corridors described below, Section 5.10 of the Draft EIS also details a number of regionally specific factors such as financial incentives and development costs, that have the capacity to influence the course of future land use patterns in the Traverse City area.

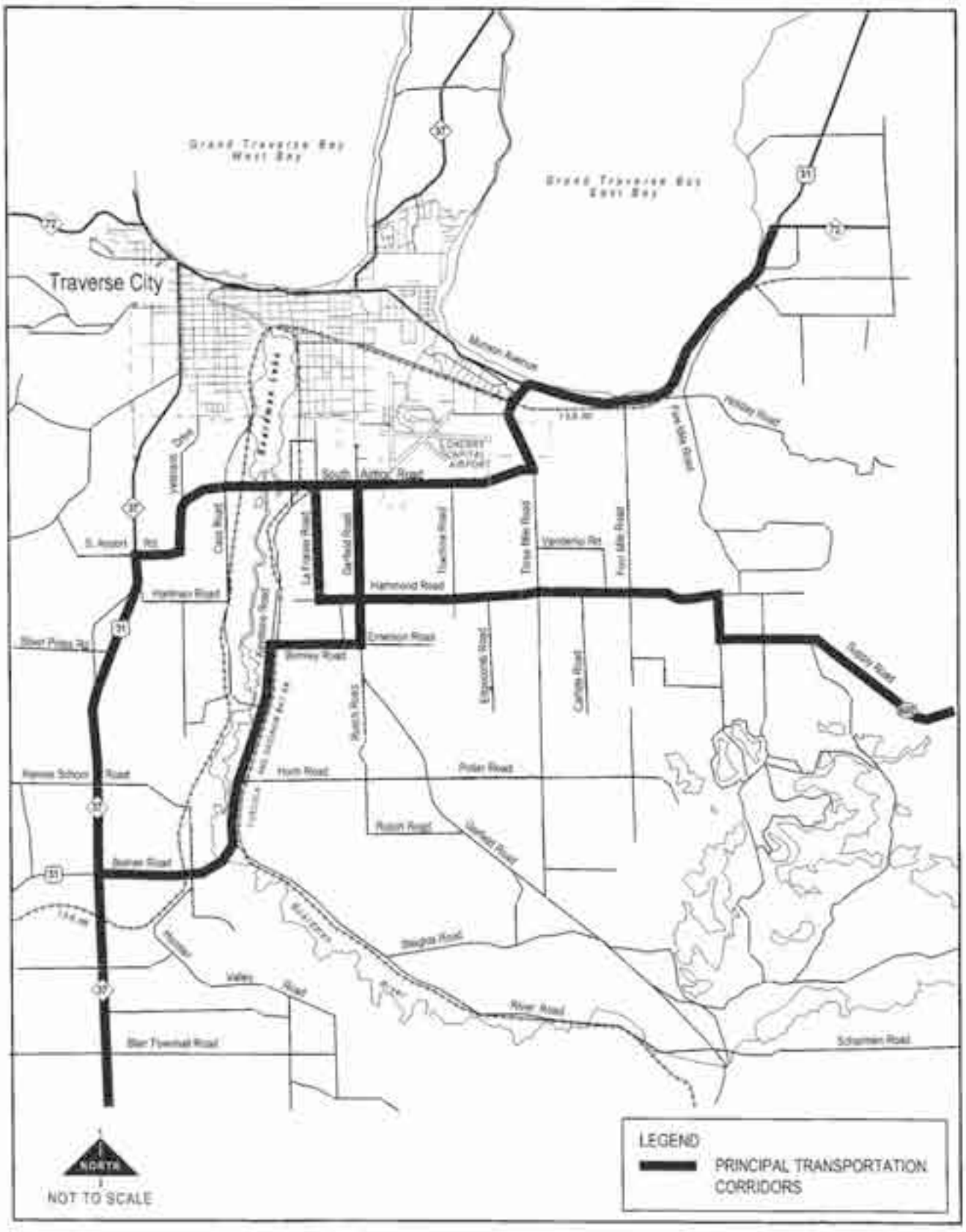
Transportation Patterns. Within the Traverse City project area, existing commercial/industrial development and transportation improvements (specifically on Hammond Road between Garfield and Three Mile roads) have begun to establish an east-west transportation corridor that is compatible with Garfield and East Bay Township's long range plans. Based on personal observation and conversations with business establishments in the Cass Road corridor, several main transportation routes that serve to move traffic in and out of the Traverse City region emerge (Figure 5.10-1). West of the Boardman River, these include South Airport Road and U.S. Route 31/M-37. East of the river the main corridors include LaFranier/Garfield roads and Hammond Road east to Supply Road via High Lake Road, Beitner to Keystone and Hammond Road via Birmley Road, or South Airport and Three Mile roads to U.S. Route 31 (Munson Avenue) east to M-72. From the south, Beitner and Keystone Road traffic west to Cass Road is limited by weight restrictions on the Cass Road Bridge.

These observations are supported by the information presented in the respective township transportation plans (Figure 5.10-2 and see Figure 4.3-7). According to these documents, Hammond Road is primarily designated as an industrial/commercial/retail corridor west of Four Mile Road. Establishing the Hartman-Hammond corridor as the regional transportation arterial envisioned by local plans, improves transportation service efficiency for local businesses and is not likely to be the cause of further uncontrolled development. With the exception of the congestion on South Airport Road, the easy access that encourages new development is already relatively well-established today via Hammond Road in conjunction with existing collectors such as LaFranier and Garfield roads. In addition, although large tracts of land on Hammond Road appear undeveloped and therefore at some risk, planning direction for the area is strong. Township comprehensive plans present well described land use visions for the area. In conjunction with the Region Development Guidelines, these will actively serve to guide development appropriately.

5.10.3 Alternatives Impact Assessment

The following paragraphs offer a discussion of the No-Build and Recommended alternatives and their implications regarding secondary and cumulative land use and socio-economic and natural resource impacts.

FIGURE 5.10-1



BOARDMAN RIVER CROSSING MOBILITY STUDY

REGIONAL TRANSPORTATION PATTERNS

Land Use and Socio-economics.

No-Build Alternative. Clarification has been requested by the U.S. EPA in their response to the Draft EIS (Section 7) as to the projected development pattern of the No-Build Alternative. In response, each Township planning office has provided additional material and comments regarding the Township's respective current comprehensive plans. This additional material has been analyzed and is integrated in the following discussion.

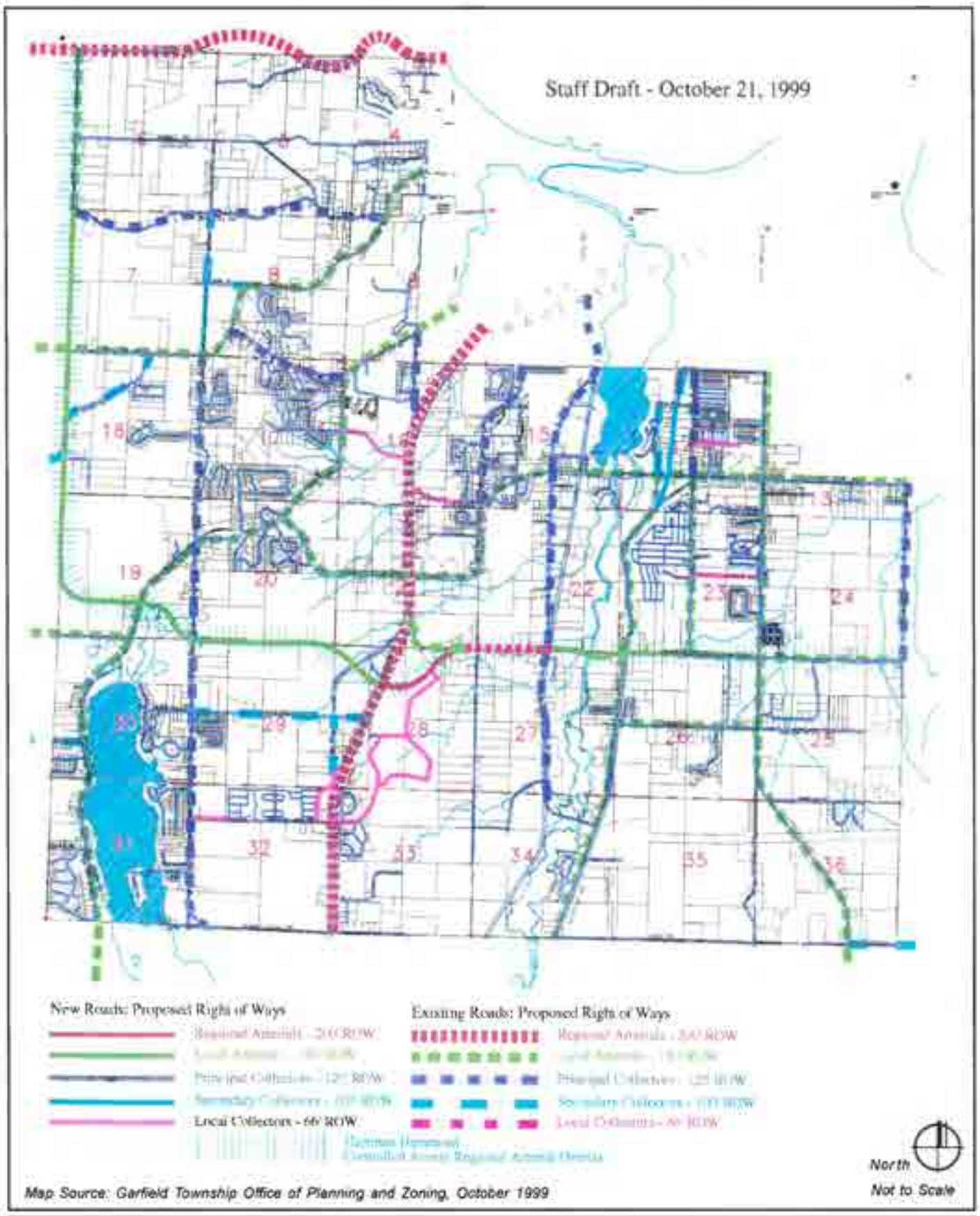
Garfield Township. The portions of the project corridors located in Garfield Township include Hartman Road, the Boardman River valley, and the section of Hammond Road from west of LaFranier Road above Keystone Road east to the township boundary at Townline Road. Build components in this section include Hartman Road, the Boardman River crossing, and a portion of Hammond Road. A Hartman-Hammond Connector across the Boardman River has been shown in the Township's Comprehensive Plan since at least 1994, and has been carried forward in subsequent planning documents such as the Township's *Major Thoroughfare Plan* (see Figure 5.10-2) and the *Miller Creek Area Study* (see Figure 4.3-9).

The Township views this connection as a straightforward link in the one mile grid pattern that serves as the county's basic road system. Based on input from Mr. Harsch, Director of Planning for Garfield Township, the Township's *Major Thoroughfare Plan* identifies the Hartman-Hammond connection extended west to Gray Road as an opportunity to establish new links in the existing transportation system serving the Grand Traverse region (Harsch, 2000). The Township believes these transportation recommendations, if implemented, will improve road continuity between M-72 west of Traverse City and U.S. Route 131 to the east. Not only will they provide an alternate route to avoid lakefront congestion, they will also create the only local arterial with the potential to link U.S. Route 31 in the west and U.S. Route 131 east of Traverse City, the two north-south federal highways that provide access to the Traverse City area (Harsch, 1999). The Hammond Road-US 131 connection, also addressed in East Bay Township's Comprehensive Plan, is discussed in later paragraphs.

Because of the attendant traffic volumes that are likely to occur with such a connection, Garfield Township's Plan suggests a multi-lane facility and designates the corridor as a "Regional Arterial" in the Township's Thoroughfare Plan (see Figure 5.10-2). By including this recommendation in Township planning documents, local officials recognize the high probability of continued growth and prosperity in the Township and the need for proactive planning to integrate future land use scenarios and the transportation systems that serve them in order to maintain transportation efficiency. The importance of this integrated planning is emphasized in Wisconsin's 21st century transportation plan, TransLinks 21, discussed earlier in this section (WisDOT, 1993).

Although the Hartman-Hammond Connector is recognized by the Township in its current planning documents, it believes these transportation improvements will not encourage development that would not otherwise occur in the Hartman-Hammond corridor. Several reasons are cited in support of this.

1. The Township's planning strategies are ecologically based, limiting the level and types of development on sensitive lands and permitting a full range of development opportunities on non-sensitive lands. This limits development on the north face of the Manistee Moraine (approximately the area of Hartman Road), since it is a highly sensitive area with many springs, small streams, wetlands, and steep, easily-erodible slopes. As a result, intensive



Garfield Township Major Thoroughfare Plan — *Figure 5.10-2*

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

development in Garfield Township is planned to occur primarily on the glacial lake plain north of the moraine (Harsch, 2000). Hammond Road lies at the base of the moraine where land is more suited for higher development intensity (see Figure 4.1-1).

2. Because the north slope of the moraine severely limits developable land in the immediate Traverse City area and demand for land remains high due to the area's popularity, all land that can be developed will be, independent of whether the Hartman-Hammond connection is constructed. Projected future land uses in the Township shown in Figure 4.3-4 have been determined in the planning process by integrating factors such as suitably developable land, the character of the existing development, and the market demand for a variety of land uses. It should be noted that the demand for residential land in the Township is equal to or greater than the demand for commercial development (Harsch, 2000).

3. Garfield Township uses "legislative-based zoning" to control the Township's Zoning Ordinance. This better enables the Township's ability to limit, guide and control land use development patterns. Because this control occurs at the township level, local officials firmly believe that they are able to control the character of future development under either the No-Build or Recommended Alternative scenario. (Harsch, 2000).

Other reasons also support the probability of future development of the Hartman Road corridor under the No-Build scenario. They include the fact that there are no protected farmlands enrolled under Part 361 of the Natural Resources and Environmental Protection Act (PA 451, as amended) bordering Hartman Road, and that sanitary sewer exists along U.S. Route 31/M-37 south to the southern limits of the project area.

Garfield Township has provided a general development classification scheme (Figure 5.10-3) in support of their belief that land use development will not be driven by a connection between Hartman and Hammond roads. The figure shows whether the probability of a parcel's being developed is dependent on the Hartman-Hammond Connector. It quickly demonstrates that virtually all parcels in the corridor – to the Township's eastern limit and bound by South Airport Road to the north and Spring Hill Road to the south – will be developed in the foreseeable future without the Hartman-Hammond Connector (Harsch, 2000).

The *Miller Creek Area Study Development Concept*, prepared for the Township in 1997, shows the essential character of a possible long range build-out scenario of the Miller Creek watershed (see Figure 4.3-9) (Design 3, 1997). Developed as a different planning tool, the development concept essentially conforms to the Township's Comprehensive Long Range Plan but is more descriptive of the desirable landscape character that the Township seeks to preserve.

As depicted in Garfield Township's *Comprehensive Plan*, retail/office development west of the Boardman River valley is confined to the Hartman Road/U.S. Route 31 intersection with the remainder of Hartman Road maintained in residential development. The commercial hub depicted in the Study builds on the small existing retail/office center at the present Hartman Road intersection, and expands it as part of a planned unit development (PUD). Higher residential development intensity is proposed closer to the retail/office center and lessens east of this point in order to protect sensitive natural areas on the north face of the Manistee Moraine. Higher commercial and residential densities are also confined north of a Miller Creek greenway easement along U.S. Route 31, Cass, and South Airport

roads. As required by the Township's Service Drive Ordinance, new access roads that serve new development between U.S. Route 31 and Cass Road will keep curb cuts on Hartman Road to a minimum and help maintain transportation efficiency. Although the *Miller Creek Area Study* shows the new proposed Hartman Road intersection as described in the Recommended Alternative, the development pattern depicted along Hartman Road is in keeping with the *Comprehensive Plan* and not dependent on this intersection configuration. The *Comprehensive* and *Major Thoroughfare* plans (see Figures 4.3-4 and 5.10-2) also show proposed roads in Sections 7, 14, 16, 19, 20, 23, 28, 29, 32, and 33.

East of Keystone Road, intermittent sections of open land that currently border Hammond Road are at most risk for transportation-induced development if the Recommended Alternative is constructed. In Garfield Township this includes land surrounding the intersections of LaFranier and Hammond, the south side of Garfield and Hammond, and Townline and Hammond roads. Existing rural/agricultural land between these intersections would also be more likely to convert to more intensive land use as Hammond Road, a local arterial, becomes a more major thoroughfare.

The probability of this transportation-induced development potential is best evaluated relative to the existing long range development plans in the Township. As shown in the *Comprehensive Long Range Plan* and the *Hammond/3 Mile Area Study* and supported by Figure 4.3-10, virtually all land in the Hammond Road corridor in Garfield Township is scheduled for development in PUD, local business, medium/moderate residential, or industrial land use categories. For reasons discussed earlier, Township officials are confident that these documents are representative of the long range No-Build scenario and believe that because of the enacted planning and zoning controls, if Hartman and Hammond roads are connected, the corridor will not become lined with commercial development as has South Airport Road (Harsch, 2000).

Like the *Miller Creek Area Study* around Hartman Road, the *Hammond/3 Mile Area Study* shows commercial, service, and office retail development concentrated primarily at the intersections of LaFranier and Garfield roads with residential and industrial development set within a matrix of trails and preserved natural areas associated with the Miller Creek watershed. Coupled with internal service roads that minimize curb cuts on Hammond Road, this matrixed development pattern and the preservation of natural areas along the corridor help maintain the existing open space character bordering the road as development continues to expand.

East Bay Township. The portion of the project corridors in East Bay Township include Hammond Road from Townline Road east to Three Mile Road, and Three Mile Road north to U.S. Route 31/M-72 (Munson Avenue). The "build" section in this part of the project corridor is located on Three Mile Road between South Airport Road and U.S. Route 31/M-72 where the road would be widened to a four/five lane road from its current two lane configuration.

At the request of East Bay Township, Mr. Jay Kilpatrick (Williams & Works), project manager and principle planner for preparation of East Bay's *Comprehensive Plan*, provided commentary to Mr. Michael Dillenbeck (GTCRC) regarding the Township's position on future development scenarios relative to the completion of the Recommended Alternative. Like Garfield Township, Mr. Kilpatrick's comments demonstrate East Bay Township's beliefs that population and attendant development, and Hammond Road traffic will continue to grow independent of a connection between Hartman and Hammond roads. In support of this, Mr. Kilpatrick cites:

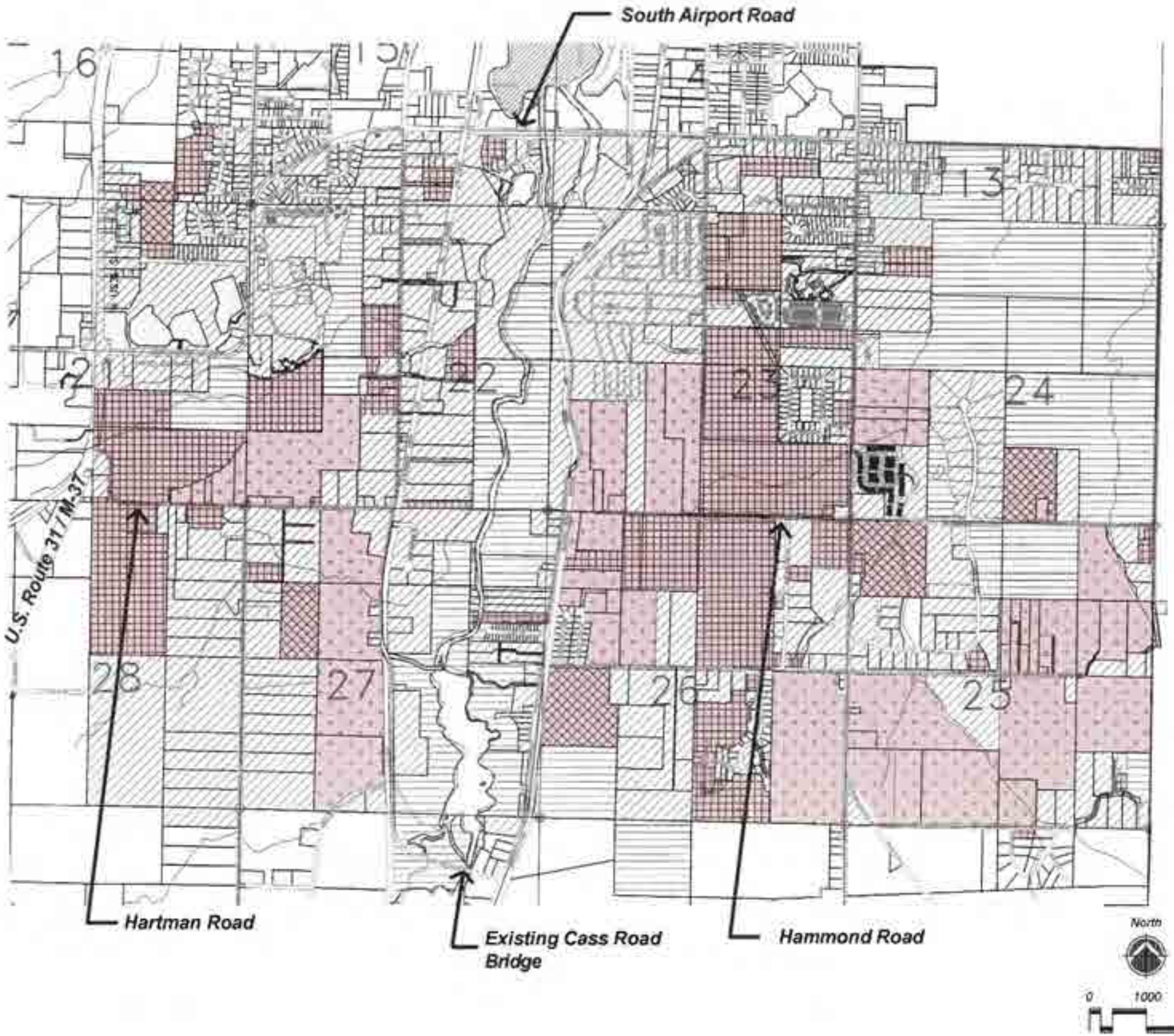


Figure 5.10-3

Garfield Township Generalized Development Classification Scheme

A-No Data or undetermined

B-Developed/No Future Change
Parcels currently developed whose status is not likely to change significantly in a 10-20 year time frame

C-Protected/Public Lands
Parcels which are one or more of the following: held by Public Bodies, held Land Conservancies, subject to development rights purchase, subject to PA116 Contract or have environmental sensitivity which severly limits development in the future.

D-Developed/Redevelop 10-20 years
Parcels currently developed which are likely to redevelop in the next 10-20 year time frame with or without the Hartman-Hammond connection

E-Undeveloped/Development 10-20 years
Parcels currently undeveloped which will be developed in 10-20 year time frame.

F-Undeveloped/Development Planned
Parcels currently undeveloped which have been or are currently being planned for development or are currently being marketed for development.

G-Nondevelopment w/o Hartman-Hammond
Parcels which are likely not to be developed without the Hartman-Hammond connection in place.

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

- Michigan Department of Transportation (MDOT) projected traffic demand using east-west connections through the Township of 33,000 to 35,000 cars per day;
- over 3,100 new households in the Township in the next 20 years;
- population growth of nearly 100 percent in the next 20 years;
- existing topography that limits the location of both an east-west corridor and its outlet to U.S. Route 31/M-72 (Munson Avenue); and
- the future importance of Supply Road as a major entry point into the Traverse City region from the southeast.

In addition, the recently published Comprehensive Plan recognizes Hammond Road has already become a multi-lane regional arterial roadway where it was widened in 1994 between Townline Road and Three Mile Road. Because of this, East Bay's Plan emphasizes the importance of establishing limitations and controls that maintain Hammond Road's carrying capacity yet minimize land uses that function as large regional destinations regardless of a future connection with Hartman Road (Kilpatrick, 2000; East Bay Township, 1999).

The widening of the existing Hammond Road segment in 1994, the potential connection of Hartman and Hammond roads across the Boardman River, and the potential improvement of U.S. Route 131 with a new interchange at Supply Road leading into Traverse City virtually completes the east-west regional arterial transportation corridor south of Traverse City that is discussed in Garfield Township's *Comprehensive Plan*. Both township comprehensive plans recognize the value of this corridor and its essential functioning today on existing roads despite the lack of connection over the Boardman River valley.

It should be noted at this point that both the "regional arterial" described by Garfield Township and the recommendations of the Boardman River Crossing Mobility Study are separate from MDOT's U.S. Route 31/M-72/M-37 Regional Corridor Study (1996) which is designed to address larger regional transportation issues. Although the Recommended Alternative is likely to be used by Traverse City drivers to avoid existing congestion on South Airport Road or U.S. Route 31, it is not intended to function as a bypass for the larger Grand Traverse region. MDOT will make a decision to extend the Regional Corridor Study after evaluating new travel patterns that may occur if the Recommended Alternative is constructed.

To address the potential growth-inducing impacts of the Hartman-Hammond corridor, East Bay Township's 1999 Comprehensive Plan establishes a growth boundary using human-made and topographic limits (the Consumer's Energy right-of-way, the north face of a glacial ridge in the center of the Township, and the limits of gravity service in the existing wastewater collection district). Within this line, the Plan includes creation of a village center near the Hammond/Three Mile Road intersection and, like Garfield Township, promotes mixed-use and cluster development to preserve significant tracts of important natural features and to promote complementary high quality residential development (East Bay Township, 1999).

East of Townline Road, the *Hammond/3 Mile Area Study* (see Figure 4.3-10) depicts a mix of service/commercial, office and retail development on the north side of Hammond Road from opposite Elmbrook Golf Course to Three Mile Road. Retail/business centers are accessed by an interior service road that leads north into a 110 hectare (272 acre) industrial development surrounding the northwest quadrant of the retail core. This development is buffered from the Woodcreek residential complex further north by a preserved open space system established to protect Mitchell Creek and its associated wetlands. According to Mr. Kilpatrick, the regional arterial nature of the existing and future Hammond Road was influential in the siting of this industrial development.

Residential development surrounds the core of the commercial/industrial village center that extends east to Four Mile Road. Higher residential densities (attached, two-family, and multi-residential units) establish the first-line residential zone around the village core. Just east of Four Mile Road, the Study identifies a new proposed road west of High Lake Road leading south/southeast from Hammond Road to connect Four Mile Road and Supply Road east to U.S. Route 131. Like in Garfield Township, the proposed future development pattern of the Township is interspersed with trails and preserved natural areas. Most new development in the Township is accessed by internal roads to minimize curb cuts on existing roads. This is particularly important to maintaining smooth traffic flow on Hammond Road.

East Bay's *Comprehensive Plan* discusses a number of implementation strategies in detail that are critical to accomplishing the Township's goals. Among them are preparing a detailed land use plan for a village center that includes an area between Three Mile and Four Mile roads approximately 0.4 kilometers (0.25 miles) north and south of Hammond Road. Preparation of this plan detail will ensure agreement as to land use types, development intensity, circulation patterns, vehicular access points, and design standards for signage, building facade treatment and lighting that will serve to establish a coherent and ordered appearance. Standardization of these details serves to mitigate against the visual confusion of competing architectural, advertising and lighting styles that often contributes to a chaotic street appearance such as is found on South Airport Road.

A second important strategy in the Plan is the preparation of corridor plans for Hammond, Three Mile and Supply roads to help direct the form of selected land uses in these areas. The purpose of these plans is to create development standards that may be implemented through overlay zones, PUD standards, or other mechanisms. Details of the plans should establish integrated treatments for building elevations, landscaping, lighting, building massing, protecting viewsheds and access management. Both plans and implementation mechanisms must be prepared.

A third strategy recommends a complete revision of the Zoning Ordinance and Map to better support the Future Land Use Map and land use designations described in the *Comprehensive Plan*. This strategy also recommends assuring the Ordinance is sufficiently flexible to support innovative development techniques and sufficiently clear to control inefficient development patterns. The goal of the Ordinance is to establish flexible, clustered open space development as the norm versus traditional development patterns.

Fourth, the Plan recommends preparation of a Transportation Thoroughfare Plan for East Bay Township, in cooperation with the Grand Traverse County Road Commission, that supports the objectives of both organizations. From a Township perspective, the plan should define the road hierarchy, development setbacks, access controls, a non-motorized transportation system and a multi-year capital improvements plan.

Lastly, one of the more far seeing strategies recommended by the Plan is the creation of a Greater Grand Traverse Planning Council in recognition of the larger regional community of which East Bay is a part. The function of the Council would be to serve as a forum for dialogue on land use issues within the community, particularly on projects that have regional impact or require potential zoning changes or master plan revisions. Using this geographically holistic approach responds to the regionality of many of today's development projects and enables the greater Grand Traverse community to better respond to the transportation needs of the region.

Other strategies outlined in the plan include:

- buffering wildlife corridors and streams using new setback standards;
- inventorying important natural features and identifying threatening trends that need to be controlled;
- establishing overlay zones and other protective mechanisms of important natural features;
- creating incentives to advance regional economic development; and
- promoting Purchase of Development Rights, a Michigan-supported program, and Transfer of Development Rights, a proposed bill before the State legislature.

These strategies are critical to ensuring the Comprehensive Plan is implemented as envisioned by the Township and to controlling the future growth the Township faces. As written, the plan recognizes that ensuring that development occurs according to development standards designed to preserve important natural features and valued rural character lies primarily with planning officials. Garfield and East Bay Townships, each in their own way, are developing control mechanisms to manage this growth in the foreseeable future. This level of active planning at the township and county level will direct growth to appropriately zoned areas regardless of the transportation improvements that are implemented. However, as traffic continues to worsen in the face of no action, existing and developing traffic patterns may change as tourists and the local population seek new, less-traveled routes in an attempt to avoid congestion. This may direct more cars to local roads not intended for such traffic and place additional pressure on the Township to control development.

The Recommended Alternative. If implemented, a number of positive secondary and cumulative impacts are likely to result from this alternative. First, the improved intersection of U.S. Route 31/M-37 and a realigned Hartman Road combined with a new bridge over the Boardman River will greatly facilitate light industrial truck traffic that conducts commerce both within and outside the Traverse City region. Local land use plans and organizations like the Chamber of Commerce have encouraged the relocation and new development of light industrial uses within planned industrial parks bordering Hammond Road for several years. A Hartman-Hammond Connector will create a new direct route to U.S. Route 31/M-37 southbound, diverting some of the trucks that currently use South Airport, Garfield, Birmley, Keystone, and Beitner to access U.S. Route 31/M-37, U.S. Route 131, and M-72.

Second, the connection will benefit commuters and clients that work in or visit businesses within the industrial parks on Cass Road and Hammond Road by providing more direct access to and from those locations. Third, the connection will benefit schools and students by reducing the travel length and the

time needed by school buses and parents needed to transport their children (Derrigan, 1998; Fite, 1998). Lastly, the connection will benefit the proposed planned development depicted in the *Miller Creek Area Study* between U.S. Route 31/M-37 and Cass Road in the vicinity of the Hartman Road realignment by providing more convenient transportation access to facilities and road connections east of the Boardman River. Thus, in its scope, the Recommended Alternative recognizes existing entry/exit circulation patterns and responds to more efficiently serve the transportation needs of the economic community.

In contrast to its more positive impacts, however, the Recommended Alternative will also direct more truck and automobile traffic through the Hartman Road-Cass Road intersection. This is due, in part, to the large number of school buses that are housed on Cass Road south of Hartman Road. Preliminary estimates for increased school bus traffic if the Hartman/Hammond connection is constructed, project that approximately 60, and occasionally 80 to 85, buses daily will cross the valley at this point (Derrigan, 1998). In addition, some commercial trucks from the Cass Road industrial corridor that now use South Airport Road in order to travel east or west are also likely to re-route to the new connection. The increased traffic near this intersection and Sabin School raises safety concerns regarding daily pick-up and drop-off of children in front of the school on Cass Road. These potential conflicts make the intersection design here particularly important. Should the Recommended Alternative move forward, the details of how this is best accomplished will be addressed in the final design phase of the project.

In the east, under current conditions, Three Mile Road is a relatively heavily traveled two-lane road through a primarily residential setting. East Bay's Comprehensive Plan reports that 1995 average daily traffic (ADT) ranges from 10,000 to 20,000 vehicles based on data provided by TC-TALUS (East Bay Township, 1999) for the section of Three Mile Road between South Airport Road and U.S. Route 31/M-72. This use pattern, likely to be heavier today, clearly demonstrates the South Airport Road/Three Mile Road/U.S. Route 31 connection as a main east-west transportation corridor in the project area. South of the intersection with South Airport Road, the ADT on Three Mile Road is less than 10,000 vehicles. In contrast to the City designation, East Bay's Comprehensive Plan identifies this section of Three Mile Road, along with South Airport Road, Hammond Road, Garfield Road and Supply Road as local arterials in their Existing Transportation Map.

The *City Plan* and the City Future Land Use Map as amended through February 2000 designates all of Three Mile Road as a collector road. As a collector street, the Plan considers Three Mile Road as a "principle traffic corridor within the community" designed to a two to three lane standard with two-meter (five- to six-foot) sidewalks. Adequate right-of-way is encouraged in order to include bike lanes. In a November 1999 letter to the Grand Traverse County Road Commission, Mr. Bob Otwell, Chairman of the Traverse City Planning Commission, expressed concern that, as described to the Commission, the proposed Three Mile Road improvements do not conform to the City Plan. The letter goes on to express further concern that, "as described, it (the roadway design) will make walking or bicycling along this corridor more dangerous and less desirable." In order to assure safe accommodation of non-motorized traffic, GTCRC agrees that the proximity of a state park, an elementary school and the TART Trail to this section of Three Mile Road will influence the detailed design of this section of the Recommended Alternative. They will work to support additional funding for these efforts in the coming months (see Mitigation below). The detail of how this is accomplished will be more completely addressed should the project move forward.

Certainly traffic on Three Mile Road will continue to intensify as a result of it being part of the main transportation infrastructure for the Traverse City area. While the proposed widening to four/five lanes between South Airport Road and U.S. Route 31/M-72 will help move traffic, these increases in traffic, with their attendant noise and congestion, are more compatible with commercial, rather than residential land use. As with Sabin Elementary School at Cass and Hartman roads, should the Recommended Alternative be constructed, safety issues for pedestrians and bicyclists, as well as cars and buses entering and exiting East Bay Elementary School east of Three Mile Road, must be addressed as part of final design. Although not indicated in the *Hammond/3 Mile Area Study*, over time, more residential properties along Three Mile Road may be converted to commercial uses isolating the school from the existing residential community. In support of this conversion, the Township's Comprehensive Plan identifies the land area north of Parsons Road for regional commercial development.

Reconstruction of Four Mile Road to improve driving conditions will also be important to guaranteeing more efficient handling of the increased traffic likely to occur as a result of its designation as a north-south alternate arterial to Three Mile Road by the Township's Comprehensive Plan. As a result, more traffic on Hammond Road or U.S. Route 31/M-72 may opt to travel Four Mile Road rather than Three Mile or Five Mile Road to continue east-west travel through the Traverse City area to M-72 in Acme Township.

Mitigation. The character of future development that occurs in the Traverse City region will be driven by existing plans, legislative-based zoning, Township ordinances, and mitigation strategies that govern the type of allowable development for a particular parcel as well as certain aspects of its design. For example, Section 7.2.8 of Garfield Township's Zoning Ordinance limits the number of road access points for parcels fronting a state highway or county primary road such as Hammond Road. Based on the ordinance, one access point is permitted for each parcel having a single tax code number or for all contiguous parcels owned by a single individual or related individuals, or a single entity or related entities. Further, the ordinance requires new parcels created by subdividing to have access provided by subdivision roads, other public or private roads or service drives that use the common access point established for the original parcel. This form of access management will serve to protect user safety and traffic flow on primary roads, such as Hartman, Hammond or Three Mile Road, by limiting curb cuts and helping maintain the desired boulevard character on Hartman Road.

Because of the region's growth, its position as the economic center of Michigan's northern Lower Peninsula, and the overwhelming appreciation within the community for the area's natural resources and quality of life, planning and community action to preserve the region's character have been both intense and forward thinking. As a result, the Traverse City area has a number of planning controls in place to help direct and define the region's growth in the coming years. Strong planning management and community support of both planning goals and design development guidelines will continue to be important to positively guiding future growth. The extent to which the impacts of this growth are perceived as negative will depend on how well new development, including the bridge over the Boardman River, is integrated into the existing landscape. Good design, effective ordinance controls, and preservation of existing natural areas and other important landscape features, as shown in the *Miller Creek Area Study Development Concept* and the *Hammond/3 Mile Area Study* will help to retain the high-quality of life of the area.

The direction summarized in the following documents will help mitigate potential secondary and/or cumulative impacts that may occur should the Recommended Alternative be constructed.

- *Grand Traverse County Master Plan* (1996). This plan has been developed through direct involvement of local government and citizenry in a visioning process that developed goals and future growth scenarios for the County. The plan establishes a growth management strategy based on five management levels for progressively intense development that guide land use decisions.

- *Grand Traverse County Comprehensive Recreation Development Plan* (1997). Also developed through public input and community wide consensus, the plan identifies a series of prioritized capital improvements needed to meet plan goals. Priority selections related to the project area that help preserve open space include acquiring parkland in strategic locations in the county (including East Bay and Garfield Townships), and land acquisition and development of the Boardman Trail (also called the Riverwalk).

- *Garfield Township Comprehensive Land Use Plan* (1999). Supplemented by subsequent individual area studies such as the 1997 *Miller Creek Area Study*, and the 1998 *Hammond/3 Mile Area Study*, Garfield Township's Comprehensive Plan organizes denser land uses nearer the city boundary and reserves outlying areas for rural residential and agricultural uses to preserve critical natural features. Open space corridors follow Miller Creek tributaries and protect the watershed through defined riparian buffer zones. These greenways and non-motorized pedestrian trails connect the township in a system of recreational trails. The plan accommodates planned development strategies and seeks to encourage cluster development and open space preservation.

- *East Bay Township Comprehensive Plan* (1999). The goals of the Township Plan emphasize an awareness of both regional growth issues and the natural features that give the township its quality. They include strengthening existing neighborhoods, preserving natural features, maintaining rural character, avoiding developmental sprawl, and integrating the township's roadway network in accordance with its land use objectives. Growth will be concentrated north of the Consumers Energy easement and focused in a village center at Hammond and Three Mile Roads. Where possible, clustered development will be encouraged. Coordinated planning at a regional level is also recognized as an important growth management tool.

- *Grand Traverse Bay Region Development Guidebook* (1992). The Development Guidebook was produced as a joint effort by a number of planning groups in the five-county area surrounding Traverse City. It is a unique effort that includes design and planning recommendations that have been developed to proactively manage and direct growth while protecting valued natural resources. A companion document providing sample regulations that support these goals is also available.

- *The Traverse City Area Transportation and Land Use Study Long Range Plan* (TC-TALUS, 1995). This study analyzes future transportation needs and land use systems in the Traverse City region and makes recommendations to the appropriate jurisdictional bodies based on the study's findings. Goals emphasize preservation of the environmental, agricultural and community character of the area while building consensus around a regional transportation/land use plan that reduces demand on the road system. TC-TALUS remains an active participant in the planning processes of the Traverse City region.

- *Grand Traverse Regional Land Conservancy* (GTRLC, 1997). The GTRLC is a four-county regional land conservancy created to help preserve the remaining critical natural areas of the Grand Traverse region through conservation easements and land preserves. GTRLC also works in partnership with agencies, conservation groups, landowners, and local jurisdictions to promote watershed and farmland protection programs such as the highly successful Purchase of Development Rights (PDR) program that has been instrumental in protecting scenic viewsheds and farmland in Mission Peninsula.

Mitigation for secondary and cumulative land use and socio-economic impacts will come from coordination between these local and regional planning agencies as well as from adhering to clearly defined ordinances that support the visions of each community. The similarity of the priorities and visions defined in the respective comprehensive plans speaks to the commonality of values shared by many people in the project area. Implementation of these existing local planning documents and design guidelines will provide the most effective mitigation. With these plans, the region has a strong base from which to guide growth and address impacts caused by both regional growth and recommended local transportation improvements.

In addition to planning and land use controls, roadway design issues such as intersection treatments, median and right-of-way landscaping, guardrail and bridge design, vertical and horizontal road alignment, and access restrictions are all design details that must be carefully evaluated for their control of secondary and cumulative impacts. Land development design standards such as building setbacks; viewsheds; and architectural, lighting, and signage standards – or others detailed in the *Grand Traverse Bay Region Development Guidebook* (Planning and Zoning Center, 1992) – will also have a major effect on maintaining a community appearance that responds to the beauty and character of the region. Changes in the visual aesthetics as well as the functionality of the project area are particularly important to control with appropriate design guidelines and development standards. This continued sensitivity to community preferences is critical to maintaining the region's future public image and quality of life.

In support of these goals and as further mitigation, the Grand Traverse County Road Commission has committed to supporting a search for additional funding to construct bike paths along the Recommended Alternative and public paths along the Boardman River should the Recommended Alternative be constructed. They are also willing to host public meetings to review the bridge design for the Boardman River crossing and/or any other road enhancements prior to taking construction bids. Further, they will:

- donate excess right-of-way in the Boardman River valley to the Grand Traverse Nature Education Reserve;

- work with the Reserve and area schools to establish educational opportunities to teach students about current wetland mitigation techniques;

- encourage preparation of East Bay and Garfield Township corridor plans that require developers who seek to change existing zoning ordinances or master plans to implement property enhancements that reflect community values;

- encourage creation of a residential community to re-locate current Hartman Road residences for those who wish to stay in the vicinity of Hartman Road; and

- purchase access rights on the 1.6 kilometers (one mile) of new road connecting Hartman and Hammond roads to eliminate the possibility of future curb cuts.

Natural Environment. Secondary and cumulative impacts to the natural environment occur in any community experiencing growth and development with or without transportation network modifications. The extent to which these impacts occur is influenced by a number of factors as discussed above, including the effectiveness of local planning and development controls. The following section includes discussion of the future No-Build condition with regards to secondary and cumulative natural environment impacts and the likely influence of the Recommended Alternative on those impacts. Opportunities to minimize impacts with and without the Recommended Alternative are also discussed.

No-Build Alternative. Secondary and cumulative natural environment impacts associated with the future No-Build condition are expected to occur in proportion to the growth and development of the Traverse City area. New development typically results in increased impervious surface (i.e., more open land is covered by pavement and buildings), altered stream hydrology due to increased storm water runoff and increased velocities, increased soil erosion and sedimentation, degradation of aquatic habitat, fragmented wildlife habitat, and altered or displaced wetland resources.

Within the project corridors of the Recommended Alternative, future development is anticipated as reflected by the Garfield and East Bay townships' planning documents, as previously discussed. These documents, along with existing zoning ordinances, however, identify a number of mitigating measures that are in place to control future development and minimize its impact to the natural environment. Garfield Township's Zoning Ordinance, for example, requires all new development that may affect storm water to prepare and submit a plan to the Zoning Administrator that specifically indicates how storm water will be detained on-site to retain existing runoff rates. A Land Use Permit is not issued until the Zoning Administrator accepts the plan. Similarly, the Township will not issue a Build Permit until the Grand Traverse County Soil Erosion and Sedimentation Control Permit, if required, is approved.

Garfield Township's Zoning Ordinance also requires a 7.6-meter (25-foot) building (including parking lot) setback from Michigan Department of Environmental Quality designated wetlands, unless it can be proved that the development will not impair wetland values.

According to East Bay Township's Comprehensive Plan, development proposals in the Township will be required to "address specific performance standards intended to maintain and enhance the natural characteristics of the region and to maintain its buffering properties." These standards include: 1) protecting wildlife corridors and streams within a minimum 61-meter (200-foot) wide corridor; 2) accurately field verifying wetland boundaries; 3) providing storm water runoff detention and treatment to protect stream quality; 4) dedicating a scenic easement of 30 meters (100 feet) from all county roads consisting of natural vegetation and non-motorized trail connections; 5) minimizing formal landscaping and restrictions on excessive fertilization; 6) prohibiting high traffic generating land uses; and 7) requiring performance bonds, deed restrictions, etc. East Bay Township also has a storm water detention provision in their Zoning Ordinance similar to Garfield Township's Zoning Ordinance.

The combination of local plans, zoning ordinances, the County's Soil Erosion and Sedimentation Control Ordinance, and State of Michigan regulations such as the Natural Resources and Environmental Protection Act (Act 451 of 1994) provide protection to the area streams, wetlands and wildlife corridors under the No-Build Alternative.

Recommended Alternative. To further analyze the influence of the Recommended Alternative on secondary and cumulative impacts to storm water runoff, pollutant loading from the increased impervious surface associated with this project's new roadway was estimated using a statistical approach (see Section 5.1.5). The conclusions of the analysis indicate that the Recommended Alternative will not adversely impact Jack's Creek, Mitchell Creek, or the other two unnamed tributaries crossed by the Recommended Alternative near the Boardman River. Mitigation measures required to control the rate of storm water runoff from the increased impervious surface are discussed later.

The removal of trees adjacent to the portion of Mitchell Creek bordering Three Mile Road that will be relocated may affect water temperatures, and secondarily affect resident fish such as brown trout. Shrub and tree planting along the banks will be needed to minimize the long-term secondary impacts to water temperature.

Over time, the reconstruction of Four Mile Road may attract more vehicles to this road. Although the traffic modeling conducted for the Recommended Alternative did not indicate a congestion concern for Four Mile Road, the potential exists for increased storm water runoff pollutants to enter the narrow tributary (Baker's Creek) next to Four Mile Road. Unlike Mitchell Creek, which generally is buffered from Three Mile Road by vegetated ground, Baker's Creek is immediately adjacent to a long stretch of Four Mile Road (see Figure 4.1-3). This tributary was observed to contain native wetland vegetation, which may be sensitive to runoff pollutants such as road salt. Long-term observation of this creek would be needed to determine if additional vehicles on Four Mile Road have an effect on the plant species and water quality.

The Recommended Alternative has been sited to minimize secondary and cumulative impacts to wildlife habitat associated with Jack's Creek (see Figure 4.1-3). Opportunities to minimize road cut and impacts to the mixed upland hardwoods located at the western end of the alignment should be considered during final design. Mature trees currently located within the central portion of this woodlot will become edge trees after roadway clearing and grading. Protection of their root systems from compaction, cutting and moisture loss during construction will be needed to sustain them and minimize wildlife habitat loss.

Another area of concern with regards to secondary and cumulative impacts to wildlife and wildlife habitat is in the Boardman River valley. The earthen embankments for the Recommended Alternative will reduce the wildlife corridor width at the point where the road crosses the valley. The extent of terrestrial wildlife movement north and south may be reduced as a result of a more narrow passage way; however, the bridge abutment setbacks from the river's edge are proposed to allow wildlife to pass under the bridge. Consequently, populations of species that use wooded corridors such as white-tailed deer are not expected to be reduced by the Recommended Alternative.

The contribution of the Recommended Alternative to secondary and/or cumulative impacts regarding wetlands (such as a change in hydrology or acidity from increased storm water runoff pollutants) is not

a major concern for this project as indicated by the storm water analysis presented in Section 5.1.5. Furthermore, the Grand Traverse County Road Commission must meet the requirements of the County's Soil Erosion and Sedimentation Control Ordinance. Final design will be required to address storm water runoff generated by this project and BMPs such as the use of constructed vegetated swales to slow storm runoff, sediment basins to filter out pollutants, and detention basins to hold and release runoff at a controlled rate will be incorporated into construction documents and permit applications.

Mitigation. Continued implementation of the many local plans developed within the Traverse City area that identify the preservation of large open spaces and planned development will provide some mitigation for natural environment secondary and cumulative impacts. In addition, the Grand Traverse County Road Commission's compliance with local, state and federal environmental regulations will ensure that the Recommended Alternative is not a contributing factor to secondary and/or cumulative natural environment impacts.

Section 6

SECTION 4(f)/6(f) EVALUATION

Section 6
SECTION 4(f)/6(f) EVALUATION

Section 4(f) of the 1966 Department of Transportation Act (49 US Code Sec. 1653(f)) specifies that publicly owned land from a park, recreation area, or wildlife and waterfowl refuge of national, state or local significance, or any land from an historic site of national, state or local significance, may not be used for transportation projects unless: 1) there is no feasible and prudent alternative to the use of such land; and 2) proposed projects include all possible planning to minimize harm.

Section 6(f) of the Land and Water Conservation (LAWCON) Act (PL 88-578 [16 US Code Sec. 460L-4 - 460L-11]), as amended, was enacted to ensure that property acquired or developed with LAWCON assistance is retained and used for public outdoor recreation use. Any property so acquired or developed shall not be wholly or partly converted to other than public outdoor recreation uses without the approval of the Secretary of the U.S. Department of the Interior.

Public school properties are typically not classified as Section 4(f), unless their facilities support an organized public recreational activity such as youth soccer or serve a community recreational purpose (for example, a playground that serves a neighborhood recreational need after school hours). Two school properties potentially affected by the Hartman-Hammond Road Connector with Three Mile Road Alternative (i.e., the Recommended Alternative), Sabin Elementary and East Bay Elementary schools, do not meet the definition of a Section 4(f) resource. The portion of school property potentially affected by the Recommended Alternative at Sabin Elementary School serves primarily physical education classes with minimal walk-on use after school hours (Crawford, 1999). Similarly, the portion of East Bay Elementary School property potentially affected is used for parking and as a landscaped buffer from Three Mile Road.

Several recreational areas and historic resources classified as Section 4(f) properties are located in close proximity to the Recommended Alternative. One of these resources, the Grand Traverse Nature Education Reserve, contains specific facilities constructed using LAWCON funds, qualifying them for protection under Section 6(f) (Schreiner, 1995). The following evaluation of potential impacts to Section 4(f)/6(f) properties has been prepared according to Federal Highway Administration (FHWA) Technical Advisory Report T 6640.8A (1987).

6.1 PROPOSED ACTION

The Boardman River Crossing Mobility Study was initiated to address the needs associated with the deficient Cass Road Bridge, as well as to address the east-west surface transportation system flow constriction problems in the Traverse City area. The Recommended Alternative is designed to replace the transportation service provided by the Cass Road Bridge and to improve east-west circulation within the project area.

6.2 NEED FOR ACTION

The Boardman River Crossing Mobility Study area is located in one of northwest Michigan's popular residential and business centers. Between 1980 and 1990, population in the Traverse City Transportation and Land Use Study (TC-TALUS) study area increased approximately 17 percent (from 53,000 to 62,000); population projections indicate a 77 percent increase over the 25-year period between 1990 and 2015. This represents the TC-TALUS medium growth population forecast (109,781) for the year 2015. Employment is expected to increase 74 percent over this same period.

As a result of the area's growth, more light industrial, commercial, and residential units will be constructed, resulting in increased congestion on area roadways. This trend is already evident with the increased traffic flow resulting from the new commercial centers constructed on South Airport Road and expansion and construction of industrial parks east of the Boardman River on Hammond Road.

Few north-south deficiencies have been identified in the project area. However, the existing locations and condition of river crossings hinder east-west travel over the Boardman River. Between Grand Traverse Bay and Beitner Road, six crossings traverse the Boardman River. Three of these crossings are located within the 9.5 kilometers (6 miles) between Traverse City's southern limit and Beitner Road.

Studies of existing traffic volumes and levels of service (LOS) indicate that congestion on most of the Boardman River crossings is reaching unacceptable levels. Congestion is compounded by the inadequacies of the existing Cass Road Bridge. The structure has been reduced from two travel lanes to a single 4.6-meter (15-foot) non-signaled travel lane with a weight restriction of 9 metric tons (10 tons) on single-axle vehicles. The Cass Road Bridge is structurally deficient and functionally obsolete for current and future use.

Because of the limited number of crossings over the Boardman River, the east-west crossings carry some of the highest volumes of traffic in the region. Traffic studies evaluating recent and projected population growth in the area indicate that east-west mobility across the Boardman River will be a major problem within the next few years. These problems will worsen with the eventual closure of the Cass Road Bridge.

6.3 ALTERNATIVES

The alternatives addressed in this Final Environmental Impact Statement (Final EIS or FEIS) include the No-Build and the Hartman-Hammond Road Connector with Three Mile Road (i.e., the Recommended Alternative). The Recommended Alternative also includes reconstruction and repaving of the existing Four Mile Road between Hammond Road and U.S. Route 31/M-72.

These two alternatives are described further in Section 3 and at the beginning of Section 5 of this document and summarized below. The alternatives considered and dismissed during the preparation of the Draft Environmental Impact Statement (Draft EIS or DEIS) and following the Public Hearing held for this project are also discussed in Section 3 of this document.

6.3.1 No-Build Alternative

As part of the No-Build Alternative, the Cass Road Bridge would be maintained, without significant changes to the existing structure, until it is no longer safe to accommodate through traffic. Typical low-cost, low-impact improvements, such as intersection and traffic signal improvements, would be made to improve the efficiency of the existing roadway network in the project area. The No-Build Alternative would not correct current or future traffic flow problems and would not replace traffic service lost as a result of the eventual closure of the Cass Road Bridge.

6.3.2 Recommended Alternative

The Hartman-Hammond Connector portion of the Recommended Alternative involves constructing a new bridge across the Boardman River valley to connect Hartman and Hammond roads. Specifically, this alternative includes relocating and redesigning Hartman Road, as a four-lane boulevard, between U.S. Route 31/M-37 and Cass Road. Between Cass Road and the western end of the existing Hammond Road, a new four-lane (undivided) road and new bridge will be constructed. The existing Hammond Road west of LaFranier Road will be widened to four lanes.

The Recommended Alternative also involves widening Three Mile Road and reconstructing Four Mile Road. Three Mile Road from 198 meters (650 feet) south of South Airport Road to U.S. Route 31/M-72 will be widened to four/five lanes, and Four Mile Road will be reconstructed within the existing right-of-way from the Hammond Road/Four Mile Road intersection to U.S. Route 31/M-72. The purpose of road reconstruction is to replace the existing unstable, organic material sub-base with a stable gravel sub-base to reduce freeze/thaw impacts on the paved surface and improve the road surface. Work on Four Mile Road would occur prior to Three Mile Road widening so that it may be used as a detour during the Three Mile Road construction.

6.4 SECTION 4(f)/6(f) RESOURCES

6.4.1 Recreational Resources

Recreational properties which are located within the Recommended Alternative project corridor and considered to be Section 4(f) and/or Section 6(f) resources are presented below and identified in Figure 6.4-1.

Grand Traverse Nature Education Reserve. The Grand Traverse Nature Education Reserve is located approximately 4 kilometers (2.5 miles) south of Traverse City. The Reserve began in 1969 when the Consumers Power Company (now Consumers Energy) transferred 97 hectares (240 acres) of its Boardman River property to Grand Traverse County with the stipulation that it be used for public recreation purposes. Formally dedicated as a protected area in 1976 by the County Board of Commissioners, the Reserve is currently greater than 162 hectares (400 acres) and follows more than 3.9 kilometers (2.4 miles) of the Boardman River. The ecosystems contained within its boundary represent a majority of the natural systems found in the Traverse City area. The Reserve serves as an extremely popular recreational and educational destination.

Representative ecosystems found within the Reserve include a bog, marsh, pond, cedar swamp, upland deciduous forest, and pine forest in addition to the Boardman River and its associated creeks. Two

dams in the Reserve create two impoundments, Sabin and Boardman ponds, which are focal points on the property. The Reserve contains more than 8 kilometers (5 miles) of developed trails and boardwalks; more than 0.8 kilometer (0.5 mile) of paved trails; picnic areas; barrier-free fishing platforms; and many scenic overlooks. Recreational activities include canoeing and kayaking, hiking, photography, bird watching, fishing, nature study, and cross-country skiing (Grand Traverse County Parks and Recreation, 1997).

The overlook, parking lot and trailhead located on the west side of Sabin Dam within the Nature Reserve were constructed using LAWCON funds and, therefore, are considered Section 6(f) resources. These resources are located approximately 0.8 kilometer (0.5 mile) south of the proposed centerline of the Recommended Alternative.

The existing reserve trail system is part of the larger proposed Grand Traverse County Master Trail Plan. A number of studies have recommended that the Boardman Valley Trail system be developed on both sides of the Boardman River in this area to connect downtown Traverse City to the Reserve (Harsch, 1988; OCBA, 1991). Recommendations will be included in an updated Master Plan for the Reserve and will include trail improvements and connections to the proposed Boardman Riverwalk that would extend north of the Reserve on both sides of the river. An additional 5 hectares (13 acres) of land located immediately north of the former northern boundary of the Grand Traverse Nature Education Reserve was donated to the Grand Traverse Regional Land Conservancy by the former private land owners. This property was recently included in the Grand Traverse Nature Education Reserve through a conservation easement, which will ultimately further the efforts of developing the Riverwalk (Fleming, 1998).

The land between the Reserve and the YMCA (located along the Boardman River, south of South Airport Road) is private property but contains informal trails used by the public. Grand Traverse County and Garfield Township are working together to identify strategies for more formal development of the Boardman Valley Trail system. One logical connection involves obtaining the right to enhance the existing informal trail along the west side of the river, extending it north into Medalie Park at the south end of the Boardman Lake. Ultimately, long range plans envision trail connections between the Downtown Riverwalk, a completed Boardman Lake Trail, and the Grand Traverse Nature Education Reserve.

George and Ada Reffitt Nature Preserve. Immediately south of the railroad adjacent to Three Mile Road is the entrance to the George and Ada Reffitt Nature Preserve, created in 1992 through land donation by Ronald and Donna Reffitt and now protected by the Grand Traverse Regional Land Conservancy. Totaling 21 hectares (52 acres), the property includes 823 meters (2,700 feet) of Mitchell Creek and a large wetland that contains wood turtles, a species listed as Special Concern in Michigan. The preserve is located just south of Traverse City State Park on the east side of Three Mile Road near Parsons Road and the Traverse Area Recreational Trail. The bulk of the property extends east and south behind East Bay Elementary School and the Cherry Capital Airport runway protection zone on the east side of Three Mile Road. The preserve has a good trail system that is widely used by the local community. Wildlife that may be seen within the preserve include salmon and steelhead trout, deer, muskrat, mink, otter, and a variety of songbirds. Represented plant communities include the pine-oak ecosystem typically found on dryer recessional beach ridges (an important geological feature of the area), and forested cedar-swamp wetland dominated by the northern white cedar (GTRLC, 1997; Fleming, 1998).

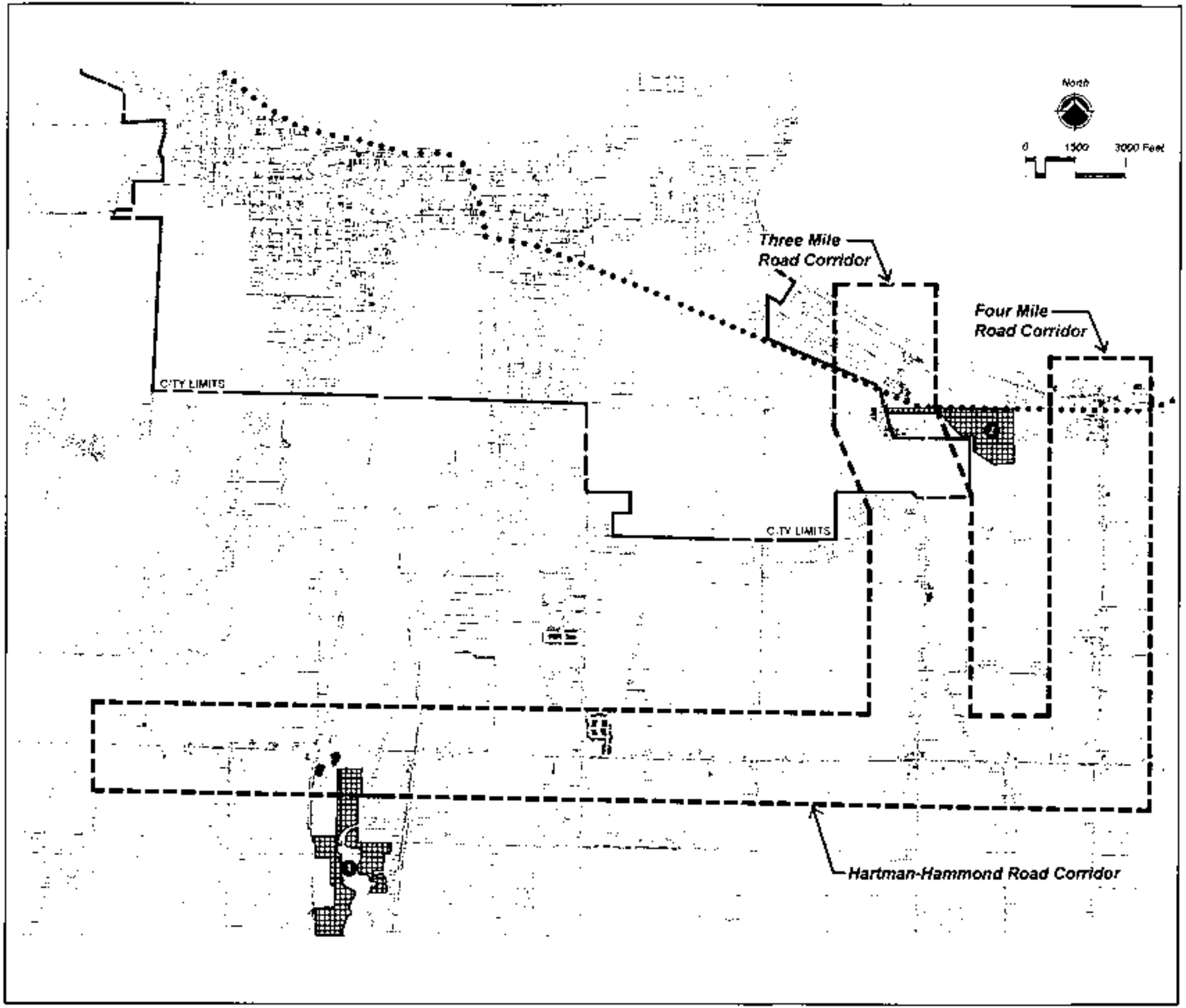


Figure 6.4-1

Section 4(f)/6(f) Recreational Resources

Legend

Recreational/Natural Area

1 Grand Traverse Nature Education Reserve

2 George and Ada Ruffit Nature Preserve

TART Trail

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

Traverse Area Recreational Trail (TART). The TART trail crosses Three Mile Road on the north side of the Tuscola and Saginaw Bay Railroad south of Parsons Road. This trail system is a 12-kilometer (7.5-mile) east-west "rails to trails" route that includes a 2.4-meter (8-foot) wide asphalt path. This route parallels Grandview Parkway/U.S. Route 31 from East Traverse Highway (M-72) and connects southeast to Parsons Road via the old railroad bed just east of Franklin Street in downtown Traverse City. After crossing Three Mile Road, the trail follows the old rail bed east past Four Mile Road. Plans for the trail include extending it around East Arm Grand Traverse Bay, past Five Mile Road to Bunker Hill Road. Ultimately, it is expected to connect downtown Traverse City with the Grand Traverse Resort in Acme Township and the Boardman Riverwalk trail system. Uses include hiking, jogging, walking, roller skating, and cross-country skiing. No motorized use is permitted on the trail (OCBA, 1991).

6.4.2 Historic Resources

Four historic Section 4(f) resources were identified that could be adversely impacted by the Recommended Alternative. (See Figure 6.4-2.) The State Historic Preservation Office (SHPO) has concurred that these properties meet the criteria for listing on the National Register of Historic Places (NRHP).

4273 Three Mile Road. Constructed in 1941, this small house is one of only three extant round-log houses in the project area. Based on its Craftsman-inspired details, distinctive architectural style, and proximity to the other two log-constructed houses, this house would be eligible for listing on the NRHP.

4283 Three Mile Road. The house at 4283 Three Mile Road is the second of three extant round-log houses in the area. Constructed in 1940, this house is eligible for listing on the NRHP by virtue of its distinctive architectural style and its proximity to the other two log houses.

4314 Three Mile Road. The log house at 4314 Three Mile Road is the third of three extant round-log houses located in the study area. Like its counterparts at 4273 and 4283 Three Mile Road, this house would be eligible for listing on the NRHP because of its distinctive architectural style and its proximity to the other two log houses.

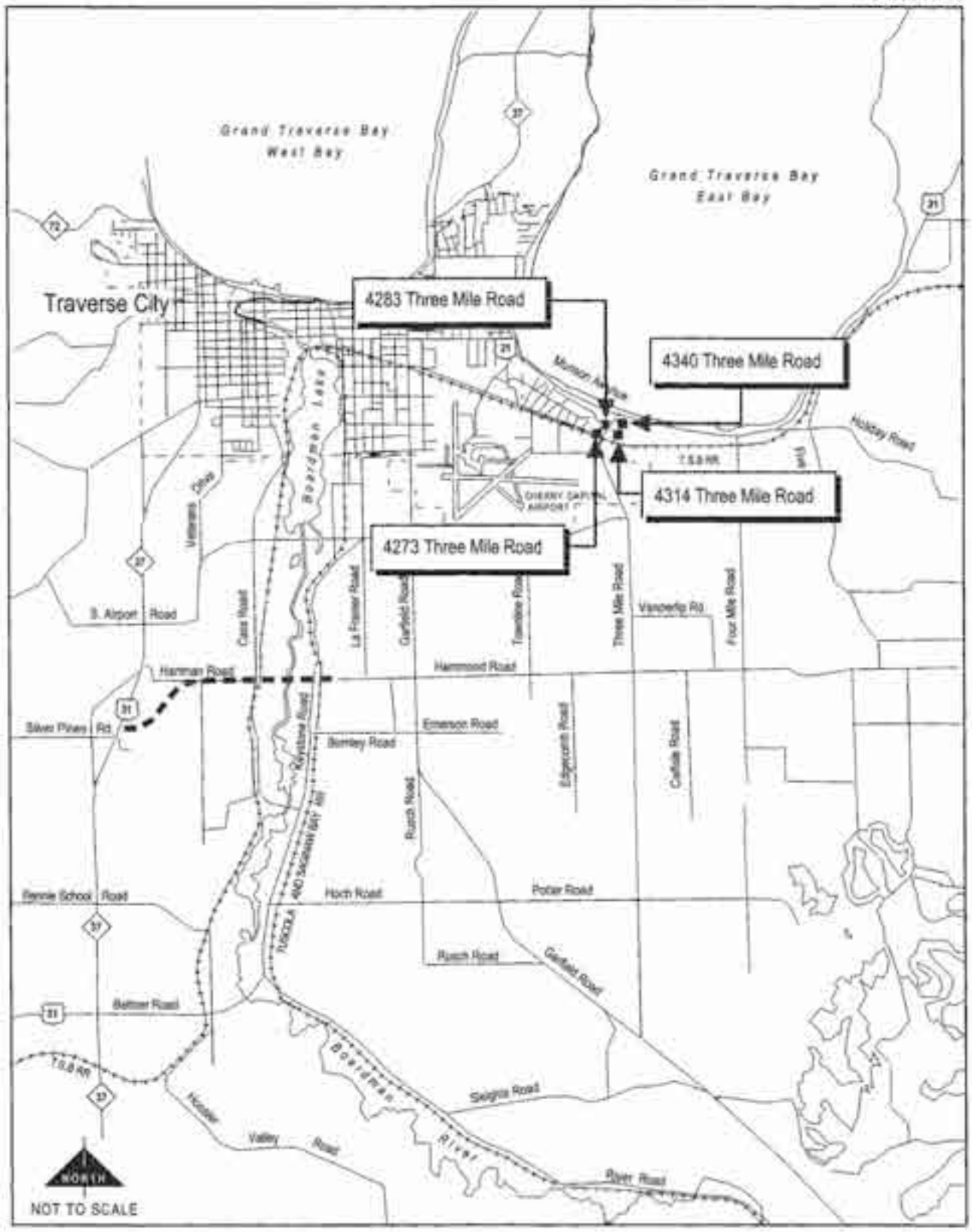
4340 Three Mile Road. The house at 4340 Three Mile Road, constructed in 1936, is a ranch-style house that incorporates a number of Arts-and-Crafts details. It is an excellent, well-maintained example of the early ranch form, making it eligible for listing on the NRHP.

6.5 IMPACTS TO THE SECTION 4(f) AND/OR 6(f) RESOURCES

6.5.1 No-Build Alternative

The Grand Traverse County Road Commission (GTCRC) is proposing to close Cass Road to through vehicular traffic from a point approximately 560 meters (1,850 feet) west of the existing bridge to a point 30 meters (100 feet) east of the bridge. Cass Road crosses the Grand Traverse Nature Education Reserve as part of the Boardman Dam. This proposed road closure will benefit the Reserve, according to the Grand Traverse County Parks and Recreation Department. The Department Director has stated that the proposed closure of the Cass Road Bridge to through vehicles will "enhance the facility due to

FIGURE 6.4-2



BOARDMAN RIVER CROSSING MOBILITY STUDY

IMPACTED SECTION 4(f) HISTORIC RESOURCES

the elimination of traffic through the Reserve..." (Schreiner, 1995). The closure of Cass Road Bridge is also proposed as part of the Recommended Alternative.

6.5.2 Recommended Alternative

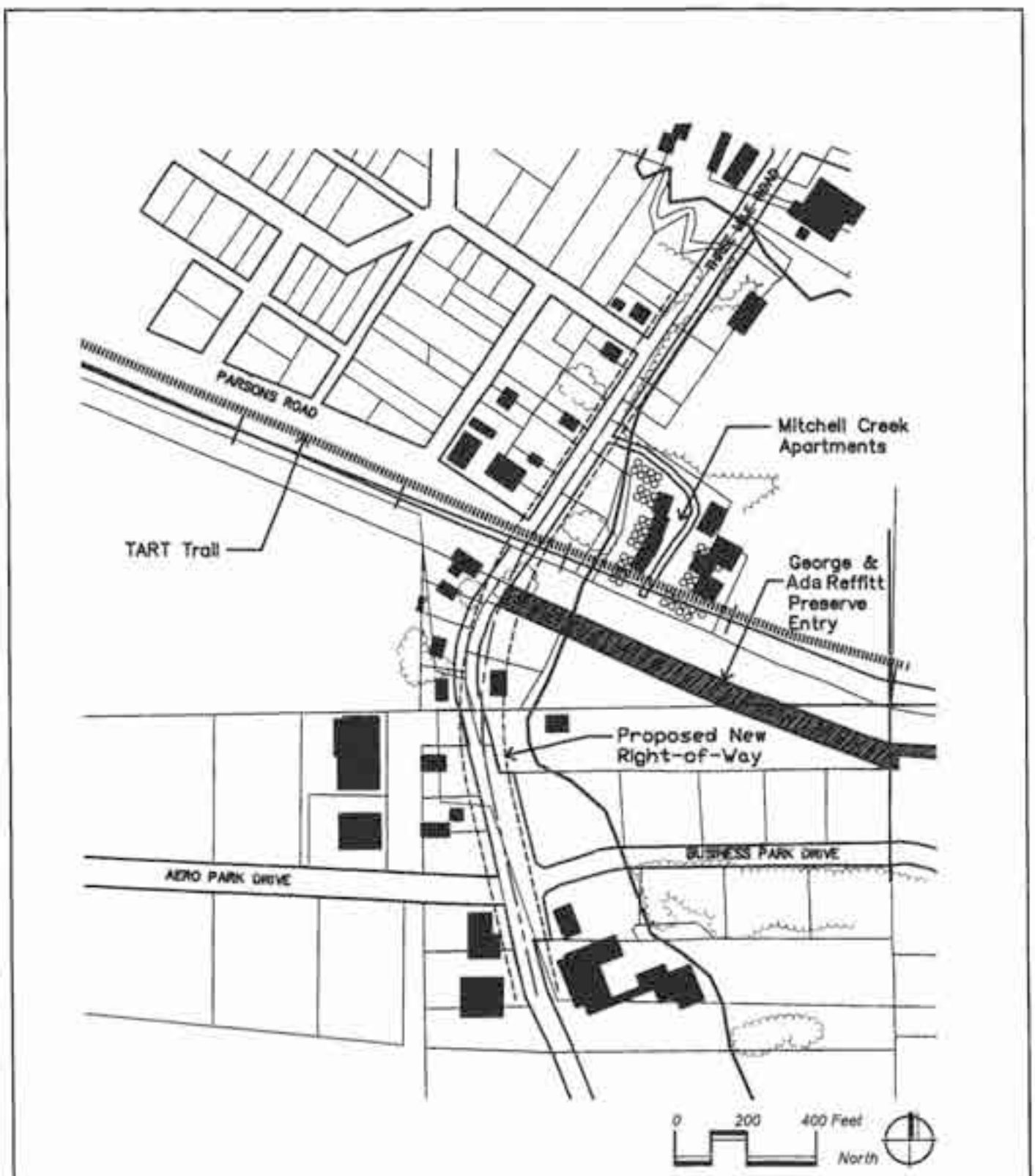
This alternative will not displace any publicly owned recreational resource. The Hartman-Hammond Connector will be located approximately 152 meters (500 feet) north of the Grand Traverse Nature Education Reserve's northern boundary. This distance helps minimize potential noise impacts to the Reserve. The Reserve is classified under FHWA activity category "A," in which a noise abatement criterion of 57 dBA applies. The existing noise level at the north end of the Reserve is estimated to be 48.9 dBA. With the Hartman-Hammond Connector, the noise level is expected to increase to 55.0 dBA. Since the estimated noise increase is below the abatement criterion of 57 dBA and the estimated increase is less than 10 dBA, no noise impact is projected, and no noise abatement will be required. Similarly, the bridge will not be visible from the current reserve boundaries due to the dense vegetation in the Reserve and winding nature of the trail system. Therefore, the Hartman-Hammond Connector will not negatively impact the aesthetic character of the Reserve.

The proposed Riverwalk through the valley connecting the Reserve to the YMCA will be accommodated by the proposed bridge design. At least 15 meters (50 feet) on both sides of the Boardman River will remain unobstructed by the bridge abutments or piers to allow wildlife and pedestrian movement under the bridge.

The Section 6(f) facilities (overlook, parking lot, and trailhead near Sabin Dam) will not be affected by the Recommended Alternative because the Hartman-Hammond Connector centerline is more than 0.8 kilometer (0.5 mile) north of these facilities.

Three Mile Road widening will displace approximately 4.5 meters (15 feet) of the TART trail and displace approximately 149 square meters (1,600 square feet) of the George and Ada Reffitt Preserve. The effect of these impacts is expected to be minor at these locations. (See Figure 6.5-1.) The TART trail will continue to cross Three Mile Road at the same location where a pedestrian crossing signal is installed. The impact to the Reffitt Preserve property is minor, since the impact occurs along Three Mile Road and the actual trail marker is set back farther from the road. The preserve property next to Three Mile Road is upland and includes a small gravel parking lot (public parking is restricted by a posted "No Parking" sign).

The SHPO has determined that the Recommended Alternative will have an adverse impact on the four historic properties identified along Three Mile Road. (The Draft EIS documented adverse impacts to only one historic property – 4314 Three Mile Road.) The Three Mile Road widening will require an additional 7.5 meters (25 feet) of right-of-way from the historic properties at 4273 Three Mile Road, 4283 Three Mile Road, 4314 Three Mile Road, and 4340 Three Mile Road. While no structures will be displaced, the widening will reduce the setback at these four addresses from 23 meters (75 feet) to 15 meters (50 feet). The SHPO has determined that the road widening and reduction in setback constitutes an adverse impact because it will diminish the integrity of the properties' location, setting, and feeling (36 CFR 800.5(a)(1). Additionally, at 4314 Three Mile Road, the project will require the removal of a 2-meter (6-foot) high wooden privacy fence.



Impacts to Section 4(f) Resources *Figure 6.5-1*

BOARDMAN RIVER CROSSING MOBILITY STUDY

Grand Traverse County, Michigan

6.6 AVOIDANCE ALTERNATIVES

The No-Build Alternative will avoid all adverse impacts to Section 4(f) and Section 6(f) recreational resources and, like the Recommended Alternative, will have a positive impact on the Grand Traverse Nature Education Reserve. This is due to the anticipated closure of the Cass Road Bridge to through traffic and reduction of the associated traffic-generated noise.

Because it is located north of the Grand Traverse Nature Education Reserve, the Recommended Alternative avoids impacts to the Reserve's Section 4(f) and Section 6(f) resources and facilities. It also avoids affecting the use of the TART trail and the George and Ada Reffitt Preserve (Fleming, 1998); however, some property loss from these facilities will occur with this alternative. These impacts are described in the previous section.

The historic properties that will be impacted along Three Mile Road are located on both sides of the road. (See Figure 6.4-2.) The proposed improvements through this area could be shifted to the east or to the west. However, doing so, while lessening the impact to the properties on one side of the road, would increase the impact to the properties on the other side. Complete avoidance of these properties is not feasible.

Since these Section 4(f) resources front Three Mile Road and additional right-of-way will be required to accommodate the proposed widening, there is no way to completely avoid impacts to these properties unless a different roadway were widened. As part of the development of the Draft EIS, Four and Five Mile roads, both located east of Three Mile Road, were identified in the project area as potential alternatives to Three Mile Road. However, as determined in the Draft EIS, the widening of either of these roadways in lieu of widening Three Mile Road would not be prudent. The major reasons leading to this determination were that improvements to Three Mile Road would accommodate higher projected traffic volumes; have fewer wetland impacts; and be consistent with the East Bay Township Master Plan. See Section 3.4.2 of the Draft EIS for more information on the dismissal of Four and Five Mile roads.

6.7 MEASURES TO MINIMIZE IMPACTS

Enhancing the George and Ada Reffitt Preserve entrance with landscaping that is compatible with the preserve's mission will be considered to minimize the property displacement impact of widening Three Mile Road. This would be accomplished in the final design phase.

Including a signalized pedestrian crossing, as is currently installed to assist TART trail users cross Three Mile Road, will mitigate road widening impacts.

Prior to widening Three Mile Road, the four NRHP-eligible properties on Three Mile Road will be photographed and a report will be created to document the development of recreational housing in the Traverse City area. Original photographs and reports will be submitted to the SHPO and appropriate local archives designated by the SHPO. A copy of historic information collected for the specific properties at 4273 Three Mile Road, 4283 Three Mile Road, 4314 Three Mile Road, and 4340 Three Mile Road will also be provided to individual landowners. If the Three Mile Road improvements are to be implemented, minor alignment shifts should be resolved during final design.

Landscaping removed as a result of the Three Mile Road widening will be replaced as negotiated with the individual landowners. The privacy fence at 4314 Three Mile Road will be relocated or replaced to reduce visual and noise intrusions; any reconstruction should take into account a similar reduction in both visual and noise impacts (Leipham, 1998).

A copy of the Memorandum of Agreement between FHWA and the SHPO regarding the impacted historic properties along Three Mile Road is provided in Appendix D.

6.8 COORDINATION

Consultation with the owner or authorized representative of each potential Section 4(f)/6(f) property is required as part of this review. Consultation with the Grand Traverse County Parks and Recreation Director occurred during the preparation of the Cass Road Bridge Replacement Environmental Assessment (Schreiner, 1995) and during the preparation of the Boardman River Crossing Mobility Study Draft EIS (Schreiner, 1999). The Grand Traverse Regional Land Conservancy was also contacted during the study (Fleming, 1998).

In accordance with Section 106 of the National Historic Preservation Act of 1966 (as amended), the FHWA and the GTCRC have contacted property owners and other interested parties regarding the proposed cultural resources mitigation. Consultation was conducted by soliciting comments from interested parties, who were identified from their remarks about historic resources received during prior public meetings. Three organizations and the four landowners along Three Mile Road were contacted. As a result of concerns expressed by three organizations and one landowner, a Section 106 meeting was held at the Traverse Area District Library in Traverse City. One landowner attended the meeting and supported the proposed mitigation. See Appendix D for documentation on the Section 106 mitigation consultation conducted for this project.

Preliminary comments received for each potentially impacted Section 4(f) resource are incorporated in the impacts discussion of this section.

Section 7

CONSULTATION AND COORDINATION

Section 7
CONSULTATION AND COORDINATION

An Environmental Assessment (EA) was initiated in 1995 for the Cass Road Bridge Reconstruction project. During the preparation of the EA, a number of coordination efforts occurred. A Citizen's Advisory Committee (CAC) was formed to solicit pubic input on the proposed project early in the planning process and to educate citizen representatives about potential competing interests that would need to be reconciled in the selection of a preferred alternative. CAC meetings were held on 18 July and 12 September 1995 and 30 April 1996. A field trip in the project area was also conducted with the CAC on 30 April 1996.

Comments on the project were also solicited from agency representatives through several methods. A scoping document was distributed, and a scoping meeting was held on 19 July 1995. The following federal and state agencies received the scoping document.

- U.S. Environmental Protection Agency
- U.S. Department of the Interior, Fish and Wildlife Service
- Federal Emergency Management Agency
- Federal Highway Administration
- Michigan Department of Natural Resources
- Michigan Department of Environmental Quality
- Michigan Department of State, Bureau of History
- Michigan Department of Transportation

A complete list of scoping document recipients is included in Appendix F of the *Cass Road Bridge Replacement on the Hartman/Hammond Road Alignment Environmental Assessment*.

In addition, six meetings were held with members of the Grand Traverse County Parks and Recreation Department and the Grand Traverse Nature Education Reserve Advisory Committee to discuss project alternatives and potential mitigation measures. Meeting dates were 22 September 1995 and 10 and 15 January, 18 March, 7 June, and 29 October 1996.

Comments received during scoping and from the public information program were classified into five categories: environmental impacts, compatibility with community goals, traffic impacts, comments on project alternatives, and Grand Traverse County Parks and Recreation Department comments.

A Public Hearing was conducted on the EA 24 June 1997. Approximately 400 people attended the hearing and approximately 240 comments were received. Comments addressed such topics as:

- support for and opposition to the project;
- suggestions and/or questions regarding the evaluated alternatives and environmental impacts;
- opinions regarding the process used during the conduct of the study;
- limits of the study; and
- cost.

Based on the nature of the public and agency comments on the EA and at the Public Hearing, the Grand Traverse County Road Commission (GTCRC), Michigan Department of Transportation (MDOT), and Federal Highway Administration (FHWA) agreed to expand the study to more fully evaluate other alternatives. This more detailed analysis led to the preparation of the Environmental Impact Statement (EIS) for the Boardman River Crossing Mobility Study, beginning in fall 1997. A notice of intent to prepare an EIS appeared in the Federal Register on 5 December 1997. Subsequently, the Draft EIS (or DEIS) was completed in May 1999; a notice of availability appeared in the Federal Register on 4 June 1999. A formal Public Hearing was held on 28 June 1999.

7.1 AGENCY COORDINATION

The National Environmental Policy Act of 1969 (NEPA) and Section 404 of the Clean Water Act allow for a joint regulatory review process used by FHWA and MDOT to encourage early participation by federal and state resource agencies in an attempt to more efficiently complete the regulatory requirements of both NEPA and Section 404. The joint NEPA/404 process establishes interactive coordination between participating agencies at critical decision points during project development. These critical points, called concurrence points, are built into the process in an attempt to reach agreement among regulatory agencies on important project issues. Concurrence by an agency at a particular point does not mean the agency agrees that the project will be built or a permit will be granted. Rather, it means that the project can be advanced to the next step. Similarly, non-concurrence does not preclude MDOT from exercising its right to go forward with project development; however, gaining concurrence does preclude revisiting of decisions agreed to earlier in project development.

There are three concurrence points during this process. These include concurrence on:

1. purpose and need;
2. alternatives carried forward for detailed study; and
3. the Recommended Alternative.

FHWA and MDOT gained concurrence at the first point prior to issuance of the Draft EIS from the U.S. Army Corps of Engineers; U.S. Environmental Protection Agency; U.S. Department of Interior, Fish and Wildlife Service; and Michigan Department of Environmental Quality (See Appendix C). These agencies agreed that the project description and overall purpose and need for the project was accurate. Absent significant new information, the purpose and need for addressing the existing Cass Road Bridge deficiency and east-west mobility within the Traverse City area will not be re-evaluated.

Through the Draft EIS, FHWA and MDOT sought and eventually received concurrence on the alternatives carried forward. The following sections summarize the comments received from resource and local agencies regarding this project after circulation of the Draft EIS and the project team responses to these comments. As part of the circulation of the Final EIS, concurrence on the selection of the Recommended Alternative (the Hartman-Hammond Road Connector with Three Mile Road Alternative) is being sought.

7.1.1 Federal Agency Comments

U.S. Environmental Protection Agency. The U.S. Environmental Protection Agency (EPA) in a letter received August 10, 1999 rated the Draft EIS as "EO-2", with the "EO" indicating that the U.S. EPA had environmental objections to the proposed action and the "2" indicating that additional information needed to be provided in the Final EIS. The U.S. EPA raised concerns regarding the following items: 1) Characterization of the No Action (No-Build) Alternative, 2) Alternatives Analysis, 3) Wetland Impacts, 4) Water Quality and Aquatic Resource Impacts, and 5) Secondary and Cumulative Impacts.

The U.S. EPA requested a clarification regarding the population projections for the "No Action" Alternative and whether the baseline populations and development patterns were based on a true "no-build" situation. Regarding the methods used to analyze the alternatives, the U.S. EPA requested a description of how the project alternatives were modified and optimized before they were ultimately dropped.

Impacts to wetlands, water quality, and aquatic resources were also a concern for the U.S. EPA. The concerns were regarding the impacts on the Mitchell Creek and Boardman River watersheds in terms of water quality and aquatic resources if the Hartman-Hammond Road Connector with Three Mile Road Alternative were to be implemented. The U.S. EPA also requested that the relationship between wetland losses, aquatic resources, groundwater recharge and discharge areas, and drinking water be more clearly stated. Finally, it was noted that a mitigation plan for wetland impacts by watershed, incorporating impacts to aquatic resources and water quality, was also needed.

The U.S. EPA's original letter did not give concurrence on the alternatives carried forward for detailed analysis in the Draft EIS.

Response to Comment. As part of the process of seeking concurrence on the alternatives studied in the Draft EIS and to facilitate a response to the U.S. EPA's letter, a field visit of the study area was conducted with agency representatives on September 24, 1999. Prior to the field visit, a draft response was prepared and transmitted to the U.S. EPA addressing the comments in their original letter. Following the field meeting, the U.S. EPA provided a second letter, dated October 18, 1999, requesting additional information on the characterization of the No Action Alternative and on the alternatives analysis, as well as requesting information describing the response to specific comments raised by the Michigan Land Use Institute. A second response was then prepared and provided to the U.S. EPA. After which, on February 4, 2000, the U.S. EPA provided concurrence on the alternatives carried forward. In their letter providing concurrence, the U.S. EPA requested that the Final EIS provide information prepared through the coordination process, information describing future operation of the roadway, and additional maps depicting current and future land uses. Appendix C includes the U.S. EPA's letters and the responses prepared by the project team. As appropriate, the information prepared during coordination with the U.S. EPA is also included within the main body of the Final EIS.

U.S. Department of the Interior, Fish and Wildlife Service. The U.S. Department of the Interior Fish and Wildlife Service (FWS) letter stated that a more detailed comprehensive "Wetland Habitat Mitigation Plan" should be included in the Final EIS. The letter also stated that the South Airport Road Widening Alternative is the more preferable alternative from an environmental standpoint, however,

they would not be opposed to the selection of the Hartman-Hammond Connector Alternative if this alternative was more desirable to meet other planning objectives.

The letter indicated that the U.S. FWS could not concur with the first proviso of Section 4(f) because a prudent and feasible alternative advanced — the Hartman-Hammond Connector Alternative — will not impact Section 4(f) resources, while the South Airport Widening and Three Mile Road Alternative will. The letter also noted that although the Draft EIS stated that there was no Section 6(f) property within the alternative project corridors, amenities within the Grand Traverse Nature Education Reserve had been funded, in part, with matching grants from the Land and Water Conservation Fund (LAWCON), which qualifies it as 6(f) land. Reserve property is located within the Hartman-Hammond Connector study corridor but would not be adversely affected by either of the build alternatives advanced, which is consistent with the Section 6(f) analysis conclusion presented in the Draft EIS.

In addition, the letter concurred with the selection of the alternatives carried forward for detailed analysis in the Draft EIS.

Response to Comment. The level of information provided in the Conceptual Wetland Mitigation Plan included in the Draft EIS was discussed during an agency field meeting (May 20, 1998) and determined to be appropriate for the Draft EIS stage of the project. The Final EIS includes a more detailed plan for wetland mitigation that addresses the impacts associated with the Recommended Alternative. (See Appendix B-4.)

Both the Hartman-Hammond Connector and the South Airport Road Widening alternatives include the widening of Three Mile Road and the reconstruction of Four Mile Road. Therefore, both build alternatives have potential impacts to Section 4(f) resources. However, as discussed in Section 6 of this document and the Draft EIS, these impacts have been minimized to the extent possible and can be mitigated.

The LAWCON partially funded amenities which triggered the designation of the Grand Traverse Nature Education Reserve property as a Section 6(f) property include the overlook, parking lot and trailhead located on the west side of the Sabin Dam, located approximately 0.8 kilometers (0.5 miles) south of the proposed Hartman-Hammond Connector centerline. The Final EIS includes a revised statement regarding Section 6(f) resources (See Section 6 of this document).

U.S. Army Corps of Engineers. The U.S. Army Corps of Engineers (COE) stated that the South Airport Road Widening Alternative would have fewer wetland impacts and less adverse impacts to high quality surface waters and aquatic resources than would the Hartman-Hammond Connector Alternative. Additionally, the Hartman-Hammond Connector Alternative would have greater cumulative impacts to these same resources as a result of likely future roadside development.

The COE also stated that the Conceptual Wetland Mitigation Plan would need more detail in the Final EIS. Specifically, the Mitigation Plan should specify wetland functions and values that are to be replaced and/or created and how this will be accomplished and monitored. The letter from the COE also mentioned that if any work or improvement is carried out on Three Mile Road or Four Mile Road, a permit from the COE may be needed because of the proximity of the roads to Lake Michigan.

The COE concurred with the selection of alternatives carried forward for detailed analysis in the Draft EIS.

Response to Comment. The comparison of alternatives conducted to select a Recommended Alternative involved not only a review of potential impacts to natural resources such as wetlands, aquatic resources and water quality, but also the social and economic environment of the project area. Section 3 of this document summarizes the selection process. Proposed mitigation measures to address secondary and cumulative impacts from the Recommended Alternative are described in Section 5.

The Wetland Mitigation Plan has been revised to address the specific impacts associated with the Recommended Alternative. Permits from the COE and others, such as the MDEQ, will be sought for impacts to regulated resources following the FHWA issuance of a Record of Decision.

U.S. Department of Transportation, Federal Aviation Administration. The Federal Aviation Administration (FAA) requested additional information regarding: 1) the maximum elevation of the highest structure, 2) distance of the highest structure to the nearest runway, and 3) sketches showing both the highest structure and the distance of the highest structure to the nearest runway for proposed alternatives.

Response to Comment. A response letter was prepared to provide the information requested by the FAA. (See Appendix C.)

U.S. Department of Agriculture, Forest Service. The U.S. Department of Agriculture Forest Service reviewed the Draft EIS and indicated in their letter that they had no comments at this time.

Response to Comment. No response is required.

U.S. Department of Health and Human Services, Public Health Service. The U.S. Department of Health and Human Services Public Health Service reviewed the Draft EIS and stated that the document addressed their potential concerns and that they had no specific comments to offer at this time.

Response to Comment. No response is required.

National Geodetic Survey. The National Geodetic Survey (NGS) requested that information from the NGS database be reviewed to determine the location and designation of any geodetic control monuments that could be affected by this project.

Response to Comment. The NGS database was reviewed, and it was determined that no geodetic control monuments will be impacted by this project.

7.1.2 State Agency Comments

Michigan Department Of Environmental Quality. The Michigan Department of Environmental Quality (MDEQ) stated in its letter dated August 6, 1999 that a Boardman River crossing, if necessary, on alignment with Hartman and Hammond Roads appears to offer a better solution than rebuilding the Cass Road Bridge. Additionally, the MDEQ requested a discussion in the Final EIS addressing why a combination of the Beitner Road/Keystone Road Improvements Alternative with the South Airport

Road Widening with Three Mile Road Alternative does not meet the purpose and need of the project. The MDEQ provided concurrence on the alternatives carried forward, contingent upon the Final EIS description of alternatives studied.

The MDEQ requested receipt of a wetland mitigation and monitoring plan as part of a MDEQ permit application. The permit application should also address any potential flood damage associated with stream relocation, enclosure, or bridging.

Response to Comment. Section 3.4 of this document includes a discussion of alternatives considered since the circulation of the Draft EIS, including the combination of the Beitner Road/Keystone Road Improvements Alternative (without reconstructing the Cass Road Bridge) with the South Airport Road Widening with Three Mile Road Alternative.

Permits for any impacts to wetlands, inland lakes or streams, and/or floodplain resources would be applied for after the completion of the Final EIS and a Record of Decision is issued. The Grand Traverse County Road Commission would be the applicant of any future permit requests and would supply the requested information at that time.

State Historic Preservation Office. The State Historic Preservation Office (SHPO) letter indicated that they had no specific comment on the EIS itself. However, they referred to their June 7, 1999 letter (Appendix C) to the Grand Traverse County Road Commission which was issued prior to their review of the Draft EIS. In their June 7th letter, the SHPO indicated that the widening of Three Mile Road will have an adverse effect on 4273, 4283, 4314, and 4340 Three Mile Road, which have been determined to be eligible for listing in the National Register of Historic Places. This determination of effect prompts the Grand Traverse County Road Commission to begin consultation with the SHPO and other interested parties; to notify the Advisory Council on Historic Preservation; to prepare a case study that demonstrates all prudent and feasible alternatives have been explored, the proposed measures to mitigate the adverse effect, and the views of any interested persons; and to develop a memorandum of agreement.

Response to Comment. The Draft EIS documented adverse impacts to only one historic property (4314 Three Mile Road). See Section 5.5 of this document for a discussion of proposed mitigation.

In accordance with Section 106 of the National Historic Preservation Act of 1966 (as amended), the FHWA and the GTCRC have contacted property owners and other interested parties regarding the proposed cultural resources mitigation. Consultation was conducted by soliciting comments from interested parties, who were identified from their remarks about historic resources received during prior public meetings. Three organizations and the four landowners along Three Mile Road were contacted.

As a result of concerns expressed by three organizations and one landowner, a Section 106 meeting was held at the Traverse Area District Library in Traverse City. One landowner attended the meeting and supported the proposed mitigation.

Appendix D contains information regarding the Section 106 review process for this project, including documentation of the consultation and Section 106 meeting, coordination with the Advisory Council on Historic Preservation, and a copy of the fully executed memorandum of agreement.

7.1.3 Local Agency/Municipality Comments

Acme Township. The Acme Township letter provided a summary of the discussions at the Acme Township Planning Commission meeting held July 26, 1999. At the meeting, the Planning Commission unanimously agreed that any further action regarding a proposed Hartman-Hammond bridge should be tabled and the issue of the bridge should be taken to a vote of the public. They noted that the Master Plan for Acme Township states that the majority of Acme Township residents are against a bypass being built in or passing through the Township. Furthermore, in 1996 a resolution was passed against the proposals at that time for a bypass. It was stated that the proposed bypass would have negative impacts on prime farmland, important wetlands and watersheds, and recreational opportunities for residents and visitors of Acme and Grand Traverse County.

Response to Comment. This project is a local road improvement project and not a regional bypass study. None of the corridors presented in the Draft EIS pass through Acme Township. At this time, a public vote is not planned in regards to alternatives presented in the Boardman River Crossing Mobility Study.

7.1.4 Other Agency Comments

Michigan United Conservation Clubs. The Michigan United Conservation Clubs (MUCC) comment letter identified concerns regarding secondary and cumulative impacts to the Boardman River fishing resources from the Hartman-Hammond Connector Alternative. The comment letter specifically raised concerns about potential increased run-off and sedimentation not only within the immediately affected portion of the river but throughout the resource. The letter encouraged additional analysis of the potential impacts to the Boardman River ("one of Michigan's top trout streams") in the Final EIS process. An excerpt from the MUCC's Trout Streams of Michigan was provided with the comment letter.

Response to Comment. The secondary and cumulative impacts to water quality and fisheries resources of the Boardman River by the Recommended Alternative are addressed in the Final EIS in Section 5.10 Secondary and Cumulative Impacts.

Additional responses regarding the characterization of the Boardman River within the project area are included within the response to Public Comments and the response to the U.S. EPA's first comment letter (see Appendix C).

7.2 LOCAL GOVERNMENT COORDINATION

GTCRC representatives provided project updates on a monthly basis to the Physical Resource Committee of the Grand Traverse County Board of Commissioners. The monthly meeting notes were distributed to all of the County Commissioners, the Grand Traverse County Planning Commission, and Garfield Township and East Bay Township. GTCRC representatives also met with the Traverse City Commissioners during meetings held on 25 May, 20 July and 3 August 1998 to provide project updates.

Of particular interest to the GTCRC was the direction provided by the City Commissioners regarding the feasibility of a Traverse City Cross-Town Connector Alternative proposed during one of the CAC

meetings. The City Commissioners concluded at the 3 August meeting that there was no public support for a four-lane Cross-Town Connector Alternative. A two-lane Cross-Town Connector Alternative was also evaluated, but it was determined that it did not meet the purpose and need for the project.

GTCRC representatives attended the 11 May 1998 East Bay Township Board meeting to provide project update information. GTCRC representatives also provided a project update to Garfield Township at the 2 September 1998 Planning Commission meeting. The meeting focused on the proposed South Airport Road Widening Alternative.

As appropriate, GTCRC representatives are coordinating with local officials and agencies regarding this project.

7.3 PUBLIC COORDINATION

During the preparation of the Draft EIS, the following public participation activities were conducted:

- networking sessions;
- CAC meetings (CAC membership was expanded in November 1997 at the beginning of the EIS process);
- community workshops;
- interest group workshops;
- citizen survey; and
- media outreach.

More information on the public coordination activities that occurred prior to the circulation of the Draft EIS is included in that document. Subsequent to issuance of the Draft EIS, CAC meetings were conducted in 17 August 1999 and 18 January 2000 to discuss responses to agency and public comments. Additionally, in March 2000 the GTCRC sent a letter to CAC members identifying the Recommended Alternative.

The remainder of this section focuses on comments received from citizens and interest groups on the Draft EIS and at the Public Hearing. The Public Hearing for this project was held on June 28, 1999. The summary of public comments is organized by topics similar to those presented in the Final EIS. A full set of Public Hearing comments, including the Public Hearing transcripts, are on file and available for public review at the GTCRC office.

A total of 390 comments were received with a total of 479 signatures. The comments were received in five different forms:

- letters addressed to the GTCRC, MDOT or the FHWA;
- comments written on the comment sheet provided at the Public Hearing and made available at the GTCRC;
- oral comments transcribed by a court reporter at the hearing;

- pre-printed postcards indicating opposition to the Hartman-Hammond Connector and South Airport Road Widening alternatives; and

- a report prepared by The Michigan Land Use Institute with The Coalition for Sensible Growth and the Environmental Law & Policy Center, including a supporting report prepared by The New Alternatives, Inc.

The following table illustrates the distribution of comments received classified by form type.

Form of Comment	Number Received	Number of Signatures
Letter	99	179
Comment Sheet	98	101
Transcript	43	44
Postcard	148	149
Reports	2	6
Total	**390**	**479**

Throughout the following text, percentages of comments addressing a particular topic, or supporting or opposing a particular alternative, are provided to generally characterize the amount of interest or preference for a topic or alternative. Comments from a few individuals have been double counted because some individuals provided basically the same comment through a variety of forms (e.g., completing both a Public Hearing comment sheet and writing a letter or signing a pre-printed postcard in addition to a comment sheet).

PURPOSE AND NEED

Many comments indicated there is currently too much traffic on South Airport Road. Frequently, comments indicated opposition for a specific alternative if that alternative was perceived to not meet the purpose and need of the study. The Michigan Land Use Institute's report stated that the Draft EIS "defined an unreasonably narrow, arbitrary, and factually unsupported statement of purpose and need."

Traffic Modeling. Comments summarized in the reports prepared by The Michigan Land Use Institute and The New Alternatives, Inc. raised concerns regarding the traffic modeling conducted by the Traverse City Transportation and Land Use Study (TC-TALUS) and MDOT used to compare alternatives discussed in the Alternatives Section of the Draft EIS. One of the concerns focused on population projections used in developing the 2015 socio-economic forecasts. The population projections prepared by TC-TALUS are higher than the Michigan State Demographer's projections for the year 2015. Additionally, the report claims that the projections are based on an inconsistently defined geographic area.

The report cites the trip generation rates used in the 2015 traffic modeling as another cause for concern. The New Alternatives, Inc. report states that these rates are not sensitive to proposed changes and/or restrictions in future land use, and therefore result in a "faulty" model. Additionally, concerns

were raised regarding the use of 10 percent of the average daily traffic and a 55/45 directional split to represent peak hour conditions.

Response to Comments. Concurrence on the Project Purpose and Need was received from the appropriate resource agencies for this project. The build alternatives evaluated in the Draft EIS consist of various options of improving or replacing the structurally deficient Cass Road Bridge. It is unrealistic to think this project could resolve all of the constriction problems associated with the east-west surface transportation system in the Traverse City area. In Table 2.1-3 of this document, the projected 2015 traffic volumes on the east-west river crossings is reported for the No-Build Alternative. This table shows that in the future, approximately 120,000 vehicles per day will traverse these crossings. The crossing projected to carry the greatest volume of traffic is South Airport Road.

Investment in the Cass Road Bridge will be required to maintain it as operable. Since a large investment would be necessary to keep the bridge open, it was deemed prudent to evaluate bridge replacement alternatives in additional locations other than along the existing alignment where this investment could be more effective in the overall transportation network. Travel demand modeling results for all of the build alternatives, except for the Cross-Town Connector Alternative, indicate that they have limited potential to divert traffic from Grandview Parkway/U.S. Route 31 and Eighth Street. However, these results also show that with the closure of the Cass Road Bridge, traffic is diverted to the crossing projected to handle the greatest volume of traffic and operate at the worst level of service in the future — the South Airport Road crossing. Diverting traffic to this crossing will exacerbate the congestion problems projected for this roadway.

The population projections reported in the Draft EIS were re-examined following the public comment period. As a result of this re-examination, some inconsistencies and errors were found in the reporting of population forecasts in the document. The 2015 population projection for the TC-TALUS study area, corresponding to the travel demand forecasts reported in the Draft EIS, is 109,781. This is described by TC-TALUS as their medium growth forecast and should have been the forecast reported in the Draft EIS. The Draft EIS reported 124,000 as the TC-TALUS study area population forecast in the Purpose and Need Section and as the Grand Traverse County population forecast in Affected Environment Section. The 124,000 represents the high growth population forecast for the TC-TALUS study area. The high growth forecast (124,000) was not part of the socio-economic forecasts used to generate the travel demand modeling results that are reported in the Draft EIS. The travel demand forecasts reported in the Draft EIS represent the projected traffic conditions corresponding to the medium growth population forecast (109,781) for the TC-TALUS study area.

These errors have been corrected and the inconsistencies clarified in the Final EIS. In the Final EIS, the 2015 medium growth population forecast for the TC-TALUS study area reported is 109,781.

Another issue raised regarding the TC-TALUS forecasts is that they are too high. The 2015 socio-economic forecasts for the TC-TALUS study area were developed prior to the start of this project. TC-TALUS projects a population increase from 61,881 to 109,781 between 1990 and 2015 in their study area. This equates to an average annual increase of 2.3 percent. The Michigan State Demographer projects population to increase from 64,273 in 1990 to 93,500 in 2015 in Grand Traverse County. This equates to an average annual increase of 1.5 percent. (The TC-TALUS study area does not encompass all of Grand Traverse County and encompasses a portion of Leelanau County.) When the TC-TALUS forecasts were originally questioned, they did an independent evaluation to help

determine the validity of their projections. To do so, they analyzed 1995 mid-decade census data. The mid-decade census estimates Grand Traverse County population to be 72,016. This is conceded by some township clerks to be low due to the fact that persons are not required by law to respond. The State Demographer mid-decade population estimate is 70,764. Additionally, TC-TALUS developed an estimate of 1995 population in Grand Traverse County by analyzing new residential building permits approved. The results of this analysis estimated the 1995 population at 73,781. The State Demographer's estimates indicate that population in Grand Traverse County grew 1.9 percent per year between 1990 and 1995. Then from 1995 to 2015, the State Demographer projects the average annual growth between 1995 and 2015 to be 1.4 percent. Yet, based on the mid-decade census, population in Grand Traverse County grew on average at a rate of 2.3 percent per year. Based on the TC-TALUS estimate, population grew 2.8 percent per year in Grand Traverse County and at 2.2 percent per year in their study area.

Regardless of the methods used to forecast population, there will always be a level of uncertainty associated with the results. However, based on the data provided by TC-TALUS, it was concluded that their forecasts are, at a minimum, as reasonable as the Michigan State Demographer and appropriate for use as part of this project.

The procedures used by TC-TALUS, including the trip generation process, are still typical of what many metropolitan planning organizations are using elsewhere in the State of Michigan, as well as throughout the country. The TC-TALUS modeling has proven to be a valuable tool in evaluating transportation projects in the area, and the results are reasonable for use on the Boardman River Crossing Mobility Study. (See the Purpose and Need Section for more information on this issue.)

The use of 10 percent of the average daily traffic and a 55/45 directional split to represent peak hour conditions is typical of traffic analyses done for an EIS. More comprehensive data was not available for this project. However, these assumptions were used for all alternatives analyzed; changing them for all alternatives will not change the effectiveness of the alternatives when compared to each other.

Bypass versus Local Road Project. The Michigan Land Use Institute's report claims that the Draft EIS improperly segments the Boardman River Crossing Project from a proposed bypass around Traverse City. The report states that the "proposed Boardman River Crossing is a critical component of a bypass of Traverse City linking U.S. Route 31/M-37 on the southwest to U.S. Route 31/M-72 on the northeast." The report claims that the Draft EIS ignores the larger bypass plans and their direct and indirect impacts on the region.

Response to Comments. The Boardman River Crossing Mobility Study has always been considered a separate project from the U.S. Route 31 Regional Corridor Study. The Regional Corridor Study is a bypass study that evaluates numerous miles of new alignment in an attempt to address regional mobility. That study has progressed to a point where three alternative corridors have been identified. In contrast, the alternatives analyzed for this project are not considered bypasses and do not address regional transportation as a bypass would. The Hartman-Hammond Connector could, to some extent, act as a bypass as travelers attempt to avoid the congestion projected for the northerly Boardman River crossings in the area. At this time, no determination has been made regarding whether or not the Regional Corridor Study will proceed further. MDOT has indicated that if one of the alternatives evaluated in the Boardman River Crossing Mobility Study is constructed, they will evaluate the effect

that alternative has on travel patterns and then determine how to proceed with the Regional Corridor Study.

ALTERNATIVES

The majority of comments clearly stated a preference for either conducting further study of the Smart Roads Alternative proposed by The Coalition for Sensible Growth or building the Hartman-Hammond Road Connector with Three Mile Road Alternative. No written or verbal submissions supported the South Airport Road Widening with Three Mile Road Alternative. A number of comments raised concerns about the analysis of various alternatives and requested additional consideration of other alternatives, in particular, the Smart Roads Alternative. These comments are summarized below.

South Airport Road Widening with Three Mile Road Alternative. Essentially, no support for the South Airport Road Widening Alternative was received. Several reasons were given in the comments received for opposition to this alternative:

- A high number of homes and businesses would be displaced;
- Traffic problems would not be alleviated;
- Cost would be too high;
- Safety would not be improved on South Airport Road;
- Truck traffic would continue to increase on South Airport Road;
- Displacements would result in a loss of tax revenue; and
- Existing speeds on South Airport Road are already high and a wider South Airport Road would result in even higher speeds.

Response to Comments. The number of business and residential displacements associated with this alternative were reported in the Draft EIS. The number of displacements were determined assuming that most of the roadway widening would occur on the north side of South Airport Road. A number of comments were received recommending that the proposed alignment be shifted to the south, just west of Three Mile Road. Preliminary analysis indicates that the number of residential displacement would be reduced if the alignment were shifted through this area. However, even if the alignment were shifted, the South Airport Road Widening Alternative would displace considerably more businesses than would the Hartman-Hammond Connector Alternative.

Traffic congestion along South Airport Road would be reduced by this alternative as indicated by the traffic modeling results shown in Table 3.2-1 of the Draft EIS. The proposed alternative includes not only widening South Airport Road but incorporating a number of Transportation System Management (TSM) improvements such as improved signal timing and access management (e.g., further controls on the location of curb cuts).

The cost of this alternative is estimated to be approximately $13 million more than the Hartman-Hammond Connector Alternative. The cost of construction and property acquisition is a factor in selecting a Recommended Alternative, but other costs that are not easily assigned a dollar value such as impacts to the natural environment or aesthetic resources are factors of concern, too.

Results of the travel demand forecasting conducted for this project indicate that South Airport Road will operate at level of service D across the Boardman River if it were widened to six lanes. Level of

service D is typically considered acceptable and an appropriate level of service to design for in the future. Under the No-Build Alternative, South Airport Road is projected to operate at level of service F across the Boardman River. A detailed accident analysis was not conducted for this alternative. However, based on this information, it is assumed that the widened facility will likely result in improved safety.

Commercial vehicle traffic will likely increase along South Airport Road if this alternative were implemented. However, the improved facility is projected to accommodate the projected increase in traffic at an acceptable level of service.

Tax base loss from this alternative is estimated to be considerably higher ($7.4 million) compared to the Hartman-Hammond Connector Alternative ($0.7 million); however, mitigation measures such as providing relocation assistance to affected business may off-set this loss.

The Grand Traverse County Road Commission has analyzed traffic crashes reported for the last five years for which records are available. Through this period, no fatalities were reported on South Airport Road, and the crash rate is less than on other east-west arterials or major collectors within the project area. The safety record on South Airport Road is considered "very good." Based on this information, it does not seem appropriate to consider lowering the speed limit at this time.

Hartman-Hammond Road Connector with Three Mile Road Alternative. Approximately 35 percent of comments received favor the Hartman-Hammond Connector. The reasons people cited for supporting this alternative were:

- Improved east-west traffic flow;
- Improved motorist safety;
- Improved connections to both north/south and east/west routes;
- Responds to the transportation needs of population growth;
- Supports continued economic growth;
- Least impact on the surrounding areas;
- Lower cost than other build alternatives;
- Fewer displacements than South Airport Road Widening Alternative;
- Improved school bus routes; and
- Reduced noise and air pollution.

Those in support of the Hartman-Hammond Connector Alternative expressed a number of concerns with the alternative that may need to be addressed through mitigation measures or other studies, including:

- The proposed alternative should be extended farther to the east/west;
- All measures should be taken to protect natural resources within the project area;
- The rural nature and farmland adjacent to the road should be preserved;
- Zoning/regulations should be enacted to limit access and control land use along the corridor;
- The alternative is located too close to Sabin Elementary School; and
- Too many residences would be displaced.

The 148 pre-printed postcards indicated opposition to both the South Airport Road Widening Alternative and the Hartman-Hammond Connector Alternative. The total percentage of comments indicating opposition to this alternative is approximately 42 percent. The reason people cited for opposing this alternative included:

- Contributes to sprawl;
- Will lead to increased traffic on connecting roads;
- Located too close to Sabin Elementary School;
- Creates potential to become another South Airport Road (due to increased congestion and development);
- Impacts the natural environmental (i.e., wetlands, wildlife, Boardman River valley);
- Results in too many displacements;
- Not a true "bypass";
- Not a long-term solution;
- Will lead to a decrease in property values;
- Will negatively affect the quality of life and safety for adjacent homeowners;
- Will increase the noise pollution in the Boardman Valley; and
- Will change current development patterns.

Response to Comments. Many of the comments received in support of this alternative are supported by findings reported in the Draft EIS. Some of the comments are more subjective in nature and cover issues that were not evaluated in detail in the Draft EIS. Comments of this nature include those regarding improved safety and improved school bus routes.

Of all the build alternatives evaluated for this project, this alternative is projected to have the greatest positive impact on east-west mobility. Regardless of the alternative selected, it is likely that additional studies evaluating mobility in the region will be conducted. The TC-TALUS Long Range Transportation Plan projects that several roads in the county will operate at level of service F in the future, particularly in the northwest portion of Garfield Township and in to the eastern edge of Long Lake Township.

A number of comments indicated that implementation of this alternative will result in increases in traffic on several other area roadways. The travel demand forecasting conducted for this project does not support this notion. Traffic projections indicate that this alternative, compared to the No-Build, will primarily divert traffic from South Airport Road and Beitner Road and not have a major impact elsewhere. Projected traffic volumes on Three Mile Road are up to 4,000 vehicles per day higher under this alternative compared to the No-Build Alternative. However, projected levels of service are also improved because the facility would be widened from two to four lanes.

If this alternative is advanced as the Recommended Alternative, during final design the Grand Traverse County will ensure that all Federal, state, and local requirements are met to protect the natural environment. Additionally, if feasible, narrowing the right-of-way and slight alignment modifications will be evaluated to determine if the number of displacements and the magnitude of other impacts can be reduced.

This alternative includes the widening of 3.1 kilometers (1.9 miles) of existing roads and the construction of 2.3 kilometers (1.4 miles) of new alignment, including a new bridge across the

Boardman River. It is consistent with the existing transportation network and local long-range plans, and the proposed connector is located closer to Traverse City than the existing Cass Road Bridge. The Garfield Township Planning Department believes that land use development in the area will be the same with or without the Hartman-Hammond Connector and that the Connector will not contribute to sprawl.

Numerous interviews have been conducted with officials from the Garfield Township Planning Department. They remain committed to maintaining their Comprehensive Land Use Plan. The comprehensive plan identifies very little planned commercial development along Hartman and Hammond Roads through the project area. Most of the commercial development planned is within planned unit developments. Therefore, it is unlikely that the remaining available land along Hartman and Hammond Roads will be developed in a similar fashion as along South Airport Road.

Additional comments regarding this alternative that are more specific to a particular resource category are addressed later in this section.

Smart Roads Alternative. All of the signed pre-printed postcards were in favor of the Smart Roads Alternative. When combined with the approximately 12 percent of signatures from other comment methods expressing support for this alternative, a total of approximately 44 percent of all respondents indicated support for the Smart Roads Alternative. About three percent of respondents were opposed to this alternative.

The reasons stated for supporting this alternative were:

- Protects natural resources;
- Prevents sprawl;
- Preserves the small town feel of Traverse City;
- Provides for other non-automobile modes of transportation;
- Lower cost than other options;
- Fewer impacts/displacements of residences and businesses; and
- Encourages centralized development.

Response to Comments. The Smart Roads Alternative was not carried forward in the Draft EIS because it did not meet the Purpose and Need of the Project. The alternative as presented by the Michigan Land Use Institute included the reconstruction of the Cass Road Bridge to a two-lane facility. As discussed in documentation provided to the U.S. EPA, improvements to the Cass Road Bridge will result in Section 4(f) impacts to the Grand Traverse Nature Education Reserve that are more substantial in nature than those associated with other feasible and prudent alternatives, specifically the Hartman-Hammond Connector. Therefore, it was concluded that any alternative consisting of the rehabilitation of the Cass Road Bridge should be dismissed.

The Smart Roads Alternative without the Cass Road Bridge does not meet the project purpose and need because the level of service on South Airport Road remains F (compared to the No-Build Alternative). The level of service on Beitner Road, however, does improve from E to B. There is also a slight improvement to the level of service on Eighth Street.

Even though the Smart Roads Alternative with the Cass Road Bridge rehabilitation was dismissed because of the Section 4(f) impacts that would result, it was also evaluated from a transportation standpoint as well. With the Cass Road Bridge improvement, this alternative is projected to improve levels of service on South Airport Road (from F to E) and Beitner Road (from E to B) when compared to the No-Build Alternative. This alone meets the first goal identified in the Purpose and Need Section of the Draft EIS, which is "... to improve levels of service on the Boardman River crossings adjacent to the Cass Road Bridge, while improving or maintaining levels of service on the other crossings, as compared to 2015 No-Build conditions." However, this alternative includes the rehabilitation of the Cass Road Bridge to a two-lane facility and the widening of the Beitner Road Bridge from two lanes to four lanes. Yet, the levels of service projected for South Airport Road and on the Cass Road Bridge are E, typically evaluated as unacceptable. The marginal improvement to level of service in the project area, while meeting one of the goals in the Draft EIS, is considered insufficient to fully meet the purpose and need of the project.

Since this alternative does not meet the Purpose and Need for the project, its potential impacts were not quantified. However, considering that the Smart Roads Alternative consists of over eight kilometers (five miles) of roadway widening (from two to four lanes) and two major bridge rehabilitation projects, it seems likely that the impacts and costs associated with this alternative would be similar to those of the Hartman-Hammond Connector Alternative that includes 3.1 kilometers (1.9 miles) of roadway widening on 2.3 kilometers (1.4 miles) of new alignment (including a new bridge over the Boardman River).

Additionally, the improvements to Keystone and Beitner Roads proposed as part of this alternative extend through Garfield Township and in to Blair Township. It seems more likely that this alternative could promote development away from the urbanized area of Traverse City than the build alternatives carried forward in the Draft EIS.

Other Alternatives Discussed. Approximately five percent of the comments submitted were in favor of a "bypass." Several comments suggested that a bypass should be located at Chum's Corners. Three percent specifically mentioned support for a "Keystone/Beitner Alternative," with one percent opposing an alternative by this name. Only one percent of respondents indicated support for the TSM Alternative independently of being combined with other alternatives. One percent of the comments were in favor of creating a limited access highway.

Other alternatives identified by comments included:

- Build a "bypass" from Chum's Corners to Acme;
- Build a "bypass" from U.S. Route 31 to M-72;
- Improve/utilize existing roads from the junction of M-37 and U.S. Route 31 following Beitner, Keystone, Hammond, and Four Mile Road through Acme to U.S. Route 31 North;
- Extend Silver Pines Road to the existing Cass Road Bridge;
- Link Hartman and Hammond Roads by using the crossing at either Cass Road or Sabin dam;
- Build farther to the south;
- Utilize/improve public transportation; and
- Connect Hartman-Hammond roads to Four Mile Road or Six Mile Road.

Response to Comments. As described earlier in this section, this project is not a regional bypass. Many of the alternatives suggested above are located well outside the project area defined for this study. A wide variety of alternatives were developed for this project in an attempt to meet the purpose and need of the project. Roadway improvements to the east of the project area may be beneficial but do not address mobility across the Boardman River. Improvements to the south, farther away from Traverse City, will be less effective at diverting traffic from the Boardman River Crossings identified in this study. TSM measures were combined with all of the build alternatives evaluated and will be implemented as appropriate on area roadways. The TSM Alternative and the Beitner Road/Keystone Road Improvements Alternative do not meet purpose and need for the project. The issue of improving public transportation is described below as part of the Analysis of Alternatives.

Analysis of Alternatives. The Michigan Land Use Institute's report raised issues regarding the alternatives analysis presented in the Draft EIS. The following bulleted points are intended to provide a concise summary of the report comments related to alternatives analysis. The report itself is available for review at the GTCRC office. Comments in the report included:

- Travel Demand Management (TDM) alternatives were dismissed without adequate analysis. The Draft EIS failed to provide any description of the methodology used to model these concepts.
- Public Transit was not considered despite the public's support of public transit in the region.
- Pedestrian-based alternatives were not analyzed in the Draft EIS.
- South Airport Road does not meet the project goals identified in the Purpose and Need and therefore should not have been carried through the Draft EIS study.
- The Hartman-Hammond Connector Alternative will begin operating at a level of service D *(in the year 2015)*. The benefits of this alternative are overstated.
- Smart Roads Alternative with Cass Road Bridge meets the Draft EIS purpose and need and project goals, yet is improperly dismissed.

Response to Comments. Travel demand forecasting results for the TDM alternatives presented in the Draft EIS indicate that there are limited improvements to levels of service on the east-west Boardman River crossings. Under the Village Center Alternative, compared to the No-Build Alternative, annual average daily traffic (AADT) on the Eighth Street crossing would be 1,500 vehicles lower, resulting in a level of service improvement from E to D. However, on Beitner Road, AADT is projected to increase 8,500 vehicles per day resulting in a level of service degradation from E to F. For the Growth Boundary Alternative, an additional 4,000 vehicles per day (compared to the No Build) are projected on the Grandview Parkway/U.S. Route 31 river crossing, resulting in the level of service degrading to an F. On Beitner Road, 2,500 fewer vehicles per day are projected, with the level of service improving from E to C. Additional analysis of the TDM alternatives as stand alone measures indicates that the number of deficient lane miles of road in the TC-TALUS network would increase under both of these alternatives even when assuming substantial reductions in the number of trips generated on the regional network.

The TDM alternatives evaluated in the Draft EIS are quite progressive in nature. However, they have been tested to have limited, and in some ways, negative impacts on the overall transportation network. This, coupled with the fact that the likelihood of implementation is limited, led to the dismissal of these alternatives.

After comments were received following the Public Hearing for this project, additional evaluation on the effect of transit improvements was conducted. Transit was originally addressed in the *Cass Road Bridge Replacement on the Hartman/Hammond Road Alignment Environmental Assessment*. At that time, it was concluded that transit improvements have only limited potential to reduce the number of vehicles operating on area roadways. The issue was reinvestigated after distribution of the Draft EIS. TC-TALUS interviewed an official with the Bay Area Transit Authority (BATA) to gather information regarding four fixed bus routes that BATA is planning to implement.

Currently, existing ridership on BATA is 320,000 rides per year. This equates to the elimination of approximately 770 vehicle trips per day, assuming vehicle occupancy of 1.6 persons per vehicle. BATA estimates that half of its current ridership will switch from the current demand response system to the fixed route service. They also estimate that overall ridership could increase by approximately 140,000 rides per year. This increase equates to less than 350 vehicle trips removed from area roadways per day, indicating the limited potential for transit improvements to improve traffic congestion in Grand Traverse County.

The Grand Traverse County Road Commission does not discourage improvements to transit service, but does not view them as a viable solution to the problems addressed by the Boardman River Crossing Mobility Study. As documented in the Draft EIS, the levels of service on the east-west Boardman River crossings are projected to be either E or F unless a new crossing is constructed or capacity improvements to existing crossings are made. Regardless of the magnitude of transit system enhancements alone, the number of east-west river crossings in the Traverse City area will remain fixed. An enhanced transit system does not have the potential to remove enough vehicles from area roadways to noticeably reduce congestion on these crossings.

Likewise, pedestrian-based alternatives do not realistically have the potential to meet the purpose and need of this project.

The build alternatives evaluated in the Draft EIS consist of various options of improving or replacing the structurally deficient Cass Road Bridge. In Table 2.1-3 of this document, the projected 2015 traffic volumes on the east-west river crossings is reported for the No-Build Alternative. This table shows that in the future, approximately 120,000 vehicles per day will traverse these crossings. The crossing projected to carry the greatest volume of traffic is South Airport Road. It was concluded that improving the level of service on this crossing to an acceptable level, level of service D or better, improves east-west transportation flow. Therefore, this alternative was carried forward in the Draft EIS even through it is not projected to improve levels of service on Beitner Road.

The analysis presented in the Draft EIS focused on the levels of service on the Boardman River crossings. Of the alternatives analyzed, the Hartman-Hammond Connector with Three Mile Road Alternative is projected to have the greatest positive impact on the levels of service on the Boardman River crossings, with the exception of the four-lane Cross-Town Connector Alternative. The Cross-Town Connector Alternative was subsequently dismissed because the City of Traverse City indicated

they would not approve a four-lane facility on that alignment. The Draft EIS states that the Hartman-Hammond Connector will operate at an acceptable level, level of service D, in the future. This projected level of service corresponds to year 2015 traffic, not the first year of operation or "immediately." Based on the information available today, the Hartman-Hammond Connector Alternative meets the project purpose and need and will operate at an acceptable level of service. Based on the current plans for the area, there is no reason to believe this will change. However, it should be noted that planning of any kind, including transportation planning, is an ongoing process and, as such, should continually be re-evaluated. It is possible that the need for additional transportation improvements in the area could arise. However, it is very unlikely that the Cass Road Bridge will be replaced if the Hartman-Hammond Connector is constructed.

Dismissal of the Smart Roads Alternative was discussed earlier in this section.

RESOURCE CATEGORY

Physical and Ecological Environment. Ten percent of the comments received addressed environmental impacts and were concerned with the overall impact to the natural environment. Approximately one half of these comments mentioned a specific environmental impact. These comments generally fell into two categories: 1) water, specifically the potential for increased siltation in the Boardman River due to the construction of the bridge and the impact to Mitchell Creek watershed and all eight tributaries; and 2) terrestrial resources, mentioning the impacts to wetlands, particularly rare cedar and black ash swamp, and the impacts to wildlife habitat.

The Michigan Land Use Institute's report states that the Draft EIS should have provided a comparison of wetland impacts associated with rebuilding the Cass Road Bridge versus the impacts associated with building a Hartman-Hammond Connector over the Boardman River. Also, the report states that the Draft EIS lacks the data to assert that there would be no impact to Threatened or Endangered species.

Response to Comments. Construction of a bridge across the Boardman River and the proposed construction activities in the vicinity of Mitchell Creek could potentially increase sedimentation within these waterways, as described in the Draft EIS. Best Management Practices (BMPs) during construction were identified in the Draft EIS and further discussed in the Final EIS (Section 5: Physical and Ecological Environment) to address the potential impact. Implementation of construction related BMPs to prevent increased storm water runoff, erosion and sedimentation are typically made a condition of receipt of state and federal permits for work affecting water resources and wetlands. Several permits will be required for this project, as discussed in Section 1 of the Draft EIS and Final EIS. The permit conditions will be integrated with the construction documents and construction contract, allowing for enforcement and penalty not only by the regulatory agencies but also the owner (in this case, the Grand Traverse County Road Commission).

Potential wetland impacts associated with rebuilding the Cass Road Bridge were considered during the preparation of the *Cass Road Bridge Replacement on the Hartman/Hammond Road Alignment Environmental Assessment* (1995-1996) and compared to impacts associated with alternative bridge construction locations. The MDEQ concluded in a letter dated September 10, 1996 (included in Appendix C) following field review of the project area wetlands that an alternative crossing location, such as the Hartman-Hammond Connector alignment, was preferred over rebuilding the existing Cass Road Bridge.

Field investigation of wetland areas within the proposed project area, including the Hartman-Hammond and Cass Road corridors were conducted by a qualified botanist and were assessed using methodology deemed acceptable by federal and state regulatory agencies. A report prepared by Mr. LaCross confirms the scientific accuracy of the characterization and delineation of wetland types included in the *Cass Road Bridge Replacement on the Hartman/Hammond Road Alignment Environmental Assessment* (1996), which was also presented in the Affected Environment Section of the Draft EIS and used for analysis in the Environmental Consequences Section of the Draft EIS. In addition, Mr. LaCross reports that the forested wetlands within the areas of impact have experienced some degree of disturbance since European settlement. Lastly, it is understood that forested wetland systems, especially coniferous wetland systems, are difficult to create; however, the mitigation ratio takes this into account by requiring creation of a greater amount of wetland area than what is directly impacted.

Submittal of written requests to the U.S. FWS and the Michigan Department of Natural Resources (MDNR) Michigan Natural Features Inventory (MNFI) are performed to enlist the aid of these agencies in obtaining records indicating the presence of individuals and/or habitat of federal- or state-listed Threatened and Endangered Species occurring within a proposed project area. These agencies were contacted during preparation of the EA and again during preparation of the Draft EIS. The MDNR indicated in its response letter, dated May 8, 1998 that "No known occurrences of federal or state-listed endangered, threatened, or otherwise significant species, natural plant communities, or natural features at the location(s) specified..." were found in their database, and the U.S. FWS response letter provided a similar conclusion. The U.S. FWS did recommend in their response letter that the Grand Traverse County Road Commission make annual requests for updated information regarding the potential presence of protected species within the project area. Request letters for updated information from the U.S. FWS and the MDNR were sent to these agencies after circulation of the Draft EIS. Both agencies have since replied and have indicated there are still no known occurrences of federal or state-listed endangered, threatened, or otherwise significant species in the project area (Appendix C).

Land Use. Seventeen percent of the comments received cited a concern for land use in these general areas: 1) change in land use patterns, 2) displacements, 3) agricultural land and open space impacts, and 4) sprawl.

Over half of the comments received raised concerns that the construction of the Hartman-Hammond Road Connector with Three Mile Road Alternative would lead to "sprawl." One comment raised the concern that the Hartman-Hammond Connector would promote growth patterns that would make all citizens auto dependent. Two other comments suggested that the new road would attract large-scale retailers and the large corporate franchises. Approximately one third of the respondents reflected this concern by suggesting that zoning restrictions and access limitations be placed on the Hartman-Hammond Connector Alternative to control development along the new road.

Of the comments received that referenced land use issues, approximately one-third indicated that the comment writer's home or business would be displaced by construction of one of the build alternatives. Additionally, ten percent of the comments mentioned the need to protect agricultural land and open space within the study area.

Response to Comments. The extent of direct farmland impacts from the proposed Hartman-Hammond Connector Alternative was documented in the Draft EIS. Cumulative impacts to farmland as a result of this build alternative must be considered in combination with other past, present and anticipated future

actions. The conversion of farmland to other uses such as residential or commercial development is influenced by many factors as described in the Draft EIS (Section 5.10). Responses provided by East Bay and Garfield Township planners (see comment response under Secondary and Cumulative Impacts) indicates that conversion of farmland to other more developed uses is planned to occur within the project area independent of the Hartman-Hammond Connector.

The patterns of new development will be influenced by a number of factors as described in the Draft EIS under Section 5.3.7 Zoning and Land Use Planning and under Section 5.10 Secondary and Cumulative Impacts. The numerous planning efforts conducted by Grand Traverse County, Garfield Township and East Bay Township, as described in the Draft EIS, suggest that residential development is more likely to occur in the vicinity of Hartman Road, west of Cass Road, than large-scale retailers. The existing zoning along Hartman Road is primarily Agricultural and Rural Residential classifications. A fairly small area of Highway Service classification is designated near the existing U.S. Route 31/Hartman Road intersection. Therefore, existing zoning restricts large-scale retailers along the currently less developed portion of the Hartman-Hammond corridor. In Garfield Township, future access will be restricted in accordance with Section 7.2.8 of the Garfield Township Zoning Ordinance along the Hartman-Hammond Connector. This will act as a mitigation measure to further control development patterns.

Socio-economics. Thirteen percent of the comments received addressed concerns regarding socio-economic impacts. The concerns raised regarding socio-economics were in two primary categories: 1) property value; and 2) small-town character of Traverse City. One percent of the comments received from homeowners stated a concern that the increased development along the Hartman-Hammond Connector would negatively affect their property value.

Half of the comments received concerning socio-economic impacts specifically addressed the potential for increased development and an influx in population. These comments reflected a concern that these changes would lead to a change in the character of Traverse City, which would deter visitors from coming to Traverse City. Comments stated that construction of the Hartman-Hammond Connector would lead to a change in "their way of life" and "sense of place." They also addressed the environmental impacts because the "environment is their economy."

Response to Comments. It has not been the experience of the Grand Traverse County Road Commission to see any decrease in value of property due to road improvements or expansion. Property values in Grand Traverse County are appreciating at approximately eight percent per year in recent years. If the land sold is for a more intense use than it is currently being used, an increase in value could result.

As noted above, the numerous planning efforts of the local jurisdictions indicates a high level of sensitivity to the issue of sense of place. The *Grand Traverse Bay Region Development Guidebook*, for example, includes design and planning recommendations to help manage and direct the growth in Grand Traverse County while protecting the region's valued natural resources. This document and others is used by local planning officials to address the types of concerns expressed in public comments received for this project study.

Cultural Resources. One letter, with 14 signatures, was received that expressed a concern for impacts to historic resources. The report from the Michigan Land Use Institute and the Coalition for Sensible

Growth stated that a more thorough analysis of historical resources in the entire area is required. This report also states that a structure at Three Mile Road is on the National Register of Historic Places and would be impacted due to the widening of Three Mile Road.

Response to Comments. Between July 1996 and March 1999, 62 pre-World War II properties (158 total structures) were assessed, covering the entire project area (including the South Airport Road corridor), for potential listing on the National Register of Historic Places. Properties included farmsteads, individual houses, commercial/light industrial properties, and the Boardman River Dam and Power House. Of the 158 structures, two potential historic districts and four individual structures have been determined by the SHPO as potentially eligible for listing on the National Register of Historic Places:

- Sleder Meat Packing Plant, 200 Hammond Road East;
- Black Family Historic District;
- 4273 Three Mile Road;
- 4283 Three Mile Road;
- 4314 Three Mile Road; and
- 4340 Three Mile Road.

None of the structures documented are currently listed on the National Register of Historic Places.

Project impacts will be limited to four properties on Three Mile Road (4273, 4283, 4314, and 4340) as a result of road widening. These four properties will lose approximately 7.5 meters (25 feet) of frontage; no buildings will be displaced. Consultation with landowners and the interested public about mitigation of adverse effects has taken place (See Appendix D.)

All above-ground cultural resources investigations were conducted in accordance with the National Historic Preservation Act of 1966 (as amended) (16 U.S. Code 470 *et seq*), MDOT Work Specifications, and Michigan SHPO guidelines. All investigations were conducted by cultural resources professionals who are listed with the SHPO as meeting the Secretary of the Interior's Standards for professional qualifications.

Visual and Aesthetic Resources. Three percent of the comments were concerned that the Hartman-Hammond Connector would impact the natural beauty of the area because of the new bridge crossing and the increased development that would occur along the road.

Response to Comments. The Draft EIS study identified the visual and aesthetic importance of the Boardman River valley to the community (see Section 4.6 and Section 5.6 of the Draft EIS). The analysis of the Hartman-Hammond Connector indicated that the bridge design could potentially adversely affect the scenic quality of the valley and that mitigation measures are needed to minimize impacts. A workshop meeting was held during the analysis phase of the study involving CAC members to identify possible mitigation measures. Additional meetings and reviews of engineering plans will be required to develop beneficial guidelines for the bridge design for the Hartman-Hammond Road Connector with Three Mile Road Alternative (i.e., the Recommended Alternative).

Air Quality. One percent of the comments identified the Hartman-Hammond Connector Alternative as a project that would be beneficial to air quality because it would result in lower emissions by reducing congestion and diverting truck traffic out of town.

Response to Comments. An analysis of regional air quality was not required for this project because the project area is in attainment for all pollutants covered by the National Ambient Air Quality Standards (NAAQS). It is possible that some improvement to regional air quality would result under the Hartman-Hammond Connector or the South Airport Road Widening alternatives because congestion is reduced when compared to the No-Build Alternative. However, any change in regional air quality would probably not be noticeable.

The microscale carbon monoxide analysis conducted for this project indicated that none of the alternatives would result in violations of the NAAQS.

Noise. Five comments addressed a concern that the construction of the bridge across the Boardman River would increase noise pollution. One comment suggested that noise pollution would be reduced by the Hartman-Hammond Connector Alternative because of the reduction in truck traffic traveling through town.

Response to Comments. A noise analysis was conducted for the No-Build Alternative and the build alternatives carried forward in the Draft EIS. Noise levels were projected for 21 receptors along the proposed Hartman-Hammond Connector alignment. Increases in noise levels are projected for all of these receptors. According to the FHWA noise abatement criteria, noise impacts are projected at 11 of these receptors. However, no cost-effective noise barrier could be constructed to mitigate this increase in noise.

The noise analysis conducted focused on areas where impacts could potentially result. Therefore, areas where noise levels could be reduced as traffic diverts to an improved or new facility were not analyzed. Based on traffic projections prepared for this project, decreases in noise levels at receptors along South Airport Road are possible if the Hartman-Hammond Connector Alternative is implemented.

Secondary and Cumulative Impacts. Fourteen percent of the comments received expressed concerns about the potential secondary and cumulative impacts from the alternatives. Approximately 20 percent of the comments with concerns regarding secondary and cumulative impacts addressed the proximity of the Hartman-Hammond Connector to Sabin Elementary School. Half of the comments regarding secondary and cumulative impacts addressed a concern regarding the increased traffic on Three Mile Road and other connecting roads due to the proposed improvements. Another one-third of the comments that addressed cumulative impacts anticipated a positive impact from diversion of truck traffic, improved travel time for school buses, and improved commuter access associated with the Hartman-Hammond Connector. Comments received also raised concern for future increases in population and development potentially influenced by the Hartman-Hammond Connector. The Michigan Land Use Institute's report, in particular, expressed an issue with the accuracy of the land use analysis presented in the Draft EIS.

Response to Comments. Sabin Elementary School is located at the intersection of Hartman Road and Cass Road. As part of the Hartman-Hammond Connector Alternative, Hartman Road is proposed to be widened from two to four lanes. No air quality or noise impacts are projected for this area. Safety

issues addressed in some of the comments received were not evaluated as part of this project and would be difficult to quantify. However, no major impacts to overall safety in the area is anticipated.

Of the alternatives carried forward, the Hartman-Hammond Connector with Three Mile Road Alternative is the most effective alternative at improving east-west mobility across the Boardman River in the project area. The primary traffic-related impact of the Hartman-Hammond Connector Alternative is the diversion of traffic from South Airport Road and Beitner Road to the proposed River Crossing. Based on the travel demand forecasts developed for this project, traffic impacts in other areas are minor. Projected traffic volumes on Three Mile Road are up to 4,000 vehicles per day higher under this alternative compared to the No-Build Alternative. However, projected levels of service are also improved because the facility would be widened from two to four lanes.

The Hartman-Hammond Connector is illustrated on maps included within a number of published planning documents such as the Garfield Township's Comprehensive Land Use Plan (see Figure 4.3-5 of the Draft EIS), the East Bay and Garfield Townships Combined Future Land Use Map (Figure 4.3-4 of the Draft EIS), and Garfield Township's Hammond/3 Mile Area Study (Figure 4.3-10 of the Final EIS) and the Miller Creek Area Study (Figure 4.3-9 of the Final EIS). The question of whether the inclusion of the bridge in the planning documents will stimulate development west of the Boardman River was examined in the Draft EIS study (see page 5-59) and addressed in the Final EIS as well. The question of whether the expectation of the Hartman-Hammond bridge has influenced the townships' respective planning processes was raised with East Bay and Garfield Townships' planners to obtain new information to facilitate a response to public comments.

According to the respective planners for East Bay and Garfield Townships (Orttenburger, 1999; Harsch, 1999), the Comprehensive Land Use plans and zoning policies for each township were developed independently of the proposed bridge connection between Hartman and Hammond roads. The following points were given in support of this conclusion:

East Bay Township

- Hammond Road has historically functioned as a major east-west traffic corridor through the township because it intersects with several existing roads to provide access to U.S. Route 31 and Garfield Township;

- Hammond and Three Mile Roads have been identified as the preferred commercial-industrial corridor for a number of years as shown in the Comprehensive Land Use Plan; and

- The Three Mile Road/Hammond Road intersection was identified in the Comprehensive Land Use Plan as a proposed Village Center. The township intends to implement this plan independently of a possible bridge connection.

Charter Township of Garfield

- Private property within the township currently has sufficient road access to support development independent of the proposed bridge connection;

- Development activity in the township is occurring south of Hammond Road and has not been slowed by the lack of connection between Hartman and Hammond roads; and

- The bridge is included in planning documents solely to show continuity in east-west traffic flow patterns as would occur based on a standard rectilinear grid system.

Based on this information, the potential bridge connection between Hartman and Hammond roads across the Boardman River valley has not been influential in planning the existing or projected growth patterns for either township, and the No-Build Alternative serves as an appropriate base line from which to assess potential impacts of the remaining alternatives.

The Draft EIS references numerous local planning initiatives intended to control inefficient and chaotic development (i.e., "sprawl") within the Grand Traverse area (see Section 4.3.7, Section 5.3.7, and Section 5.10.2). The Draft EIS does not conclude that "sprawl" is inevitable within the Hartman-Hammond corridor regardless of whether a bridge is built, but states that development is planned to occur, and likely to occur in the future, west of the Boardman River as indicated by numerous planning documents and a review of past and present land uses in the project area. The Draft EIS acknowledges the importance of "strong planning management and community support of both planning goals and design development guidelines ... to guiding this growth in a positive fashion" (page 5-59 of the Draft EIS). The above noted East Bay and Garfield Townships' planners responses further clarify the relationship between township planning philosophy, policy and documents.

Public Involvement. Relatively few comments, with the exception of the Michigan Land Use Institute's report, were related to the public involvement process used during the Draft EIS study. The report expressed concerns regarding the content and recording of CAC meetings; the project team's frame of mind regarding public input; the content of workshop meetings, informational videos and public opinion surveys; and the format of the Draft EIS Public Hearing.

Response to Comments. The CAC agendas were organized to follow the Consultant's technical work plan. As the team generated work, it was presented for informational purposes to the CAC. As project decisions were required by the GTCRC, the CAC was presented with information first, so they could provide input that would then be taken to the GTCRC for action. The CAC was created to act in an advisory capacity only and was not empowered to make decisions. It is always challenging to satisfy the variety of interests and technical knowledge that exist on a committee such as this when structuring an agenda and allocating time periods for each discussion. Based upon MDOT methods used with similar project's advisory committees, the methods used to conduct these meetings were reasonable.

In response to the comment regarding poor note taking at CAC meetings, examples of inaccuracies would be helpful to understand the basis of these concerns. Meeting notes were very comprehensive and well organized. Copies of meeting notes were mailed to each CAC member following meetings. Time was always provided at the end of each meeting when such an issue could have been raised. No such concerns were ever brought to the attention of the project team, and therefore, no alternative approaches were discussed.

There was a great deal of interest expressed by citizens to provide a comprehensive public information and participation process. Such a process requires substantial financial resources to be successful. Meetings were scheduled in response to citizen requests. Not all citizens agreed with the topics raised, but others were very supportive of them. For example, while some CAC participants thought it was inappropriate to discuss bridge enhancements prior to the selection of a Recommended Alternative,

others believed it was a prerequisite to having adequate information in order to provide the appropriate input.

The Public Hearing format followed for both the EA and the Draft EIS was consistent with the MDOT Procedures for Public Involvement. MDOT utilizes the Informal Open House format to maximize flexibility for public attendance and public interests to obtain information. The panel of Road Commissioners located at the court reporter's table allowed dialogue between Commissioners and citizens. All public comments, the hearing transcript and agency comments are available for review at the GTCRC office.

Section 8

LIST OF PREPARERS

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MICHIGAN DEPARTMENT OF TRANSPORTATION

Mark Dionise, P.E., Transportation Engineer. Document review and coordination with local agencies and the Federal Highway Administration. Fourteen years of experience in transportation engineering. B.S. Civil Engineering.

John Lanum, Transportation Planner. Review and coordination of transportation and land planning issues. Twenty-three years of experience in transportation planning. M.S. Business Administration; B.S. Engineering Technology.

Lori Noblet, Transportation Planner. Review and coordination of environmental issues and regulations. Twelve years of experience with the Michigan Department of Transportation. Master of Urban Planning; B.S. Political Science.

Kari Settle, Transportation Planner. Review and coordination of transportation and land use issues. Eight years of experience in transportation planning with the Michigan Department of Transportation. B.S. Urban and Regional Planning.

GRAND TRAVERSE COUNTY ROAD COMMISSION

Micheal Dillenbeck, P.E., Manager of the Grand Traverse County Road Commission. Chair Citizen Advisory Committee, local liaison with special interest groups, and provision of road commission records. Four years in municipal engineering and 25 years in a managerial capacity for two Michigan county road commissions. B.S. Civil Engineering, Michigan Technological University.

TRAVERSE CITY AREA TRANSPORTATION AND LAND USE STUDY (TC-TALUS)

Matt Skeels, AICP, Director. Transportation Modeling. Ten years experience in transportation planning and modeling. M.S. Geography - Land Use Analysis, Eastern Michigan University; B.S. Geography and Geology, Central Michigan University.

PARSONS TRANSPORTATION GROUP (DE LEUW, CATHER & COMPANY)

Jere Hinkle, P.E., Project Manager/Transportation Engineer. Thirty-five years of experience in transportation planning and environmental analysis. M.S. Civil Engineering, Northwestern University; B.S. Civil Engineering, Kansas State University.

Tony Pakeltis, AICP, Senior Transportation Planner. Alternatives definition and analysis, traffic, air quality and noise analyses. Ten years experience in transportation planning and environmental analysis. Master of Urban Planning and Policy, University of Illinois at Chicago; Bachelor of Urban Planning, B.S. Environmental Design, Ball State University.

Mark Peterson, P.E., Project Engineer. Preliminary engineering and design. Sixteen years experience in roadway design. B.S. Civil Engineering, Iowa State University.

Peter Reinhofer, Associate Civil Engineer. Air quality and noise analyses. Two years experience in transportation planning and modeling and environmental documentation. B.S. Civil Engineering, Marquette University.

SMITHGROUP JJR INCORPORATED

Patricia A. Beckjord, Environmental Planner. Land use, socio-economics, and visual assessments. Four years experience in environmental planning and impact assessment. Master of Landscape Architecture, University of Michigan; B.S. Medical Technology, Wittenberg University.

Gary Crawford, Biologist. Physical and ecological environment assessments. Five years experience in environmental assessment and impact statement preparation. Master of Fisheries Resource Science, University of Michigan; B.S. Biology, Eastern Michigan University.

Nancy Ford Demeter, (See reference for Commonwealth Cultural Resources Group, Inc.). Provided technical editing for JJR sections.

Douglas L. Denison, Principal-in-Charge. Twenty-two years experience in environmental assessment and impact statement preparation, project management, and water resource analysis. M.S. Water Resource Science, University of Michigan; B.S. Aquatic Biology, Eastern Michigan University.

Karen L. Gallagher, Project Manager. Thirteen years experience in environmental assessment and impact statement preparation, including social, economic, and environmental analysis, and project management. Master of Landscape Architecture, B.S. Natural Resources, University of Michigan. Registered Landscape Architect in Michigan.

Susan J. Dickinson Gott, Public Information Specialist. Eighteen years experience in community planning, environmental planning, and preparation of environmental documents. B.G.S. University of Michigan.

Jerome F. Kelly, Biologist. Sites of Environmental Concern. Thirty years experience with environmental site assessments, hazardous waste site investigations, and environmental planning. Master of Science, Environmental Biology, University of Miami; B.A. Biology/Chemistry, Saint Mary's College of Minnesota.

GOURDIE/FRASER & ASSOCIATES, INC.

Robert Hammond, P.E., Project Manager. Twenty-eight years of experience in civil engineering design of roads and public utilities and project management. B.S. Civil engineering, Michigan State University.

COMMONWEALTH CULTURAL RESOURCES GROUP, INC.

Christopher J. Benison, Archaeologist. Staff archaeologist with extensive experience implementing archaeological Phase I, Phase II, and Phase III research designs for Section 106 compliance. Special emphasis on geomorphological techniques to locate prehistoric sites. M.A. Anthropology, State University of New York-Binghamton; B.A. (*magna cum laude*) English, Providence College.

Nancy Ford Demeter, Compliance Specialist. Technical writer and trainer specializing in environmental compliance and Section 106 procedures. Editor/author of over 240 technical reports and environmental compliance documents. Received specialized training by the Advisory Council on Historic Preservation, the University of Nevada, and the Federal Energy Regulatory Commission. M.A. Anthropology, Wayne State University; B.A. (*summa cum laude*) Anthropology, Wayne State University.

Daniel G. Landis, Archaeologist. Staff archaeologist proficient in traditional field methods, global positioning systems (GPS), and laboratory methods. Involved in field reconnaissance and crew supervision since 1981. M.A. Anthropology, Eastern New Mexico University; B.A. Anthropology, University of Michigan.

Richard A. Neumann, Historic Architect. Registered architect conducting National Register of Historic Places assessments since 1978. Member of the American Institute of Architects, National Trust for Historic Preservation, and the Association for Preservation Technology. B.Arch., University of Michigan.

James A. Robertson, Ph.D., Principal Investigator. Senior archaeologist involved in managing large-scale cultural resources investigations for transportation projects since 1988. Specializes in Midwestern and Eastern prehistoric sites. Expert in microwear lithic analysis. Ph.D. Anthropology, Michigan State University; M.A. Anthropology, University of Illinois at Chicago; B.A. History, College of Wooster.

Elaine H. Robinson, Architectural Historian. Architectural historian with special emphasis on Midwest vernacular buildings and farmsteads. Proficient in National Register of Historic Places evaluation, including cultural landscape assessment. M.S. Historic Preservation, Eastern Michigan University; B.F.A. (with honors) Interior Architecture, Wayne State University.

Kent C. Taylor, Archaeologist. Staff archaeologist experienced in logistics and field project design on sites throughout the U.S. since 1972. Expert in prehistoric and historic artifact analyses. M.A. Anthropology, Wayne State University; B.A. Anthropology, Wayne State University.

Donald J. Weir, Project Manager. President of Commonwealth Cultural Resources Group, Inc. Expert in large-scale, multi-state transportation and energy projects. Actively involved in historic and prehistoric cultural resources investigations since 1974. Serves on the Michigan Historical Commission. M.A. Anthropology, Michigan State University; B.A. Social Sciences, Michigan State University.

Section 9

DISTRIBUTION OF THE FINAL EIS

Section 9
DISTRIBUTION OF FINAL ENVIRONMENTAL IMPACT STATEMENT

The Final Environmental Impact Statement is being distributed to the following federal, state, regional, and local agencies and other interested parties for their review and comments.

Federal Agencies

Federal Emergency Management Agency
U.S. Army, Detroit District, Corps of Engineers
U.S. Department of Agriculture, Forest Service
U.S. Department of Agriculture, Natural Resource Conservation Service
U.S. Department of Commerce
U.S. Department of the Interior, Fish and Wildlife Service
U.S. Department of Transportation, Federal Aviation Administration
U.S. Environmental Protection Agency

U.S. Senators and Representatives

U.S. Representative Bart Stupak, District No. 1
U.S. Senator Carl Levin
U.S. Senator Spencer Abraham

State Agencies

Michigan Department of Agriculture
Michigan Department of Community Health
Michigan Department of Environmental Quality
Michigan Department of State, Bureau of History

State Senators and Representatives

State Representative Jason Allen, District No. 104
State Senator George A. McManus, Jr., District No. 36

Regional and Local Jurisdictions and Agencies

Acme Township
Bay Area Transportation Authority
City of Traverse City
East Bay Township
Garfield Charter Township
Grand Traverse County Board of Commissioners
Grand Traverse County Parks and Recreation Department

Grand Traverse County Planning Department
Grand Traverse County Sheriff
Grand Traverse County Soil and Water Conservation District

Other

Boardman River Project
Cherry Capital Airport
Coalition for Sensible Growth
Conservation Resource Alliance
Grand Traverse Bay Watershed Initiative
Michigan Environmental Council
Michigan Land Use Institute
Michigan United Conservation Clubs
New Designs for Growth
Northern Michigan Environmental Action Council
Traverse City Downtown Development Authority
Tuscola and Saginaw Bay Railway Company
Traverse City Area Public Schools
Traverse City Public Library
Other Citizen Advisory Committee Members (not included in above list)

Section 10

LITERATURE CITED

Section 10
LITERATURE CITED

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