ENVIRONMENTAL ASSESSMENT/ENVIRONMENTAL ASSESSMENT WORKSHEET

Trunk Highway 169
Elk River to Zimmerman

State Project: 7106-73 (Elk River); 7106-71 (Zimmerman)
Minnesota Project: To Be Assigned

From: Trunk Highway 101/County State Aid Highway 39 interchange in the City of Otsego
To: 277th Avenue north of City of Zimmerman
in
Cities: Otsego, Elk River, and Zimmerman, Township: Livonia
Counties: Wright and Sherburne
Section(s), Township(s), Range(s):
Sections: 3-5, 8-10, 15-17, 27-29, 32-34; T35N; R26W
3-5, 8-10, 15-17, 20-22, 27-29, 32-34; T34N; R26W
2-4, 9-11, 14-16, 21-23, 26-28, 33-35; T33N; R26W
3, 10, 11; T32N; R26W

Submitted pursuant to 42 U.S.C. 4332 and M. S. 116D
By the
U.S. Department of Transportation
Federal Highway Administration and
Minnesota Department of Transportation
For

Conversion of Trunk Highway (TH) 169 from an expressway facility to a freeway facility from Elk River through Zimmerman, including TH 101 lane addition in Otsego from County State Aid Highway (CSAH) 39 to the TH 10/101/169 system interchange, and expansion of the TH 101 Mississippi River crossing between Otsego and Elk River.

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6/29/10
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7/22/10
Date

Approved by:

[signature]
FHWA – Area Engineer

9/20/2010
Date

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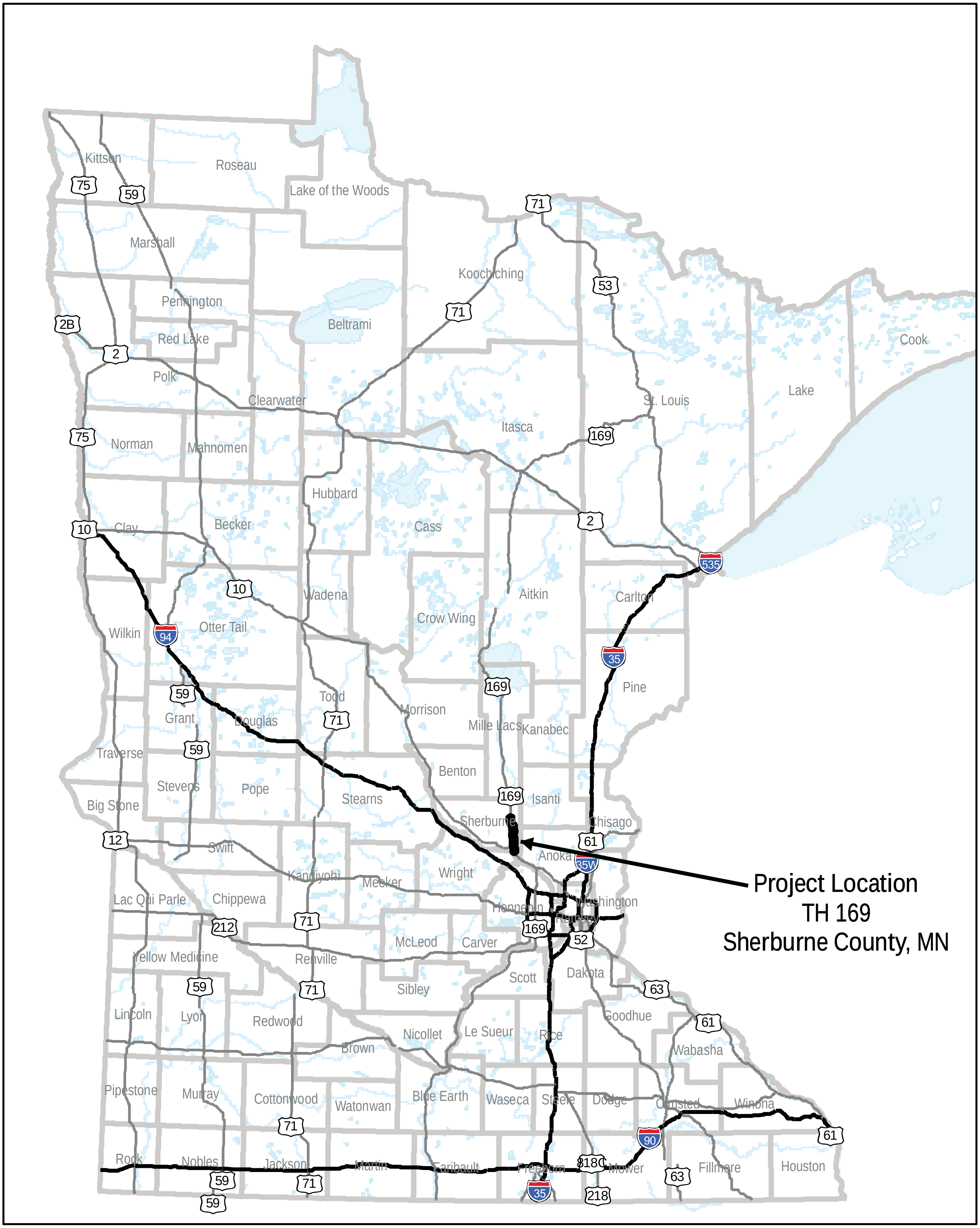

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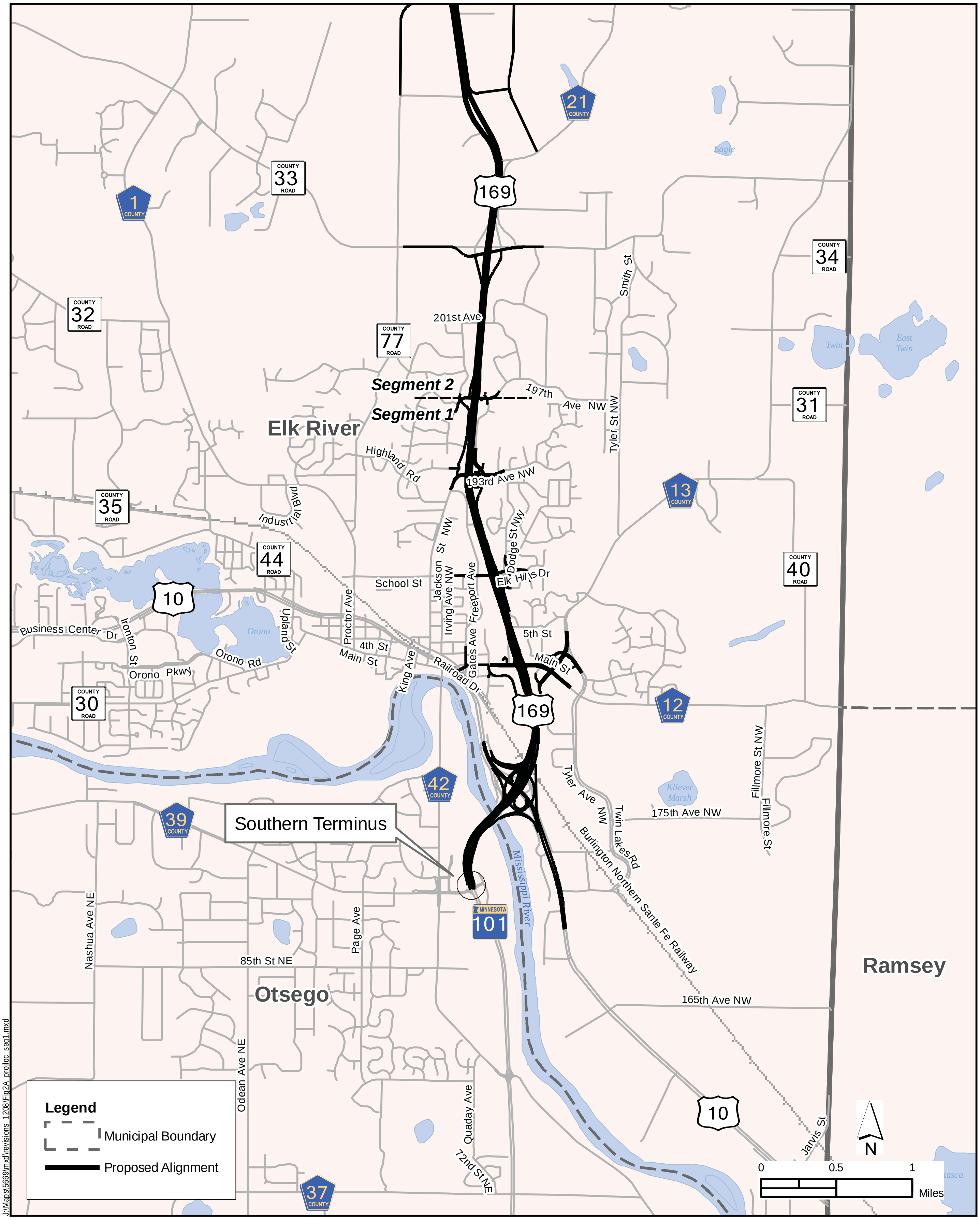
STATE LOCATION MAP

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 1



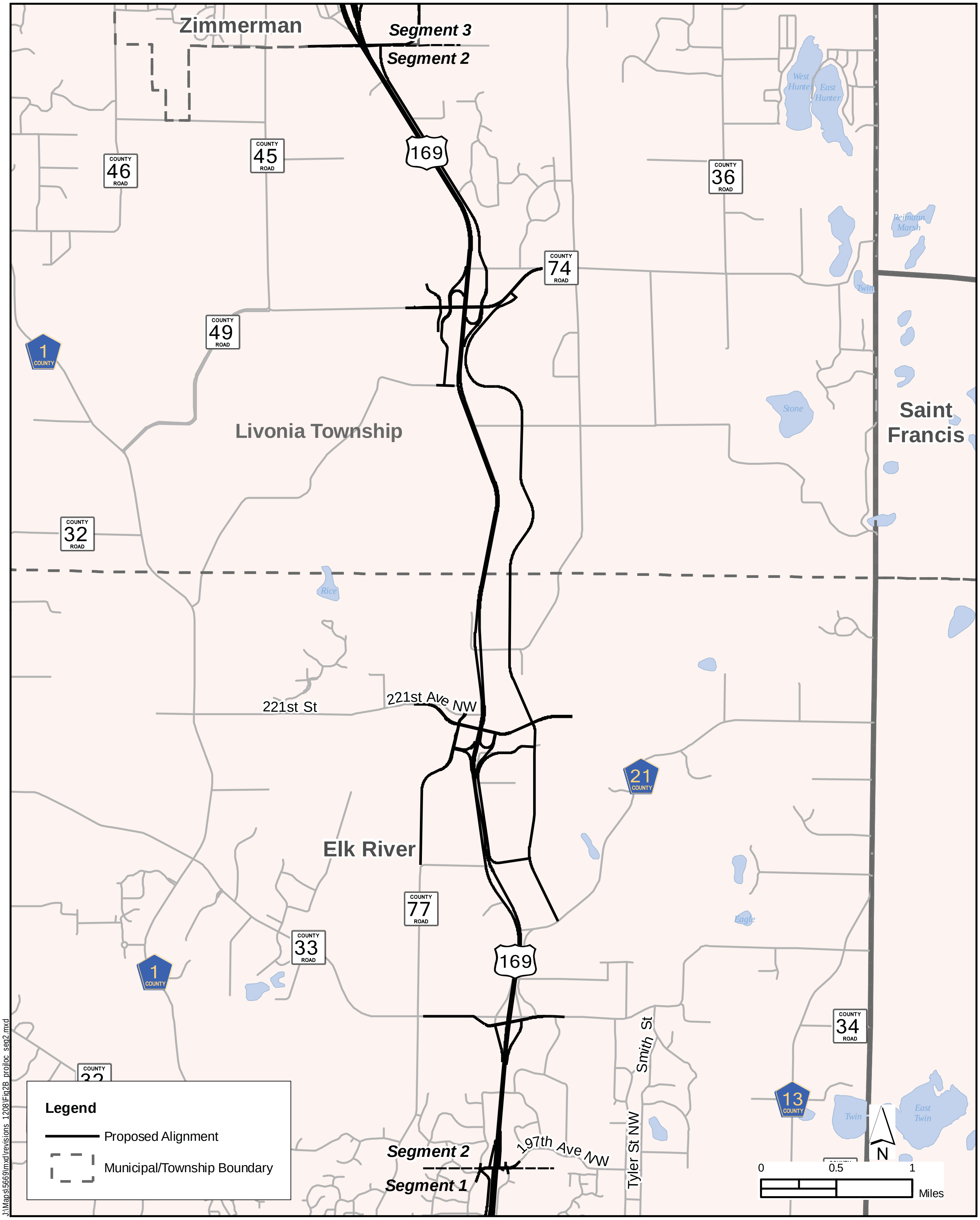
PROJECT LOCATION: SEGMENT ONE - URBAN ELK RIVER

Figure 2A

Segment One: CSAH 39 to197th Avenue NW

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71



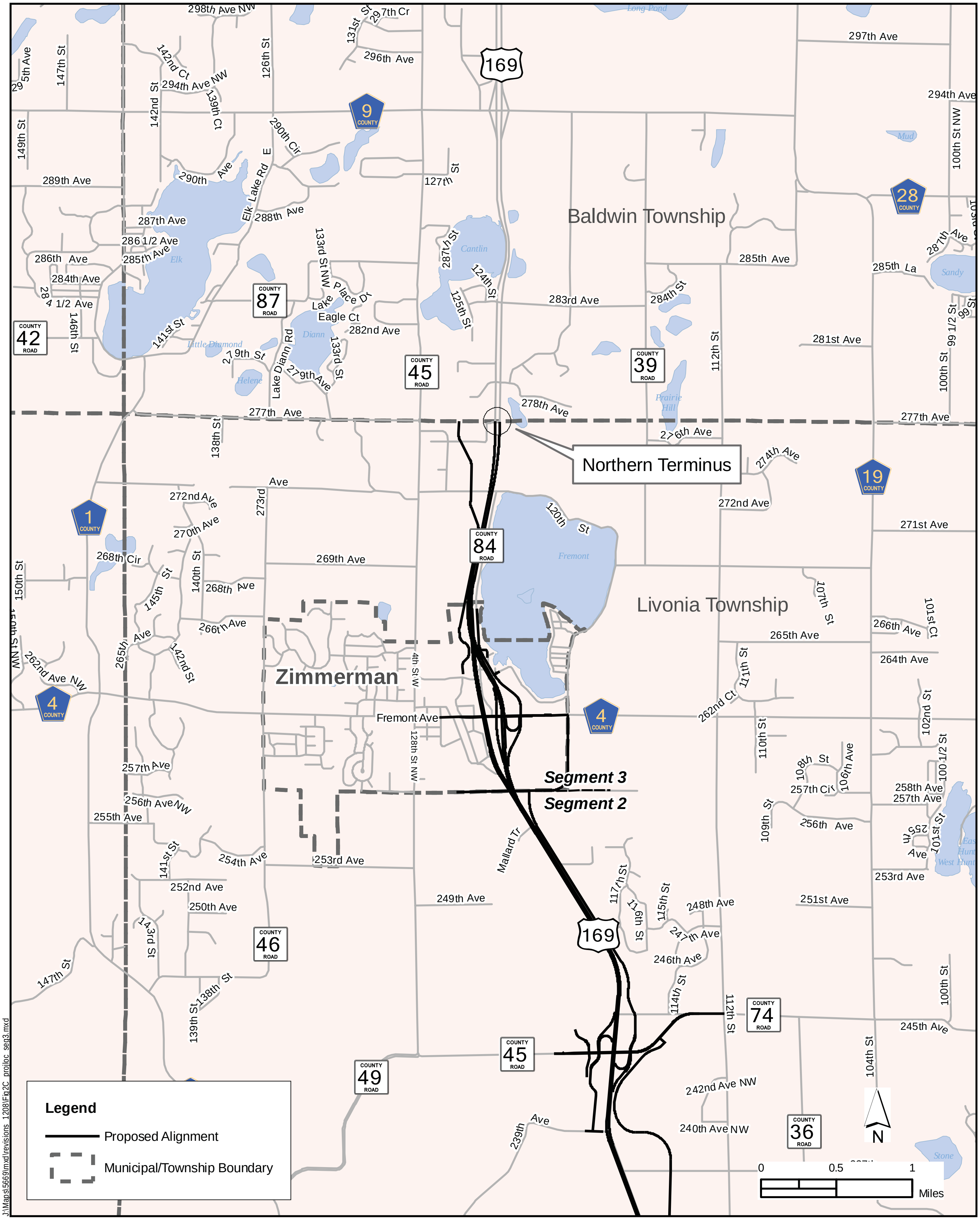
PROJECT LOCATION: SEGMENT TWO - RURAL ELK RIVER & S. LIVONIA TOWNSHIP

Figure 2B

Segment Two: 197th Avenue NW to Livonia Township/City of Zimmerman Boundary

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71



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PROJECT LOCATION: SEGMENT THREE - ZIMMERMAN & N. LIVONIA TOWNSHIP

Figure 2C

Segment Three: City of Zimmerman municipal boundary to 277th Avenue in Livonia Township

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

HIGHWAY 169: ELK RIVER TO ZIMMERMAN
ENVIRONMENTAL ASSESSMENT/ENVIRONMENTAL ASSESSMENT WORKSHEET

EXECUTIVE SUMMARY

INTRODUCTION

The Highway 169 corridor is an important north-south principal arterial route in central Minnesota. This route connects Minnesota's central lakes region with the greater Twin Cities metropolitan area as well as the growing trade centers of Princeton, Zimmerman, and Elk River. Increasing congestion and traffic volumes along the corridor threaten Highway 169's ability to deliver safe and efficient transportation service.

Highway 169's importance in the statewide transportation system has been identified in two regional transportation studies completed since 1999–the Mn/DOT *Statewide Interregional Corridor (IRC) Study* (November 1999) and the Mn/DOT *Highway 101/169 Corridor Management Plan* (April 2002).

Identifying possible solutions to transportation problems within the Highway 169 corridor requires understanding of the environmental context of Highway 169, adjoining roadways, and the various modes utilizing these roadways (e.g., automobiles, pedestrians, bicyclists), and surrounding communities. The proposed solution to the transportation problems has taken into account the potential negative impacts on the surrounding environment and strived to avoid or minimize these impacts.

PURPOSE AND NEED

The purpose of the proposed project is to prepare preliminary engineering layouts and environmental documentation for the 13-mile segment of the Highway 169 corridor from Highway 10 in Elk River to County State Aid Highway (CSAH) 4 in Zimmerman. The southern project terminus is the Highway 101/CSAH 39 interchange in Otsego. The southern project terminus was established because of the need for acceptable traffic operations between the Highway 10/101/169 system interchange and the Highway 101/CSAH 39 interchange. The northern project terminus was established because CSAH 4 is the northern terminus of the High Priority Interregional Corridor (IRC) segment of Highway 169.

This project identifies the long-term access management plan for this segment of the Highway 169 corridor and will allow for local units of government to concurrently plan for future land uses and transportation uses (vehicle and non-vehicular) adjacent to the Highway 169 corridor. The project identifies a design concept that will also inform local transportation network planning. The proposed project addresses safety concerns and capacity and operational issues, and maintains the functionality of Highway 169 as a principal arterial route within the project limits.

There is currently no funding programmed for right of way acquisition and construction of the proposed project. Right of way acquisition and construction would occur when funding becomes available. As noted above, in the near term, this Environmental Assessment/Environmental Assessment Worksheet (EA/EAW) will be used to help inform local land use and transportation planning decisions. If funding is eventually identified, it is anticipated that, at a minimum, a re-evaluation of this EA/EAW will be necessary prior to project implementation.

<u>Summary of Transportation Issues</u>

The basic transportation needs for the proposed project are summarized below:

- **Safety:** Crash data indicates there is a demonstrable safety problem along the Highway 169 corridor with crash and severity rates above the statewide average for similar facilities. Frequency of at-grade access points coupled with high mainline travel speeds contribute to the number of accidents and crash severity rate observed along the project corridor. This safety problem is likely to worsen if no improvements are made and as traffic volumes increase along the project corridor.
- **Operations:** Traffic operations analysis results indicate that several intersections along the Highway 169 corridor operate at an unacceptable LOS in the a.m. and p.m. peak hour. These conditions are expected to worsen if no improvements are made and as traffic volumes increase along the project corridor.
- **Access Considerations:** There are a total of 44 at-grade access points along the 13-mile stretch of Highway 169 between Elk River and Zimmerman. This averages to approximately three to four access points per mile. As a High Priority IRC and principal arterial roadway, access management along Highway 169 should emphasize mobility. The Mn/DOT access guidelines recommend that roadway segments such as the Highway 169 project corridor be grade-separated facilities without any private access points. With approximately three to four access points per mile, the existing Highway 169 project corridor is not currently consistent with Mn/DOT's access guidelines.

IDENTIFICATION OF PREFERRED ALTERNATIVE

The alternatives development process for the Highway 169 project through Elk River and Zimmerman involved the identification and evaluation of the project corridor as a freeway facility. Various interchange design types were considered throughout the project corridor. Interchange configurations were evaluated based on their ability to meet the corridor's transportation needs, as well as their ability to minimize environmental impacts and promote community planning goals.

The evaluation of interchange concepts and the identification of preferred interchange types throughout the project corridor was a collaborative effort that included input from Mn/DOT staff, Local Advisory Committees (Elk River, Livonia, Zimmerman, and Sherburne County staff) and local officials. Input from the public and business community throughout the project development process was also important in identifying preferred alternative interchange types.

Preferred Alternative Description

The preferred alternative transitions Highway 169 from the existing at-grade expressway facility to a limited access grade-separated freeway facility between Highway 10 in Elk River and CSAH 4 in Zimmerman, including redesign of Highway 10/101/169 system interchange. The project also includes improvements to Highway 101 from Highway 169 in Elk River to CSAH 39 in Otsego, including reconstruction of the Highway 101 bridge over the Mississippi River. A system of interchanges, overpasses, and frontage/backage roads will replace existing at-grade intersections. Interchanges will be constructed at the following locations: at Main Street, School Street, Jackson Avenue/193rd Avenue/197th Avenue, and 221st Avenue in Elk River; at CSAH 25/19 in Livonia Township; and at CSAH 4 in Zimmerman. The proposed project will result in consolidation and closure of other access locations along Highway 169.

The evaluation of interchange concepts and the identification of preferred interchange types are discussed in Sections IV.A and IV.B of the EA/EAW.

PREFERRED ALTERNATIVE IMPACTS

The Preferred Alternative would have both beneficial and adverse impacts on human and natural elements within the project area. Tables ES-2 and ES-3 (provided at the end of this Executive Summary) provide a summary of the anticipated impacts of the Preferred Alternative. Table ES-2 provides a summary of impacts of the Preferred Alternative over the entire 13-mile project corridor. Table ES-3 provides a more detailed summary of specific impacts (e.g., contaminated sites, wetlands, right of way, and relocations) by proposed interchange area. The tables also provide information on where (chapter/section) impacts are discussed in detail within the EA/EAW. Brief summaries of the anticipated project impacts and mitigation are provided below.

Transportation Impacts

- **Safety:** The proposed Highway 169 freeway facility will eliminate conflicting movements at at-grade intersections and eliminate at-grade access points. Removal of conflicting movements and reduction of congestion is expected to improve crash rates.
- **Operations:** Vehicular traffic operations were analyzed for the Preferred Alternative. The Highway 169 freeway is forecast to operate at an acceptable Level of Service (LOS) C under future Build conditions. All major intersections within the project area are forecast to operate at a LOS D or better.
- **Corridor Speed:** Under future Build conditions, Highway 169 is forecast to meet 60 mph travel speed performance criteria for High Priority IRCs (61-67 mph).
- **Access and Local Road Connectivity:** Existing local roads and the proposed frontage road system would maintain accessibility to parcels where existing at-grade access is eliminated. Where access is not maintained, properties will be acquired. Removal of all at-grade access with conversion to a freeway facility is consistent with Mn/DOT guidelines for High Priority IRCs and principal arterial roadways. The existing expressway facility (at-grade intersections) acts a barrier to east-west local traffic (vehicular and non-vehicular) across

Highway 169. Grade separations of local roadways from Highway 169 will improve local east-west travel within Elk River, Livonia Township, and Zimmerman.

- **Pedestrian and Bicycle Connections:** Sidewalks and trails would be constructed at interchange locations in Elk River. Design of interchanges in rural Elk River and Livonia Township accommodate on-road facilities, consistent with current Mn/DOT design guidelines. The CSAH 4 interchange has been designed to accommodate a future trail crossing. As a result of separating pedestrian and bicycle traffic from Highway 169, the proposed project would improve safety and connectivity for non-vehicular modes (pedestrians and bicyclists). These facilities will serve to connect neighborhoods and residential land uses with other land uses (commercial, business) on both sides of the Highway 169 project corridor.

Contaminated Sites

A Phase I Environmental Site Assessment found 50 sites of documented or potential contamination within the current study area. Four sites were identified as having high risk potential for contamination and 41 were identified as medium risk potential sites. Eighteen (18) of these properties will be affected by right of way impacts; many of these are partial “strip” takings along the roadway. Prior to construction, these properties will be drilled and sampled, if necessary, to determine the extent and magnitude of contaminated soil or groundwater.

Protected Species

The Highway 101 bridge over the Mississippi River will be inspected for swallows prior to construction. If nesting swallows are present on the bridge, measures will be taken to avoid the destruction of swallows during bridge reconstruction.

Blanding’s turtles, a state threatened and endangered species, have been observed in the vicinity of the project area. Sherburne County is identified as a Blanding’s turtle priority area (i.e., habitat protection). Suitable habitat for Blanding’s turtle is available within the project area (see Item #12 for a discussion of wetland types within the project area). While areas adjacent to proposed interchange locations have been previously disturbed, it is possible that proposed frontage/backage roads could disturb habitat suitable for Blanding’s turtle.

Frontage/backage road alignment concepts may change depending upon outcomes of gravel mining operations, local plans, and future development within the study area. The need for surveys will be determined as the project is implemented and frontage/backage roads are constructed. The contractor will be provided with a copy of the Blanding’s Turtle Fact Sheet to make them aware of the possible presence of these turtles. The need for measures, such as fencing, will be evaluated prior to construction in consultation with the Department of Natural Resources.

Black sandshell mussels, a state species of special concern, have been identified in the Mississippi River at the southern terminus of the project area. Project construction could increase turbidity, erosion, and sedimentation, directly impacting mussels within and adjacent to the project area; best management practices will be implemented to minimize these impacts. Prior to construction, a mussel survey may be necessary to determine the possible occurrence of any mussel species within the Mississippi River portion of the project area.

There are no federally listed endangered, threatened, or proposed candidate species or listed critical habitat identified in Sherburne County. A determination of effect for federally listed species will be made closer to the time of construction.

Land Use

Current land use along the project corridor includes both developed (e.g., residential, commercial, agricultural) and undeveloped (e.g., open space, wetlands, woodlands, etc.) land uses. There is a gravel mining district in northern Elk River adjacent to the Highway 169 corridor. Based on information provided in the *City of Elk River Comprehensive Plan* (August 2004), it is anticipated that some land may be available for redevelopment in the future as aggregate resources are depleted. Other land uses within the project area are not expected to differ greatly in the future or to be significantly altered by the proposed project.

Impacts on Water Resources

Wetlands

Approximately 39.1 acres of wetland impacts will result from the proposed project. Approximately 28.8 acres of wetland impacts are anticipated as a result of Highway 169 improvements and interchange construction. Remaining impacts are anticipated as a result of frontage/backage road construction and BNSF Railway relocation (see Section VII.A.12 of the EA/EAW). Unavoidable wetland impacts will be replaced following the current laws and rules in place at the time of construction.

Mississippi River

Possible impacts to the Mississippi River include dredging/excavation impacts resulting from bridge pier construction/reconstruction, dredging/excavation impacts from placement of new bridge piers in the river, fill impacts from the bridge abutment, and fill impacts from access road construction. The details of these potential impacts are unknown at this time and will be identified in greater detail during final design, closer to project implementation. Permitting for fill impacts to the Mississippi River will be coordinated with the Corps of Engineers and DNR, consistent with regulatory requirements at the time of the project's final design and construction.

Wellhead Protection Area and Drinking Water Supply Management Area

Highway 169 crosses a wellhead protection area and drinking water supply management area in the City of Elk River near Main Street. City staff was contacted regarding any impacts to wells within and adjacent to the project area. Final design studies will determine whether additional measures such as lining of proposed stormwater ponds is necessary to prohibit infiltration into groundwater. No impact to the drinking water supply is anticipated as a result of the proposed project.

Water-Related Land Use Management District

Floodway Impacts

The project will result in fill impacts to the Mississippi River floodway. Approximately 560 feet of transverse impact to the floodplain is anticipated. A hydraulic analysis conducted for the EA indicated that no significant floodplain impacts are anticipated as a result of the project.

Shoreland Overlay District

The City of Elk River has designated a shoreland overlay district adjacent to the Mississippi River. The boundary of the shoreland overlay district corresponds to the Mississippi wild and scenic river land use district.

Mississippi River (State-Designated Wild and Scenic River)

The Mississippi River, from St. Cloud to Anoka, is a state-designated wild and scenic river. The existing Highway 101 bridge over the Mississippi River is located within a segment of the river designated as recreational. Recreational users of the Mississippi River may be temporarily affected by project construction activities, as recreational navigation may be temporarily obstructed around work areas. No substantial changes to the use of this segment are anticipated with reconstruction of the Highway 101 river crossing.

The City of Elk River zoning code identifies regulations relating to wild and scenic river protection within the City. Within the project area, the wild and scenic river district boundaries extend from the Mississippi River to the Highway 10 alignment. Work on the State Trunk Highway system is not subject to any adopted local zoning codes. Construction best management practices will be identified during final design, consistent with permitting requirements in place at the time of project implementation

The DNR's Mississippi Scenic Riverway Management Plan (2004) prohibits new bridges across wild and scenic rivers unless transportation agencies can document need, and directs new bridges to existing bridge corridors unless there is no feasible alternative. As this bridge reconstruction would be located in an existing river crossing, it is consistent with the DNR's management plan.

Erosion and Sedimentation

There is a potential for erosion during construction, due to the presence of areas of Highly Erodible and Potentially Highly Erodible land and steep slopes within the project area. Impacts to wetlands and water quality will be minimized by the use of best management practices. Excess fill material will not be deposited in wetlands or other environmentally sensitive areas.

Water Quality

There were 145 wells identified within 0.25 miles of the Highway 169 corridor. The identified wells will not be impacted by the proposed project. If any additional wells are discovered during construction of the proposed project, they will be sealed in accordance with state and local regulatory requirements. A portion of the project crosses a wellhead protection area and drinking water supply management area in the City of Elk River. No impact to the drinking water supply is anticipated as a result of the proposed project.

The project will increase the amount of impervious surface in the corridor, thereby increasing stormwater runoff that may contain roadway pollutants. Stormwater management will utilize BMPs, including conveyance of runoff to stormwater detention ponds. Both urban and rural stormwater conveyance systems will be used in the Highway 169 corridor. The standards established by the National Pollutant Discharge Elimination System (NPDES) permit program will be followed to mitigate the water quality and quantity impacts created by the project. In addition, coordination will occur with the Cities of Elk River and Zimmerman as well as the Sherburne County Soil and Water Conservation District (SWCD). The standards and rules of each of these entities will be followed to the extent practicable.

Air Quality

The project will improve intersection operating capacity and reduce the amount of idling vehicles in the project area, and therefore will not result in an exceedance of carbon monoxide (CO) standards in Minnesota. Emissions of projected priority mobile source air toxics (e.g., acetaldehyde; acrolein; benzene; 1,3-butadiene; formaldehyde; and diesel particulate matter) are expected to decline between the present and year 2030 due to vehicle emissions improvements.

Noise

Many locations along the corridor exceed both daytime and nighttime noise standards under existing conditions. State daytime and nighttime noise standards are predicted to be exceeded along the project corridor with future (2030) Build conditions. Construction of the project will result in increases in traffic noise due to increases in traffic volumes, changes in traffic speeds, and changes in the vertical and horizontal alignment of project-area roadways. Some locations are predicted to experience decreases in traffic noise due in part to depression of Highway 169 through the urban Elk River area. Noise walls were modeled adjacent to Highway 169 at various locations throughout the project corridor. One 20-foot high wall located along the east side of Highway 169 between School Street and 193rd Avenue that achieved 5 dBA noise reduction was found to be cost effective and is proposed for construction.

Traffic noise impacts and mitigation will be re-assessed in the future at the time of project implementation, based on conditions and land uses in place at that time. Decisions on noise mitigation to be included in the project will be based on the results of this future noise impact re-evaluation. Final mitigation decisions will be subject to final design considerations, input from affected property owners, and community input.

Railroad

The project includes realignment of the BNSF Railway to the north of its existing alignment from 171st Avenue to the Great River Energy Site. The proposed realignment will increase impervious surfaces and result in wetland fill and right of way impacts. Right of way acquisition and relocation will be conducted in accordance with federal regulations.

Mn/DOT District 3 is proposing reconstruction of Highway 10 to a freeway facility through Elk River (SP 7102-123). The Highway 10 project includes construction of the BNSF Railway on a new alignment to the north of its existing alignment from the GRE Site to Proctor Avenue. The impacts associated with the realignment of the BNSF Railway through Elk River are described in the Highway 10 EA/EAW.

It is likely that construction of the proposed BNSF Railway alignment, grade separations through downtown Elk River, and new bridge over Highway 169 would occur as one project.

Archaeological and Historic Resources

The proposed project has been reviewed pursuant to Section 106 of the National Historic Preservation Act of 1966 (as amended), in accordance with 36 CFR 800. This project would result in an adverse effect to the St. Paul and Pacific (BNSF) Railroad Corridor, a historic resource eligible for listing in the NRHP. Mitigation for adverse effects to the St. Paul and Pacific (BNSF) Railroad Corridor are described in detail in a Memorandum of Agreement (MOA). This MOA is included as Appendix H of the EA/EAW.

No eligible archaeological sites were found during Phase I archaeological surveys; however, six parcels could not be surveyed in the Zimmerman area because property access was not granted. These parcels will be surveyed in the future when access is obtained.

Farmland

The project will convert approximately 5.7 acres of prime farmland and 2.5 acres of statewide and locally important farmland to roadway and/or highway right of way. Overall, the project will impact 54.5 acres of potential cropland. The Elk River urban service district currently extends to the proposed 197th Avenue interchange. The Zimmerman orderly annexation area includes the CSAH 4 interchange and frontage road improvements to the south to Livonia Township. Approximately 18 percent of the cultivated land impacted by the proposed project is within an existing or planned urban service district. A majority of the farmland impacted by the project is located within Livonia Township. Over the planning timeframe of the proposed project, development of agricultural land and open space is anticipated.

Parkland/Recreational Areas

Canoe and Boating Routes

The portion of the Mississippi River located within the project area is designated as a canoe and boating route. Recreational navigation may be temporary affected during reconstruction of the existing bridge and construction of the parallel crossing. No permanent impacts to recreational navigation of the river are anticipated as a result of the project.

Reconstruction of the Highway 10/101/169 system interchange would result in closure of vehicular access to Babcock Memorial Rest Area. Refer to the discussion of Babcock Memorial Rest Area below for information on Mississippi River access.

Grant-In-Aid Snowmobile Trail

The existing Highway 169 corridor from Highway 10 in Elk River to the City of Milaca, including the project area, is a DNR Grant-in-Aid snowmobile trail. Conversion of Highway 169 to a freeway facility does not require Mn/DOT to revoke the limited use permits that allow snowmobile use within the highway right of way. Freeway standards do not prohibit snowmobile use on Trunk Highway facilities. Snowmobile use could be allowed within the Highway 169 right of way under future Build conditions, unless future legislation or safety concerns required snowmobile use to be prohibited from the highway.

Babcock Memorial Rest Area

Babcock Memorial Rest Area is located along the north bank of the Mississippi River in the southwest quadrant of the Highway 10/101/169 interchange within the Highway 10 right of way. The Department of Natural Resources (DNR) supervises, operates, and maintains the easternmost portion of the site as a Water Access Site (WAS) through an interagency agreement and limited use permit with Mn/DOT. The Babcock Memorial Rest Area WAS is identified in the DNR's *Metro Area Rivers Guide*, providing boating access to the Mississippi River (carry-in and vehicular boating). The City of Elk River supervises, operates, and maintains the remaining portion of the site as a wayside through a limited use permit with Mn/DOT.

Vehicular access is currently permitted to the site through an access point along Highway 10 west of the Highway 10/101/169 interchange. Vehicular access to this site from Highway 10 would be eliminated with the reconstruction of the Highway 10/101/169 interchange. The site would continue to be accessible by boaters and canoeists from the Mississippi River. The City of Elk River Parks Map identifies a future trail along the east bank of the Mississippi River from downtown Elk River through Babcock Memorial Rest Area. A vehicular access will be maintained from Highway 10 to accommodate maintenance access.

Nearby sites will continue to provide access for recreational uses on the river. Nearby access points are located at Otsego County Park (two miles upstream of Babcock Memorial Rest Area at river mile 885.2) and in Dayton at the confluence with the Crow River (Crow/Dayton Public Access) (four miles downstream at river mile 879.0). Otsego County Park includes carry-in canoe access. The Crow/Dayton Public Access includes a boat ramp and parking facilities.

Baldwin Park

Baldwin Park is a one-acre neighborhood park located east of Highway 169 and north of Main Street. The proposed Highway 169 improvements are located within the existing highway right of way adjacent to Baldwin Park. The proposed design includes construction of retaining walls along Highway 169 to minimize impacts to adjacent properties. These retaining walls would be located within the existing right of way limits.

Great Northern Trail

Sherburne County has identified an abandoned Burlington Northern Railroad corridor as a north-south regional trail facility from Elk River to Princeton (Great Northern Trail). At its closest point (CSAH 25 in Livonia Township), the railroad corridor is located approximately 1,100 feet west of the Highway 169 corridor. The proposed CSAH 25/19 interchange design will accommodate an underpass for the future extension of the Great Northern Trail.

Right of Way Acquisitions and Relocation

A total of approximately 507 acres of right of way (306 affected parcels) will be acquired for the proposed project. Based on preliminary engineering and design, 33 single-family residences and 44 commercial businesses would be relocated as part of the proposed project. Right of way acquisition and relocation will be conducted in accordance with federal regulations.

Economic Impacts

Tax losses due to property acquisition for the proposed project are not expected to have a substantial impact on the overall tax base for the Cities of Otsego, Elk River, and Zimmerman or Sherburne County.

The proposed project is not anticipated to result in any long term diversion of traffic volumes away from the commercial and industrial areas along Highway 169. Right of way acquisition will result in the relocation of 44 commercial businesses. Because this project is not anticipated to be constructed within the timeframe of Mn/DOT's current 20-year plan, it is expected that businesses at these locations will change over time; some of the affected commercial parcels may undergo total redevelopment during the planning timeframe of the project. Where redevelopment does occur, it will provide the opportunity for Mn/DOT to work with local communities to preserve or acquire right of way with minimal impact to existing business owners and employees. Negative business impacts will be offset by improvements to safety and access within the corridor.

UNRESOLVED ISSUES

The following issue was unresolved at the time of approval of the EA/EAW:

Highway 169 Pedestrian Bridge in Elk River. An existing pedestrian bridge is located along Highway 169 in the City of Elk River approximately 0.2 miles north of School Street at 189th Avenue. This pedestrian bridge is owned by the City of Elk River and was constructed in response to pedestrian safety needs for crossing Highway 169. The pedestrian bridge serves to connect residential land uses along the east side of Highway 169 to schools and commercial land uses located along the west side of Highway 169.

Because of expansion of Highway 169 to a six-lane facility and changes to the profile of the highway, the existing pedestrian bridge will be removed with conversion of the Highway 169 to a freeway-type facility. The proposed Highway 169 improvements include construction of sidewalks along the School Street bridge over Highway 169, along with sidewalk connections to existing City facilities. Sidewalks along the proposed School Street bridge (approximately 0.2 miles south of existing pedestrian bridge) and the proposed 193rd Avenue bridge (approximately 0.5 miles north of existing pedestrian bridge) will function to provide grade-separated crossings of Highway 169 for pedestrians and bicyclists.

The need for a replacement pedestrian bridge over Highway 169 will be dependent upon pedestrian and bicycle needs identified by the City of Elk River as part of their local transportation and City plans. The pedestrian bridge could be replaced with construction of the proposed project at its existing location. It is also possible that the pedestrian bridge could be replaced in a new location, based on future bicycle and pedestrian needs identified by the City of Elk River. The location for the new pedestrian bridge will be determined in the future (closer to project implementation) in coordination with the City of Elk River.

Funding for construction of a replacement pedestrian bridge, if needed, would be identified prior to construction of the project.

PROJECT SCHEDULE, COSTS, AND FUNDING

The estimated cost of the proposed project (construction, right of way, engineering) is $523 million to $542 million (2008 dollars). There is no funding in place for construction of the Preferred Alternative. Conversion of Highway 169 to a freeway facility from Highway 10 in Elk River to the north limits of Zimmerman is identified as a performance-based investment need for the 2019-2028 timeframe in the *Mn/DOT District 3 20-Year Highway Investment Plan* 2009-2028 (August 2009). Construction and right of way costs (acquisitions and relocations) would be subject to change as a result of land use changes/redevelopment and future land costs/property values between the present and time of construction.

The anticipated project schedule is summarized below.

<u>Anticipated Project Schedule</u>

Activity	**Anticipated Date**
• Corridor Study and Preliminary Design Studies	2006 – 2008
• EA/EAW	2009 – 2010
• Public Hearing/Opportunity for Public Hearing	Summer 2010
• EIS Need Determination	Fall 2010
• Right of Way Acquisition	To be determined
• Begin Construction	To be determined

ANTICIPATED PERMITS AND APPROVALS

Table ES-1 identifies the permits and approvals anticipated for the construction of the proposed project.

TABLE ES-1
AGENCY PERMITS, APPROVALS, AND OTHER REQUIRED ACTIONS

Permit/Approval	Agency	Action Required
Federal		
Environmental Assessment	FHWA	Approval
EIS Need Decision	FHWA	Determination
Section 404 – Individual Permit	U.S. Army Corps of Engineers	Permit
Section 10 [1]	U.S. Army Corps of Engineers	Permit
Section 106	FHWA Mn/DOT Cultural Resources Unit (CRU)	Determination of Effect
As-built drawings of replacement bridge (after construction)	U.S. Coast Guard	Coordination
State		
Environmental Assessment	Mn/DOT	Approval
EIS Need Decision	Mn/DOT	Approval
Section 401	Minnesota Pollution Control Agency	Certification
Public Waters Work Permit [1]	DNR	Permit
Wetland Conservation Act (Replacement Plan) for new roads and capacity expansion projects	Mn/DOT with review by Board of Soil and Water Resources, and Minnesota Department of Natural Resources	Approval/Review
Temporary Water Appropriation Permit (if needed)	DNR	Permit
Mussel Relocation Permit (if needed) [1]	DNR	Permit
National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit	MPCA	Permit
Section 106 (Historic / Archeological)	Minnesota State Historic Preservation Officer (SHPO)	Concurrence
Local		
Municipal Consent	City of Zimmerman City of Elk River City of Otsego	Approval
County Ditch Permit	Sherburne County	Approval
Other		
Railroad Agreement	Mn/DOT and BNSF Railway	Written Agreement
Railroad Permit	Mn/DOT and BNSF Railway	Permit (stand-alone or part of Agreement)

(1) Associated with reconstruction of Highway 101 bridge over the Mississippi River.

TABLE ES-2
SUMMARY OF PREFERRED ALTERNATIVE IMPACTS
(Highway 169: Elk River to Zimmerman)

Impact	Related EA/EAW Section	Preferred Alternative Impact	Mitigation
Total Cost (millions of dollars)	V.A.	The estimated cost of the project is $523 million to $542 million (year 2008 dollars).	Not applicable.
Benefit-Cost Analysis (compared to No Build Alternative)	IV.C	Preferred Alternative would result in B/C ratio of 1.3. Project is economically justified as B/C ratio is greater than 1.0.	Not applicable.
Land Use	II.B and VII. A Item 9	Current land uses along the project corridor includes both developed (e.g., residential and commercial) and undeveloped (e.g., open space, wetlands, woodlands, etc.) land uses. Compatible with existing and planned, future land uses.	Not applicable.
Potentially Contaminated Sites (medium-risk and high-risk sites)	VII.A Item 9	Fifty (50) known / potentially contaminated sites along project corridor. Forty-one (41) sites identified as medium-risk sites. Four (4) sites identified as high-risk sites. See Table ES-3.	All potentially contaminated properties identified in the Phase I will be evaluated for their likelihood to be impacted by construction and/or acquired as right of way. If necessary, a plan will be developed for properly handling and treating contaminated soil and/or groundwater during construction.
Fish, Wildlife and Ecologically Sensitive Resources	VII.A Item 11	Potential impacts to nesting swallows with reconstruction of Highway 101 bridge over Mississippi River.	Inspection prior to construction and identification of protective measures.
		Potential impacts to river environment, including aquatic species, during reconstruction of Highway 101 bridge over Mississippi River.	Standard construction practices such as erosion control measures and riverbank stabilization measures.
		Potential impacts to black sandshell mussels (*Lingumia recta*) (state species of special concern) during reconstruction of Highway 101 bridge over Mississippi River.	Mussel survey may be necessary prior to construction to determine the possible occurrence of any mussel species within the project area.

TABLE ES-2 continued
SUMMARY OF PREFERRED ALTERNATIVE IMPACTS
(Highway 169: Elk River to Zimmerman)

Impact	Related EA/EAW Section	Preferred Alternative Impact	Mitigation
Fish, Wildlife and Ecologically Sensitive Resources	VII.A Item 11	Suitable habitat for Blanding's turtle (*Emydoidea blandingii*) (state threatened species) within project area.	Fact Sheet and Flyer included in the project special provisions. Needs for surveys and additional measures evaluated prior to construction.
		No federally listed endangered, threatened, or proposed, candidate species or listed critical habitat currently identified in Sherburne County.	Re-evaluation for federally-protected species and critical habitat prior to construction.
Wetlands	VII.A Item 12	39.1 acres of wetland impacts • Impacts from highways and interchanges=28.8 acres (see Table ES-3 for impacts by interchange area) • Impacts from frontage roads=8.7 acres • Impacts from railroad relocation=1.6 acres	Unavoidable wetland impacts will be replaced following current laws and rules in place at time of construction. See discussion of wetland mitigation in Section VII.A Item 12 of EA/EAW.
Wellhead Protection Areas and Drinking Water Management Supply Area	VII.A Item 13	Wellhead Protection Area and Drinking Water Management Supply Area located at proposed Highway 169/Main Street interchange. No impact to the drinking water supply is anticipated.	Final design studies for Main Street interchange to determine if stormwater ponds should be lined to prevent infiltration to groundwater.
Water-Related Land Use Management District	VII.A Item 14	*Floodplain Impacts* Approximately 620 feet of transverse impact to the Mississippi River floodplain from reconstruction of Highway 101 bridge.	Final design to minimize floodplain impacts. No mitigation necessary as Preferred Alternative does not result in substantial floodplain impacts.
		Mississippi River (State Wild and Scenic River) No changes to recreational designation anticipated with reconstruction of the Highway 101 river crossing; crossing is consistent with guidance to use existing river crossing locations.	No mitigation necessary as no changes to designation are anticipated.
Erosion and Sedimentation	VII.A Item 16 and VII.A Item 19	Steep slopes and highly erodible land (HEL) and potentially highly erodible land (PHEL) within project area. Potential for erosion during construction as soils are disturbed by excavation and grading.	Best management practices (BMPs) implemented during construction. Temporary and permanent erosion control plans identified in the final plans as required by NPDES permitting for construction sites.

TABLE ES-2 continued
SUMMARY OF PREFERRED ALTERNATIVE IMPACTS
(Highway 169: Elk River to Zimmerman)

Impact	Related EA/EAW Section	Preferred Alternative Impact	Mitigation
Water Quality: Surface Water Runoff	VII.A Item 17a and VII.A Item 17b	Increase in impervious surface area. Stormwater detention basins expected to mitigate the adverse effects of increased impervious surfaces and pollutant generation. Stormwater detention basins will also provide discharge attenuation. Stormwater discharged from the proposed project will not likely have a significant impact on the water quality of the identified receiving water bodies.	Standards and rules established by National Pollutant Discharge Elimination System permit program followed to mitigate the water quality and quantity impacts created by the project to the greatest extent practicable. Regulatory framework revisited during final design.
Safety Concerns	IV.B.2	Preferred Alternative reduces congestion on Highway 169 and eliminates conflicting movements at existing intersections and accesses.	No mitigation necessary.
Traffic Operations	VII.A Item 21	Freeway operations (weave movements) at acceptable Level of Service C or better under 2030 Build conditions offer substantial improvement over No-Build operations. Interchange intersection operations at acceptable Level of Service D or better under 2030 Build conditions.	No impacts associated with traffic operations analysis; no mitigation necessary.
Access Changes	VII.A Item 21	Closure/consolidation of existing at-grade access to Highway 169.	Interchange access at select locations. Local access replaced with system of frontage roads. Parcel acquisition where access is not replaced.
Air Quality	VII.A Item 22	2030 vehicle-related carbon monoxide (CO) concentrations in the study are likely to be lower than existing concentrations even considering the increase in project-related and background traffic. Overall future mobile source air toxics (MSATs) expected to be substantially lower than today due to implementation of EPA's vehicle and fuel regulations.	No mitigation necessary. See discussion of air quality in Section VII.A Item 22 of EA/EAW.

TABLE ES-2 continued
SUMMARY OF PREFERRED ALTERNATIVE IMPACTS
(Highway 169: Elk River to Zimmerman)

Impact	Related EA/EAW Section	Preferred Alternative Impact	Mitigation
Traffic Noise	VII.A Item 24 and Appendix G	Modeled noise receptor locations exceed State daytime and nighttime noise standards under future (2030) Build conditions. Noise impacts to be re-evaluated closer to project implementation based on regulations in place and conditions at time of final design and construction.	Noise wall proposed at one location along east side of Highway 169 between School Street and 193rd Avenue. Other analyzed locations did not meet reasonableness criteria (minimum 5 dBA reduction or cost-effectiveness below $3,250/dBA/receptor).
Cultural Resources	VII.A Item 25	St. Paul and Pacific (BNSF) Railroad Corridor determined eligible for NRHP. Adverse effect to St. Paul and Pacific (BNSF) Railroad Corridor as a result of Preferred Alternative. Archaeological surveys could not be completed for six parcels in the Zimmerman area because property access was not granted. These parcels will be surveyed in the future when access can be obtained.	Memorandum of Agreement (MOA) documents mitigation for adverse effect to St. Paul and Pacific (BNSF) Railroad Corridor.
Farmland	VII.A Item 25	Agricultural land to be acquired. Approximately 2.5 acres of statewide and locally important farmland is located within project corridor from Highway 10 to 239th Avenue. Approximately 5.7 acres of prime farmland soils are located within the proposed CSAH 25/19 interchange area. Approximately 18 percent of cultivated land affected by project within urban service district.	Acquisition of right of way in accordance with Federal regulations.
Parks, Recreation Areas or Trails	VII.A Item 25 and VII.B.2	*Mississippi River (Canoe and Boating Route)* No permanent impacts to recreational navigation of the river are anticipated as a result of the project.	No mitigation necessary.
		Grant-In-Aid Trail Freeway standards do not prohibit snowmobile use on Trunk Highway facilities. Snowmobile use could be allowed within the Highway 169 right of way under future Build conditions.	No mitigation necessary. Limited use permit allows snowmobile use in highway right of way.

TABLE ES-2 continued
SUMMARY OF PREFERRED ALTERNATIVE IMPACTS
(Highway 169: Elk River to Zimmerman)

Impact	Related EA/EAW Section	Preferred Alternative Impact	Mitigation
Parks, Recreation Areas or Trails	VII.A Item 25 and VII.B.2	*Babcock Memorial Rest Area* Closure of vehicle access to Babcock Rest Area (water access site) from Highway 10. Access for maintenance and emergency vehicles only. Access to site available to boaters and canoeists from Mississippi River. Nearby access to Mississippi River at Otsego County Park and Crow/Dayton Public Access.	No mitigation necessary. Operation of water access site by limited use permit.
		Baldwin Park (City of Elk River) No impacts anticipated	No mitigation necessary.
		Pedestrian Bridge (Elk River) Removal of pedestrian bridge over Highway 169 north of School Street.	Sidewalk facilities on proposed School Street bridge (approximately 0.2 miles to south of pedestrian bridge). Future pedestrian bridge could be constructed.
		Great Northern Trail Planned Sherburne County trail located west of proposed CSAH 19/25 interchange. No impacts anticipated.	No mitigation necessary. CSAH 19/25 interchange design to accommodate future grade-separated crossing for Great Northern Trail.
Visual Impacts	VII.A Item 26	The proposed project not anticipated to create adverse visual impacts. The proposed project will alter the existing visual elements with views of new transportation infrastructure.	Design and visual quality elements consistent with Mn/DOT policy in place at time of construction.
Infrastructure and Public Services	VII.A Item 28	Relocation of BNSF Railway to north of existing alignment to accommodate Highway 169.	No mitigation necessary. Coordination and Railroad Agreement with BNSF Railway during final design.
Cumulative Impacts	VII.A Item 29	Low potential for adverse cumulative impacts to resources directly or indirectly affected by the project.	Not applicable.
Social Impacts	VII.B.1	Proposed project is not expected to cause any adverse impact to any community or neighborhood.	No mitigation necessary.

TABLE ES-2 continued
SUMMARY OF PREFERRED ALTERNATIVE IMPACTS
(Highway 169: Elk River to Zimmerman)

Impact	Related EA/EAW Section	Preferred Alternative Impact	Mitigation
Section 4(f) Resources and Section 6(f) Involvement	VII.B.2	Section 4(f) evaluation for adverse effect to St. Paul and Pacific (BNSF) Railroad Corridor. No Section 6(f) properties within the project area.	Mitigation for impacts to St. Paul and Pacific (BNSF) Railroad Corridor documented in Memorandum of Agreement (see Appendix H of EA/EAW).
Indirect Effects	VII.B.4	Access closures and the construction of interchanges will create the potential for changes in land use.	No mitigation necessary. Local communities comprehensive planning activities and zoning ordinances to identify future land uses along project corridor.
Environmental Justice	VII.B.5	No known minority populations within project area. No known low-income populations within the project area. Local officials did not have knowledge of any readily identifiable low-income populations that would be affected by the proposed project.	No mitigation necessary as no minority or low income populations within the project area.
Fiscal Impacts	VII.B.6	Tax losses due to property acquisition less than 1.5 percent of the year 2007 property tax revenue for Sherburne County.	Not applicable.
		Tax losses due to property acquisition for the proposed project are less than 3.5 percent of the year 2007 property tax revenue for City of Elk River.	
		Tax losses due to property acquisition for the proposed project are less than 7.5 percent of the year 2007 property tax revenue for City of Zimmerman.	

TABLE ES-2 continued
SUMMARY OF PREFERRED ALTERNATIVE IMPACTS
(Highway 169: Elk River to Zimmerman)

Impact	Related EA/EAW Section	Preferred Alternative Impact	Mitigation
Right of Way Impacts	VII.B.6 and VII.B.7	Approximately 507 acres of right of way (306 affected parcels) would potentially be required for the proposed project. Total residential relocations include 33 single-family residences. Total commercial relocations include 44 businesses (commercial businesses, professional offices). See Table ES-3 for right of way impacts by interchange area.	Acquisition and relocation of property due to the proposed project will be conducted in accordance with the Uniform Relocation and Real Property Acquisition Act of 1970, as amended by the Surface Transportation Uniform Relocation Assistance Act of 1987 and 49 C.F.R. 24, effective April 1989 (revised January 2005).
Construction Impacts	VII.B.8	Temporary construction impacts related to traffic operations and access, air quality, noise, railroad operations, water quality, and disposal of excess materials.	Standard construction best management practices (in place at time of construction) to be implemented to minimize temporary construction-related impacts.

TABLE ES-3
SUMMARY OF PREFERRED ALTERNATIVE IMPACTS
(Highway 169: Elk River to Zimmerman By Interchange Area)

		Preferred Alternative Impacts (By Interchange Area)											
		Segment 1: Urban Elk River						Segment 2: Rural Elk River and Livonia Township				Segment 3: Zimmerman	
								221st Avenue		CSAH 25/19		CSAH 4 (Main Street)	
Impact	**Related EA/EAW Section (page number)**	**Hwy 10/101/169 System Interchange**	**Main Street**	**School Street**	**193rd Avenue/Jackson Street**	**197th Avenue**	**BNSF Railway**	**Interchange Area**	**Frontage Road**	**Interchange Area**	**Frontage Road**	**Interchange Area**	**Frontage Road**
Potentially Contaminated Sites (high- and medium-risk sites)	VII.A Item 12	6 high-risk sites. 1 medium-risk site.	7 high-risk sites. No medium-risk sites.	4 high-risk sites. No medium-risk sites.	3 high-risk sites. No medium-risk sites.	2 high-risk sites. No medium-risk sites.	1 high risk site. No medium-risk sites.	5 high-risk sites. 1 medium-risk site.		5 high-risk sites. 1 medium-risk site.		8 high-risk sites. 1 medium-risk site.	
Wetlands (acres) (% of total)	VII.A Item 13	0 acres (0 percent)	0 acres (0 percent)	0 acres (0 percent)	0.6 acres (1.5 percent)	0.4 acres (1 percent)	1.6 acres (4.1 percent)	1.0 acre (2.6 percent)	2.0 acres (5.1 percent)	2.8 acres (7.2 percent)	3.3 acres (8.4 percent)	24.1 acres (61.6 percent)	3.4 acres (8.7 percent)
Right of Way (acres) [(1)]	VII.B.7	20.5 acres [(2)]	23 acres	9.6 acres	9 acres	5 acres	12 acres	76.8 acres	42.4 acres	122 acres	29 acres	83.8 acres	73.8 acres
Right of Way (affected parcels) (partial and total acquisition) [(1)]	VII.B.7	11 parcels [(2)]	50 parcels	34 parcels	20 parcels	12 parcels	5 parcels	9 parcels	31 parcels	21 parcels	35 parcels	48 parcels	31 parcels
Right of Way (relocations) [(3)]	VII.B.7 Appendix I	0 Residential 4 Commercial	2 Residential 14 Commercial	5 Residential 7 Commercial	0 Residential 13 Commercial	1 Residential 0 Commercial	No relocations	0 Residential 3 Commercial/ Agricultural	0 Residential 0 Commercial	4 Residential 4 Commercial/ Agricultural [(4)]	No relocations	21 Residential 3 Commercial	No relocations

(1) Includes right of way impacts (acres and parcels affected) associated with local road improvements.
(2) Includes portion of project area along Highway 101 between CSAH 39 interchange and Mississippi River.
(3) Includes right of way impacts (relocations) associated with local road improvements.
(4) Includes relocations along Highway 169 north of proposed CSAH 25/19 interchange because of access closures.

I. REPORT PURPOSE

This Environmental Assessment/Environmental Assessment Worksheet (EA/EAW) provides background information including:

- need for the proposed project
- alternatives considered
- environmental impacts and mitigation
- agency coordination and public involvement

This EA/EAW was prepared as a part of the National Environmental Policy Act (NEPA) process and state environmental review process to fulfill requirements of both 42 USC 4332 and M.S. 116D. At the federal level, the EA/EAW is used to provide sufficient environmental documentation to determine the need for an Environmental Impact Statement (EIS) or that a Finding of No Significant Impact (FONSI) is appropriate. At the state level, the EA/EAW is used to provide sufficient environmental documentation to determine the need for a state EIS or that a Negative Declaration is appropriate.

At the state level, this document also serves as an Environmental Assessment Worksheet (EAW). Minnesota Rules 4410.1300 allows the EA to take the place of the EAW form, provided the EA addresses each of the environmental effects identified in the EAW form. This EA includes each of the environmental effects identified in the EAW form.

The Minnesota Department of Transportation (Mn/DOT) is the proposer and the Responsible Governmental Unit (RGU) for this project. Preparation of an EAW is considered mandatory under the following subsection:

> Minnesota Rule 4410.4300 subp. 22 (B) – *For construction of additional travel lanes on an existing road for a length of one or more miles*

This document is made available for public review and comment in accordance with the requirements of 23 CFR 771.119 (d) and Minnesota Rules 4410.1500 through 4410.1600.

The purpose of this EA/EAW is to document the potential impacts to the human and natural environment as a result of the proposed Trunk Highway 169 (Highway 169) improvements from the City of Otsego to the City of Zimmerman.[1] As discussed in the project cost and funding section (see Sections V.A. and V.B), the project is not identified in the Mn/DOT District 3 Long-Range Transportation Plan, and there is no funding for construction of the proposed project. The purpose of the project is to identify improvements to Highway 169 from Elk River to Zimmerman that will enhance long-term regional mobility while also preserving local access, and to allow the cities to plan development and local transportation

[1] Highway 169 is a US Highway and is part of the National Highway System. All US Highways in Minnesota are on the state trunk highway (TH) system.

networks consistent with future roadway plans. The project includes improvements to Highway 101 from Highway 169 in Elk River to County State Aid Highway (CSAH) 39 in Otsego; this portion of roadway crosses the Mississippi River. It is anticipated that when funding for construction of the proposed project, or portions of the proposed project, becomes available, a re-evaluation of the EA/EAW, at a minimum, will be required to update the potential impacts to the human and natural environment.

II. PROJECT DESCRIPTION

A. LOCATION AND SETTING

The proposed project is located in the City of Otsego, in Wright County, Minnesota, and in the City of Elk River, Livonia Township, and the City of Zimmerman, in Sherburne County, Minnesota (see Figure 1). The southern project terminus is the Highway 101/CSAH 39 interchange in Otsego. The northern project terminus is 277th Avenue north of Zimmerman. The total length of the project corridor is approximately 13 miles.

B. LAND USE

Current land use along the project corridor includes both developed and undeveloped land uses. For the purposes of this EA/EAW, the Highway 169 project corridor was sub-divided into three segments based on current land use patterns and development (see Figures 2A-2C). These three segments are described below.

Segment One: Urban Elk River and Otsego

The portion of Highway 101 south of the Mississippi River is in the City of Otsego and is within the City's urban service boundary (City of Otsego, Urban Service Staging Plan, November 22, 2004). The majority of land along this portion of Highway 101 is currently zoned as PUD (Planned Unit Development). Land use along the west side of Highway 101 is commercial. Land use along the east side of Highway 101 is vacant/agricultural, although commercial land uses are located at the Highway 101/CSAH 39 interchange. Future land use is indicated as being commercial throughout this portion of Highway 101 (City of Otsego, Future Land Use Map, May 2005).

Urban Elk River is defined as the area included within the City's "urban service area". The urban service boundary defines the area that currently receives, and is planned and guided to receive, municipal sanitary sewer and water service. The northern boundary of the urban service area along Highway 169 terminates at 197th Avenue NW (City of Elk River, 2007 Land Use Map, Revised September 19, 2007). The *City of Elk River Comprehensive Plan* (2004) also identifies the northern boundary of the urban service area as 197th Avenue NW.

Current land use along the urban section of the project corridor includes a variety of developed land uses. Adjacent to the Highway 10/101/169 interchange the land use is light industrial. Throughout the rest of the area, land use is primarily highway business with some high-density residential. Nearby land uses include urban residential, schools, highway business, and the central business district in downtown Elk River.

Future land use within urban Elk River, as identified in the 2004 *City of Elk River Comprehensive Plan*, is similar to the current land use. The highway business land use follows the Highway 169 corridor with the majority of land adjacent to the highway between the Highway 10 interchange and 197th Avenue planned for highway businesses, such as discount retailers, grocery, and general merchandise. The *Comprehensive Plan* provides for future highway business commercial growth at the Highway 169/CSAH 33 interchange.

Segment Two: Rural Elk River and Southern Livonia Township

Rural Elk River is defined as the area outside the Elk River urban service area, north of 197th Avenue NW, and includes portions of the City of Elk River and Livonia Township. Segment Two begins north of 197th Avenue NW and terminates at the Livonia Township/City of Zimmerman boundary.

Between the urban service boundary (197th Avenue NW) and Elk River city limits, land use transitions to rural residential. The rural residential designation is assigned to land that is currently developed and guided for future growth for residential uses but will not be served by municipal sewer and water. East of Highway 169, existing land use is primarily rural residential with nearby areas identified as undeveloped. A designated gravel-mining district and the Elk River Landfill are located west of Highway 169.

The *Comprehensive Plan* identifies a staged conversion of undeveloped/agricultural land to rural residential over the next three years. A substantial area in northern Elk River outside the urban service area, adjacent to Highway 169, is being held in reserve for future commercial development; however, municipal utilities are not currently available to support development in this area. The *Comprehensive Plan* seeks to guide development in vacant land already served by utilities before opening new areas for growth. The reserve status allows planning to facilitate the desired form of development in the future.

Based on information described in the *Elk River Gravel Mining District Final Environmental Impact Statement* (FEIS) (1994), the majority of the resources in the gravel mining area will be extracted over the next 60 years. It is anticipated that the southern portions of the mining district (south of CSAH 33) will be available for development over the next five years. The ability to provide this area with municipal services will be an essential factor in planning for future land use. The current boundary for the Elk River urban service district extends to 197th Avenue, south of the gravel mining area. The Elk River Landfill use is planned to continue in the same location.

Existing land uses within the Livonia Township segment of the project corridor were identified using the *Sherburne County Comprehensive Plan*, aerial photographs of the area, and field verification. The *Sherburne County Comprehensive Plan* identifies the area within the Highway 169 corridor as predominantly rural residential. Gravel mining operations are located west of Highway 169 at 239th Avenue. Business and industrial uses are located near the proposed

CSAH 25/29 interchange, west of Highway 169. Livonia Township staff indicated that the area east of Highway 169 is being planned for commercial and industrial uses. A business park with some commercial uses is planned east of Highway 169 just north of 249th Avenue in Livonia Township.

Segment Three: Zimmerman and Northern Livonia Township

The Zimmerman portion of the study area (Segment Three) is defined as the portion of the study area within the City of Zimmerman municipal limits north to 277th Avenue in Livonia Township.

Existing land use in Zimmerman is dominated by agricultural/rural and single family residential uses. Adjacent to the Highway 169 corridor, there is a mix of agricultural/rural and highway commercial land uses with single-family residential and vacant/undeveloped land nearby. Commercial uses are concentrated near the Highway 169/CSAH 4 intersection, close to Main Street. South of CSAH 4, the area east of Highway 169 is primarily agricultural/rural while west of Highway 169 is highway commercial with some single family residential. According to the *City of Zimmerman Comprehensive Plan*, vacant land west of Highway 169 is planned for highway commercial use. South of the commercial/business area at CSAH 4 and west of Highway 169 is a church along with an industrial use. As discussed above, a business park is planned in Livonia Township just north of 249th Avenue. The land north of the future business park is within the Zimmerman city limits, and that area will continue to be designated for agricultural/rural use.

Existing land use north of the commercial area at CSAH 4 is single-family residential with some townhomes and/or duplexes west of Highway 169. There is also a mobile home park located in this area. The area east of Highway 169 along Lake Fremont is currently single-family residential. The *City of Zimmerman Comprehensive Plan* indicates that these areas will continue as residential areas in the future.

C. EXISTING CONDITIONS

Highway 169 runs north-south in the study area from Highway 10/101 in Elk River to 277th Avenue in Zimmerman. It is a four-lane, rural-section expressway characterized by multiple at-grade roadway and driveway intersections and traffic signals at major intersections. In addition, the existing Highway 169 at-grade facility acts a barrier to east-west travel across the highway for local traffic, as well as other modes (e.g., pedestrians and bicyclists). The Highway 169 project area corridor includes 44 at-grade access points (full access and right-in/right-out) from Highway 10/101 in Elk River to 273rd Avenue in Zimmerman.[2] There are currently four traffic signals on Highway 169 in the 2.5 miles through the urban section of

[2] Several access points may be located at one at-grade intersection location (e.g., a local road located across from a business or residential driveway). When multiple accesses at an intersection are considered as one access point, the Highway 169 project corridor includes 44 access points. When each access to Highway 169 within the study area is considered individually, the Highway 169 project corridor includes 53 access points, as shown in Tables 1 through 3.

Elk River. There are no traffic signals along Highway 169 in the rural Elk River and Livonia Township area (Segment Two). There is one traffic signal at CSAH 4 in Zimmerman (Segment Three). The following describes the existing at-grade access points along the Highway 169 project corridor.

Segment One: Urban Elk River and Otsego

Highway 101 was recently converted to a four-lane freeway in Wright County. Highway 101 access is provided at the CSAH 39 interchange; there is no access to Highway 101 between the CSAH 39 interchange and the Mississippi River.

Highway 169 in the urban segment of Elk River includes 10[2] at-grade access points from the Highway 10/101 interchange to 197th Avenue. Table 1 summarizes existing access on Highway 169 between Highway 10/101 and CSAH 25.

TABLE 1
SUMMARY OF EXISTING ACCESS ON HIGHWAY 169
URBAN ELK RIVER

Type of Access	Full Access	Right-in/Right-out
State Trunk Highway[1]	2	0
County State Aid Highway/County Road	1	0
Local Road	5	2
Private	1	1
TOTAL[2]	**9**	**3**

[1] Includes two at-grade intersections in the Highway 10/101/169 system interchange.
[2] Several access points may be located at one intersection (e.g., a local road across from a driveway). These are counted separately in the total for this table, but consolidated as one access point for the total of 10 access points cited in the text.

Segment Two: Rural Elk River and Southern Livonia Township

In rural Elk River and Livonia Township, the Highway 169 corridor includes more than 20 at-grade access points from north of 197th Avenue to the Township boundary with the City of Zimmerman (does not include 253rd Avenue). This portion of the study area includes the recently constructed Highway 169/CSAH 33 interchange, which is located approximately one mile north of 197th Avenue in Elk River. Table 2 summarizes existing access on Highway 169 in rural Elk River and Livonia Township.

TABLE 2
SUMMARY OF EXISTING ACCESS ON HIGHWAY 169
RURAL ELK RIVER AND SOUTHERN LIVONIA TOWNSHIP[1]

Type of Access	Full Access	Right-In/Right-Out
County State Aid Highway/County Road	4	0
Local Road	6	1
Private[2]	14	7
TOTAL[3]	**24**	**7**

(1) Does not include the CSAH 33 interchange.
(2) One business access point is located at the Highway 169/CSAH 19 intersection.
(3) Several access points may be located at one intersection (e.g., a local road across from a driveway). These are counted separately in the total for this table, but consolidated as one access point for the total of 23 access points cited in the text.

Segment Three: Zimmerman and Northern Livonia Township

The Highway 169 corridor includes 12 at-grade access points from 253rd Avenue to 273rd Avenue. These access points provide full access or right-in/right-out only access to public roadways, businesses, and private residences. Table 3 summarizes existing access on Highway 169 within the Zimmerman city limits.

TABLE 3
SUMMARY OF EXISTING ACCESS ON HIGHWAY 169
ZIMMERMAN AND NORTHERN LIVONIA TOWNSHIP

Type of Access	Full Access	Right-In/Right-Out
County State Aid Highway/County Road	1	0
Local Road	6	2
Private	1	2
TOTAL	**8**	**4**

D. PROPOSED ACTION

The purpose of the proposed project is to address safety concerns, capacity and operational issues, and maintain the functionality of Highway 169 as a principal arterial route from Highway 10 in Elk River to CSAH 4 in Zimmerman. South of this segment, the roadway is already a freeway and meets the guidelines for a High Priority IRC. This segment was chosen because Mn/DOT has identified the corridor as a High Priority IRC to CSAH 4 in Zimmerman, the northern terminus for this project. The southern terminus, at Highway 101 and CSAH 39 in Otsego, was chosen because operations at the systems interchange at Highway 10/101/169 dictated the need for roadway improvements south of the systems interchange.

The total length of the project corridor is approximately 13 miles. The proposed project includes construction of the Highway 169 project corridor as a limited access freeway facility, including a system of interchanges, overpasses, and frontage/backage roads that replace the current at-grade intersections on Highway 169.

The proposed Build Alternative is described in detail in Section IV.B.2.

III. PURPOSE AND NEED FOR PROJECT

The Highway 169 corridor is an important north-south principal arterial route in central Minnesota. This route connects Minnesota's central lakes region with the greater Twin Cities metropolitan area as well as the growing trade centers of Princeton, Zimmerman, and Elk River. Increasing congestion and traffic volumes along the corridor threaten Highway 169's ability to deliver safe and efficient transportation service. The purpose of the proposed project is to address safety concerns, capacity and operational issues, and maintain the functionality of Highway 169 as a principal arterial route within the project limits. The project identifies a design concept that will be the basis for right of way preservation and that will inform local land use and transportation network planning. Right of way acquisition would occur when funding becomes available; construction is not programmed.

The purpose of this report is to identify and address any social, economic, or environmental impacts that may be associated with the proposed design concept and to identify the best alternative to meet the long-term regional mobility needs while preserving local access needs.

A. HIGHWAY 169'S ROLE IN THE STATEWIDE TRANSPORTATION SYSTEM

Highway 169's importance in the statewide transportation system has been identified in two regional transportation studies completed since 1999 – the Mn/DOT *Statewide Interregional Corridor (IRC) Study* (November 1999) and the Mn/DOT *Highway 101/169 Corridor Management Plan* (April 2002). These documents are discussed below.

1. Statewide Interregional Corridor (IRC) Study

The *IRC Study* identified and categorized Minnesota's Interregional Corridors and developed policies to manage them in such a way as to ensure that statewide mobility and traveler safety is maintained. The *IRC Study* defined the IRC system as 2,926 miles, or about 56 percent, of the existing state principal arterial system. The study noted that traffic volumes on the IRC system are expected to double by 2020. These growth trends further threaten the efficient movement of goods and people between regional centers. Mn/DOT has identified Highway 101/169 as a High Priority IRC from I-94 in Rogers to CSAH 4 in Zimmerman. The Highway 169 project corridor (Highway 10 in Elk River to CSAH 4 in Zimmerman) is part of this High Priority IRC.

The *IRC Study* states that high priority IRCs should "function at a free-flow level of operations, with a minimum of 60 mph speeds and minimal conflicts and interruptions to traffic flow." The *IRC Study* identifies Highway 169 as below this target for existing and future mobility performance. The study also identifies this segment of Highway 169 as at risk for signal and access point proliferation, which can significantly impair a corridor's ability to meet safety and mobility targets.

2. Highway 101/169 Corridor Management Plan

The *Highway 101/169 Corridor Management Plan (CMP)* identified performance goals for the Highway 169 project area corridor based on statewide target speed performance goals as described in the *IRC Study*. In order to meet those performance goals, the *CMP* identified the following corridor needs that should be addressed:

- **Safety:** Safety issues were identified at CSAH 4 in Zimmerman, as well as the Elk River intersections at Main Street, School Street, and Jackson Avenue.
- **Operations:** The intersection capacity analysis found that by 2025 signalized intersections in Elk River and Zimmerman would operate at an unacceptable level of service resulting in long queues, delays, and congestion. The number of signalized intersections in Elk River contributes to lower speeds along this segment of Highway 169 and safety and operational issues.
- **Corridor Speed:** The target average speed for the Highway 169 High Priority IRC from Elk River to Zimmerman is 60 miles per hour (mph). Based on year 2001 data documented in the CMP, the Highway 169 corridor from Elk River to Zimmerman is performing at an average speed of 52 mph, below the target speed for High Priority IRCs. The CMP predicted that by 2025 under No-Build conditions, average Highway 101/169 High Priority IRC speed (Rogers to Zimmerman) will fall below the high priority IRC target during peak travel periods, with an average speed of 12 mph. The average speed for the project segment from Elk River to Zimmerman will fall below the high priority IRC target during peak travel periods, with an average speed of 26 mph. The CMP identified signalized intersections in Elk River and Zimmerman as factors contributing to the below performance target speeds.

B. SAFETY NEEDS

Safety on Highway 169 is a concern due to high traffic volumes traveling at high speeds through at-grade intersections with a mix of large and small vehicles as well as vehicles pulling trailers. A safety analysis was performed for the Highway 169 project corridor in the cities of Elk River and Zimmerman and Livonia Township to identify safety issues along the existing highway. Crash rates (crashes per million vehicle miles or million entering vehicles) for both the Highway 169 mainline (i.e., roadway segments) and Highway 169 intersections were identified and compared to statewide averages for similar facilities. Historical crash records obtained from Mn/DOT roadway segment and intersection crash databases were used to determine the number of recorded crashes for the three-year period between 2003 and 2005.[3] The data includes only those crashes reported to the Minnesota Department of Public Safety (DPS).[4] Results of the safety analyses (Elk River Technical Memorandum 1 (March 16, 2007) and the Highway 169 Zimmerman Technical Memorandum 1 (May 31, 2006)) are discussed below.

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[3] Mn/DOT bases crash rates and severity rates on three-year timeframes.

[4] Due to a change in the DPS database maintenance process, it is possible that the 2003 crash database may not be complete. Mn/DOT anticipates that missing data is primarily for property damage only crashes. The underreporting of these types of crashes yields two results: (a) the crash rates reported in this document may be lower than rates using a complete dataset and (b) the severity rates reported in this document may be higher than rates calculated using a complete dataset.

Over 460 crashes occurred on the Highway 169 mainline between Highway 10/101 and 273rd Avenue between 2003 and 2005. Of the Highway 169 mainline crashes reported between 2003 and 2005, nearly 40 percent were at intersections or driveways (see Table 4).

TABLE 4
CRASH SUMMARY BY RELATIONSHIP TO INTERSECTION (2003-2005)
HIGHWAY 169 MAINLINE

	At Intersection or Driveway	Not at Intersection or Driveway	At Interchange	Other, Unknown, or Not Specified	TOTAL
Elk River	104	169	26	23	322
Zimmerman	71	63	N/A	11	145

The safety analysis found that the crash rate on Highway 169 from Highway 10/101 to 239th Avenue is 1.2 crashes per million vehicle miles, and the severity rate is 1.7 (see Table 5). The crash rate on Highway 169 from CSAH 25 in Livonia Township to 273rd Avenue north of Zimmerman is 1.1 crashes per million vehicle miles, and the severity rate is 1.6. These rates are greater than the statewide average for rural, four-lane expressway facilities, as shown in Table 5.

TABLE 5
HIGHWAY 169 MAINLINE CRASH AND SEVERITY RATE (2003-2005)
HIGHWAY 10/101/169 TO 273rd AVENUE

				Crash Rate		Crash Severity Rate	
Roadway	**From**	**To**	**Total Roadway Crashes**	**Roadway**	**Statewide Average(1)**	**Roadway**	**Statewide Average(1)**
Highway 169	Highway 10/101/169 Interchange(2)	0.5 miles north of 239th Ave.	322	1.2	0.8	1.7	1.3
Highway 169	CSAH 25	273rd Ave.	145	1.1	0.8	1.6	1.3

Notes:
(1) Statewide averages are for a rural, four-lane expressway for years 2004-2006. Data from 2003 were not used due to unreliable data in the Department of Public Safety database.
(2) Count includes crashes within the interchange area.

The crash rate on Highway 169 at CSAH 4 is 1.9 crashes per million entering vehicles, nearly 2.4 times the statewide average. Rear-end and right-angle crashes make up the majority of all crashes recorded on Highway 169 at the CSAH 4 intersection. Large numbers of rear-end crashes often indicate congestion (e.g., queues on Highway 169 at the CSAH 4 intersection) or unexpected conditions (e.g., high mainline speeds combined with frequent at-grade access).

According to the Highway 101/169 Corridor Management Plan (2002), the CSAH 4 intersection in Zimmerman represents one of the greatest safety challenges along the Highway 169 corridor.

A review of more recent data shows that the Highway 169/CSAH 4 intersection ranked within the 99th percentile statewide for the three-year period between 2000 and 2002. With 69 recorded crashes from 2000 to 2002, the Highway 169/CSAH 4 intersection ranked 27th in the state and 4th in Mn/DOT District 3 for Minnesota trunk highway intersection crashes. In terms of crash severity, the Highway 169/CSAH 4 intersection ranked 101st in the state and 14th in Mn/DOT District 3 for the three-year period between 2000 and 2002. As noted in the CMP, "[t]he isolation of the traffic signal and the high speeds of approaching traffic on Highway 169 at the intersection are factors likely attributable to the high crash rate at CSAH 4."

Of the total roadway crashes reported on Highway 169 in the project area for the 2003 to 2005 timeframe, five crashes included a fatality and 150 crashes included injuries of varying degrees. Four of the five crashes that included fatalities occurred within the Livonia Township and Zimmerman portion of the project area. Crashes that included property damage only accounted for approximately 67 percent of the total number of crashes reported during this period (see Table 6).

TABLE 6
HIGHWAY 169 CRASH SEVERITY (2003-2005)
HIGHWAY 10/101/169 to 273rd AVENUE

Roadway	From	To	Crash Type			Total Segment Crashes
			Fatality	Injury	Property Damage Only	
Highway 169	Highway 10/101/106	0.5 miles north of 239th Ave.	1	111	210	322
Highway 169	CSAH 25	273rd Ave	4	39	102	145
TOTAL FOR PROJECT CORRIDOR			**5**	**150**	**312**	**467**

Crash data for fatal and type A (incapacitating) injury crashes was reviewed for the five-year period from 2001-2005[5] to determine any patterns between these types of accidents and existing at-grade access on Highway 169 within the project corridor. For the five-year period from 2001 to 2005, 18 total crashes were fatalities or type A injury crashes (7 fatalities; 11 type A injury). Of the 18 total crashes that included a fatality or type A injury, eight of these crashes involved a turning movement at an existing intersection. Four of the eight crashes that occurred on Highway 169 between CSAH 25 in Livonia Township and 273rd Avenue in Zimmerman involving a fatality or type A injury crash for the 2001 to 2005 timeframe occurred at or near the Highway 169/CSAH 4 intersection.

Safety on Highway 169 is a concern due to high mainline traffic volumes and speeds, along with the proliferation of at-grade access and the mix of large and small vehicles. As highlighted by the results of the safety analysis described above, there is a need to improve safety on Highway 169 in Elk River, Livonia Township, and Zimmerman. In addition, a significant concern with respect to safety is the increasing traffic volumes forecast for Highway 169. As traffic volumes increase on Highway 169, the number of gaps available diminishes for users accessing Highway 169 at unsignalized intersections. Consequently, as traffic volumes increase,

[5] Fatal and type A injury crashes are more rare events and were therefore evaluated on a longer five-year timeframe.

users will take more risks when entering the traffic stream from side streets and the safety problems documented above will likely increase.

C. EXISTING AND FUTURE TRAFFIC CONGESTION

Highway 169 from Highway 10/101 in Elk River to 277th Avenue north of Zimmerman currently experiences congestion problems during the p.m. peak hours. Existing traffic volumes, signalized intersections, and frequency of at-grade access points along the corridor contribute to congestion problems along this segment and negatively impact mobility. See Section II.C for discussion of existing access points along Highway 169.

A traffic operations analysis was performed for existing and future No-Build conditions as shown in Table 7 and detailed in the Traffic Operations Memoranda in Appendix E. The signalized intersections were analyzed using the Synchro/SimTraffic software and unsignalized intersections were analyzed using the Highway Capacity Software. Capacity analysis results identify a Level of Service (LOS), which indicates how well an intersection is operating. The LOS results are based on average delay per vehicle. Intersections are given a ranking from LOS A through LOS F. LOS A indicates the best traffic operation and LOS F indicates an intersection where demand exceeds capacity. LOS E indicates that the intersection is operating at, or very near, its capacity and that drivers experience substantial delays. LOS A through D is generally considered acceptable by drivers.

The existing (2006) a.m. peak hour analysis shows that all key intersections operate at an acceptable LOS D or better with the exception of Highway 169/CR 77 in Segment Two (rural Elk River and southern Livonia Township). This intersection shows high delay in the a.m. peak hour on the side street approach, which results in poor side-street levels of service. The existing (2006) p.m. peak hour analysis shows that several key intersections operate at an unacceptable LOS E or worse, mostly due to side street delays.

Under No-Build (2030) conditions, most intersections along the Highway 169 corridor report high delays and unacceptable LOS in both the a.m. and p.m. peak hour periods as a result of increased ADT volumes without additional lane capacity. The results of the analysis shown in Table 7 indicate that almost all intersections will operate at unacceptable LOS in the future during both the a.m. and p.m. peak hours. This is due to increasing traffic volumes on the mainline, which will exceed capacity and cause significant queuing and delays on the mainline as well as side streets.

TABLE 7
EXISTING AND FUTURE NO BUILD HIGHWAY 169 INTERSECTION CAPACITY
A.M. AND P.M. PEAK HOUR INTERSECTION LEVEL OF SERVICE[1]

Intersections with Highway 169	Existing (2006)		No Build (2030)	
	A.M.	P.M.	A.M.	P.M.
Segment One: Urban Elk River				
Highway 169/Highway 10 South Ramps[2]	A/B	**D/F**	**F/F**	**E/F**
Highway 169/Highway 10 North Ramps	B	**E**	**E**	**F**
Highway 169/Great River Energy Entrance[2]	A/A	**D/E**	A/A	**D/E**
Highway 169/Main St	D	**F**	**F**	**F**
Highway 169/5th St[2]	A/B	A/A	**F/F**	**F/F**
Highway 169/School St	D	C	**F**	**E**
Highway 169/191st Ave[2]	A/A	A/A	**E/F**	B/B
Highway 169/193rd Ave	C	C	**F**	**E**
Highway 169/197th Ave	B	B	**F**	D
Segment Two: Rural Elk River and Southern Livonia Township				
Highway 169 East Ramps/205th Ave[2]	A/A	A/A	A/A	A/A
Highway 169/CR 77 (213th Ave) [2]	A/**F**	A/D	**F/F**	**F/F**
Highway 169/Elk River Bituminous Entrance[2]	A/B	B/**F**	B/**F**	D/**F**
Highway 169/221st Ave[2]	A/C	A/C	**F/F**	**F/F**
Highway 169/225th Ave[2]	A/D	A/**F**	**E/F**	**E/F**
Highway 169/Waste Management Entrance[2]	A/C	A/A	D/**F**	C/**F**
Segment Three: Zimmerman				
Highway 169/CSAH 4	D	**E**	**F**	**F**

(1) LOS is a measure of congestion. LOS D or better is generally considered acceptable by drivers. LOS E and F are unacceptable.
(2) Indicates a side-street stop controlled intersection. The overall LOS is followed by the LOS on the side-street approach.

Existing traffic volumes contribute to congestion at key intersections along the project corridor. Existing (2006) and No Build (2030) average daily traffic volumes along Highway 169 are shown in Table 8. The forecast traffic growth on Highway 169 indicates that congestion and delays will continue to worsen throughout the project corridor.

TABLE 8
HIGHWAY 169 AVERAGE DAILY TRAFFIC VOLUMES

Location	Existing (2006) ADT [1]	No-Build (2030) ADT [3]
Highway 169 (north of Highway 10/101/169 interchange)	52,000	77,000
Highway 169 (Main Street to 193rd Avenue)	48,000	62,000 – 69,500
Highway 169 (193rd Avenue to CSAH 33)	34,500	60,000
Highway 169 (north of CSAH 77)	30,500	64,000
Highway 169 (south of CSAH 4 in Zimmerman)	29,930 [2]	49,000

(1) Minnesota Department of Transportation. 2008. The Minnesota Department of Transportation Website (online). 2006 Trunk Highway Volumes General Highway Map for Sherburne County, Minnesota, accessed 02-15-2008 at **http://www.dot.state.mn.us/traffic/data/maps/thcountymapdex.html**.

(2) Existing average daily traffic for Highway 169.

(3) 2030 ADT volumes were developed using a travel demand modeling process based on assumptions derived from the *Draft Sherburne County Transportation Plan* (2006) process. For a detailed summary of the Travel Demand Modeling process, see the Traffic Operations and Forecasts Memoranda in Appendix E.

D. HIGHWAY 169 ACCESS CONSIDERATIONS

There are a total of 44 at-grade access points along the 13-mile stretch of Highway 169 between Elk River and Zimmerman. This averages to approximately three to four access points per mile. Mn/DOT has developed an access management policy (adopted March 2002, effective July 2002) for the access management of the trunk highway system. The Mn/DOT access guidelines recommend that High Priority IRC and principal arterial roadway segments such as the Highway 169 project corridor be grade-separated facilities without any private access points. With approximately three to four access points per mile, the existing Highway 169 project corridor is not currently consistent with Mn/DOT's access guidelines. There is a need to manage access along the Highway 169 project corridor in order to maintain its function of providing mobility as a High Priority IRC and principal arterial roadway.

E. TRANSPORTATION NEED SUMMARY

The previous sections describe in detail the purpose and need for the proposed project. The basic transportation needs for the proposed project are summarized below:

- Crash data indicates there is a demonstrable safety problem along the Highway 169 corridor with crash and severity rates above the statewide average for similar facilities. Frequency of at-grade access points coupled with high mainline travel speeds contribute to the number of accidents and crash severity rate observed along the project corridor. This safety problem is likely to worsen if no improvements are made and as traffic volumes increase along the project corridor.
- Traffic operations analysis results indicate that several intersections along the Highway 169 corridor operate at an unacceptable LOS in the a.m. and p.m. peak hour. These conditions are expected to worsen if no improvements are made and as traffic volumes increase along the project corridor.

- The *Highway 101/169 CMP* included an evaluation of future travel speed performance for the Highway 169 corridor. Future travel speed performance for the Highway 169 project corridor is forecast to be 26.2 mph, below the performance standard for high priority IRCs.[6] There is a need to improve mobility along the Highway 169 corridor from Elk River to Zimmerman, consistent with its function as a high priority IRC.
- There are a total of 44 at-grade access points along the 13-mile stretch of Highway 169 between Elk River and Zimmerman. This averages to approximately three to four access points per mile. As a high priority IRC and principal arterial roadway, access management along Highway 169 should emphasize mobility. The Mn/DOT access guidelines recommend that roadway segments such as the Highway 169 project corridor be grade-separated facilities without any private access points. With approximately three to four access points per mile, the existing Highway 169 project corridor is not currently consistent with Mn/DOT's access guidelines.

F. EVALUATION CRITERIA

Both measurable and qualitative objectives were identified for the proposed project. These objectives were used to identify alternatives that address the transportation purpose and need for the project, as well as additional transportation goals and objectives identified during the project development process. The following evaluation criteria were used as quantitative and qualitative measurements of addressing the purpose and need:

- Studied alternatives should provide adequate capacity to accommodate high priority IRC speed performance goals (60 mph or greater).
- Studied alternatives should be consistent with Mn/DOT access guidelines for High Priority IRCs and principal arterial roadways in order to preserve and/or enhance mobility on Highway 169.
- Studied alternatives should provide adequate roadway capacity and geometrics on Highway 169 to accommodate future average daily traffic volumes.
- Studied alternatives should eliminate at-grade conflicts on the Highway 169 corridor.

Other Transportation Goals and Objectives

The following goals were additional transportation quantitative and qualitative measurements for the evaluation of alternatives:

- Studied alternatives should be consistent with current engineering standards.
- Studied alternatives should be consistent with current Mn/DOT interchange access spacing guidelines (i.e., one-mile spacing between interchange access points without auxiliary lanes in developed areas).

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[6] Since completion of the *IRC Study* and *Highway 101/169 CMP*, methodologies for evaluating IRC travel speed have been refined as described in the Statewide Transportation Plan (January 2009 Draft). Under this refined mobility performance measure, the Highway 169 High-Priority IRC still does not meet travel speed performance measures under future (year 2028) conditions.

- Studied alternatives should be consistent with current Mn/DOT practice of providing a minimum spacing of 750 feet between interchange ramp intersections and the first local road intersection.
- Studied alternatives should provide adequate intersection capacity and geometrics at ramp termini intersections. A critical lane analysis was used for the CSAH 19/25 and CSAH 4 interchanges to evaluate intersection capacity. A critical lane analysis is a higher-level planning analysis that provides an indication of whether an intersection is under, at/near, or over capacity. A critical lane volume greater than 1,400 vehicles per hour (vph) indicates an over capacity movement at a given intersection. A critical lane volume under 1,200 vph indicates a greater level of reserve capacity.
- Studied alternatives should provide local alternative access that replaces existing direct access to Highway 169. The location of local alternative access should be, to the extent feasible, consistent with City and Township plans.
- Studied alternatives should maintain and enhance existing and future roadway system connectivity within the project area.
- Land uses in rural Elk River and Livonia Township include gravel mining operations. Studied alternatives should be designed, consistent with current engineering standards, to accommodate gravel mining operations (e.g., heavy truck considerations).

In addition to the transportation goals and objectives listed above, the identified alternative(s) should accommodate year 2030 peak hour traffic volumes at an acceptable LOS D or better. The BNSF Railway line through Elk River is one of the busiest freight railroad lines in Minnesota. This line also services the Northstar Commuter Rail between Big Lake and downtown Minneapolis. Because of the importance of the BNSF Railway line as a freight and commuter rail corridor, the ability to maintain rail traffic was a key consideration in project development.

<u>Social, Economic, and Environmental Objectives</u>

In addition to the transportation goals and objectives listed above, it is necessary to consider social, economic, and environmental resource impacts as part of the highway project development process. Qualitative and quantitative measurements of potential social, economic, and environmental impacts were identified with the proposed roadway project. The following is a listing of criteria used in evaluating social, economic, and environmental impacts. These criteria were identified with input from local stakeholders as being more important in identifying the Preferred Alternative interchange types along the Highway 169 project corridor.

- Minimize right of way acquisition/relocation impacts.
- Minimize construction costs.
- Avoid or minimize impacts to wetlands.
- Consistency with local land use and transportation plans and zoning ordinances.
- The City of Elk River and the City of Zimmerman expressed a desire to preserve opportunities for redevelopment along the Highway 169 corridor. As such, studied alternatives should accommodate redevelopment opportunities, consistent with local land use plans.

IV. ALTERNATIVES

The *Highway 101/169 CMP* (2002) determined that Highway 169 from Highway 10 through Zimmerman must be converted to a freeway facility in order to meet IRC mobility goals, improve operations, and improve safety. The alternatives development process for the Highway 169 project through Elk River and Zimmerman involved the consideration of Highway 169 cross sections and vertical alignments as well as interchange and local access alternatives as described below. The alternatives evaluation process is documented in Technical Memorandum 5: Alternatives Development, Evaluation and Selection of Preferred Alternative dated January 28, 2009 (see Appendix B). A summary of the results of this process is provided below.

The evaluation of interchange concepts and the identification of preferred interchange types throughout the project corridor was a collaborative effort that included input from Mn/DOT staff, Local Advisory Committees (Elk River, Livonia, Zimmerman, and Sherburne County staff) and local officials. Input from the public and business community throughout the project development process was also important in identifying preferred alternative interchange types.

A. ALTERNATIVES CONSIDERED BUT REJECTED

1. Segment One: Urban Elk River Freeway Cross Section and Interchanges

Freeway Cross Section Alternatives Considered but Rejected

The *Highway 101/169 CMP* (2002) demonstrated there is the potential for some congestion with the four-lane freeway as the urban Elk River segment (Highway 10 to 197th Avenue) is forecast to operate at LOS D under future Build conditions. The six-lane freeway is forecast to operate at LOS C with speed performance above the goal for a High Priority IRC. The six-lane freeway represents an option for improving the Highway 169 corridor through Elk River with less congestion under future Build conditions relative to the four-lane freeway. Therefore, a four-lane freeway was rejected as the long-term vision for Highway 169 through Elk River (Highway 10 to 197th Avenue), but could be considered as a initial construction phase for the project.

Highway 10/101/169 Interchange Design Types Considered But Rejected

Alternative A1 (Full Regional Interchange – Four Level): Alternative A1 would provide high speed, free flow for all interchange movements (see Figure C-1, Appendix C). Accommodating high speeds for all movements would result in higher costs due to the number, height (four-level structures), and lengths of new bridges over the Mississippi River, BNSF Railway, and other roadways. Compared to the other two alternatives, Alternative A1 was estimated to require the greatest amount of new right of way, primarily in the southwest and southeast quadrants of the interchange. The eastbound Highway 10 to northbound Highway 169 ramp would potentially encroach upon the Mississippi River shoreline and its associated floodplain. Because of these impacts, along with the high costs associated with the extensive height and number of structures (relative to other alternatives), Alternative A1 was eliminated from further consideration.

Alternative A2 (Interchange with Loops – Three Level): Alternative A2 would provide free-flow conditions for all interchange movements. High speed ramps would be provided for major traffic movements, and lower speed loops would be provided for minor traffic movements (see Figure C-2, Appendix C). Accommodating high speeds for major traffic movements results in lower costs relative to Alternative A1, but still higher costs result due to the number, height (three-level structures), and lengths of new bridges over the Mississippi River, BNSF Railway, and other roadways. The northbound Highway 101 to eastbound Highway 169 ramp would also require additional right of way in the southeast quadrant of the interchange, although these right of way impacts would likely be similar in magnitude to Alternative A3 (Preferred Alternative; see Section IV.B.2). Because of the higher costs associated with three-level structures, Alternative A2 was eliminated from further consideration.

Highway 169/Main Street Interchange

Highway 169/Main Street Interchange Design Types Considered But Rejected

Standard Diamond Interchange: The standard diamond interchange concept would provide a single directional ramp for each entrance and exit movement to and from Highway 169 at a realigned Main Street. Under the standard diamond interchange concept, Main Street would be realigned to the north of its existing alignment to connect to CSAH 13 east of Highway 169. This alignment of Main Street would allow for a near perpendicular crossing of Highway 169 (see Figure C-3, Appendix C). The standard diamond interchange concept would result in substantial right of way impacts in all four quadrants of the interchange. Because of these right of way impacts, the standard diamond interchange concept was dismissed from further consideration.

Folded Diamond Interchange (Loops in **NW and NE Quadrants):** The folded diamond interchange (loops in NW and NE quadrants) (see Figure C-4, Appendix C) concept would result in right of way impacts in all four quadrants of the interchange. The local road connection from the northbound entrance ramp is not consistent with Mn/DOT standard practice of not permitting local roadway connections to interchange ramps. Without the local road connection to the northbound entrance ramp, accessibility to the northeast quadrant of the interchange is more limited. Because of these reasons, the modified diamond interchange was dismissed from further consideration.

Folded Diamond Interchange (Loops in the NW and SE Quadrants): The folded diamond interchange (loops in the NW and SE quadrants) (see Figure C-5, Appendix C) would minimize impacts to residential properties, was the least costly of the two alternatives, and would provide good connectivity to the commercial areas in northeast and southwest quadrants of the Main Street interchange. However, it was not identified as the preferred alternative because it would require the relocation of 18 to 22 businesses (northwest and southeast quadrants of the interchange) and would provide limited access to the commercial areas in the southeast quadrant of the interchange. Under the folded diamond (loops in the NW and SE quadrants) alternative, the first local intersection on Main Street east of Highway 169 would be restricted to right-in/right-out, and the first full access intersection would be located further to the east of the commercial area at Twin Lakes Road. Because of these impacts, the folded diamond alternative (loops in the NW and SE quadrants) was dismissed from further consideration.

School Street Interchange

Highway 169/School Street Interchange Design Types Considered But Rejected

School Street Overpass: Several initial design concepts for School Street included a bridge over Highway 169 with no direct access to Highway 169. Because the distance between Main Street and School Street is approximately 0.6 miles, an overpass only at School Street would increase the distance between consecutive interchanges along Highway 169 in Elk River, which is more consistent with Mn/DOT interchange spacing guidelines for urban areas (see Figure C-4, Appendix C). However, an analysis of existing traffic volumes and forecast (2030) volumes under Build conditions at School Street without access to Highway 169 found that the local roadway system and adjacent interchange access points would be over capacity without access at School Street. Because of these impacts, the overpass only concept at School Street was dismissed from further consideration.

Compressed Diamond Interchange with Braided Ramps: The compressed diamond interchange with braided ramps would provide a single directional ramp for each entrance and exit movement to and from Highway 169 at School Street (i.e., full access interchange). The interchange ramps would be compressed towards the Highway 169 mainline to minimize right of way impacts to adjacent properties (see Figure C-6, Appendix C).

The braided ramps would require two additional bridges to separate the Main Street and School Street ramp movements, increasing project costs relative to other alternatives considered for School Street. In addition, multiple comments were received from the Elk River business community concerning access to/from Highway 169 at School Street. Under the braided ramp concept, northbound motorists destined for the School Street area would have to access the School Street exit ramp south of Main Street. If a motorist inadvertently passes this exit, there is no opportunity to access School Street without "backtracking" from the Jackson/193rd Avenue interchange. Because of increased costs and concerns from the business community, the braided ramp concept was dismissed from further consideration.

Jackson Avenue/193rd Avenue/197th Avenue Interchanges

Highway 169/Jackson/193rd/197th Avenue Interchange Design Type Considered But Rejected

Split Diamond Interchange with Partial Access at Jackson/193rd Avenue: A split diamond interchange with partial access at Jackson/193rd Avenue would provide a bridge over Highway 169 at 197th Avenue and at Jackson/193rd Avenue. At 197th Avenue, access to Highway 169 would be provided by a half-diamond interchange oriented to the north (see Figure C-7, Appendix C). This concept does not accommodate southbound exits from Highway 169 to Jackson/193rd Avenue. Therefore, all southbound Highway 169 traffic destined for Jackson/193rd Avenue would have to exit at 197th Avenue, using the local roadway system to access Jackson/193rd Avenue. Because this concept concentrates southbound exiting traffic at 197th Avenue, it was dismissed from further consideration.

2. Segment Two: Rural Elk River and Livonia Township Interchanges

221st Avenue/Future CR 121 Interchange

Highway 169/221st Avenue Interchange Design Types Considered But Rejected

Standard Diamond Interchange: The standard diamond interchange concept would provide a single directional ramp for each entrance and exit movement to and from Highway 169 at 221st Avenue (see Figure C-8, Appendix C). The standard diamond interchange was estimated to result in the greatest impacts to the Elk River Landfill. The standard diamond interchange concept would also impact wetland areas in the northeast quadrant of the interchange (wetland W3-8, see Figure 4C, Appendix A). Because of these impacts, the standard diamond interchange concept was dismissed from further consideration.

Hybrid Tight Diamond Interchange: The hybrid tight diamond interchange concept would provide a single directional ramp for the entrance and exit movements to and from northbound Highway 169. The southbound Highway 169 exit ramp would be folded to the south, providing a loop in the southwest quadrant of the interchange. This concept was identified in an effort to avoid wetland and landfill impacts and minimize property impacts east of Highway 169. However, compressing the northbound entrance and exit ramps closer to the mainline would still impact wetlands areas in the northeast quadrant of the interchange, and would impact property in the southeast and northeast quadrants of the interchange. For these reasons, the hybrid tight diamond concept was dismissed from further consideration.

Folded Diamond Interchange: The folded diamond interchange concept would provide a loop ramp in the southwest and southeast quadrants of the interchange for southbound exit ramp and northbound entrance ramp movements. This interchange concept would avoid impacts to the landfill in the northwest quadrant and avoid impacts to wetlands in the northeast quadrant of the interchange. However, heavy truck movements associated with landfill activities on the downgrade of the southbound exit loop raised safety and operational concerns.

CSAH 25/19 Interchange

Highway 169/CSAH 25/19 Interchange Design Types Considered But Rejected

Standard Diamond: While potential residential relocations associated with the standard diamond concept were similar to the folded diamond concept (NW and SE quadrants), the standard diamond interchange was anticipated to result in greater overall right of way impacts (relative to other interchange concepts). Under the standard diamond interchange alternative, the south frontage road west of Highway 169 is also least consistent with access spacing goals (i.e., 750 feet from interchange ramps to first local road intersection). Because of these impacts, the standard diamond interchange concept was rejected from further consideration.

Folded Diamond (Ramps Folded to the North): The folded diamond (ramps folded to the north) concept would limit property impacts south of CSAH 25/19 and avoid woodland areas in the southwest quadrant of the interchange. However, this would also result require an estimated 140 to 150 acres of right of way, and result in 10 to 15 residential relocations. Because of these impacts, the folded diamond concept (ramps folded to the north) was rejected from further consideration.

Folded Diamond (Ramps Folded to the South): The folded diamond (ramps folded to the south) would limit property impacts north of CSAH 25/19. However, the folded diamond concept was estimated to require 150 to 160 acres of right of way to the south, and was estimated to result in 10 to 15 residential relocations. In addition, wetland areas to the west of the interchange prohibited frontage road connections in the southeast quadrant of the interchange. Because of these impacts, the folded diamond concept (ramps folded to the south) was rejected from further consideration.

3. Segment Three: Zimmerman CSAH 4 Interchange

Highway 169/CSAH 4 Interchange Design Type Considered But Rejected

Compressed Diamond Interchange on Existing Alignment: The compressed diamond interchange configuration was identified to minimize right of way impacts to the residential area along the east side of Highway 169 between the highway and Lake Fremont. Compressing the interchange ramps in towards one another minimizes the amount of right of way necessary to accommodate an interchange, and would likely impact fewer wetland areas.[7] It was also estimated that the compressed diamond interchange alternative would require fewer residential relocations. However, the compressed diamond interchange alternative was estimated to result in up to 15 commercial/business relocations, and could result in an additional 5 to 10 commercial/business relocations depending upon design details. These commercial property impacts were primarily the result of expanding CSAH 4 through downtown. The compressed diamond interchange alternative would also divide the Zimmerman business district into east and west sides of Highway 169. Construction staging for the compressed diamond alternative would be more complex, relative to the shifted alignment alternative, because the interchange would be constructed along the existing Highway 169 alignment. As a result, this would limit access to CSAH 4 and downtown Zimmerman during the construction period. Because of the commercial/business impacts, the compressed diamond interchange configuration was rejected from further consideration.

B. ALTERNATIVES UNDER CONSIDERATION, INCLUDING THE NO-BUILD ALTERNATIVE

1. No-Build Alternative

The No-Build Alternative would maintain Highway 169 as an at-grade expressway with no changes in access from the Highway 10/101/169 interchange in Elk River to the 273rd Avenue intersection in Zimmerman.

[7] Estimated wetland impacts did not include stormwater management considerations. Wetland impacts could increase with this alternative when stormwater management, depending upon stormwater design, because there are no infield areas within the interchange for stormwater treatment.

The No-Build Alternative would not address the purpose and need of the project as described below:

- The No-Build Alternative would not address safety needs along Highway 169. Maintaining the existing number of at-grade access points along the highway would perpetuate turning movement conflicts that contribute to the crash and severity rates observed on Highway 169.
- The No-Build Alternative would not address traffic operations on Highway 169. As shown in Table 5 in Section III.B, a majority of intersections evaluated on Highway 169 from Elk River to Zimmerman are projected to operate at an unacceptable LOS D or worse under year 2030 No-Build conditions.
- The No-Build Alternative would not provide adequate capacity to accommodate future traffic volumes on Highway 169. Future ADTs on Highway 169 are forecast to range from 77,000 in Elk River to 49,000 in Zimmerman (see Table 8). The increased traffic volumes will result in congestion throughout the project corridor.
- The No-Build Alternative would not meet travel speed performance goals for a High Priority IRC as identified by the *IRC Study*. The travel speed performance goal for a High Priority IRC is 60 mph. The travel speed for the Highway 169 corridor from Elk River to Zimmerman under future (2025) No-Build conditions, based on studies completed with the *Highway 101/169 CMP* (2002), is predicted to be 26.2 mph, below the performance goal for High Priority IRCs.
- The No-Build Alternative would perpetuate the 44 existing access points along Highway 169 in Elk River, Livonia Township, and Zimmerman, which is inconsistent with Mn/DOT guidelines for principal arterial/High Priority IRCs.

The No-Build Alternative would not address the purpose and need of the project as described in Section III, and is not identified as the preferred alternative for the project. However, the No-Build Alternative was used as the basis for comparison of social, economic, and environmental impacts of the Preferred Alternative described in this EA/EAW.

2. Build (Preferred) Alternative

The Build (Preferred) Alternative consists of a system of interchanges, overpasses, and frontage and backage roads to replace the existing at-grade intersections on Highway 169. The preferred alternative is illustrated in Figures 4A through 4E, Appendix A.

The Build Alternative provides for the closure/consolidation of access along Highway 169. As a result of the proposed project, 18 local roadway access points and 26 private access points will be closed with access replaced by a system of frontage and backage roads (see Table 26 in Section VII.A.21). It is important to note that frontage/backage roads may be constructed before the construction of interchanges on Highway 169. The City of Elk River, City of Zimmerman, Livonia Township, and Sherburne County will make final decisions on locations and alignments for frontage/backage roads and any local pedestrian/bike routes in the context of the larger local transportation system and development patterns at the time of frontage/backage road construction. If the decision is made to consider construction of alignments other than those discussed in this EA/EAW, additional design work, environmental analysis, and amendments to this EA/EAW, if needed, will be conducted at that time.

Major components of proposed roadway improvements are discussed for each segment of the Highway 169 corridor in the following sections and illustrated in Figures 4A through 4E, Appendix A. Typical sections for Highway 169, intersecting local roadways, interchange ramps, and the Highway 101 Mississippi River bridge are illustrated in Figures 5A through 5E, Appendix A.

Segment One: Urban Elk River

Highway 101 and Mississippi River Crossing

Under the Build Alternative, a third lane and auxiliary lanes would be added to Highway 101 in both the north and southbound directions from CSAH 39, over the Mississippi River, and to the Highway 10/101/169 interchange. The Build Alternative would require reconstruction of the existing Highway 101 Mississippi River crossing as a six-lane bridge with auxiliary lanes (see Figure 5A, Appendix A). A new structure would span the Mississippi River along the south side of the mainline river crossing. The typical section for this structure is shown in Figure 5B, Appendix A. This new bridge would accommodate northbound Highway 101 movements to east- and westbound Highway 10.

Highway 169 Mainline

Highway 169 Cross Section

The ultimate vision for Highway 169 through Elk River is a six-lane freeway facility. The six-lane freeway facility provides greater capacity to accommodate forecast increases in travel demand along the Highway 169 corridor. The six-lane Highway 169 freeway section is illustrated in Figure 5C, Appendix A.

The Build Alternative has been designed such that it can initially be constructed as a four-lane freeway facility through Elk River. When warranted, a third-lane will be added to the inside shoulders to provide additional capacity.

The Highway 169 Build Alternative through Elk River also includes a series of auxiliary lanes and a Collector-Distributor (C-D) road between Main and School Streets and School Street and 193rd Avenue. The C-D roads separate entrance/exit weave movements from the mainline. As described below, the Highway 169 profile is depressed through urban Elk River. Typical sections for the depressed Highway 169 mainline with auxiliary lanes and C-D roads are illustrated in Figure 5C, Appendix A.

Highway 169 Vertical Profile

The Highway 169 Build Alternative vertical profile is depressed compared to the surrounding environment. This is proposed because it minimizes the amount of reconstruction of local roadways that cross over the highway, and also because depressing the highway can provide some degree of traffic noise mitigation.

The extent to which the Highway 169 profile could be depressed was limited by groundwater elevations throughout the project corridor. The Highway 169 profiles were designed to maintain seven feet of clearance between the finished centerline elevation and the seasonal high groundwater elevation in order to maintain adequate groundwater separation in the roadside ditches. As such, the elevation of local roadways over Highway 169 was increased to provide the required clearance between Highway 169 and the bottom of bridges. Changing local road elevations to accommodate bridges over Highway 169 resulted in construction limits and impacts for the project to extend out beyond the highway corridor at interchange locations. These impacts are included in the evaluation of the Build Alternative throughout this EA/EAW.

Highway 10/101/169 System Interchange

The proposed Highway 10/101/169 interchange will be constructed as a two-level interchange that accommodates free-flow conditions for all movements. A two-phase signal is proposed to control the entrance movement from the northbound Highway 101 and southbound Highway 169 entrance ramp to eastbound Highway 10. This signal is forecast to operate at an acceptable LOS D during the a.m. peak hour and an acceptable LOS B or better under future (2030) Build conditions.

Future Mn/DOT projects that address transportation needs on Highway 10 east of the Highway 10/101/169 interchange will include additional study of the two-phase signal and access consolidation/changes on Highway 10 east of the Highway 10/101/169 system interchange.

BNSF Railway Relocation

The proposed project includes relocation of the BNSF Railway from near 173rd Avenue east of Highway 169 to the Great River Energy (GRE) site west of Highway 169 (approximately 6,000 feet) (see Figures 4A and 8, Appendix A). The proposed railroad right of way is designed to accommodate a future third track. The relocation of the BNSF Railway is needed to accommodate the proposed Highway 169 alignment north of the Highway 10/101/169 system interchange.

Under the proposed project, the Highway 169 alignment is shifted approximately 300 feet to the east of its existing alignment at the BNSF Railway crossing. The Highway 169 alignment shift is necessary to accommodate Highway 10/101/169 interchange ramp movements, to minimize right of way impacts to adjacent properties, and to accommodate a perpendicular crossing of the Mississippi River south of the interchange. As such, the existing BNSF Railway bridge over Highway 169 would be removed, and a new railroad bridge would be constructed. The railroad realignment and new bridge will maintain railroad operations during highway construction.

For the project, the proposed BNSF Railway alignment would tie in to the existing alignment at a point near the GRE site and a City of Elk River wastewater treatment plant west of Highway 169. This location is the closest point west of Highway 169 that the proposed BNSF Railway alignment can tie in to the existing alignment while maintaining minimum design standards. However, this tie-in location does introduce an additional curve in the railroad alignment, raising some concerns regarding rail operations. Mn/DOT will re-examine this issue in consultation with BNSF Railway during final design within the context of other projects in the Elk River area.

The proposed railroad relocation ties in to the existing track alignment near 173rd Avenue, east of Highway 169. There is a curve in the existing railroad alignment at this location. The proposed BNSF Railway alignment would match into this curve.

Impacts associated with the railroad relocation are described in Section VII.A.28.

Main Street/School Street Interchange

The Build Alternative improvements in this area include full access interchanges at both Main Street and School Street (see Figure 4A, Appendix A). Typical sections for Main Street and School Street are illustrated in Figure 5E, Appendix A. A C-D roadway system on Highway 169 between Main Street and School Street separates entrance and exit movements from the mainline.

- **Main Street:** The proposed Main Street interchange would be constructed as a single-point urban interchange with ramp connections to the C-D road north of Main Street. Main Street would be constructed as a four-lane urban roadway with turn lanes. Access to/from Line Avenue at Main Street will be replaced with access at CSAH 13. Carson Street would be reconstructed to extend further to the west, increasing intersection spacing on Main Street west of Highway 169. Carson Street would provide local access to the GRE facility in the northwest quadrant of the Highway 10/101/169 interchange. Bicycle/pedestrian walkways will be constructed along Main Street east and west of Highway 169.

- **School Street:** The proposed School Street interchange would be constructed as a full access compressed diamond interchange with ramp connections to a C-D road north and south of School Street. School Street, in the vicinity of the proposed interchange, would be reconstructed as a four-lane urban section roadway. The School Street/Dodge Street intersection would be relocated further to the east of its existing location to increase spacing between the interchange ramp intersections. Bicycle/pedestrian walkways will be constructed along School Street east and west of Highway 169.

Jackson/193rd/197th Avenue Interchange

Improvements in this area include construction of a split diamond interchange with full access at Jackson/193rd Avenue (see Figure 4B, Appendix A). Typical sections for Jackson/193rd Avenue and 197th Avenue are illustrated in Figure 5E, Appendix A. The Jackson/193rd Avenue interchange would provide full access to Highway 169. Access to northbound Highway 169 and access from southbound Highway 169 would be provided at 197th Avenue. Bicycle/pedestrian trails will be constructed across Highway 169 at Jackson Avenue/193rd Avenue and 197th Avenue.

A C-D road will connect the School Street and Jackson/193rd Avenue interchanges. This C-D road functions to separate ramp entrance and exit movements from the mainline through traffic.

Segment Two: Rural Elk River and Southern Livonia Township

Frontage and Local Road Improvements

The removal of direct access to Highway 169 (driveways and intersections) will be replaced by local roadway improvements and a system of frontage/backage roads. A preliminary concept has been developed for frontage/backage roads north of the existing CSAH 33 interchange. This frontage/backage road concept is illustrated in Figures 4B through 4D, Appendix A. Frontage/backage road alignments may change from this concept depending upon outcomes of gravel mining operations, local plans, and future development. Highway 169 north of CSAH 33 is largely undeveloped with large aggregate mining operations and the Elk River Landfill occupying substantial tracts of land in this area.

1. **Backage Road West of Highway 169 (CSAH 33 to 221st Avenue):** The proposed backage road would extend the existing CR 77 alignment north to an intersection with 221st Avenue (the location of a proposed Highway 169 interchange). This road would redirect existing Highway 169 access at CR 77. Because of the Elk River Landfill, no frontage/backage road system is proposed west of Highway 169 from 221st Avenue to 239th Avenue.

2. **Backage Road West of Highway 169 (239th Avenue to CSAH 25/19):** The proposed backage road would provide a local roadway connection between 239th Avenue and CSAH 25/19 (the location of a proposed Highway 169 interchange). This road would redirect existing Highway 169 access points at 239th Avenue, CSAH 25/19, and one private driveway located between 239th Avenue and CSAH 25/19.

3. **Frontage Road East of Highway 169 (CSAH 33 to CSAH 25/19):** The proposed frontage road would provide a local roadway connection between CSAH 33 (an existing Highway 169 interchange) and CSAH 25/19 (the location of a proposed Highway 169 interchange). This road would help redirect existing Highway 169 access points at 225th Avenue, 237th Avenue, CSAH 25/19, and five private driveways currently located between CSAH 33 and CSAH 25/19.

CSAH 33 Interchange

A standard diamond type interchange was recently constructed at Highway 169 and CSAH 33 in Elk River (see Figure 4B, Appendix A). This construction included access closure to Highway 169 and construction of frontage road in the northeast quadrant of the interchange. The proposed project will not affect the Highway 169/CSAH 33 interchange.

221st Avenue/Future CR 121 Interchange

Improvements at 221st Avenue/CR 121 include removal of direct access to Highway 169 at 221st Avenue and construction of a full-access interchange with a button-hook ramp configuration in the southwest quadrant and folded diamond ramps in the southeast quadrant. Highway 169 will bridge over 221st Avenue/CR 121. 221st Avenue/CR 121 will be depressed;

Highway 169 will remain at its existing grade. Typical sections of the Highway 169 bridges over 221st Avenue are illustrated in Figure 5B, Appendix A.

221st Avenue/CR 121 would be constructed on a shifted alignment to the south to avoid impacts to the Elk River Landfill and minimize fill impacts to wetlands east of Highway 169. 221st Avenue/CR 121 would initially be constructed as a two-lane roadway, with the ability to expand to a four-lane section when warranted by future development in rural Elk River and need for additional capacity. Typical sections for 221st Avenue (two-lane interim condition and four-lane full build-out condition) are illustrated in Figure 5F, Appendix A. Impacts described throughout this document are based on the four-lane section for 221st Avenue as a worst-case scenario. The Highway 169 bridges have been designed to accommodate the future expansion of 221st Avenue to a four-lane section roadway.

<u>237th Avenue (CR 74)/239th Avenue</u>

Improvements at 237th Avenue and 239th Avenue include removal of existing intersections, and the connection into the frontage/backage road systems proposed east and west of Highway 169. The frontage road system west of Highway 169 would connect 239th Avenue to CSAH 25. The frontage road system east of Highway 169 would extend from the CSAH 33 interchange in Elk River to 277th Avenue north of Zimmerman.

<u>CSAH 25/19 Interchange</u>

Improvements at CSAH 25/19 include removal of at-grade intersections and construction of a folded diamond interchange with loop ramps for the northbound and southbound on-ramps folded in the northwest and southeast interchange quadrants. CSAH 19 will be realigned to the south directly across from CSAH 25 to create one continuous roadway (these roads presently intersect Highway 169 at two "T" intersections 0.25 miles apart). Additional improvements include connection into the frontage/backage road systems proposed east and west of Highway 169. The frontage road system west of Highway 169 would connect 239th Avenue to CSAH 25. The frontage road system east of Highway 169 would extend from the CSAH 33 interchange in Elk River to 277th Avenue north of Zimmerman.

Segment Three: Zimmerman and Northern Livonia Township

<u>CSAH 4 Interchange</u>

Improvements at CSAH 4 include removal of the at-grade intersection and the construction of a hybrid diamond interchange with shifted Highway 169 alignment. Under the preferred alternative, Highway 169 would be shifted approximately 700 feet to the east of its existing alignment at CSAH 4. The hybrid diamond interchange includes a tight urban diamond ramp configuration west of Highway 169 and a loop in the southeast quadrant of the interchange. The east frontage road (Fremont Drive) will form the north leg of the CSAH 4/northbound ramp intersection. The CSAH 4 Bridge over Highway 169 has been designed to accommodate a pedestrian and bicycle facility along the north side of the bridge. The City of Zimmerman plans to develop a revised transportation plan, including trail and sidewalk plans, in the near future. The City will identify their trail and sidewalk facility needs through this planning process.

The proposed design does not preclude implementation of a pedestrian and bicycle facility along CSAH 4 from east of Highway 169 to downtown Zimmerman.

Additional improvements include an overpass at 257th Avenue south of CSAH 4 and a frontage road system east of Highway 169 that extends from CSAH 25/19 in Livonia Township to 257th venue. A frontage road system west of Highway 169 extends 2nd Street north of CSAH 4 to 277th Avenue.

Pedestrian and Bicycle Considerations

Direct access to Highway 169 for pedestrians and bicyclists would be removed under the Preferred Alternative. The proposed action would improve safety by providing grade-separated crossings of Highway 169 for pedestrians and bicyclists at interchanges and grade separations described above. In the urban segment of Elk River, pedestrians and bicyclists would be re-directed to the local trail and sidewalk system. The City of Elk River currently has existing sidewalks and trails parallel to Highway 169 on both sides of the highway. The City's parks and trail plan identifies locations of future sidewalks and trails along Highway 169 in locations where the network is incomplete.

In the rural segment of Elk River, Livonia Township, and the City of Zimmerman, once direct access to Highway 169 is removed and replaced with grade-separated crossings, pedestrians and bicyclists would be re-directed to parallel frontage and backage roads. This change could require pedestrians and bicyclists to cover additional distances to travel parallel with or to cross over Highway 169 compared to existing conditions. The distance traveled would depend upon final frontage/backage road locations, which will depend upon outcomes of local plans and future development.

Identifying the preferred alternative layout at this time will allow local units of government to revise and update their transportation plans (roadway network, multi-modal considerations including bicycle and pedestrian facilities, etc.) based on the Highway 169 improvements described in this document.

C. BENEFIT/COST ANALYSIS OF BUILD ALTERNATIVE

A Benefit/Cost Analysis (B/C Analysis) was completed for the proposed project in October 2008. The purpose of a B/C Analysis is to bring all of the direct effects of a transportation investment into a common measure (dollars), and to allow for the fact that benefits accrue over a long period of time while costs are incurred primarily in the initial years of the project. The primary elements that can be monetized for transportation projects are travel time, changes in vehicle operating costs, changes in crashes, and remaining capital value. The B/C Analysis can provide an indication of the economic desirability of an alternative, but results must be weighed by decision-makers along with the assessment of other effects and impacts. A B/C ratio of 1.0 is considered the minimum for economically justifying an improvement. The larger the ratio number, the greater the benefits per unit cost.

This B/C Analysis evaluated the difference in transportation costs between the No-Build Alternative and Build Alternative and found that the Build Alternative would result in a B/C ratio of 1.3. The proposed project is economically justified, as the B/C ratio is greater than 1.0. Details are provided in the Trunk Highway 169 – Elk River to Zimmerman B/C Technical Memorandum, dated October 8, 2008, available for review from Mn/DOT District 3.

V. PROJECT COSTS AND FUNDING

A. PROJECT COSTS

The estimated cost of the proposed project (construction, right of way, engineering) is $523 million to $542 million (2008 dollars). The right of way cost estimate (approximately $34 million) was based on 2008 assessed values from Sherburne County. The conversion of Highway 169 to a freeway facility in Elk River, Livonia Township, and Zimmerman is not programmed for funding at this time (see Project Funding discussion below). As such, construction and right of way costs (acquisitions and relocations) would be subject to change as a result of land use changes/redevelopment and future land costs/property values between the present and time of construction.

B. PROJECT FUNDING

Construction of the proposed project is not listed in the Mn/DOT *2010-2013 State Transportation Improvement Program (STIP)* (September 2009). Preliminary engineering and design planning activities for the proposed Highway 169/CSAH 4 interchange in Zimmerman was identified in the 2009-2012 STIP for federal fiscal year 2009 (Sequence #568).

The proposed project is not identified in the *Mn/DOT 10-Year Highway Investment Plan (2010-2019) (*March 2010).

There is no funding in place for construction of the Preferred Alternative. Construction of the proposed improvements to Highway 169 (Elk River to Zimmerman) are currently identified in the *Mn/DOT District 3 20-Year Highway Investment Plan 2009-2028* (August 2009) as a project that warrants consideration under Policy 5: Statewide Connections (investments that enhance mobility on IRCs) for the 2019-2028 planning period.

This EA/EAW process is intended to support the anticipated future use of federal funding and to allow for improvements, consistent with the Preferred Alternative, to be implemented over time as funding becomes available.

VI. PROPOSED PROJECT SCHEDULE

The anticipated schedule for the proposed action is shown below.

Anticipated Project Schedule

Activity	Anticipated Date
• Corridor Study and Preliminary Design Studies	2006 – 2008
• EA/EAW	Summer 2010
• Public Hearing/Opportunity for Public Hearing	Summer 2010
• EIS Need Determination	Fall 2010
• Right of Way Acquisition	To be determined
• Begin Construction	To be determined

VII. SOCIAL, ECONOMIC AND ENVIRONMENTAL IMPACTS (SEE)

This section discusses environmental impacts of alternatives identified in the Alternatives section. It contains two sub-sections:

- State Environmental Assessment Worksheet (EAW)
- Additional Federal Issues

The EAW is a standard format used in Minnesota for environmental review of projects meeting certain thresholds of Minnesota Rule 4410.4300. Federal environmental regulations not addressed in the EAW are addressed in the separate sub-section.

A. ENVIRONMENTAL ASSESSMENT WORKSHEET

Note to preparers: This form and EAW Guidelines are available at the Environmental Quality Board's website at: http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm. The Environmental Assessment Worksheet provides information about a project that may have the potential for significant environmental effects. The EAW is prepared by the Responsible Governmental Unit (RGU) or its agents to determine whether an Environmental Impact Statement (EIS) should be prepared. The project proposer must supply any reasonably accessible data for — but should not complete — the final worksheet. The complete question as well as the answer must be included if the EAW is prepared electronically.

Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. Project Title: Trunk Highway 169 Elk River to Zimmerman

2. Proposer: Mn/DOT District 3

Contact Person: Jim Hallgren
Title: Project Manager
Address: 7694 Industrial Park Road
City, state, ZIP: Baxter, MN 56425-8096
Phone: (218) 828-5797
Fax: (218) 828-5815
E-mail: james.hallgren@state.mn.us

3. RGU: Mn/DOT District 3

Contact Person: Terry Humbert
Title: Project Development Engineer
Address: 3725 12th St. N.
City, state, ZIP: St. Cloud, MN 56303
Phone: (320) 223-6527

E-mail: terry.humbert@state.mn.us

4. Reason for EAW Preparation (check one)

___ EIS scoping _X_ Mandatory EAW ___ Citizen petition ___ RGU discretion
___ Proposer volunteered

Preparation of an EAW is considered mandatory under the following subsection(s):

Minnesota Rules 4410.4300 subp.22 (B) – For construction of additional travel lanes on an existing road for a length of one or more miles

5. Project Location:

County:	Sherburne
Cities:	Otsego, Elk River and Zimmerman
Townships:	Livonia Township
Sections:	3-5, 8-10, 15-17, 27-29, 32-34; T35N; R26W 3-5, 8-10, 15-17, 20-22, 27-29, 32-34; T34N; R26W 2-4, 9-11, 14-16, 21-23, 26-28, 33-35; T33N; R26W 3, 10, 11; T32N; R26W

GPS Coordinates:

Southern Terminus:	93° 33’ 40” W 45° 16’ 56” N
Northern Terminus:	93° 34’ 57” W 45° 28’ 18” N

Tax Parcel Number: See Appendix J (total acquisitions).

Attach each of the following to the EAW:

- County map showing the general location of the project

  Refer to Figure 1 (Area Location Map).

- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries

  Refer to Figures 3A-3C, Appendix A.

- Site plan showing all significant project and natural features.

  Refer to Figures 4A-4E, Appendix A.

6. Description

a. **Provide a project summary of 50 words or less to be published in the *EQB Monitor.***

The proposed project includes reconstruction of Highway 169 to a freeway between Main Street in Elk River and CSAH 4 in Zimmerman, including redesign of Highway 10/101/169 system interchange. The project includes improvements to Highway 101 from Highway 169 in Elk River to CSAH 39 in Otsego, including reconstruction of the Highway 101 bridge over the Mississippi River. The proposed project will remove at-grade intersections and signals along the project corridor, which cause congestion, delay, and safety concerns. A system of interchanges, overpasses, and frontage/backage roads will replace existing at-grade intersections. A collector-distributor road design will be constructed providing full access interchanges at Main Street and School Street in Elk River. Interchanges will also be constructed at Jackson Avenue/193rd Avenue/197th Avenue and 221st Avenue in Elk River. Interchanges will be constructed at CSAH 25/19 in Livonia Township and CSAH 4 in Zimmerman. The proposed project will result in consolidation and closure of access along Highway 169.

b. **Give a complete description of the proposed project and related new construction. Attach additional sheets as necessary. Emphasize construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes. Include modifications to existing equipment or industrial processes and significant demolition, removal or remodeling of existing structures. Indicate the timing and duration of construction activities.**

<u>Project Description</u>

Refer to Section IV.B.2 for a description of the proposed project.

<u>Project Schedule</u>

Refer to Section VI for the proposed project schedule.

c. **Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.**

Refer to Section III (Purpose and Need for the Project).

d. **Are future stages of this development including development on any outlots planned or likely to happen? __Yes _X_No**

If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

Not Applicable.

e. **Is this project a subsequent stage of an earlier project? ___Yes _X_No**

If yes, briefly describe the past development, timeline and any past environmental review.

A separate project, Highway 10 within Elk River (S.P. 7102-123), is being planned to the west of this project, and is the subject of an EA/EAW, anticipated to be published in summer 2010. The Highway 10 Project is the conversion of Highway 10 to a freeway facility from Main Street to west of Upland Avenue.

The Highway 169 Project and the Highway 10 Project address different transportation needs. The timeframe for implementation for each project could differ depending upon transportation needs and funding. Both projects are identified in the *Mn/DOT District 3 20-Year Highway Investment Plan 2009-2028* (August 2009) as projects that warrant consideration under Policy 5: Statewide Connections (investments that enhance mobility on IRCs) for the 2019-2028 planning period. The design for the Highway 169 Project is consistent with the preferred alternative design for the Highway 10 Project. These projects have been designed so that each could be constructed to match existing conditions or proposed future conditions on Highway 10 and Highway 169.

Both projects also include realignment of the BNSF Railway. A discussion of the BNSF Railway realignment associated with the Highway 169 Project and the Highway 10 Project is included in Section VII.A, Item 28.

7. Project Magnitude Data

Total project acreage: 644 acres(1)
Total project length: 13.3 miles (CSAH 39 in Otsego to 273rd Avenue NW north of Zimmerman)
(1) Total project area within the preliminary construction limits

Number of residential units:	N/A	Unattached:	N/A
		Attached:	N/A
		Maximum units per building	N/A

Commercial, industrial or institutional building area (gross floor space): total square feet: N/A

Indicate areas of specific uses (in square feet):

Office:	N/A	Manufacturing:	N/A
Retail:	N/A	Other Industrial:	N/A
Warehouse:	N/A	Institutional:	N/A
Light Industrial:	N/A	Agricultural:	N/A
Other Commercial:	N/A	Building height:	N/A

If over 2 stories, compare to heights of nearby buildings: N/A

8. Permits and Approvals Required. **List all known local, state and federal permits, approvals and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure.** *All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.*

   Refer to Section VIII.B for a list of permits and approvals required. Refer to Section V for a discussion of the proposed cost and funding for the project.

9. Land Use. **Describe current and recent past land use and development on the site and on adjacent lands. Discuss project compatibility with adjacent and nearby land uses. Indicate whether any potential conflicts involve environmental matters. Identify any potential environmental hazards due to past site uses, such as soil contamination or abandoned storage tanks, or proximity to nearby hazardous liquid or gas pipelines.**

   <u>Land Uses</u>

   The proposed project is located in the City of Otsego, City of Elk River, Livonia Township, and the City of Zimmerman. Current land use along the project corridor includes both developed (e.g., residential and commercial) and undeveloped (e.g., open space, wetlands, woodlands, etc.) land uses. See Section II.B.

   The current land use patterns along the project corridor are perpetuated in the Comprehensive Plans for the cities of Elk River and Zimmerman. As described in Section VII.A.27, the Highway 101/169 Corridor Management Plan, City of Elk River Comprehensive Plan, City of Zimmerman Comprehensive Plan, and Livonia Township Transportation Plan all identify the closure/consolidation of at-grade access along Highway 169 with a long-term vision of Highway 169 as a freeway (i.e., access through interchanges only) through the study area.

   <u>Potential Environmental Hazards</u>

   The presence of potentially contaminated properties (defined as properties where soil and/or groundwater is impacted with pollutants, contaminants, or hazardous wastes) is a concern in the development of highway projects because of potential liabilities associated with ownership of such properties, potential cleanup costs, and safety concerns associated with construction personnel encountering unsuspected wastes or contaminated soil or groundwater. Contaminated materials encountered during highway construction projects must be properly handled and treated in accordance with state and federal regulations. Improper handling of contaminated materials can worsen their impact on the environment. Contaminated materials also cause adverse impacts to highway projects by increasing construction costs and causing construction delays.

A Phase I Environmental Site Assessment (Phase I) provides information on potentially contaminated properties. A Phase I of the project area, from 277th Avenue in Zimmerman to the Highway 10/101/169 interchange, was completed in June 2008 in general conformance with Mn/DOT requirements for Phase I Environmental Assessments. Mn/DOT requirements include ranking of identified environmental sites for hazard potential to impact the corridor, generally identified as the area within 500 feet of the outermost shoulders of the proposed roadway(s). These properties are identified through review of historic land use records; aerial photos; Environmental Protection Agency (EPA), Minnesota Pollution Control Agency (MPCA), and county/city records; and current property condition.

Sites of high potential concern identified by the Phase I include properties that have a documented release of chemicals or other strong evidence of contamination such as soil staining or storage of large volumes of petroleum or other chemicals. Medium potential concern sites may include properties where relatively smaller volumes of petroleum, chemicals, or hazardous materials are stored, but there is no evidence of spills or releases, or properties with documented releases that have been "closed" (no further cleanup action deemed necessary) by the MPCA. A "closed" site is considered a medium risk because it may still have residual soil or groundwater contamination. Low potential concern sites include properties where small volumes of chemicals or hazardous materials have been used or stored. Table 9 provides definitions for properties considered to have a high, medium, or low potential for contamination.

TABLE 9
POTENTIAL FOR CONTAMINATION: DEFINITIONS

High Potential for Contamination	Sites where there are one or more of the following: • Documented releases to the subsurface, such as a leak or spill. • A large amount of chemicals known or inferred to be in use at the facility. • Stains, odors, stressed vegetation, or some other indication that a release has occurred. • Active or inactive dumps/landfills.
Medium Potential for Contamination	Sites where there are one or more of the following: • Known or inferred medium or small quantities of chemicals used or stored. • Underground storage tanks with no documented release. • Indications of poor housekeeping (poor housekeeping can indicate that any leaks or spills that occur may not be handled correctly). • Documented releases that have the potential to migrate to the corridor even though the site is located more than 500 feet from the existing corridor right of way.
Low Potential for Contamination	Sites where there are one or more of the following: • Known or inferred small or very small quantities of chemicals used or stored on the property. • Indications of good housekeeping (good housekeeping indicates that any leaks or spills that occur are more likely to be handled correctly).

Source: Mn/DOT Highway Development Process Handbook. Contaminated Properties, Appendix 1.

The Phase I found 50 sites of documented or potential contamination within the current study area. Four (4) sites were identified as having high risk potential for contamination and 41 were identified as medium risk potential sites. Table 10 lists the properties with high or medium potential for contamination, and their locations are shown in Figures 6A-6C, Appendix A. Eighteen (18) of these properties will be affected by right of way impacts; many of these are partial "strip" takings along the roadway. Properties likely to be affected by the project are identified in bold type in Table 10.

TABLE 10
KNOWN OR POTENTIALLY CONTAMINATED SITES NEAR HIGHWAY 169 CORRIDOR

Site ID	Site Name	Site Address	Risk Potential	Reason for Concern (Contaminant)
1	Elk River Ford	17219 Highway 10	Medium	Closed LUST [(1)]
3	Deano's Collision Specialists	11063 173rd Avenue NW	Medium	Auto repair facility
4	E Z Service Station	17345 Highway 10	Medium	Closed LUST
5	Saxon Motors	17354 Zane Street NW	Medium	Closed LUST
6	Lees Riverside Auto (Orphan)	17375 Highway 10	Medium	Auto repair facility
7	Deanos Auto Specialists	17501 Highway 10	Medium	Auto repair facility
8	**Great River Energy**	**17845 Highway 10**	**High**	**Electrical power plant; ash disposal solid waste permit, listed on Minnesota List of Sites (MN LS); UST, AST, LAST[(1)]**
9	Wash & Fill	18296 Zane Street NW	Medium	USTs[(1)]
10	**Superamerica #4338**	**200 Main Street**	**Medium**	**UST**
11	**Kennedy Transmission**	**269 Carson Street**	**Medium**	**ASTs[(1)]**
12	**Abra Auto Body & Glass**	**275 Carson Avenue**	**Medium**	**Auto repair facility**
13	**Jr Tech Automotive**	**279 Carson Avenue**	**Medium**	**Auto repair facility**
14	**Petro Plus DBA Tires Plus**	**285 Carson Avenue**	**Medium**	**Auto repair facility**
16	Northern Auto Services Inc.	522 Dodge Avenue	Medium	Auto repair facility
17	Elk River Tire & Auto Inc.	690 Dodge Avenue	Medium	Auto repair facility
19	**Holiday Station #313**	**18823 Freeport**	**Medium**	**USTs**
20	**Precision Tune - Elk River**	**18850 Dodge Street N**	**Medium**	**Auto repair facility**
21	Mn/DOT Truck Station	18938 Dodge Avenue NW	Medium	Closed LUSTs; ASTs
22	Midas Muffler (orphan)	19244 Freeport	Medium	Auto repair facility
23	**Superamerica #4470**	**11554 193rd Avenue NW**	**Medium**	**USTs**
24	**Valvoline Instant Oil Change**	**19395 Evans Street**	**Medium**	**Auto repair facility**
25	Zystra Harley Davidson	19600 Evans Street NW	Medium	Vehicle repair facility
26	BP Service Station	19696 Evans Street NW	Medium	USTs
27	Apple Valley Reddy Mix / Elk River Reddy Mix	20600 Highway 169	Medium	UST; ASTs
28	Cemstone Products Co. (Orphan)	11755 213th Avenue NW	Medium	ASTs
29	Auto B Rite Inc.	21401 Highway 169	Medium	Auto repair facilities
30	Camas Minnesota / Aggregate Industries	21530 and 21700 Highway 169 N	Medium	LAST; ASTs[(1)]

TABLE 10 continued
KNOWN OR POTENTIALLY CONTAMINATED SITES NEAR HIGHWAY 169 CORRIDOR

Site ID	Site Name	Site Address	Risk Potential	Reason for Concern (Contaminant)
31	Elk River Bituminous	21531 Highway 169 N	Medium	Closed LUST
33	Tiller Corporation / Commercial Asphalt	11711 221st Avenue NW / 10711 221st Avenue NW	Medium	ASTs
34	Elk River Sanitary Landfill	22460 Highway 169	High	Landfill; state Superfund site
35	Glenn Bolles	Highway 169 and 239th Avenue	High	Undeveloped site has potential for groundwater contamination from Elk River landfill
36	**Aluminum Recycling Inc.**	**25127 Highway 169**	**Medium**	**Auto salvage facility**
37	**Schmeige & Son Auto (Orphan)**	**25140 Highway 169**	**Medium**	**Auto repair facility**
38	**Dale's Car Repair**	**12181 253rd Avenue NW**	**Medium**	**Auto repair facility**
39	Service Station	25315 Highway 169	Medium	Closed LUST
41	Olys Service	25375 Highway 169	Medium	Auto repair facility
42	Phillips / Zimmerman One Stop	25810 Main Street	Medium	Closed LUST, USTs
43	Daves Spur	25874 Highway 169	Medium	USTs
44	**Superamerica #4535**	**26075 3rd Street E**	**Medium**	**USTs**
45	**Liberty Transport**	**County Road 4 and Highway 169**	**Medium**	**Diesel fuel spill**
46	**Holiday Stationstore #239**	**26125 Highway 169**	**Medium**	**USTs**
47	Fortress Auto Body	26131 3rd Street E	Medium	Former auto repair facility
48	Warzecha Auto Works	26155 3rd St. E	Medium	Auto repair facility
49	**Zimmerman Dump**	**1/8 mile north of Hwy. 169 and CSAH 4 intersection, east of Hwy. 169**	**High**	**Former dump; on Minnesota List of Sites (MN LS)**
50	**Possible filling station**	**No address**	**Medium**	**Possible filling station**

(1) Acronyms used: Above Ground Storage Tank (AST); Under Ground Storage Tank (UST); Leaking Underground Storage Tank (LUST); Leaking Aboveground Storage Tank (LAST); Resource Conservation and Recovery Act (RCRA); Facility Index System (FINDS)

Shaded areas represent sites with high risk.

Bolded properties represent sites likely to be impacted by construction of the proposed project.

Copies of the Phase I report are on file at the District 3–Brainerd office. An appointment can be made to review the documents by calling the Project Manager at 218-828-5797.

The portion of the project area along Highway 101 was studied by Mn/DOT in 2004 (Minnesota Department of Transportation Environmental Assessment/Environmental Assessment Worksheet for Grade Separations on Highway 101 and CSAHs 36, 37, 42, and 39 in Cities of Otsego and St. Michael. September 27, 2004). Conditions in the project area north of CSAH 39 have not changed since this study. A limited Phase I ESA was completed as part of the Highway 101 EA. Of the properties with contamination potential that were identified in the Highway 101 EA, none are located north of CSAH 39 between the CSAH 39 interchange and the Mississippi River.

Mitigation

All potentially contaminated properties identified in the Phase I will be evaluated for their likelihood to be impacted by construction and/or acquired as right of way. Any properties with a potential to be impacted by the project will be drilled and sampled if necessary to determine the extent and magnitude of contaminated soil or groundwater in the areas of concern. The results of the drilling investigation will be used to determine if the contaminated materials can be avoided, or the project's impacts to the properties minimized. If necessary, a plan will be developed for properly handling and treating contaminated soil and/or groundwater during construction.

Once actual ponding locations are identified and further investigation of sites is completed, it will be determined whether any ponds should be lined to avoid flushing any existing contaminants into the groundwater.

If during construction contaminated soils are encountered, the response will be handled consistent with MPCA requirements.

10. Cover Types. **Estimate the acreage of the site with each of the following cover types before and after development:**

Cover types before and after construction of the project are tabulated in Table 11. The total project area includes all areas (interchange areas and frontage roads) within the preliminary construction limits for the entire 13.3 mile project corridor from the existing CSAH 39 interchange in Otsego to north of the proposed CSAH 4 interchange in Zimmerman.

TABLE 11
COVER TYPES BEFORE AND AFTER PROJECT

	Roadway	
	Before (Acres)	**After (Acres)**
Types 1-8 wetlands	39.1	0
Wooded/forest	77.7	0
Brush/Grassland	205.7	0
Cropland	54.5	0
Lawn/landscaping	9.9	376.4
Impervious surfaces [(1)]		
• Developed lands	25.6	0
• Roadways	225.8	251.8
Other: Stormwater Ponds	0	15.7
Other: Gravel mines	6.6	0
TOTAL:	**643.9**	**643.9**

Source: Cover types for existing conditions were identified using 1990 land use/land cover data for Sherburne County (Land Management Information Center. 1990. International Coalition Land Use/Land Cover. Published by Minnesota DNR. October 1, 1995).

(1) Impervious surfaces for existing (before) conditions defined as roadway, residential, and urban/industrial land uses. Roadway land cover data for Sherburne County included impervious and lawn/landscaping cover types within roadway right of way.

If **Before** and **After** totals are not equal, explain why:

Not applicable.

11. Fish, Wildlife and Ecologically Sensitive Resources

a. **Identify fish and wildlife resources and habitats on or near the site and describe how they would be affected by the project. Describe any measures to be taken to minimize or avoid impacts.**

In the developed areas of Elk River and Zimmerman that have previously been disturbed by residential and commercial development and previous road construction, wildlife is limited to those species that have adapted to live in urban areas.

A review of the Minnesota Department of Natural Resources (DNR) Natural Heritage Database identified two native plant communities (no legal protection status) within the project area. In Elk River, a mature oak forest remnant was identified near 193rd Avenue west of Highway 169. However, the identified remnant area has since been disturbed by commercial and residential development. Any remaining oak forest is outside the construction limits of the proposed improvements and will not be impacted by the proposed project. A red oak-white oak-basswood forest was identified west of Highway 169 just south of Zimmerman. This area is beyond the construction limits of the proposed improvements and will not be impacted by the project.

The proposed project includes reconstruction and expansion of the existing Highway 101 Mississippi River crossing. A new structure will be constructed in the river on the south side of the existing crossing to accommodate movements from northbound Highway 101 to east- and westbound Highway 10. The river corridor is used for wildlife habitat, travel, and migration. Prior to construction, further coordination with the DNR may be necessary to identify strategies to minimize impacts to wildlife, where practical and feasible. In addition, the existing Highway 101 Bridge will need to be inspected for swallows prior to the initiation of construction activities. If swallows are present, measures would need to be taken in accordance with the Migratory Bird Treaty Act. These measures include, but are not limited to, scheduling the bridge work outside of the nesting season (before May 15 or after September 1) or netting the structure to prevent the birds from establishing nests.[8]

b. **Are any state-listed (endangered, threatened or special concern) species, rare plant communities or other sensitive ecological resources on or near the site?**

__Yes _X_ **No**

If yes, describe the resource and how it would be affected by the project. Describe any measures that will be taken to minimize or avoid adverse impacts. Provide the license agreement number (LA-__) and/or Division of Ecological Resources contact number (ERDB ___________) from which the data were obtained and attach the response letter from the DNR Division of Ecological Resources. Indicate if any additional survey work has been conducted within the site and describe the results. If the DNR Natural Heritage and Nongame Research program has been contacted give the correspondence reference number: ERDB #20070708

The proposed project will involve work within the Mississippi River. This work includes reconstruction of the existing Highway 101 river crossing and construction of a new structure parallel to the existing bridge. This construction/reconstruction is necessary because of geometric/alignment changes associated with the Highway 10/101/169 interchange and to accommodate forecast increases in traffic volumes.

Potential impacts on the river environment resulting from construction actions discussed includes erosion and sedimentation impacts associated with construction activities in the river, along the shore, and from stormwater discharges to the river from construction areas. Other impacts to the river environment from reconstruction of the Mississippi River crossing include disturbance to the river substrate and sedimentation from work boat and barge propeller wash. Wildlife, fish, and other aquatic species may temporarily relocate to other locations in the river during construction activities.

[8] Minnesota Department of Transportation Environmental Assessment/Environmental Assessment Worksheet for Grade Separations on Highway 101 and CSAHs 36, 37, 42, and 39 in Cities of Otsego and St. Michael. September 27, 2004. Note that conditions in the project area have not changed substantially since this study.

Standard construction practices such as erosion control measures and riverbank stabilization measures will be followed to minimize construction impacts (e.g., turbidity and sedimentation impacts) on wildlife and fisheries/aquatic species. The proposed project will be re-evaluated closer to the construction timeframe to identify potential impacts and appropriate mitigation strategies.

State-Listed

The DNR Natural Heritage and Nongame Research Program was contacted (ERDB #20070708) to determine if any rare plant or animal species or other natural features are known to occur within proximity to the proposed project. There are 56 known occurrences of rare species or native plant communities within an approximate one-mile radius of the project area.

Black sandshell mussels (*Lingumia recta*), which are identified by the DNR as a state species of special concern, have been identified in the Mississippi River. As noted above, the project includes reconstruction of the existing Highway 101 Mississippi River crossing, as well as construction of a new structure parallel to the existing crossing. Prior to construction, a mussel survey may be necessary to determine the possible occurrence of listed mussel species within the Mississippi River portion of the project area.

Blanding's turtles (*Emydoidea blandingii*), a state threatened species, have been observed in the vicinity of the project area. Blanding's turtle habitat requirements include larger wetlands for overwintering, sandy areas for nesting, and summer use of larger type 3 (shallow marsh) or type 6 (shrub swamp) wetland areas. Sherburne County is also identified as a Blanding's turtle priority area (i.e., habitat protection). Suitable habitat for Blanding's turtle is available within the project area (see Item #12 for a discussion of wetland types within the project area). While areas adjacent to proposed interchange locations have been previously disturbed, it is possible that proposed frontage/backage roads could disturb habitat suitable for Blanding's turtle.

Frontage/backage road alignment concepts described in this document may change depending upon outcomes of gravel mining operations, local plans, and future development within the study area. The need for surveys will be determined as the project is implemented and frontage/backage roads are constructed. A copy of the most recent Blanding's Turtle Fact Sheet and Flyer (see Appendix D, DNR response dated April 19, 2007) will be included in the project special provisions to make project contractors aware of the possible presence of these turtles, and to help project contractors recognize the turtle in the field. Needs for measures such as fencing to keep turtles from crossing Highway 169 will also be evaluated prior to construction in consultation, with DNR.

A Gopher snake (*Pituophis catenifer*), which is identified by the DNR as a species of special concern, was spotted in the project area near CSAH 4 in 1990. This area currently includes substantial commercial development and the project is not anticipated to have any impacts on the Gopher snake population.

In 1996, a loggerhead shrike (*lanius ludovicianus*) nested in the area of Highway 101 and CSAH 39 (Minnesota Department of Transportation Environmental Assessment/Environmental Assessment Worksheet for Grade Separations on Highway 101 and CSAHs 36, 37, 42, and 39 in Cities of Otsego and St. Michael. September 27, 2004). This area has been impacted by current construction of the TH 101/CSAH 39 interchange.

See correspondence from DNR Natural Heritage and Nongame Research Program in Appendix D.

Federally Listed

The Mn/DOT Office of Environmental Services (OES) reviewed the project area for federal threatened and endangered species. There are no federally listed endangered, threatened, or proposed candidate species or listed critical habitat identified in Sherburne County. However, since the proposed project will not be constructed for several years and because this information is subject to change, any determination of effect made at this time may be premature. It is recommended that the action be reevaluated and consultation reinitiated within three years prior to the start of construction. See correspondence from Mn/DOT OES in Appendix D.

The proposed project involves reconstruction of the Highway 101 bridge over the Mississippi River. Swallows are protected by the Federal Migratory Bird Treaty Act. The bridge will be inspected for swallows prior to construction. If nesting swallows are present on the bridge, measures will be taken to avoid the destruction of swallow nests during bridge reconstruction. In accordance with Mn/DOT policy and in compliance with the Federal Migratory Bird Treaty Act, 50 CFR 21.41, impacts on swallow nests will be avoided by conducting the work outside of the nesting season (September 1 to May 15) or preventing the birds from nesting, using techniques such as netting, until completion of the project.

Ecologically Sensitive Resources

The Mississippi River Islands Scientific and Natural Area (SNA) is located west of the project area. This SNA is dominated by floodplain forest and is verified as a colonial water bird nesting site. No project impacts to the SNA are anticipated.

12. Physical Impacts on Water Resources. Will the project involve the physical or hydrologic alteration — dredging, filling, stream diversion, outfall structure, diking, and impoundment — of any surface waters such as a lake, pond, wetland, stream or drainage ditch?

_X_ **Yes** ___**No**

If yes, identify water resource affected and give the DNR Public Waters Inventory number(s) if the water resources affected are on the PWI. Describe alternatives considered and proposed mitigation measures to minimize impacts.

Regulatory Context

Sherburne County, the City of Elk River, and the City of Zimmerman regulate impacts to wetlands within their jurisdiction as Local Governmental Units (LGUs) under the Minnesota Wetland Conservation Act (WCA). Within Mn/DOT right of way, Mn/DOT acts as LGU for wetland impacts. Impacts to waters of the U.S. (non-isolated wetlands within the project area) are regulated by the U.S. Army Corps of Engineers (COE) under Section 404 of the Clean Water Act (CWA). In addition, impacts to navigable waters of the U.S. are regulated by the COE under Section 10 of the Rivers and Harbors Act of 1899.

DNR Division of Waters maintains maps that show public water bodies under Minn. Stat. 105.42, which requires a permit be obtained before making any alterations in the course, current, or cross-section of these waters. The types of public waters that exist under this classification are basins, ditches, and watercourses. Impacts to DNR Public Waters are regulated by the DNR.

Current regulations require that impacts to wetlands for non-agricultural projects within this area of the state must be replaced at a ratio of 2:1, and replacement must include wetland restoration or creation at an amount equal to or greater than the area of the impact. If the replacement is of a different type of wetland as that impacted, or is not completed in advance of the impact or other considerations, under current regulations, the ratio could be raised to 2.5:1. Impacts to DNR Public Waters are reviewed, and mitigation determined, by the DNR on a project-by-project basis.

Mn/DOT will coordinate water resource and wetland review and permitting with the Board of Water and Soil Resources (BWSR) and the COE, consistent with regulatory requirements at the time of the project's final design and construction. Wetland review and permitting for local road improvements outside of Mn/DOT right of way would be coordinated with Sherburne County, the City of Elk River, the City of Zimmerman, and BWSR. Public waters permitting will be coordinated with the DNR, consistent with requirements at the time of final design and construction.

Methodology

Wetlands (See Figures 4A-4E in Appendix A) were assessed by Mn/DOT staff in the Summer 2005 and verified in November 2007 and August 2008 using criteria from the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory. 1987.

Corps of Engineers Wetland Delineation Manual, Technical Report Y-87-1. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS). The boundaries were established based on vegetation, soils, and hydrology. Criteria and indicators of these parameters are outlined in the COE Delineation Manual. All boundaries are approximate and were not formally delineated for this stage of project review. Identified wetlands are also classified according to descriptions set forth in *Wetland Plants and Plant Communities of Minnesota & Wisconsin - Second Edition* (USCOE Publication; Eggers and Reed. 1997) and *Wetlands of the United States* (USFWS Circular 39, Shaw and Fredine, 1971).

Prior to the onsite inspection, various sources were reviewed to identify potential wetlands in the project area. These data sources include the following:

- The National Wetlands Inventory (NWI)
- The USDA Natural Resources Conservation Service (NRCS) SSURGO soil data of Sherburne County, Minnesota
- The Hydric Soils List for Sherburne County, Minnesota
- The Minnesota Public Waters and Wetlands Inventory (DNR)
- Recent Aerial Photographs
- U.S. Geological Service Quadrangle Maps

In addition, a general assessment of the primary function(s) provided by each of the wetlands was conducted, based upon MnRAM 3.1 analyses of representative wetlands within the project area. While most wetland systems provide some level of all of the potential wetland functions (i.e. hydrologic maintenance, flood/storm water attenuation, water quality, shoreline protection, wildlife habitat, aesthetics/recreation/education, and groundwater interaction), only the function(s) provided by each wetland at least at a moderate level, are noted in Table 12 below. Those functions provided at a high or exceptional level are highlighted with bold type. It should be noted that this functional assessment takes into account conditions present in 2007, and that conditions will likely change in the years prior to final design and permitting. A formal functional analysis will be completed, consistent with regulatory agency processes, at that time to assess the functionality of existing wetlands to determine the mitigation needed to address any losses of those functions.

Findings

The project area is located within the Mississippi River (17) Major Watershed. The Mississippi River, a DNR Public Watercourse and a Section 10 water of the U.S., flows through the southern portion of the project area. Tibbits Brook is a DNR Public Watercourse, the PWI mapping of which starts at the west side of Highway 169 just south of the City of Zimmerman and continues to the southwest, away from the project area. Lake Fremont (DNR #16P) is a DNR Public Water at the northern limits of the project area northeast of the City of Zimmerman. Reconstruction of the Highway 101 bridge will result in fill impacts to the Mississippi River (DNR Public Watercourse). These impacts are summarized at the end of this section.

Within the project area, 73 wetlands were identified as shown on Figures 4A through 4E, Appendix A and listed in Table 12 below. In general, most of the wetlands are surrounded by agricultural fields. In more settled areas, development typically extends very close to the wetland boundaries. A few wetlands are more remote from the Highway 169 corridor where frontage or connecting roads may be proposed, and some of these wetlands are surrounded by wooded uplands. The wetland edges are defined by a rise in topography and a noticeable change in vegetation, typically from cattails, reed canary grass, or, in a few cases, diverse wetland vegetation to a mown grass, a cropped/fallow landscape, or a developed and impervious surface.

In addition to the wetlands discussed below, the edges of roadside ditches and stormwater treatment ponds along the project corridor that exhibit wetland characteristics were also identified (see Figures 4A-4E in Appendix A). Stormwater ponds and roadside ditches differ from natural wetlands in that they were constructed on non-hydric soils in areas that were not previously wetlands, for the purpose of managing and treating stormwater runoff, not for the purpose of creating wetlands. Therefore, impacts are eligible for the Incidental Wetlands exemption under WCA (Minn. R. Ch. 8420.0122, subp. 5) and do not require replacement. The COE, under Section 404 of the Clean Water Act, may determine jurisdictional control over some ditches that have relatively permanent flow or that have a significant nexus to navigable waters. Most ditches and stormwater ponds, however, will not be jurisdictional and will be treated as non-wetland for this analysis. At the time of permitting, current laws and rules will be used to determine jurisdictional authority.

As indicated above, primary functions provided by each of the wetlands are provided in Table 12. Representative wetlands of each type and topographic setting found, as well as small and large basins, were chosen as the basis for functional analysis of all wetlands within the project area. Only those functions provided at a moderate or higher level are listed, and high and exceptional levels are highlighted in **bold** type. With regard to groundwater interaction, most of the wetlands in the project area provide a combination of groundwater recharge and discharge, depending upon season, precipitation, and other factors. A few of the wetlands act mainly as groundwater discharge systems, and they are indicated in Table 12 as such under "Notes."

Table 12 also identifies the impact to each wetland based upon current project layouts. Impacts from the main trunk highway system and interchanges are noted in **bold** type. Remaining impacts are a result of the proposed frontage/backage road system and the proposed BNSF Railway alignment. Wetland impacts that will result from construction of frontage/backage roads are preliminary and based on current development and land use. More detailed design and evaluation of wetland impacts will be closely reviewed and verified at the time of construction of frontage/backage roads and the BNSF Railway realignment since these elements may be constructed before full conversion of Highway 169 from an expressway to a freeway occurs. Furthermore, all of the indicated construction limits and proposed impacts are preliminary and represent a worst case scenario. Reductions of impacts are expected as the project moves through the concept, design, and construction processes.

Alternatives Analysis

Throughout the analysis, alternative designs were evaluated to determine if wetlands could be avoided and to identify minimization opportunities. (Refer to discussion of alternatives in Section IV.B.)

Proposed Mitigation

The evaluation of wetland sequencing (avoidance, minimization, mitigation) that follows was completed based on wetland regulations in place at the time of publication. Closer to the time of construction the environmental review process will take into account the status of federal and state regulations.

Federal and state wetland regulations require the use of a sequenced approach when projects have the potential to impact wetlands. Sequencing requires first avoiding wetland impacts if possible, and, if impacts are not avoidable, they must be minimized to the greatest extent practicable. Sequencing also includes repair of temporary impacts and reduction or elimination of impacts over time. After all options for avoidance, minimization, rectification, and long term reduction of impacts have been considered and implemented, compensation that will replace lost wetland functions is required for those impacts that are not avoidable.

Efforts to avoid wetland impacts from the proposed interchanges began when potential alignments were being developed. See Section IV.A for discussion of the interchange alternatives development process. Preliminary interchange concepts were refined during scoping to avoid/minimize wetland impacts. Changes to ramp locations and configurations were developed during the design process to avoid wetland impacts where possible. Complete avoidance of wetland impacts was not deemed prudent and feasible in all cases due to the presence of extensive wetlands in some areas and the need to balance impacts to the social environment.

Further minimization, rectification, long-term reduction, and compensation of wetland impacts will be addressed in detail in subsequent steps in the environmental process. Additional design modifications will also be considered during the final design to further minimize wetland impacts. Temporary construction access within the areas that impact wetlands will be restored upon completion. In addition, these temporary impacts may be further minimized through timing of construction during winter months when soils are frozen.

The southern portion of the project area, south of the Mississippi River to CSAH 39 and north of the Mississippi River around the City of Elk River, is developing or already developed and on-site mitigation opportunities are limited. North of Elk River, gravel mining operations along the project corridor are in varied stages of extraction, and present some opportunity for establishment of high quality wetland communities as extraction is completed in different areas. In the coming years, Mn/DOT may work with the gravel mine operators to develop plans for reclamation of areas following extraction of the gravel resource. The high quality wetland community of wetland W5-21, in the path of the proposed Highway 169/CSAH 4 Interchange, is an option as a source for transplanting and establishment of wetland communities.

North of these gravel mining operations, continuing to the City of Zimmerman, extensive wetland complexes occupy the area west of the project corridor, limiting on-site mitigation opportunities. The area east of the project corridor has a more undulating topography, and wetland complexes are more scattered throughout the area. Some of these wetlands have been altered with drainage systems, providing an opportunity for restoration through interruption or management of the drainage systems.

TABLE 12
PROJECT AREA WETLANDS

Wetland ID*	Township 1/4, 1/4, Sec. (R26W)	Total Wetland Size (ac)	Impact Area/ % of Total Wetland Area (1)	Dominant Vegetation	Type (Eggers & Reed/Circ 39) and Topographic Setting (2)	**Notes**, including primary function(s) (3)
WR-1 (4)	T32N NW, SW 2	1.3 ac	0.8 62%	Reed canary grass (RCG)	Wet meadow/2 **Tributary**	Hydrologic maintenance, flood storage, downstream and wetland water quality
WR-2 (4)	T32N NW, SW 2	6.1 ac	0.8 13%	RCG	Wet meadow/2 **Tributary**	Hydrologic maintenance, flood storage, downstream and wetland water quality
W1-1*	T32N SE, SW 3	>10	0.0 0%	Box elder, silver maple, cottonwood, willow	Floodplain Forest/1L **Floodplain**	**Hydrologic maintenance**, flood storage, downstream and wetland water quality maintenance, shoreline protection, wildlife habitat, aesthetics/recreation/education
W1-2	T32N SW, NE 3	0.6	0.0 0%	Cattails	Shallow marsh/3 **Tributary**	Hydrologic maintenance, flood storage, **downstream and wetland water quality**, wildlife habitat, aesthetics/recreation/education
W1-3	T32N NW, NW 3	0.12	0.0 0%	RCG	Seasonally flooded basin/1 Isolated	Hydrologic maintenance, flood storage, **downstream** and wetland **water quality**, wildlife habitat, aesthetics/recreation/education
W1-4	T32N NW, NW 3	0.9	0.0 0%	RCG	Wet meadow/2 Isolated	Hydrologic maintenance, **flood storage**, downstream and wetland water quality, wildlife habitat, aesthetics/recreation/education
W1-5*	T33N SW, SW 35	3.5	0.0 0%	Cattails, reed canary grass, sedge	Shallow marsh/3 **Tributary**	Hydrologic maintenance, **flood storage**, downstream and wetland water quality, wildlife habitat, aesthetics/recreation/education
W2-1*	T33N NW, SE 27	10.3	**0.6 ac** **<6%**	Open water, cattail fringe	Shallow open water/5, Isolated	Hydrologic maintenance, **flood storage**, **downstream** and wetland **water quality**, wildlife habitat, **fishery**, **aesthetics/recreation/education**
W2-2*	T33N NW, SE 27	0.1	0.0 0%	Box elder	Wooded swamp/7 Isolated	**Hydrologic maintenance**, **flood storage**, downstream and wetland water quality, wildlife habitat
W2-3	T33N NW, SE 22	<0.1	**<0.1 ac** **100%**	RCG	Wet meadow/2 Isolated	Hydrologic maintenance, flood storage, downstream and wetland water quality, aesthetics/recreation/education
W2-4	T33N NW, NE 22	1.4	**0.3 ac** **21%**	RCG	Wet meadow/2 Isolated	Hydrologic maintenance, flood storage, **downstream** and wetland **water quality**, aesthetics/recreation/education

TABLE 12 continued
PROJECT AREA WETLANDS

Wetland ID*	Township 1/4, 1/4, Sec. (R26W)	Total Wetland Size (ac)	Impact Area/ % of Total Wetland Area (1)	Dominant Vegetation	Type (Eggers & Reed/Circ 39) and Topographic Setting (2)	**Notes**, including primary function(s) (3)
W3-1	T33N NW, SE 10	0.8	0.0 0%	Cattails	Shallow marsh/3 Isolated	Hydrologic maintenance, flood storage, downstream and wetland water quality, **wildlife habitat**, amphibian habitat, aesthetics/recreation/education, groundwater discharge
W3-2*	T33N SE, NW 10	0.8	0.8 ac 100%	Cattail fringe, open water	Deep marsh/4 Isolated	Hydrologic maintenance, flood storage, downstream and **wetland water quality, wildlife habitat**, amphibian habitat, aesthetics/recreation/education, groundwater discharge
W3-3	T33N NW, NE 10	1.3	0.1 ac 7%	RCG	Wet meadow/2 Isolated	**Hydrologic maintenance**, flood storage, **downstream** and wetland **water quality**, wildlife habitat, groundwater discharge
W3-4	T33N SW, NE 10	0.7	0.4 ac 57%	Cattails, RCG	Shallow marsh/3 Isolated	Hydrologic maintenance, flood storage, downstream and wetland water quality, **wildlife habitat**, amphibian habitat, aesthetics/recreation/education, groundwater discharge
W3-5	T33N SW, NE 10	2.5	0.2 ac 8%	Cattails, RCG	Shallow marsh/3 Isolated	Hydrologic maintenance, flood storage, downstream and wetland water quality, **wildlife habitat**, amphibian habitat, groundwater discharge
W3-6	T33N NW, NE 10	<0.1	<0.1 ac 100%	Cattails, RCG	Shallow marsh/3 Isolated	Hydrologic maintenance, flood storage, **downstream and wetland water quality**, wildlife habitat, groundwater discharge
W3-7	T33N NW, NE 10	0.3	<0.1 ac 4%	Cattails, RCG	Shallow marsh/3 Isolated	Hydrologic maintenance, flood storage, **downstream and wetland water quality**, wildlife habitat, amphibian habitat, groundwater discharge
W3-8*	T33N NW, NE 10	5.5	**1.0 ac 18%**	Cattails, RCG	Shallow marsh/3 Isolated	**Hydrologic maintenance**, flood storage, **downstream and wetland water quality**, wildlife habitat, amphibian habitat, groundwater discharge
W3-9	T33N SE 3	0.5	0.0 0%	Cattails, open water	Deep marsh/4 Isolated	Hydrologic maintenance, flood storage, downstream and **wetland water quality, wildlife habitat**, amphibian habitat, groundwater discharge
W3-10	T33N SW, SE 10	0.1	0.0 0%	Cattails, RCG	Shallow marsh/3 Isolated	Hydrologic maintenance, flood storage, **downstream and wetland water quality**, wildlife habitat, amphibian habitat
W3-11	T33N SW, SE 10	0.3	0.3 ac 100%	Cattails, RCG	Shallow marsh/3 Isolated	Hydrologic maintenance, flood storage, **downstream and wetland water quality**, wildlife habitat, amphibian habitat

TABLE 12 continued
PROJECT AREA WETLANDS

Wetland ID*	Township 1/4, 1/4, Sec. (R26W)	Total Wetland Size (ac)	Impact Area/ % of Total Wetland Area (1)	Dominant Vegetation	Type (Eggers & Reed/Circ 39) and Topographic Setting (2)	**Notes**, including primary function(s) (3)
W4-1	T34N SE, SE 27	1.6	0.6 ac 38%	RCG	Wet meadow/2 Isolated	**Hydrologic maintenance**, flood storage, **downstream** and wetland **water quality**
W4-2*	T34N NW, SE 27	0.3	0.0 0%	Cattails, RCG	Shallow marsh/3 Isolated	Hydrologic maintenance, flood storage, downstream and wetland water quality, wildlife habitat
W4-3	T34N NW, SE 27	<0.1	0.0 0%	RCG	Wet meadow/2 Isolated	Hydrologic maintenance, flood storage, downstream and wetland water quality, aesth/rec/edu
W4-4	T34N SW, NW 27	0.5	0.0 0%	Cattails	Shallow marsh/3 Isolated	Hydrologic maintenance, flood storage, **downstream and wetland water quality**, wildlife habitat, amphibian habitat, aesthetics/recreation/education
W4-5	T34N NE, SW 27	0.4	0.2 ac 50%	Cattails	Shallow marsh/3 Isolated	Hydrologic maintenance, flood storage, **downstream and wetland water quality**, wildlife habitat, amphibian habitat, aesthetics/recreation/education
W4-6*	T34N SE, NW 27	<0.1	<0.1 ac 100%	RCG, Carex sp.	Seasonally flooded basin/1, Isolated	Hydrologic maintenance, flood storage, **downstream** and wetland **water quality**, wildlife habitat, aesthetics/recreation/education
W4-7	T34N SW, NW 27	1.2	**0.3 ac 25%**	RCG	Wet meadow/2 **Tributary**	**Hydrologic maintenance**, flood storage, **downstream** and wetland **water quality**, wildlife habitat
W4-8*	T34N SW, NW 27	0.3	**0.1 ac 33%**	Cattail fringe to open water	Deep marsh/4 Isolated	**Hydrologic maintenance**, flood storage, downstream and wetland water quality**, wildlife habitat**, amphibian habitat
W4-9	T34N SW, NW 27	<0.1	**<0.1 ac 100%**	Cattails	Shallow marsh/3 Isolated	Hydrologic maintenance, flood storage, **downstream and wetland water quality**, wildlife habitat, amphibian habitat
W4-10	T34N SW, NW 27	0.1	**0.1 ac 100%**	Cattails	Shallow marsh/3 Isolated	Hydrologic maintenance, flood storage, **downstream and wetland water quality**, wildlife habitat, amphibian habitat, aesthetics/recreation/education
W4-11	T34N SW, NW 27	0.2	**0.2 ac 100%**	Cattails	Shallow marsh/3 Isolated	Hydrologic maintenance, flood storage, **downstream and wetland water quality**, wildlife habitat, amphibian habitat, aesthetics/recreation/education
W4-12	T34N SE, NW 27	0.8	**0.8 ac 100%**	RCG	Wet meadow/2 Isolated	**Hydrologic maintenance**, flood storage, **downstream** and wetland **water quality**, wildlife habitat, aesthetics/recreation/education

TABLE 12 continued
PROJECT AREA WETLANDS

Wetland ID*	Township 1/4, 1/4, Sec. (R26W)	Total Wetland Size (ac)	Impact Area/ % of Total Wetland Area (1)	Dominant Vegetation	Type (Eggers & Reed/Circ 39) and Topographic Setting (2)	**Notes**, including primary function(s) (3)
W4-13	T34N SW, NE 27	>20	1.4 ac 5%	Carex lacustris, cattails, RCG	Shallow marsh/3 Isolated	**Hydrologic maintenance,** flood storage, **downstream and wetland water quality**, **wildlife habitat,** amphibian habitat
W4-14	T34N NW, NW 27	0.2	0.0 0%	RCG	Wet meadow/2 Isolated	Hydrologic maintenance, flood storage, **downstream and wetland water quality**, wildlife habitat
W4-15	T34N SW, SW 22	>65	0.4 ac 1%	RCG	Wet meadow and shallow marsh/2-3 **Tributary**	**Hydrologic maintenance,** flood storage, **downstream and wetland water quality**, **wildlife habitat,** fishery habitat
W4-16*	T34N SW, SW 22	1.9	0.1 ac 5%	Cattails, RCG	Shallow marsh/3 **Tributary**	Hydrologic maintenance, flood storage, **downstream and wetland water quality**, **wildlife habitat, fishery habitat**, aesthetics/recreation/education
W4-17	T34N SE, SW 22	0.1	0.1 ac 100%	RCG	Wet meadow/2 Isolated	Hydrologic maintenance, flood storage, **downstream** and wetland **water quality**, wildlife habitat, aesthetics/recreation/education
W4-18	T34N SE, SW 22	0.1	0.0 0%	RCG	Wet meadow/2 Isolated	Hydrologic maintenance, flood storage, **downstream** and wetland **water quality**, wildlife habitat, aesthetics/recreation/education
W4-19	T34N NW, NE 27	>7.5	**1.2 ac <16%**	Cattails	Shallow marsh/3 Isolated	**Hydrologic maintenance**, flood storage, **downstream and wetland water quality**, wildlife habitat, amphibian habitat, aesthetics/recreation/education
W4-20	T34N NE, NW 28	1.3	0.0 0%	Cattail fringe to open water	Deep marsh/4 **Tributary**	**Hydrologic maintenance**, flood storage, downstream and wetland water quality**, wildlife habitat**, fishery habitat, aesthetics/recreation/education
W4-21	T34N NW, SW 22	1.5	0.0 0%	Box elder, cottonwood	Wooded swamp/7 **Tributary**	**Hydrologic maintenance**, flood storage, **downstream and wetland water quality, wildlife habitat**, amphibian habitat, groundwater discharge
W4-22	T34N SE, SW 22	0.2	100 sf <1%	RCG	Wet meadow/2 Isolated	Hydrologic maintenance, flood storage, **downstream** and wetland **water quality**, wildlife habitat, aesthetics/recreation/education

TABLE 12 continued
PROJECT AREA WETLANDS

Wetland ID*	Township 1/4, 1/4, Sec. (R26W)	Total Wetland Size (ac)	Impact Area/ % of Total Wetland Area (1)	Dominant Vegetation	Type (Eggers & Reed/Circ 39) and Topographic Setting (2)	**Notes**, including primary function(s) (3)
W4-23	T34N NE, SW 22	0.1	0.0 0%	Cattails	Shallow marsh/3 Isolated	**Hydrologic maintenance**, flood storage, **downstream** and wetland **water quality**, wildlife habitat, amphibian habitat, aesthetics/recreation/education
W4-24	T34N SE, SW 22	0.6	<0.1 ac 7%	Carex lacustris, RCG	Wet meadow/2 Isolated	Hydrologic maintenance, flood storage, **downstream** and wetland **water quality**, wildlife habitat
W4-25	T34N NE, SW 22	0.1	0.0 0%	Willow, RCG	Shrub swamp/6 **Tributary**	**Hydrologic maintenance**, **flood storage**, **downstream** and wetland **water quality**, wildlife habitat, aesth/rec/edu
W4-26*	T34N NE, SW 22	0.4	0.1 ac 25%	Silver maple, box elder	Wooded swamp/7 **Flow-through**	**Hydrologic maintenance**, flood storage, **downstream and wetland water quality**, **wildlife habitat,** amphibian habitat, groundwater discharge
W4-27*	T34N SW, NW 22	0.1	0.1 ac 100%	RCG	Wet meadow/2 **Tributary**	**Hydrologic maintenance**, flood storage, **downstream** and wetland **water quality**, wildlife habitat, aesthetics/recreation/education
W4-28	T34N SW, NW 22	0.1	0.0 0%	Cattails	Shallow marsh/3 Isolated	**Hydrologic maintenance**, flood storage, **downstream** and wetland **water quality**, wildlife habitat, amphibian habitat
W4-29	T34N SW, NW 22	0.2	0.0 0%	Cattails	Shallow marsh/3 Isolated	**Hydrologic maintenance**, flood storage, **downstream** and wetland **water quality**, wildlife habitat, amphibian habitat
W4-30	T34N SW, NW 22	0.3	0.1 ac 33%	Cattails	Shallow marsh/3 Isolated	**Hydrologic maintenance**, flood storage, **downstream** and wetland **water quality**, wildlife habitat, amphibian habitat
W4-31	T34N NW, NW 22	5.7	200 sf <1%	Box elder, willow, RCG	Shrub swamp/6 Isolated	**Hydrologic maintenance flood storage**, **downstream** and wetland **water quality**, wildlife habitat, amphibian habitat
W5-1	T34N SE, SE 16	11.0	0.0 0%	Cattails, lake sedge	Shallow marsh/3 **Tributary**	Hydrologic maintenance, flood storage, **downstream** and wetland **water quality**, wildlife habitat**,** aesth/rec/edu
W5-2	T34N SE, SE 16	2.1	279 sf 3%	RCG	Wet meadow/2 Isolated	Hydrologic maintenance, flood storage, **downstream** and wetland **water quality**, wildlife habitat, aesthetics/recreation/education
W5-3	T34N SE, SE 16	0.6	0.0 0%	RCG	Wet meadow/2 Isolated	Hydrologic maintenance, flood storage, **downstream** and wetland **water quality**, wildlife habitat, aesthetics/recreation/education

TABLE 12 continued
PROJECT AREA WETLANDS

Wetland ID*	Township 1/4, 1/4, Sec. (R26W)	Total Wetland Size (ac)	Impact Area/ % of Total Wetland Area (1)	Dominant Vegetation	Type (Eggers & Reed/Circ 39) and Topographic Setting (2)	**Notes**, including primary function(s) (3)
W5-4	T34N SW 16	>58	1.2 ac <2%	Cattails, RCG	Shallow marsh/3 **Flow-through**	Hydrologic maintenance, flood storage, **downstream** and wetland **water quality**, wildlife habitat
W5-5*	T34N NW, SE 16	20.1	2.1 ac 10%	Cattails, purple loosestrife, phragmites, RCG	Shallow marsh/3 **Flow-through**	Hydrologic maintenance, flood storage, **downstream** and wetland **water quality**, wildlife habitat, aesthetics/recreation/education
W5-6	T34N NE, SE 16	0.6	<0.1 ac 5%	RCG	Wet meadow/2 Isolated	Hydrologic maintenance, flood storage, **downstream** and wetland **water quality**, wildlife habitat
W5-7	T34N NE, SE 16	3.3	0.0 0%	Cattails	Shallow marsh/3 Isolated	**Hydrologic maintenance**, flood storage, **downstream and wetland water quality**, wildlife habitat, amphibian habitat
W5-8	T34N NE, SE 16	0.2	0.0 0%	RCG	Wet meadow/2 Isolated	Hydrologic maintenance, flood storage, **downstream** and wetland **water quality**, wildlife habitat
W5-9*	T34N SW, NE 16	0.4	**0.2** **50%**	RCG	Wet meadow/2 **Tributary**	**Hydrologic maintenance**, flood storage, **downstream** and wetland **water quality**, **wildlife habitat**, amphibian habitat
W5-10	T34N SE, NE 16	0.1	178 sf 3%	Box elder, cottonwood	Wooded swamp/7 Isolated	**Hydrologic maintenance**, flood storage, downstream and wetland water quality, wildlife habitat, aesthetics/recreation/education
W5-11	T34N SE, NE 16	1.0	304 sf 7%	Cattails	Shallow marsh/3 Isolated	**Hydrologic maintenance**, flood storage, **downstream** and wetland **water quality**, wildlife habitat, amphibian habitat, aesthetics/recreation/education
W5-12	T34N SW, NE 16	1.6	**0.5** **31%**	RCG	Wet meadow/2 **Tributary**	**Hydrologic maintenance**, flood storage, **downstream** and wetland **water quality**, **wildlife habitat**
W5-13	T34N SW, NE 16	2.2	**1.8** **82%**	Cattails, RCG	Shallow marsh/3 **Tributary**	Hydrologic maintenance, flood storage, **downstream** and wetland **water quality**, wildlife habitat**,** aesthetics/recreation/education
W5-14	T34N NW, NE 16	1.6	**1.6** **100%**	RCG	Wet meadow/2 **Tributary**	**Hydrologic maintenance**, flood storage, **downstream** and wetland **water quality**, wildlife habitat, aesth/rec/edu
W5-15	T34N NW, NE 16	0.4	**0.4** **100%**	Cattails	Shallow marsh/3 Isolated	**Hydrologic maintenance** flood storage, **downstream** and wetland **water quality**, wildlife habitat, amphibian habitat
W5-16	T34N NW, NE 16	0.3	**0.3** **100%**	Cattails	Shallow marsh/3 Isolated	**Hydrologic maintenance**, flood storage, **downstream** and wetland **water quality**, wildlife habitat, amphibian habitat

TABLE 12 continued
PROJECT AREA WETLANDS

Wetland ID*	Township 1/4, 1/4, Sec. (R26W)	Total Wetland Size (ac)	Impact Area/ % of Total Wetland Area (1)	Dominant Vegetation	Type (Eggers & Reed/Circ 39) and Topographic Setting (2)	**Notes**, including primary function(s) (3)
W5-17*	T34N NW, NE 16	4.3	**3.8** **88%**	RCG	Wet meadow/2 **Tributary**	Hydrologic maintenance, flood storage, downstream and wetland water quality, wildlife habitat, aesthetics/recreation/education
W5-18	T34N NE, NE 16	11.4	**6.7** **59%**	RCG, Carex sp.	Wet meadow/2 **Tributary**	**Hydrologic maintenance**, flood storage, **downstream** and wetland **water quality**, **wildlife habitat,** amphibian habitat
W5-19	T34N SW, SE 9	360 sf	**360 sf** **100%**	Cattails	Shallow marsh/3 Isolated	**Hydrologic maintenance**, flood storage, **downstream** and wetland **water quality**, wildlife habitat, amphibian habitat
W5-20	T34N SE, SE 9	13.3	**5.6** **42%**	Willow, cottonwood, box elder, dogwood, RCG, Scirpus sp.	Shrub swamp/6 **Tributary**	Moderate quality vegetation community. **Hydrologic maintenance, flood storage, downstream and wetland water quality, wildlife habitat,** aesthetics/recreation/education.
W5-21*	T34N SW, SE 9	10.5	**3.2** **32%**	Alder, sensitive fern, tussock sedge, red osier dogwood, Scirpus sp.	Shrub swamp/6 **Tributary**	**High quality vegetation community**. **Hydrologic maintenance, flood storage, downstream and wetland water quality, wildlife habitat,** aesthetics/recreation/education
		Total wetland impacts:	Overall: 39.1 ac	**Impacts from highway and interchanges: 28.8**	Impacts from frontage roads: 8.7 Impacts from railroad: 1.6	

* Indicates wetland used as a reference wetland for a full MnRAM 3.1 analysis.
(1) Impacts from Trunk Highway system and interchanges highlighted in **BOLD**. Frontage road impacts are not highlighted.
(2) Topographic setting included to help determine which wetlands may fall under COE jurisdiction (i.e. non-isolated - in **BOLD**).
(3) Functions listed are those evaluated at a MODERATE level or higher. **HIGH** and **EXCEPTIONAL** functionality are identified in **BOLD**.
(4) Approximate boundaries of wetlands along the north side of the BNSF Railway and east of Highway 10 (wetlands WR-1 and WR-2) were identified based on a review of aerial photography, USGS 7.5 minute quadrangle maps, NWI data, and hydric soils data. The dominant vegetation of these wetlands was assumed to be reed canary grass based on the dominant vegetation observed at similar wetlands within the project area. Realignment of the BNSF Railway will also result in fill impacts to a stormwater pond located between WR-1 and WR-2. Detailed evaluation and delineation of these wetlands will occur prior to construction of the BNSF Railway realignment.

As mentioned above, wetland W5-21, in the City of Zimmerman, exhibits a high quality scrub-shrub wetland community. Prior to construction of the interchange, this plant community should be carefully harvested and transplanted at another mitigation site that is developed to address the proposed impacts associated with Highway 169.

In addition to the above opportunities, some potential mitigation sites are often identified during the process of purchasing right of way simply because the agents are speaking directly to people that may not have come to the public meetings. In addition, excess land or uneconomic remnants may be identified that are useful as potential wetland sites. As the final design process gets under way, there are often small opportunities to enlarge a basin or replace an impact in the same basin where an impact occurs. The public meeting forum can produce suggestions for mitigation opportunities. Finally, if Mn/DOT is unsuccessful at project specific replacement, Mn/DOT would make use of the option of replacing wetlands through the Cooperative Wetland Replacement Program (CWRP), which Mn/DOT has funded through BWSR.

Long-term reduction of impacts will be accomplished by maintaining the existing hydrologic characteristics of basins experiencing partial impacts as a result of the project. Specifically, this would be accomplished through measures that ensure that drainage patterns between and through wetlands are maintained and prevent wide fluctuations from existing water levels.

Unavoidable wetland impacts will be replaced following the current laws and rules in place at the time of construction. State and federal wetland regulations change frequently as the result of legal challenges, interpretations, and new legislation. If this project were to be constructed now, there are several guidance documents that would determine replacement ratios and methods.

Guidance currently available includes Corps Regulatory Guidance Letter 02-2, which discusses methods to achieve replacement of functional losses to achieve no net loss. Additionally, The Wetlands Compensatory Mitigation Rule released by the U.S. EPA and U.S. Corps of Engineers outlines new standards for replacement that utilizes the best available science and uses innovative, results based replacement. Most importantly, the Corps released a Draft St. Paul District Wetland Compensatory Mitigation Policy for Minnesota in March of 2007 that established a watershed approach to compensatory mitigation that outlines replacement ratios to achieve no net loss of wetland functions.

In Minnesota, there has been a shift from project specific, on-site replacement, which was historically constructed at the same time as the impacts, to the current practice of using a statewide banking system. An Interagency Memorandum of Understanding for the State of Minnesota, Wetland Regulatory Simplification was signed in 1994 by state and federal agencies approving the use of the State Wetland Bank for wetland projects. A public Notice from the Corps dated May 28, 1999, outlined mitigation banking and its approval for use for Section 404 and Section 10 regulatory purposes. Finally, in 2005, Mn/DOT and the Minnesota Board of Water and Soil Resources (BWSR) entered into an agreement to share staff, time, and resources to expand the State Wetland Bank to include Mn/DOT projects, known as the Cooperative Wetland Road Program (CWRP). The goal is to cooperate to establish wetland bank sites in targeted areas of the state so that replacement will be available prior to project impacts in “Bank Service Areas” close to the impact.

Replacement for this project is anticipated to come through the CWRP, which should be in place before the impacts occur and be within the watershed or at least within the same Bank Service Area. Compensation ratios for this part of Minnesota are currently at a minimum of 2:1 since less than 80 percent of the pre-settlement wetlands remain. Replacement ratios can also be increased for out of kind, not in place (watershed or Bank Service Area) or not in advance replacement.

If, during project development, a particular replacement site is identified that due to special circumstances must be developed along with the project, a replacement plan will be designed for that site. An example of special circumstances would be if a particular wetland is impacted to such an extent that the basin must be expanded to provide potentially lost functions that are considered unique or rare for the area.

County Ditch System

Sherburne County Ditch Number One, which acts as the outlet for Lake Fremont, crosses the study area near the proposed CSAH 4 interchange (see Figure 4E in Appendix A). This ditch is not identified as a protected water on the DNR *Public Waters and Wetlands Inventory Map for Sherburne County, Minnesota* (Revised 1996). To minimize the number and length of new culvert crossings in the proposed interchange area, approximately 3,700 feet of County Ditch One will be removed and realigned. Approximately 3,200 feet of new county ditch will be constructed to the east of the interchange. Approximately 600 feet of Branch Number One of the County Ditch One system will be utilized as part of the realignment.

Mississippi River

Reconstruction of the Highway 101 Bridge would result in impacts to the Mississippi River. Possible impacts to the Mississippi River include dredging/excavation impacts resulting from bridge pier construction/reconstruction, dredging/excavation impacts from placement of new bridge piers in the river, dewatering, fill impacts from the bridge abutment, and fill impacts from access road construction. The details of these potential impacts are unknown at this time, and will be identified within a timeframe closer to project implementation. Permitting for fill impacts to the Mississippi River will be coordinated with the Corps of Engineers and DNR, consistent with regulatory requirements at the time of the project’s final design and construction.

13. Water Use. **Will the project involve installation or abandonment of any water wells, connection to or changes in any public water supply or appropriation of any ground or surface water (including dewatering)?**

_X_ **Yes** ___ **No**

If yes, as applicable, give location and purpose of any new wells; public supply affected, changes to be made, and water quantities to be used; the source, duration, quantity and purpose of any appropriations; and unique well numbers and DNR appropriation permit numbers, if known. Identify any existing and new wells on the site map. If there are no wells known on site, explain methodology used to determine.

Any waterlines that may be impacted by the future construction of the proposed project would be relocated.

Water Wells

Wells adjacent to and within the project area were identified from the Minnesota Geological Survey/Minnesota Department of Health County Well Index database. There were 145 wells identified within 0.25 miles of the Highway 169 corridor. In addition, three well locations were previously identified in the area of TH 101/CSAH 39[9]. A small number of wells are located along Segment One in urban Elk River. The largest number of wells are located between 197th Avenue and 205th Avenue along Segment Two of the project corridor in rural Elk River and Livonia Township, where several residential subdivisions are serviced by wells because the area is outside the urban service boundary of Elk River. The identified wells will not be impacted by the proposed project. If any additional wells are discovered during construction of the proposed project, they will be sealed in accordance with state and local regulatory requirements.

Wellhead Protection Area and Drinking Water Supply Management Area

Highway 169 crosses a wellhead protection area and drinking water supply management area in the City of Elk River. Wellhead protection areas are areas from which water enters a community's well. The drinking water management supply area is an area surrounding a public water supply well and is managed by the City of Elk River. City staff was contacted regarding any impacts to wells within and adjacent to the project area. No impact to the drinking water supply is anticipated as a result of the proposed project. Staff further indicated that highway projects are not identified in the plan as projects with the potential to affect drinking water. Final design studies will determine whether additional measures such as lining of proposed stormwater ponds is necessary to prohibit infiltration into groundwater.

Dewatering

If temporary dewatering is needed during project construction, the appropriate DNR groundwater appropriation permits would be obtained for any temporary dewatering activities.

[9] Minnesota Department of Transportation Environmental Assessment/Environmental Assessment Worksheet for Grade Separations on Highway 101 and CSAHs 36, 37, 42, and 39 in Cities of Otsego and St. Michael. September 27, 2004. Conditions in the project area have not changed substantially since this study.

14. Water-Related Land Use Management District**. Does any part of the project involve a shoreland zoning district, a delineated 100-year flood plain, or a state or federally designated wild or scenic river land use district?**

_X_ **Yes** __ **No**

If yes, identify the district and discuss project compatibility with district land use restrictions.

Segment One: Urban Elk River

There are no water-related land use management districts within Segment One of the project area (urban Elk River) north of the Highway 10/101/169 system interchange. Floodway impacts and water-related land use management districts associated with the Mississippi River are described below.

Shoreland Overlay District and Wild and Scenic River Land Use District

State highways such as Highway 169 are not subject to local regulations; however, compatibility of the proposed action with local ordinances is an important consideration. The City of Elk River has designated a shoreland overlay district adjacent to the Mississippi River. The boundary of the shoreland overlay district along the Mississippi River corresponds to the Mississippi wild and scenic river land use district. This boundary follows the Highway 10 alignment within the project area.

With respect to placement and design of roadways, the Elk River shoreland zoning and wild and scenic river district ordinance is concerned with erosion control and utilizing natural vegetation and topography to screen views from public waters. Erosion control will follow best management practices in place at the time of final design and construction (see Section VII.A.16). Reconstruction of the Highway 101 bridge over the Mississippi River will include re-vegetating areas that are affected by the project. Details of this re-vegetation will be identified prior to construction, consistent with Mn/DOT practices in place at the time of project implementation.

Floodway Impacts

Reconstruction of the existing Highway 101 Mississippi River crossing and construction of the proposed Highway 10/101/169 interchange will result in fill impacts to the Mississippi River floodway. The project will create a transverse encroachment within the floodplain of the Mississippi River of 620 feet. The proposed bridges span most of the floodplain and corresponding floodway; however, encroachments will occur with the proposed bridge abutments, approaches, and piers. A floodplain assessment is included in Appendix F.

Mississippi River (State-Designated Wild and Scenic River)

The Mississippi River, from St. Cloud to Anoka, is a state-designated wild and scenic river. Under the state wild and scenic rivers program, river segments are designated as “wild,” "scenic," or "recreational." The Mississippi River segment from St. Cloud to Clearwater is designated as scenic; the segment from Clearwater to Anoka is designated as recreational. According to Minnesota Rules 6105.0060 Subp. 3, recreational rivers "are those rivers that may have undergone some impoundment or diversion in the past and that may have adjacent lands which are considerably developed, but that are still capable of being managed so as to further the purposes of this act."[10] In addition, recreational rivers may also be readily accessible by preexisting roads or railroads.

The existing Highway 101 Bridge over the Mississippi River is located within the river segment designated as recreational, and is located within the Mississippi wild and scenic river district boundaries. The existing river crossing corridor consists of two structures. The Highway 101 river crossing would be reconstructed and expanded within the existing river crossing corridor as part of the proposed project. The proposed improvements to the Highway 101 river crossing include:

- Expansion of the Highway 101 river crossing from two lanes to three lanes in both the north- and southbound directions.
- Construction of auxiliary lanes on the Highway 101 river crossing to accommodate weave movements from CSAH 39 to northbound Highway 101 and from westbound Highway 10 to southbound Highway 101.
- Construction of a new structure within the corridor to accommodate the movement from northbound Highway 101 to east- and westbound Highway 10. This structure would be located within the existing Highway 101 river crossing corridor, approximately 200 feet (centerline to centerline) south of the existing bridge (see Figure 4A, Appendix A).

The DNR's *Mississippi Scenic Riverway Management Plan* (2004) prohibits new bridges across wild and scenic rivers unless transportation agencies can document need, and directs new bridges to existing bridge corridors unless there is no feasible alternative. As this bridge reconstruction would be located in an existing river crossing, it is consistent with the DNR's management plan.

Recreational users of the Mississippi River may be temporarily affected by project construction activities, as recreational navigation may be temporarily obstructed around work areas. No substantial changes to the recreational designation of this segment of the Mississippi River are anticipated with reconstruction of the Highway 101 river crossing. See Section VII.A.25 for a discussion of canoeing and boating routes.

<u>Segment Two: Rural Elk River and Southern Livonia Township</u>

Segment Two does not involve any water-related land use management districts.

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[10] Minnesota Office of the Revisor of Statutes. 2008. The Minnesota Office of the Revisor of Statutes Website (online). Minnesota Administrative Rules 6105.0060 Rivers Eligible for Inclusion in River System accessed 2008-10-16 at https://webrh12.revisor.leg.state.mn.us/rules/?id=6105.0060.

Segment Three: Zimmerman and Northern Livonia Township

Zimmerman is identified as a "non-floodprone community" on the Flood Insurance Rate Map for Sherburne County (Map No. 27141C0000, effective date: May 4, 2000). As such, the community panel for the City was not printed by the Federal Emergency Management Agency (FEMA).

A shoreland zoning district has been designated around Lake Fremont. The boundary of the shoreland district is approximately 1,000 feet from the lakeshore. Portions of the project corridor and CSAH 4, as well as the residential area on the lake, fall within the shoreland district. As part of the proposed project, additional roadways will be built within the shoreland district, including portions of Highway 169, Fremont Drive, and 2nd Street. City staff indicated that because the proposed project is for the purposes of public transportation, they do not have any concerns with respect to impacts in the shoreland district.

15. Water Surface Use. **Will the project change the number or type of watercraft on any water body?**

___Yes _X_No

If yes, indicate the current and projected watercraft usage and discuss any potential overcrowding or conflicts with other uses.

Not applicable.

16. Erosion and Sedimentation. **Give the acreage to be graded or excavated and the cubic yards of soil to be moved:**

644 **acres**   3.7 million **cubic yards**

The acreage to be graded or excavated is based on the preliminary construction limits currently identified for the proposed project. The cubic yards of soil to be moved are also based on the preliminary construction limits for the proposed project, and assume grading to a depth of one yard throughout the preliminary construction limits.

Describe any steep slopes or highly erodible soils and identify them on the site map.

Steep slopes are identified as slopes of 12 percent or greater. There are areas of steep slopes throughout the project corridor. Areas of steep slopes were identified using the Natural Resource Conservation Service (NRCS) Soil Survey of Sherburne County. Steep slopes were identified in Elk River near the Highway 169/Highway 10 system interchange and south of the Highway 169/CSAH 33 interchange. In Zimmerman, areas of steep slopes were identified around Lake Fremont. See also Section VII.A.19.

According to the NRCS, highly erodible land (HEL) and potentially highly erodible land (PHEL) are areas of land that have a high potential for erosion. These classifications are based on soil type and steep slope characteristics. A soil map unit with an erodibility index of 8 or greater is considered to be HEL as set forth in the 7 CFR 610, subp B.

PHEL map units need to be field verified to confirm whether characteristics meet the HEL designation requirements. When disturbed through activities such as development, these areas have a high potential for soil erosion. Particular attention should be paid to HEL areas as they can present unstable soil conditions that can result in erosion if not properly managed during construction activities.

According to the NRCS Electronic Field Technical Guide, three soil mapping units were identified as highly erodible land (HEL) or potentially highly erodible land (PHEL).

- Stonelake-Sanburn complex (6 to 15 percent slope) and Stonelake-Nebish complex (6 to 12 percent slope) were identified as PHEL.
- Stonelake-Sanburn complex (15 to 40 percent slope) was identified as HEL.

The proposed project impacts areas of HEL/PHEL. Areas of HEL/PHEL are spread throughout the project corridor and surrounding area. Avoiding all areas of impact is not possible due to the characteristics of surrounding land.

Describe any erosion and sedimentation control measures to be used during and after project construction.

The potential for erosion during construction will exist, as soils are disturbed by excavation and grading. As the design of a Preferred Alternative is carried forward, it will be further refined to minimize any impacts to areas of HEL.

Erosion and sedimentation of all exposed soils within the project corridor will be minimized by utilizing the appropriate best management practices (BMPs) during construction. Implementation of BMPs during final construction greatly reduces the amount of construction-related sedimentation and helps to control erosion and runoff. Ditches, dikes, siltation fences, bale checks, sedimentation basins, and temporary seeding will be utilized as temporary erosion control measures during construction grading. Because the immediate purpose of the project is to preserve right of way and the road itself will not be built for many years, these BMPs may change. As new BMPs are developed, they will be incorporated into the construction phase of the project.

Temporary and permanent erosion control plans will be identified in the final site grading and construction plans for each stage as required by the National Pollutant Discharge Elimination System (NPDES) permitting for construction sites. Erosion control plans will also be consistent with erosion/sediment control standards of the Cities of Otsego, Elk River, and Zimmerman to the extent that is practicable. A Storm Water Pollution Prevention Program (SWPP) that includes erosion control and sediment management practices will be submitted with the NPDES permit as part of design and implementation of proposed improvements. Erosion control measures, including requiring erosion control plans and designating a site inspector and enforcer, will be in place and maintained throughout the entire construction period. Removal of erosion control measures will not occur until all disturbed areas have been stabilized.

17. Water Quality; Surface Water Runoff

a. **Compare the quantity and quality of site runoff before and after the project. Describe permanent controls to manage or treat runoff. Describe any stormwater pollution prevention plans.**

The existing roadway consists of a four-lane divided highway with a rural drainage system. Stormwater runoff from the existing roadway generally flows toward vegetated ditches, allowing for some degree of infiltration, filtering, and vegetative uptake of nutrients and pollutants before entering the downstream receiving waters. Stormwater discharge attenuation occurs to a limited extent where ditches are flat and/or controlled by culverts. Although the direct discharge of stormwater runoff to wetlands without primary treatment is detrimental to long-term integrity, wetlands generally provide excellent water quality benefits and stormwater discharge attenuation.

The standards established by the National Pollutant Discharge Elimination System (NPDES) permit program will be followed to mitigate the water quality and quantity impacts created by the project. In addition, coordination will occur with the Cities of Elk River and Zimmerman as well as the Sherburne County Soil and Water Conservation District (SWCD). The standards and rules of each of these entities will be followed to the extent practicable. The proposed project does not currently fall under the jurisdiction of a watershed management organization or watershed district. During final design, the regulatory framework outside of the NPDES permit must be revisited to ensure that the latest standards and rules are achieved.

Stormwater quantity and quality mitigation for the proposed project is described in further detail below, based on current regulatory requirements. The following project segments and water resources within the project area and proposed treatment areas are shown in Figures 7A through 7E, Appendix A.

<u>Segment One: Urban Elk River</u>

The proposed project would feature an urban stormwater conveyance system with corresponding storm sewer and discharge to designated stormwater treatment facilities. All stormwater generated from the Highway 169 corridor and interchanges will be directed to stormwater detention basins located at the proposed Highway 169 interchanges with TH 10, Main Street, School Street, and 193rd Avenue, as well as the south bank of the Mississippi River immediately west of Highway 169. Therefore, the stormwater detention basins are expected to mitigate the adverse effects of the increased impervious surfaces and pollutant generation. Stormwater detention basin locations for frontage roads will be determined during final design, but are expected to be handled in a similar manner to Highway 169. In addition to providing water quality treatment, the stormwater detention basins will also provide discharge attenuation so that existing discharge rates will be maintained as required by City ordinances.

Segment Two: Rural Elk River and Southern Livonia Township

The proposed project will feature a rural stormwater conveyance system with corresponding ditches and culverts discharging to designated stormwater treatment facilities. Most stormwater generated from the proposed project will be directed to one of several stormwater detention basins located at the proposed Highway 169/ 221st Avenue and Highway 169/CSAH 25/19 interchanges. Therefore, the stormwater detention basins are expected to mitigate the adverse effects of the increased impervious surfaces and pollutant generation. Stormwater detention basin locations for frontage roads will be determined during final design, but are expected to be handled in a similar fashion to Highway 169. In addition to providing water quality treatment, the stormwater detention basins will also provide discharge attenuation. Where it is not feasible to direct stormwater to stormwater detention basins, other BMPs, such as vegetated swales, infiltration basins, and/or grit chambers, will be utilized.

Segment Three: Zimmerman and Northern Livonia Township

The proposed project will feature both an urban stormwater conveyance system with corresponding storm sewer and a rural stormwater conveyance system with corresponding ditches, each discharging to designated stormwater treatment facilities. The realigned portions of Highway 169 at the CSAH 4 interchange and those portions of Highway 169 that will be maintained on the existing alignment will continue to have a rural stormwater conveyance system. Several stormwater detention basins have been proposed to mitigate the adverse impacts of the proposed Highway 169/ CSAH 4 interchange. Pond locations for frontage roads will be determined during final design of the project, but expect to be handled in a similar manner. Where it is not feasible to direct stormwater to stormwater detention basins, other BMPs, such as vegetated swales, infiltration basins, and/or grit chambers will be utilized so that existing discharge rates will be maintained as required by City ordinances.

b. **Identify routes and receiving water bodies for runoff from the site; include major downstream water bodies as well as the immediate receiving waters. Estimate impact runoff on the quality of receiving waters.**

Stormwater discharged from the proposed project will not likely have a substantial impact on the water quality of the identified receiving water bodies. As a result of the proposed improvements, water quality may be improved over existing conditions. In Segment Two and portions of Segment Three, the existing roadway has a rural drainage system that allows direct discharge of stormwater runoff to receiving water bodies with minimal water quality treatment or rate attenuation. The majority of the proposed project will direct stormwater runoff to stormwater detention basins designed according to NPDES standards before discharging to the identified receiving water bodies. Additional treatment will occur where stormwater detention basins discharge to swales and tributary wetlands of the identified receiving water bodies. Wetlands and swales positively affect stormwater quality by effectively increasing the residence time of the stormwater within the hydrologic system, allowing additional removal of total suspended solids. In addition, vegetative uptake of nutrients such as total phosphorus further improves water quality.

The routes and receiving bodies for stormwater runoff are detailed for the following project segments and shown in Figures 7A-7E, Appendix A.

According to the Section 303(d) list of impaired waters published by the MPCA (2008) the following waters are listed as impaired for aquatic consumption resulting in fish consumption advisories due to excess levels of mercury and polychlorinated biphenyls:

- Mississippi River between the Elk River and the Crow River
- Elk River between Orono Lake and the Mississippi River

The proposed project should not adversely affect these waters with respect to this impairment because these impairments are not associated with stormwater runoff from roadways.

<u>Segment One: Urban Elk River</u>

Stormwater runoff generated from Segment One of the proposed project north of 193rd Avenue will be directed via storm sewer to Wetland W2-1. Wetland W2-1 is located adjacent to the southeast exit ramp of the proposed Highway 169/193rd Avenue interchange. Existing flow patterns are expected to be maintained. Excess stormwater will be discharged from W2-1 to the west via the existing storm sewer, which ultimately discharges to the Mississippi River. Stormwater runoff generated from Segment One of the proposed project, south of 193rd Avenue, will be directed via storm sewer and open channels to the Mississippi River.

<u>Segment Two: Rural Elk River and Southern Livonia Township</u>

Stormwater runoff generated from Segment Two of the proposed project north of CSAH 25/19 will be directed primarily to Tibbits Brook and County Ditch 32. County Ditch 32 is a small tributary of Tibbits Brook. Tibbits Brook is a tributary of Elk River, which ultimately discharges to the Mississippi River. Stormwater runoff generated from Segment Two of the proposed project south of CSAH 25/19 will be directed to various wetlands located within the drainage corridor of Highway 169. In general, no clearly-defined drainage path is present within the drainage corridor of Highway 169. Given the presence of wetlands within this segment without defined outlets, this area may function as recharge area for the underlying aquifer. There are no receiving waters within 2,000 feet of the proposed project that are identified by MPCA as impaired.

Segment Three: Zimmerman and Northern Livonia Township

Stormwater runoff generated from Segment Three of the proposed project north of the CSAH 4 discharges to Lake Fremont. County Ditch One functions as an outlet of Lake Fremont and is a tributary to Tibbits Brook. Tibbits Brook discharges to Elk River, which is a tributary to the Mississippi River. Stormwater runoff generated from Segment Three of the proposed project south of CSAH 4 discharges to County Ditch One or County Ditch 32. County Ditch 32 is a tributary of Tibbits Brook. There are no receiving waters within 2,000 feet of the proposed project that are impaired according to the 303(d) list of impaired waters published by the MPCA. There are no receiving waters within 2,000 feet of the proposed project that are identified by MPCA as impaired.

18. Water Quality.

a. **Describe sources, composition and quantities of all sanitary, municipal and industrial wastewater produced or treated at the site.**

Not applicable.

b. **Describe waste treatment methods or pollution prevention efforts and give estimates of composition after treatment. Identify receiving waters, including major downstream water bodies (identifying any impaired waters), and estimate the discharge impact on the quality of receiving waters. If the project involves on-site sewage systems, discuss the suitability of site conditions for such systems.**

Not applicable.

c. **If wastes will be discharged into a publicly owned treatment facility, identify the facility, describe any pretreatment provisions and discuss the facility's ability to handle the volume and composition of wastes, identifying any improvements necessary.**

Not applicable.

19. Geologic Hazards and Soil Conditions.

a. **Approximate depth (in feet) to ground water** __4__ feet minimum
__22__ feet average

Source: Piezometer data collected by Mn/DOT at 12 piezometer locations along the project corridor.

Approximate depth (in feet) to bedrock __150__ feet minimum
__175__ feet average

Source: Minnesota Geological Survey Maps of Gridded Bedrock Elevation and Depth to Bedrock in Minnesota

Reports and studies collected with the Limited Phase I ESA identify a perched water table (groundwater depth of 1.5 to 2 feet) near Highway 169 in the Zimmerman area.

The Anoka Sand Plain Regional Hydrogeological Assessment shows the minimum and average depths to groundwater to be much deeper (52 feet and 114 feet respectively) than the data provided above. However, due to the depressed roadway section proposed for Highway 169 in urban Elk River (Highway 10/101/169 interchange to 197th Avenue), several piezometers were installed to determine the average and seasonal high groundwater elevations. Groundwater data was collected from May 2006 through the present. The Highway 169 profiles were designed to maintain seven feet of clearance between the finished centerline elevation and the seasonal high groundwater elevation in order to maintain adequate groundwater separation in the roadside ditches. Resulting impacts to local roadways at Highway 169 interchanges and intersecting side streets are described above in Section IV.B.2.

Describe any of the following geologic site hazards to ground water and also identify them on the site map: sinkholes, shallow limestone formations or karst conditions. Describe measures to avoid or minimize environmental problems due to any of these hazards.

No sinkholes, shallow limestone formations, or karst conditions are located within the project area.

As discussed in Section VII.A.13, a portion of the Highway 169 corridor is in a wellhead protection area and a drinking water supply management area. Construction of the proposed project involves limited use of contaminants and, therefore, results in limited potential for soil contamination. If a spill were to occur during construction, appropriate actions to remediate would be taken in accordance with MPCA guidelines.

b. **Describe the soils on the site, giving NRCS (SCS) classifications, if known. Discuss soil texture and potential for groundwater contamination from wastes or chemicals spread or spilled onto the soils. Discuss any mitigation measures to prevent such contamination.**

The cities of Elk River and Zimmerman are located in Sherburne County. Sherburne County is located within the Anoka Sand Plain, which is characterized by thick surface deposits of sand and gravelly sand. The sand and gravel aquifers provide a ready supply of groundwater irrigation for agriculture, and also provide a drinking water supply for much of the county. Important bedrock aquifers underlie the surficial sand aquifers in the eastern portion of Sherburne County. These aquifers serve as water supply for a large portion of east central Minnesota, including the Twin Cities metropolitan area. Table 13 lists the soil types along the corridor.

According to the Anoka Sand Plain Regional Hydrological Assessment (2003), the geologic sensitivity of the uppermost aquifer of the Anoka Sand Plain is generally very high in Sherburne County. A substantial number of the soil units in the project corridor have sandy textures. The coarse texture of the soil makes the groundwater especially susceptible to contamination. Due to the relatively high permeability of these soils, a potential chemical or waste spill could infiltrate into the soil and into the groundwater.

It is important to note that high geologic sensitivity does not indicate that groundwater quality has been or will become degraded and low geologic sensitivity does not guarantee that water will remain pristine. Potential for groundwater contamination in the project area can be examined by looking at the following factors: (1) the properties of the contaminant itself, (2) the direction of groundwater movement, (3) permeability of the soils above the water resource, and (4) the presence or absence of a confining layer above the water resource. However, construction of the proposed project would involve limited use of contaminants and, therefore, results in limited potential for soil contamination. If a spill were to occur during construction, appropriate actions to remediate would be taken in accordance with MPCA guidelines.

See Section VII.A.16 for additional soil information.

TABLE 13
SOIL TYPES WITHIN PROJECT AREA

Soil Name*	Soil Symbol	Percent Slope
Hubbard loamy sand	7A	0-2
Hubbard loamy sand	7B	2-6
Hubbard loamy sand	7C	6-12
Nebish fine sandy loam(1)	32B	2-6
Zimmerman fine sand	158A	0-3
Zimmerman fine sand	158B	3-6
Zimmerman fine sand	158C	6-12
Talmoon loam(1)	346	0-2
Mahtomedi loamy coarse sand	454B	1-6
Seelyeville muck	540	0-1
Cathro muck	544	0-1
Pierz sandy loam(1)	623B	2-6
Sanburn fine sandy loam	730B	2-6
Udorthents-Pits, gravel, complex	1028	
Isan sandy loam	1110	0-2
Stonelake-Sanburn complex	1253B	1-6
Stonelake-Sanburn complex	1253C	6-15

TABLE 13 continued
SOIL TYPES WITHIN PROJECT AREA

Soil Name*	Soil Symbol	Percent Slope
Stonelake-Sanburn complex	1253E	15-40
Elk River-Mosford complex[(2)]	1257	0-6
Stonelake-Nebish complex	1260B	2-6
Stonelake-Nebish complex	1260C	6-12
Fordum Loam[(2)]	1378	0-2

*Soils on the local Hydric Soils list for Sherburne County are highlighted in **BOLD**.
[(1)] Prime Farmland (Soil Survey of Sherburne County, Minnesota). Urban or built up areas of the soils listed are not considered prime farmland.
[(2)] Minnesota Department of Transportation Environmental Assessment/Environmental Assessment Worksheet for Grade Separations on Highway 101 and CSAHs 36, 37, 42, and 39 in Cities of Otsego and St. Michael. September 27, 2004. Conditions in the project area have not changed substantially since this study.

20. Solid Wastes, Hazardous Wastes, Storage Tanks.

a. **Describe types, amounts and compositions of solid or hazardous wastes, including solid animal manure, sludge and ash, produced during construction and operation. Identify method and location of disposal. For projects generating municipal solid waste, indicate if there is a source separation plan; describe how the project will be modified for recycling. If hazardous waste is generated, indicate if there is a hazardous waste minimization plan and routine hazardous waste reduction assessments.**

No municipal solid waste or hazardous waste will be generated by the proposed project. If a spill of hazardous or toxic substances should occur during or after construction of the proposed project, it is the responsibility of the transport company to notify the Minnesota Department of Public Safety, Division of Emergency Services, to arrange for corrective measure to be taken pursuant to 6 MCAR 4.9005E. Any contaminated spills or leaks that occur during construction would be responded to according to MPCA containment and remedial action procedures.

The excavation of soil materials for the future construction of the roadway will likely be necessary. Removed materials will become the property of the contractor, who may recycle the materials for use in the project or may use the materials for another project. Any contaminated materials identified within the construction area would be handled in accordance with MPCA requirements prior to reuse or disposal. If suitable, topsoil removed for the construction of the project would be salvaged for reuse and placed in areas where turf and landscaping would be located. Any disposal of excess materials would be done in compliance with state and local solid waste regulations. There would be no disposal of excess materials into wetlands, floodplains, or other sensitive areas.

b. **Identify any toxic or hazardous materials to be used or present at the site and identify measures to be used to prevent them from contaminating groundwater. If the use of toxic or hazardous materials will lead to a regulated waste, discharge or emission, discuss any alternatives considered to minimize or eliminate the waste, discharge or emission.**

Toxic or hazardous materials would not be present at the site, except for fuel and oil necessary for the construction equipment during construction.

c. **Indicate the number, location, size and use of any above or below ground tanks to store petroleum products or other materials, except water. Describe any emergency response containment plans.**

Of the 18 impacted properties with medium or high risk potential described in section VII.A.9, seven properties are reported to have aboveground and/or underground storage tanks (ASTs/USTs). If any of these properties are impacted by the project, proper care and precautions will be taken, in accordance with MPCA guidelines and regulations. No permanent above or below ground storage tanks would be installed in conjunction with this project. Temporary storage tanks for petroleum products may be located in the project area for the purpose of refueling construction equipment during roadway construction. Appropriate measures would be taken during construction to avoid spills that could contaminate groundwater or surface water in the project corridor. In the event that a leak or spill occurs during construction, appropriate action to remediate the situation would be taken immediately in accordance with MPCA guidelines and regulations.

21. Traffic.

Parking spaces added: NA

Existing spaces (if project involves expansion): NA

Estimated total average daily traffic generated: see discussion below

Estimated maximum peak hour traffic generated and time of occurrence: see discussion below

Indicate source of trip generation rates used in the estimates.

***If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW.* Using the format and procedures described in the Minnesota Department of Transportation's Traffic Impact Study Guidance (*available at: http://www.oim.dot.state.mn.us/access/pdfs/Chapter%205.pdf*) or a similar local guidance, provide an estimate of the impact on**

traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system.

As noted in Section III, the purpose of this project is to improve roadway capacity and operational efficiency (as well as improving safety). The following discussion is a summary of the results of the traffic operations analysis that was performed at key intersections for a.m. and p.m. peak hours for existing (2006), No-Build (2030), and Build (2030) conditions. Traffic Operations Technical Memoranda are included in Appendix E. The source of the trip generation rates is the Mn/DOT Collar County Travel Demand Model.

Existing and Future Traffic Volumes

Section III.C describes existing and future traffic volumes on Highway 169 as well as expected levels of congestion under 2030 No-Build conditions. Existing average daily traffic (ADT) volumes on Highway 169 range between 47,900 vehicles per day (vpd) in Elk River to 29,930 vpd in Zimmerman. Forecast 2030 ADT volumes on Highway 169 range between 77,000 vpd in Elk River to 49,000 vpd in Zimmerman.

Existing Conditions and Future No-Build Conditions

A traffic operations analysis was performed at key intersections for a.m. and p.m. peak hours for existing and No-Build conditions. The existing (2006) p.m. peak hour analysis shows that several key intersections operate at an unacceptable LOS E or worse.

Under No-Build (2030) conditions, most intersections along the Highway 169 corridor report high delays and unacceptable LOS in both the a.m. and p.m. peak hour periods as a result of increased ADT volumes. This is due to increasing traffic volumes on the mainline that will exceed capacity and result in substantial queuing and delay. Detailed operations analysis results for No-Build conditions are discussed in Section III.C.

2030 Build Conditions

High Priority Interregional Mobility

As described in Section III.A, the Minnesota Interregional Corridor (IRC) system established overall corridor mobility goals. The Highway 101/169 corridor is a High Priority IRC from Rogers to north of Zimmerman (including the project area), and has a performance target of 60 mph for the average corridor peak-period travel speed. The Highway 101/169 High Priority IRC corridor that passes through the project area is defined as the 20-mile corridor between Rogers and Zimmerman.

The *Highway 101/169 CMP* (2002) documented existing and future (2025) performance for the Elk River, Livonia Township, and Zimmerman growth areas of the Highway 169 High Priority IRC. These growth areas correspond to the project area described in this EA/EAW. As discussed in Section III, the cumulative performance speed of Highway 169 from Elk River to Zimmerman under existing (2001) conditions is

56 mph, below the target speed of 60 mph. In the future, the performance for Highway 169 from Elk River to Zimmerman is forecast to decrease to 26 mph.

Based on analyses completed as part of the *Highway 101/169 CMP* (2002), the Highway 169 corridor from Elk River to Zimmerman is forecast to be above the High Priority IRC performance target of 60 mph under future Build (2025) conditions.

Highway 169 Operations Analysis (Urban Elk River Segment)

An operations analysis for year 2030 Build conditions was conducted for the Highway 169 mainline from Highway 10 to 197th Avenue through Elk River. The purpose of this analysis was to determine the impact to highway operations as a result of weave movements between vehicles entering and exiting the mainline from intersecting local roadways. The highway operations analysis results for a.m. and p.m. peak hours under 2030 Build conditions are shown in Table 23. As shown in Table 14, the Highway 169 mainline is forecast to operate at an acceptable LOS D or better under future Build conditions.

TABLE 14
HIGHWAY 169 OPERATIONS: HIGHWAY 10 TO 197TH AVENUE

	Build (2030) Conditions[(1)]	
	C-D Road + Auxiliary Lanes[(2)]	
Highway Segment	Northbound A.M. Peak (P.M. Peak)	Southbound A.M. Peak (P.M. Peak)
South of Hwy 10	A(D)	B(A)
Hwy 10 to Main	A(C)	B(A)
Main to School	A(C)	B(A)
C-D Road between Main and School	A(B)	A(B)
School to 193rd	A(C)	B(A)
C-D Road between School and 193rd	A(A)	B(B)
193rd to 197th	A(C)	B(A)
North of 197th	A(C)	B(A)

(1) Assumes Highway 169 is a six-lane section from Highway 10 to north of 197th Avenue.
(2) Assumes auxiliary lanes on Highway 169 between Highway 10 and Main Street and between School Street and 193rd Avenue. Assumes C-D road (collector-distributor roadway) between Main Street and School Street, as well as between School Street and 193rd Avenue.

Traffic (Intersection) Operations Analysis

An operations analysis was conducted for the a.m. and p.m. peak hours at each of the peak hour key intersections within the project area to determine how traffic currently operates along the project segment. All signalized intersections were analyzed using the Synchro/SimTraffic software and unsignalized intersections were analyzed using the

Highway Capacity Software. Capacity analysis results identify a Level of Service (LOS), which indicates how well an intersection is operating.

The operations analysis results for a.m. and p.m. peak hours under 2030 Build conditions are shown in Table 15, and discussed below. All interchange intersections operate at acceptable LOS D or better with the proposed improvements.

TABLE 15
INTERSECTION CAPACITY – 2030 BUILD
A.M. AND P.M. PEAK HOUR INTERSECTION LEVEL OF SERVICE

	Level of Service Results	
	Build (2030) A.M. Peak Period	**Build (2030) P.M. Peak Period**
Segment One: Urban Elk River		
Highway 10/101/169 System Interchange		
Hwy 10 EB/Hwy 169 entrance ramp two-phase signal	D	B
Main Street Interchange		
Main St/Gates Ave	A	B
Main St/West Ramps/Carson St	A	D
Main St/East Ramps/Line Ave	C	B
School Street Interchange		
School St/Freeport St	C	C
School St/West Ramps	A	A
School St/East Ramps	B	C
School St/Dodge Ave	C	C
193rd Avenue Interchange		
Jackson Ave/Freeport St	A	A
193rd Ave/Holt St	B	B
193rd Ave/West Ramps	B	B
193rd Ave/East Ramps/Evans St	B	B
197th Avenue Interchange		
197th Ave/Holt St/Irving St	A	A
197th Ave/West Ramp[(1)]	A/A	A/A
197th Ave/East Ramp[(1)]	A/A	A/A
197th Ave/Evans St[(1)]	A/A	A/A

[(1)] Levels of service (LOS) for unsignalized intersections are reported by an overall LOS followed by the worst approach LOS.

TABLE 15 continued
INTERSECTION CAPACITY – 2030 BUILD
A.M. AND P.M. PEAK HOUR INTERSECTION LEVEL OF SERVICE

	Level of Service Results	
	Build (2030) A.M. Peak Period	**Build (2030) P.M. Peak Period**
Segment Two: Rural Elk River and Livonia Township		
See Table 16 below for results of critical lane analysis for the 221st Avenue and CSAH 25/19 interchanges.		
Segment Three: Zimmerman (CSAH 4 Interchange)		
CSAH 4/West Access Rd	D	C
CSAH 4/West Ramps	C	C
CSAH 4/East Ramps/Fremont Dr	D	D

Critical lane analysis was performed for a.m. and p.m. peak hours under 2030 Build conditions for the interchanges at Highway 169/221st Avenue and Highway 169/ CSAH 25/19. A critical lane analysis is a planning-level tool that is used to determine the general capacity sufficiency of an intersection. Traffic volumes for critical movements at the intersection are identified and added together to obtain the sum of critical lane volumes for the intersection. The critical lane volumes are then compared to the theoretical capacity of the intersection. While capacity of a signalized intersection will vary considerably based on a number of factors (e.g., cycle length, number of traffic signal phases, lane widths, grades, vehicle mix, etc.), the capacity of a signalized intersection is typically assumed to be 1,400 vehicles per hour (vph). Intersections with critical lane volumes less than 1,200 vph are typically considered under capacity, while intersections with critical lane volumes over 1,400 vph are considered over capacity. When an intersection has critical lane volumes between 1,200 and 1,400 vph it is considered near capacity. Results presented in Table 16 show that all intersections operate well under capacity.

TABLE 16
CRITICAL LANE ANALYSIS – 2030 BUILD
221st AVENUE AND CSAH 25/19

Intersection	**Sum of Critical Lane Volumes [vph]**		**Relationship to Probable Capacity**
	A.M.	**P.M.**	
Highway 169/221st Avenue East Ramps	590	740	Under Capacity
Highway 169/221st Avenue West Ramps	685	460	Under Capacity
Highway 169/221st Avenue East Frontage Road	525	460	Under Capacity
Highway 169/221st Avenue West Frontage Road	520	540	Under Capacity
Highway 169/CSAH 19/25 East Ramps	635	790	Under Capacity
Highway 169/CSAH 19/25 West Ramps	940	655	Under Capacity

Refer to the technical memorandum in Appendix E for additional detail regarding traffic operations for the proposed project under Build (2030) conditions.

Access Changes

The proposed project will result in the closure/consolidation of a substantial amount of access along Highway 169. This will mean the loss of direct access to Highway 169 for several properties along the project corridor and will change Highway 169 access within the study area for most corridor users. Table 17 documents changes of existing and proposed access to/from Highway 169 within the project corridor.

TABLE 17
ACCESS CHANGES AND DRIVEWAYS

Location	Municipality	Existing Access	Proposed
Segment One: Urban Elk River			
Highway 10/101/169	Elk River	Full access interchange	Full systems interchange
Between Highway 10/101/169 interchange. and Main Street	Elk River	2 private access points	Redirect access to the supporting street network
Main Street/181st Street/CSAH 12	Elk River	Signalized intersection	Full access interchange
5th Street	Elk River	Right-in/right-out	Redirect access to the supporting street network
School Street	Elk River	Signalized intersection	Full access interchange
191st Avenue	Elk River	Right-in/right-out	Redirect access to the supporting street network
193rd Avenue	Elk River	Signalized intersection	Full access interchange
197th Avenue	Elk River	Signalized intersection	Half-diamond interchange There will be no access to 197th Ave from northbound Highway 169
Segment Two: Rural Elk River and Southern Livonia Township			
CSAH 33	Elk River	Full access interchange	No change
211th Avenue	Elk River	Right-in/right-out	Redirect access to the supporting street network
CR 77	Elk River	Full access intersection 1 private access point	Redirect access to the supporting street network
217th Avenue	Elk River	Full access intersection 1 private access point	Redirect access to the supporting street network
219th Avenue	Elk River	Full access intersection 1 private access point	Redirect access to the supporting street network
221st Avenue	Elk River	Full access intersection 1 private access point	Full access interchange
225th Avenue	Elk River	Full access intersection 1 private access point	Redirect access to the supporting street network
Between 225th Avenue and Elk River city limit	Elk River	2 private access points	Redirect access to the supporting street network
Between Elk River city limit and CR 74/237th Avenue	Livonia Township	3 private access points	Redirect access to the supporting street network
CR 74/237th Avenue	Livonia Township	Full access intersection	Redirect access to the supporting street network

TABLE 17 continued
ACCESS CHANGES AND DRIVEWAYS

Between CR 74/237th Avenue and 239th Avenue	Livonia Township	1 private access point	Redirect access to the supporting street network
239th Avenue	Livonia Township	Full access intersection	Underpass beneath Highway 169 connecting to supporting street network east of Highway 169
Between 239th Avenue and CSAH 25	Livonia Township	3 private access points	Access redirected to the supporting street network
CSAH 25	Livonia Township	Full access intersection	Folded diamond interchange with east route becoming CSAH 25
CSAH 19	Livonia Township	Full access intersection 1 private access point	Folded diamond interchange with west route becoming CSAH 19
247th Avenue	Livonia Township	Full access intersection	Access redirected to the supporting street network
Between 247th Avenue and 253rd Avenue	Livonia Township	6 private access points	Access west of Highway 169 removed and properties relocated Access east of Highway 169 redirected to the supporting street network
Segment Three: Zimmerman			
253rd Avenue	Zimmerman	Full access intersection	Redirect access to supporting street network
Between 253rd Avenue and 255th Avenue	Zimmerman	Unnamed access to frontage road	Redirect access to supporting street network
255th Avenue	Zimmerman	Full access intersection	Redirect access to supporting street network
257th Avenue	Zimmerman	Full access intersection	Redirect access to supporting street network
Main Street	Zimmerman	Full access intersection	Redirect access to supporting street network
Gateway Drive	Zimmerman	1 private access point	Redirect access to supporting street network
CSAH 4	Zimmerman	Full access intersection	Full access grade-separated interchange
5th Avenue N	Zimmerman	Right-in/right-out	Redirect access to supporting street network
Oak Street	Zimmerman	Right-in/right-out	Redirect access to supporting street network
Between Oak Street and 273rd Avenue	Zimmerman	2 private access points	Redirect access to supporting street network
273rd Avenue	Zimmerman	Full access intersection	Redirect access to supporting street network

Highway 169 Park and Ride Facility (Urban Elk River Segment)

A Mn/DOT-owned Park and Ride facility is located on Highway 169, just north of the Highway 10/101/169 interchange. The Park and Ride currently has direct, full access to Highway 169 from northbound Highway 169. With conversion of Highway 169 to a freeway facility, this access point to Highway 169, and subsequently the Park and Ride itself, will be closed. The Park and Ride will be replaced by the Northstar Park and Ride facility, located at 171st Avenue NW, just west of the Highway 10/101/169 interchange.

22. Vehicle-Related Air Emissions. **Estimate the effect of the project's traffic generation on air quality, including carbon monoxide levels. Discuss the effect of traffic improvements or other mitigation measures on air quality impacts.**

Motorized vehicles affect air quality by emitting airborne pollutants. Changes in traffic volumes, travel patterns, and roadway locations affect air quality by changing the number of vehicles in an area and the congestion levels. The air quality impacts from the project are analyzed by addressing criteria pollutants, a group of common air pollutants regulated by EPA on the basis of criteria (information on health and/or environmental effects of pollution). The criteria pollutants identified by the EPA are ozone, particulate matter, carbon monoxide, nitrogen dioxide, lead, and sulfur dioxide. Potential impacts resulting from these pollutants are assessed by comparing projected concentrations to National Ambient Air Quality Standards (NAAQS). In addition to the criteria air pollutants, the EPA also regulates air toxics.

Ozone

Ground-level ozone is a primary constituent of smog and is a pollution problem throughout many areas of the United States. Exposures to ozone can make people more susceptible to respiratory infection, result in lung inflammation, and aggravate preexisting respiratory diseases such as asthma. Ozone is not emitted directly from vehicles but is formed as volatile organic compounds (VOCs) and nitrogen oxides (NOx) react in the presence of sunlight. Transportation sources emit NOx and VOCs and can therefore affect ozone concentrations. However, due to the phenomenon of atmospheric formation of ozone from chemical precursors, concentrations are not expected to be elevated near a particular roadway.

The MPCA, in cooperation with various other agencies, industries and groups, has encouraged voluntary control measures to control ozone and has begun developing a regional ozone modeling effort. Recent conversations with MPCA staff indicate that the ozone models currently use federal default traffic data and a relatively coarse modeling grid. As such, ozone modeling in Minnesota is in its developmental stage, and therefore, there is no available method of determining the contribution of a single roadway to regional ozone concentrations. Ozone levels in the Twin Cities Metropolitan Area currently meet state and federal standards and Minnesota is currently classified by the Environmental Protection Agency (EPA) as an ozone attainment area. Because of these factors, a quantitative ozone analysis was not conducted for this project.

Particulate Matter

Particulate matter (PM) is categorized by the size of the particles being measured. For example, the $PM_{2.5}$ value is the measurement of particles smaller than 2.5 microns (a micron is a millionth of a meter) in a particular volume of air. Fine particles with very small diameters can move like gases and can be transported hundreds of miles from their source. Larger particles do not remain suspended and tend to settle out of the air relatively near their source.

The following summary of potential health impacts is excerpted from the EPA brochure Particle Pollution and Your Health (EPA document 452/F-03-001, September 2003):

> *Particle exposure can lead to a variety of health effects. For example, numerous studies link particle levels to increased hospital admissions and emergency room visits—and even to death from heart or lung diseases. Both long- and short-term particle exposures have been linked to health problems.*
>
> ***Long-term exposures,** such as those experienced by people living for many years in areas with high particle levels, have been associated with problems such as reduced lung function and the development of chronic bronchitis—and even premature death.*
>
> ***Short-term exposures** to particles (hours or days) can aggravate lung disease, causing asthma attacks and acute bronchitis, and may also increase susceptibility to respiratory infections. In people with heart disease, short-term exposures have been linked to heart attacks and arrhythmias. Healthy children and adults have not been reported to suffer serious effects from short-term exposures, although they may experience temporary minor irritation when particle levels are elevated.*

The MPCA states on its web site:

> *Recent data suggests that particles 2.5 microns or smaller may pose the greatest threat to human health because, for the same mass, they absorb more toxic and carcinogenic compounds than larger particles and penetrate more easily deep into the lungs.*

Motor vehicles can influence particulate matter concentrations on a local scale by directly emitting fine particles and from wind turbulence that causes particles to be mixed into the air. On a regional scale, vehicular traffic can influence particle concentrations through emission of precursor compounds (nitrogen oxides, sulfur oxides and VOCs) as well as direct emissions. Vehicle related particulate matter tends to be smaller than 2.5 microns as stated in the following document. The study *Transportation-Related Air Toxics: Case Study Materials Related to US 95 in Nevada*, March 7, 2003, completed by Sonoma Technology, states:

> *With the exception of road dust, essentially all of the particulate matter attributed to vehicles (either as direct emissions or compounds, which are emitted as gases and condense into particulate matter in the ambient air) is smaller than 2.5 mm in size (pm2.5).*

The concentration of fine particulates in the atmosphere is a complex function of direct local emissions, meteorological conditions, and concentrations of various precursor compounds. Modeling of particulate concentrations is an emerging science and is being done on a regional and nationwide scale. A recent study, Transportation-Related Air Toxics: Case Study Materials Related to US 95 in Nevada, March 7, 2003, completed by Sonoma Technology, reviewed the limited data relating road proximity and fine particle concentrations and discussed the extent to which roadways might contribute to exceedances of PM $_{2.5}$ NAAQS:

> *However, these limited findings indicate that, relative to the 24-hour NAAQS of 65 mg/m^3, on-road vehicle PM$_{2.5}$ emissions may be a concern near a road (e.g., within 100 m) if background concentrations are already near the NAAQS. More research is needed to further understand the relationship between PM$_{2.5}$ concentrations and road proximity.*
>
> *There is currently a lack of guidance available to analysts regarding methodological approaches for analyzing the PM impacts of transportation projects at the micro scale.*

Widespread PM$_{2.5}$ monitoring began in Minnesota in 1999. An article published in the MPCA's Minnesota's Environment magazine, Volume 3, Number 3, Summer 2003, indicates that particulate concentrations rise to concentrations considered unhealthy for sensitive people only a few times per year. Based on recent PM$_{2.5}$ monitoring, it appears that the state of Minnesota will be in attainment of recently enacted PM$_{2.5}$ standards.

Based on the relatively low ambient concentrations observed in Minnesota and the lack of analysis methodology, no project level modeling for particulate matter was conducted for this project.

Nitrogen Dioxide (Nitrogen Oxides)

Nitrogen oxides, or NOx, are the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. Nitrogen oxides form when fuel is burned at high temperatures, as in a combustion process. The primary sources of NOx are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels. The MPCA *Air and Water Emissions Report* (March 2000) indicates that on-road mobile sources account for 31 percent of NOx emissions in Minnesota. In addition to being a precursor of ozone, NOx can cause respiratory irritation in sensitive individuals and contribute to acid rain.

Nitrogen dioxide (NO_2) levels in the Twin Cities Metropolitan Area currently meet state and federal standards. Based on the relatively low ambient concentrations of NOx in Minnesota and the long term trend of reduction in NOx emissions, it is unlikely that NOx standards will be approached or exceeded in the project area. Because of these factors, a specific analysis of nitrogen dioxide was not conducted for this project.

Sulfur Dioxide

Sulfur dioxide (SO_2) and other sulfur oxide gases (SOx) are formed when fuel containing sulfur, such as coal, oil, and diesel fuel, is burned. Sulfur dioxide is a heavy, pungent, colorless gas. Elevated levels can impair breathing, lead to other respiratory symptoms, and at very high levels aggravate heart disease. People with asthma are most at risk. Once emitted into the atmosphere, SO_2 can be further oxidized to sulfuric acid, a component of acid rain.

Over 65 percent of SO_2 released to the air comes from electric utilities, especially those that burn coal. The MPCA *Air and Water Emissions Report* (March 2000) indicates that on-road mobile sources account for just 4.8 percent of SOx emissions in Minnesota. MPCA monitoring shows that ambient SO_2 concentrations are consistently below standards. The MPCA has concluded that long-term trends in both ambient air concentrations and total SO_2 emissions in Minnesota indicate steady improvement.

Emissions of sulfur oxides from transportation sources are a small component of overall emissions and continue to decline due to the desulphurization of fuels. Minnesota is classified by the EPA as an attainment area for sulfur dioxide. Sulfur dioxide levels in the Twin Cities metropolitan area currently meet NAAQs. Because of these factors, a quantitative analysis was not conducted for this project.

Lead

Due to the phase out of leaded gasoline, lead is no longer a pollutant associated with vehicular emissions.

Carbon Monoxide

Carbon monoxide (CO) is the traffic-related pollutant of most concern in urban areas. Detailed intersection scale CO dispersion modeling was not performed for this project since it does not lie in an area where conformity requirements apply. A qualitative analysis is considered for this project.

Concentrations of CO are generally highest at intersections with poor levels of service and, consequently, more idling vehicles. The proposed design is not expected to result in any nearby intersections operating at unacceptable levels of service. Therefore, this project is not expected to result in future air quality conditions that would reach levels of CO concentrations approaching state standards. The Minnesota state standard of 30 parts per million (ppm) for 8-hour CO concentration is more stringent than the federal 8-hour standard of 35 ppm.

The USEPA (United States Environmental Protection Agency) has approved a screening method to determine which intersections require hot spot analysis. The threshold annual average daily traffic (AADT) criterion for detailed intersection-level analysis is not exceeded at any intersections that are a part of this project. Mn/DOT demonstrates by the results of the screening procedure that the intersections within the project area do not require hot-spot analysis.

Improvements in vehicle technology and in motor fuel regulations continue to result in reductions in vehicle emission rates. The EPA MOBILE 6.2 emissions model estimates that emission rates will fall by nearly 30 percent between 2008 and 2019, and an additional five to seven percent between 2019 and 2030. Consequently, 2030 vehicle-related CO concentrations in the study area are likely to be lower than existing concentrations even considering the increase in project-related and background traffic.[11]

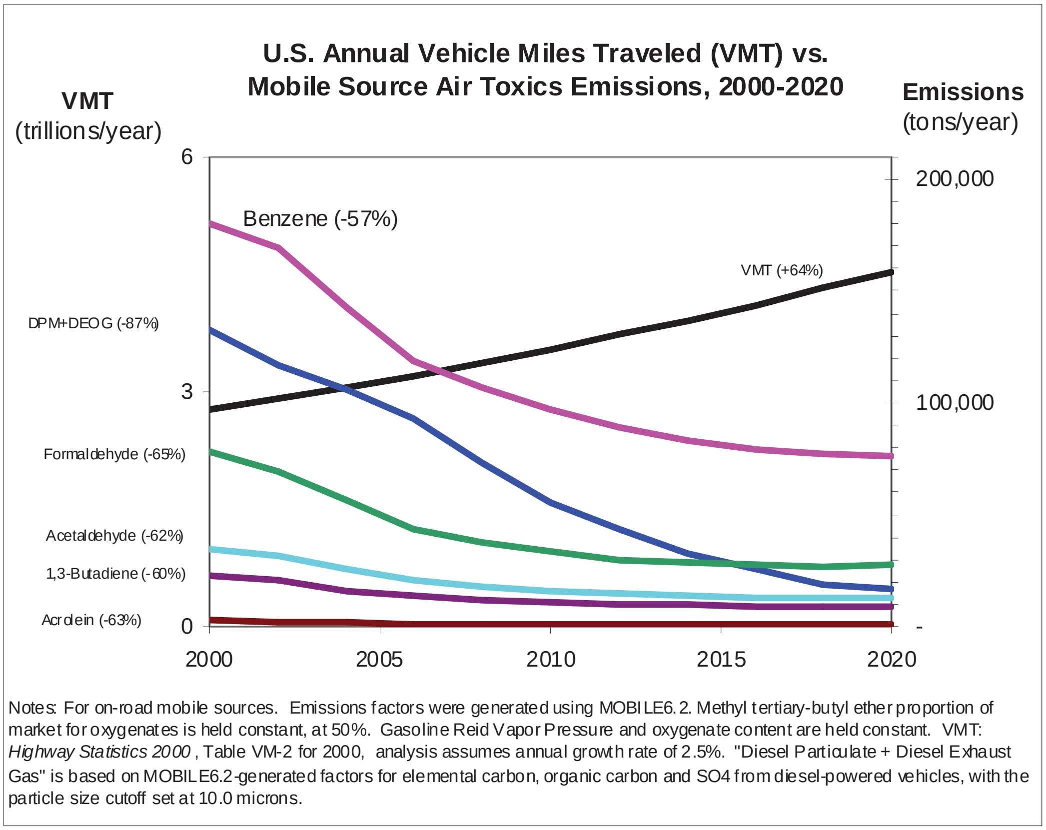
Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries).

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The EPA is the lead federal agency for administering the Clean Air Act and has certain responsibilities regarding the health effects of MSATs. The EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources, 66 FR 17229 (March 29, 2001). This rule was issued under the authority in Section 202 of the Clean Air Act. In its rule, EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, the Federal Highway Administration (FHWA) projects that even with a 64 percent increase in vehicle miles traveled (VMT), these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 percent to 65 percent, and will reduce on-highway diesel PM emissions by 87 percent, as shown in the following graph:

[11] MOBILE 6.2 model run performed October 27, 2004 by SRF Consulting Group, Inc. Stated reductions in CO emissions represent average reductions across vehicle speeds from 0 to 65 miles per hour (mph).



Notes: For on-road mobile sources. Emissions factors were generated using MOBILE6.2. MTBE proportion of market for oxygenates is held constant, at 50%. Gasoline RVP and oxygenate content are held constant. VMT: Highway Statistics 2000, Table VM-2 for 2000, analysis assumes annual growth rate of 2.5%. "DPM + DEOG" is based on MOBILE6.2-generated factors for elemental carbon, organic carbon and SO4 from diesel-powered vehicles, with the particle size cutoff set at 10.0 microns.

As a result, EPA concluded that no further motor vehicle emissions standards or fuel standards were necessary to further control MSATs. The agency is preparing another rule under the authority of Clean Air Act Section 202(1) that will address issues and could make adjustments to all 21 of the current MSATs as well as the six primary MSATs.

Unavailable Information for Project Specific MSAT Impact Analysis

This document includes a basic analysis of the likely MSAT emission impacts of the proposed project. However, available technical tools do not enable us to predict the project-specific health impacts of the emission changes associated with the alternatives. Due to these limitations, the following discussion is included in accordance with Council on Environmental Quality regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information:

Information that is Unavailable or Incomplete. Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. ach of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project. Note that the language and statistics quoted in this section are derived from "Interim Guidance on Air Toxics Analysis in NEPA Document," Cynthia J. Burbank, published by FHWA on February 3, 2006.

1. Emissions: The EPA tools to estimate MSAT emissions from motor vehicles are not sensitive to key variables determining emissions of MSATs in the context of highway projects. While the MOBILE 6.2 emissions model is used to predict emissions at a regional level, it has limited applicability at the project level. MOBILE 6.2 is a trip-based model with emission factors that are projected based on a typical trip of 7.5 miles, and on average speeds for this typical trip. This means that MOBILE 6.2 does not have the ability to predict emission factors for a specific vehicle operating condition at a specific location at a specific time. Because of this limitation, MOBILE 6.2 can only approximate the operating speeds and levels of congestion likely to be present on the largest-scale projects, and cannot adequately capture emissions effects of smaller projects. For particulate matter, the model results are not sensitive to average trip speed, although the other MSAT emission rates do change with changes in trip speed. Also, the emissions rates used in MOBILE 6.2 for both particulate matter and MSATs are based on a limited number of tests of mostly older-technology vehicles. Lastly, in its discussions of PM under the conformity rule, EPA has identified problems with MOBILE6.2 as an obstacle to quantitative analysis.

   These deficiencies compromise the capability of MOBILE 6.2 to estimate MSAT emissions. MOBILE 6.2 is an adequate tool for projecting emissions trends, and performing relative analyses between alternatives for very large projects, but it is not sensitive enough to capture the effects of travel changes tied to smaller projects or to predict emissions near specific roadside locations.

2. Dispersion. The tools to predict how MSATs disperse are also limited. The EPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated more than a decade ago for the purpose of predicting episodic concentrations of carbon monoxide to determine compliance with the NAAQS. The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at some time at some location within a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess potential health risk. The National Cooperative Highway Research Program is conducting research on best practices in applying models and other technical methods in the analysis of MSATs. This work also will focus on identifying appropriate methods of documenting and communicating MSAT impacts in the NEPA process and to the general public. Along with these general limitations of dispersion models, FHWA is also faced with a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.

3. Exposure Levels and Health Effects. Finally, even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude us from reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roadways, and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. There are also considerable uncertainties associated with the existing estimates of toxicity of the various MSATs, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against other project impacts that are better suited for quantitative analysis.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs

Research into the health impacts of MSATs is on-going. For different emission types, there are a variety of studies that show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of a number of EPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or state level.

The EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at http://www.epa.gov/iris. The following toxicity information for the six prioritized MSATs was taken from the IRIS database Weight of Evidence Characterization summaries. This information is taken verbatim from EPA's IRIS database and represents the agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- **Benzene** is characterized as a known human carcinogen.
- The potential carcinogenicity of **acrolein** cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- **Formaldehyde** is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- **1,3-butadiene** is characterized as carcinogenic to humans by inhalation.
- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- **Diesel exhaust** (DE) is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases.
- **Diesel exhaust** also represents chronic respiratory effects, possibly the primary non-cancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

There have been other studies that address MSAT health impacts in proximity to roadways. The Health Effects Institute, a non-profit organization funded by EPA, FHWA, and industry, has undertaken a major series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes, particularly respiratory problems.[12] Much of this research is not specific to MSATs, instead surveying the full spectrum of both criteria and other pollutants. The FHWA cannot evaluate the validity of these studies, but more importantly, they do not provide information that would be useful to alleviate the uncertainties listed above and enable us to perform a more comprehensive evaluation of the health impacts specific to this project.

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[12] South Coast Air Quality Management District, Multiple Air Toxic Exposure Study-II (2000); Highway Health Hazards, The Sierra Club (2004) summarizing 24 Studies on the relationship between health and air quality); NEPA's Uncertainty in the Federal Legal Scheme Controlling Air Pollution from Motor Vehicles, Environmental Law Institute, 35 ELR 10273 (2005) with health studies cited therein.

Relevance of Unavailable or Incomplete Information to Evaluating Reasonably Foreseeable Significant Adverse Impacts on the Environment, and Evaluation of Impacts Based Upon Theoretical Approaches or Research Methods Generally Accepted in the Scientific Community.

Because of the uncertainties outlined above, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level. While available tools do allow us to reasonably predict relative emissions changes between alternatives for larger projects, the amount of MSAT emissions from each of the project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. (As noted above, the current emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects.) Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives would have "significant adverse impacts on the human environment."

Qualitative MSAT Analysis

In this document, a qualitative analysis of MSAT emissions relative to the project alternatives has been provided. A qualitative assessment of this type is recommended by the FHWA for new interchange projects where the average forecast AADT is less than 150,000 vehicles. The project alternative may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain, and because of this uncertainty, the health effects from these emissions cannot be estimated.

For each alternative in this EA, the amount of MSATs emitted would be proportional to the average daily traffic, or ADT, assuming that other variables such as fleet mix are the same for each alternative. The ADT estimated for the Build Alternative is slightly higher than that for the No Build Alternative, because the interchange facilitates new development that attracts trips that were not occurring in this area before. See Traffic Operations Technical Memoranda in Appendix E. This increase in ADT means MSATs under the Build Alternatives would probably be higher than the No-Build Alternative in the study area. There could also be localized differences in MSATs from indirect effects of the project such as associated access traffic, emissions of evaporative MSATs (e.g., benzene) from parked cars, and emissions of diesel particulate matter from delivery trucks, depending on the type and extent of development. On a regional scale, this emissions increase would be offset somewhat by reduced travel to other destinations.

For all alternatives, emissions are virtually certain to be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent from 2000 to 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, ADT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for ADT growth) that MSAT emissions in the study area are likely to be lower in the future than they are today.

The new ramps and acceleration and deceleration lanes contemplated as part of the proposed project will have the effect of moving some traffic closer to nearby homes, schools and businesses; therefore, under the Build alternative there may be localized areas where ambient concentrations of MSATs would be higher. The localized differences in MSAT concentrations would likely be most pronounced along CSAH 4 under the Build alternative. However, as discussed above, the magnitude and the duration of these potential increases cannot be accurately quantified because of limitations on modeling techniques. Further, under all alternatives, overall future MSATs are expected to be substantially lower than today due to implementation of EPA's vehicle and fuel regulations.

In summary, under the Build Alternative in the design year it is expected there would be higher MSAT emissions in the study area, relative to the No-Build Alternative, due to increased ADT. There could be slightly elevated but unquantifiable changes in MSATs to residents and others in a few localized areas where ADT increases, which may be important particularly to any members of sensitive populations. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

23. Stationary Source Air Emissions.

Describe the type, sources, quantities and compositions of any emissions from stationary sources of air emissions such as boilers, exhaust stacks or fugitive dust sources. Include any hazardous air pollutants (consult *EAW Guidelines* for a listing) and any greenhouse gases (such as carbon dioxide, methane, nitrous oxide) and ozone-depleting chemicals (chloro-fluorocarbons, hydrofluorocarbons, perfluorcarbons, or sulfur hexafluoride). Also describe any proposed pollution prevention techniques and proposed air pollution control devices. Describe the impacts on air quality.

Not applicable.

24. Odors, Noise and Dust.

Will the project generate odors, noise or dust during construction or during operation?
_X_ **Yes** __**No**

If yes, describe sources, characteristics, duration, quantities or intensity and any proposed measures to mitigate adverse impacts. Also identify locations of nearby sensitive receptors and estimate impacts on them. Discuss potential impacts on human health or quality of life. (Note: fugitive dust generated by operations may be discussed at Item 23 instead of here.)

Odors and Dust During Construction

The proposed project would not generate substantial odors during construction. Potential odors would include exhaust from diesel engines and fuel storage. Dust generated during construction will be minimized through standard dust control measures such as applying water to exposed soils and limiting the extent and duration of exposed soil conditions. Construction contractors will be required to control dust and other airborne particulates in accordance with Mn/DOT specifications. After construction is complete, dust levels are anticipated to minimal because all soil surfaces exposed during construction would be in permanent cover (i.e., paved or revegetated areas).

Construction Noise

The construction activities associated with implementation of the proposed project may result in increased noise levels relative to existing conditions. These impacts will primarily be associated with construction equipment and pile driving.

The following table (Table 18) shows peak noise levels monitored at 50 feet from various types of construction equipment. This equipment is primarily associated with site grading/site preparation, generally the roadway construction phase associated with the greatest noise levels.

TABLE 18
TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVELS AT 50 FEET

Equipment Type	Manufacturers Sampled	Total Number of Models in Sample	Peak Noise Level (dBA)	
			Range	Average
Backhoes	5	6	74-92	83
Front Loaders	5	30	75-96	85
Dozers	8	41	65-95	85
Graders	3	15	72-92	84
Scrapers	2	27	76-98	87
Pile Drivers	N/A	N/A	95-105	101

Source: United States Environmental Protection Agency and Federal Highway Administration

Noise Impacts/Mitigation to the Local Communities During Construction

Elevated noise levels are to a degree unavoidable for this type of project. Mn/DOT will require that construction equipment be properly muffled and in proper working order. While Mn/DOT and its contractor(s) are exempt from local noise ordinances, it is the practice to require that the contractor(s) comply with applicable local noise restrictions and ordinances to the extent that it is reasonable. Advance notice will be provided to affected communities for any abnormally loud construction activities. It is anticipated that nighttime[13] construction may sometimes be required to minimize traffic impacts and improve safety. However, construction will be limited to daytime hours as much as

[13] The Minnesota Pollution Control Agency (MPCA) defines daytime hours as from 7:00 a.m. to 10:00 p.m. and nighttime hours as from 10:00 p.m. to 7:00 a.m (Minnesota Rules 7030.0020 Subp. 10).

possible. This project is anticipated to be under construction for several construction seasons. The duration of construction will be determined during the final design process and communicated to the public in a timely fashion. The project may be constructed in phases over time as funding becomes available (refer to Section V).

Any associated high-impact equipment noise such as pile driving, pavement sawing, or jack hammering will be unavoidable with construction of the proposed project. Pile driving noise is associated with bridge construction and sheet piling necessary for retaining wall construction. While pile driving equipment results in the highest peak noise level as shown in Table 18, it is limited in duration to the activities (e.g., bridge construction and retaining wall construction) noted above. The use of pile drivers, pavement saws, and jack-hammers will be prohibited during nighttime hours.

Traffic-Related Noise Analysis

The traffic noise analysis for the proposed project is included in Appendix G. This report includes documentation of the potential traffic noise impacts associated with the project. Traffic noise levels were modeled for existing (2007) and future (2030) No-Build and Build conditions using the MINNOISE model, a version of the FHWA "STAMINA" model adapted by Mn/DOT. The noise analysis in Appendix G includes a detailed discussion of the following:

- Discussion of traffic noise analysis methodology;
- Identification of noise-sensitive modeling receptor locations (see Figures G-1 through G-5 in Appendix G);
- Monitored noise levels at a sample of noise sensitive receptor locations within the project area and estimates of existing noise levels at other noise sensitive receptor locations;
- Predicted noise levels with future No-Build and Build conditions;
- Evaluation of the feasibility and reasonableness of noise mitigation measures; and
- Identification of potential noise mitigation areas (i.e., proposed noise barriers).

Summary of Noise Analysis Findings

State daytime and nighttime noise standards are exceeded along the project corridor under existing conditions. State daytime and nighttime noise standards are predicted to be exceeded with future (2030) Build conditions. Construction of the project will result in increases in traffic noise due to increased traffic and changes in the vertical and horizontal alignment of project-area roadways. Some locations are predicted to experience decreases in traffic noise largely due to depression of the Highway 169 roadway through the urban Elk River area. Cost-effectiveness of noise barriers was calculated; one 20-foot high wall located along the east side of Highway 169 near the southeast quadrant of the Highway 169/193rd Avenue interchange that achieved a 5 dBA reduction was found to be cost-effective and is proposed (see Table G-8 in Appendix G).

Traffic noise impacts and mitigation will be re-assessed in the future at the time of project implementation, based on conditions and land uses in place at that time. Decisions on noise mitigation to be included in the project will be based on the results of this future noise impact re-evaluation. Final mitigation decisions will be subject to community input, input from affected property owners, and final design considerations.

25. Nearby Resources.

Are any of the following resources on or in proximity to the site?

Archaeological, historical or architectural resources? _X_ **Yes** __ **No**

Prime or unique farmlands or land within an agricultural preserve? _X_ **Yes** __**No**

Designated parks, recreation areas or trails? _X_ **Yes** __ **No**

Scenic views and vistas? __**Yes** _X_**No**

Other unique resources? _X_**Yes** __ **No**

If yes, describe the resource and identify any project-related impacts on the resource. Describe any measures to minimize or avoid adverse impacts.

<u>Archaeological, Historical, or Architectural Resources</u>

The proposed project has been reviewed pursuant to Section 106 of the National Historic Preservation Act of 1966 (as amended), in accordance with 36 CFR 800. The areas of potential effect (APE) for archaeology and for architectural history were determined by the Mn/DOT Cultural Resources Unit (CRU) staff. The area of potential effect (APE) encompasses properties within, and adjacent to, the right of way for the proposed project alternatives.

Highway 101 (CSAH 39 to Mississippi River)

The portion of the project area along Highway 101 was studied by Mn/DOT in 2004.[14] Conditions in the project area have not changed substantially since this study. This study identified an archaeological site, 21WR145, east of the Highway 101/CSAH 39 intersection on a low, flat terrace overlooking the Mississippi River. It is a surface lithic scatter and was located in plowed and fallow agricultural land at the time the field survey was done. The site area was identified and defined through surface survey and shovel test excavations and encompassed approximately 8.5 acres. With a single exception, all artifacts were recovered from the ground surface. Within the site area was a small surface concentration

[14] Minnesota Department of Transportation. September 24, 2004. Environmental Assessment/Environmental Assessment Worksheet for Grade Separations on Highway 101 and CSAHs 36,37, 42 and 39 in the Cities of Otsego and St. Michael.

of lithics, measuring approximately 123 feet in diameter. One Knife Lake Siltstone flake was recovered from within the plow zone of a shovel test excavated in the center of this concentration. No artifacts were recovered from beneath the plow zone. Soil profiles exposed in shovel tests indicate that only a thin layer of intact B horizon is present beneath the plow zone. Site 21WR145 produced a total of 14 pieces of lithic debitage and two miscellaneous historic period artifacts. The Phase I survey completed at the time recommended that Site 21WR145 was not eligible for the National Register of Historic Places.

Highway 169 (Mississippi River to CSAH 4 in Zimmerman)

Phase I archaeological, geomorphological, and architectural history surveys were undertaken for the project area. Phase II evaluations were undertaken to establish the National Register of Historic Places (NRHP) eligibility status for three properties within the project area of potential effect: the St. Paul and Pacific (BNSF) Railroad Corridor District, a portion of the Vernon Cemetery, and the Farmers and Merchants Bank of Zimmerman. Although no eligible archaeological sites were found during the surveys, six parcels could not be surveyed in the Zimmerman area due to landowner refusal; these will be surveyed in the future when access is possible.

The State Historic Preservation Office (SHPO) concurred with the determination that the St. Paul and Pacific (BNSF) Railroad Corridor District is eligible for listing in the NRHP. The SHPO recommended that Vernon Cemetery and the Farmers and Merchants Bank of Zimmerman are not eligible for listing on the NRHP. (See SHPO correspondence in Appendix D.)

Determination of Effect

Mn/DOT's Cultural Resources Unit (CRU) determined, and SHPO concurred, that there would be an adverse effect to the St. Paul and Pacific (BNSF) Railroad Corridor (see agency correspondence in Appendix D). A Memorandum of Agreement (MOA) has been developed in compliance with the Section 106 process. The MOA will govern mitigation for adverse effects as a result of the proposed project. The mitigation for adverse effects to the St. Paul and Pacific (BNSF) Railroad Corridor will include an interpretive display to be located at the Northstar Commuter Rail Station in Elk River. The display will include information regarding the history of the St. Paul and Pacific (BNSF) Railroad Corridor; the content of the display will be developed in consultation with SHPO at the time of project implementation. A copy of the MOA is included as Appendix H.

<u>Prime or Unique Farmlands or Land Within an Agricultural Preserve</u>

The project area includes soils that have been identified as prime farmland soils and soils of statewide importance (see Table 13 in Section VII.A.19).

Prime farmland soils are located in the southwest quadrant of the Highway 101/ CSAH 39 interchange in Otsego. However, the area is zoned other than agricultural (planned unit development district) and is surrounded by commercial development.

An AD-1006 form was submitted to the NRCS for the proposed construction along the Highway 169 corridor between the Highway 10/101 system interchange in Elk River and 239th Avenue in Livonia Township in February 2008 (see Appendix D). Approximately 2.5 acres of statewide and locally important farmland is located within the proposed construction corridor. There are no prime farmland soils within this portion of the project area. The Highway 169 corridor is predominantly in urban land use south of the existing CSAH 33 interchange in Elk River.

An AD-1006 form was submitted to the NRCS for the proposed construction along the Highway 169 corridor in Livonia Township and Zimmerman, including the CSAH 25/19 interchange and CSAH 4 interchange, in July 2006 (see Appendix D). Approximately 5.7 acres of prime farmland soils are located within the proposed Highway 169 /CSAH 25/19 interchange area. No prime farmland soils are located within the proposed Highway 169/CSAH 4 interchange area.

Overall, the project will impact 54.5 acres of potential cropland. The Elk River urban service district currently extends to the proposed 197th Avenue interchange. The Zimmerman orderly annexation area includes the CSAH 4 interchange and frontage road improvements to the south to Livonia Township. Approximately 18 percent of the cultivated land impacted by the proposed project is within an existing or planned urban service district.

Although agricultural land may be acquired as part of the proposed project, it is not anticipated that remaining farmland will be severed or inaccessible due to the conversion of Highway 169 to a freeway facility. Access to any remaining agricultural parcels would be provided from the local road system.

The Cities of Elk River and Zimmerman have identified the areas adjacent to Highway 169 for future growth, primarily for commercial or residential land uses (see Section II.B. and Section VII.A.27). As such, it is possible that farmland adjacent to the Highway 169 corridor will be converted to other land uses by the time the proposed project is constructed.

Designated Parks, Recreation Areas, or Trails

Canoe and Boating Routes

The Mississippi River is a designated canoe and boating route. Canoe and boating routes are identified in Minnesota Statute 85.32. The purpose of Minnesota Statute 85.32 is to identify rivers which have historic and scenic values and to identify points of interest, portages, campsites, and all dams, rapids, waterfalls, whirlpools, and other serious hazards which are dangerous to canoe and watercraft travelers. This stretch of the Mississippi River is not a federally designated navigable waterway (see correspondence from US Coast Guard in Appendix D).

As discussed below, impacts to Babcock Memorial Rest Area will affect the Water Access Site located there. According to the DNR's map, *A Canoe and Boating Guide to the Mississippi River* (2008), nearby access points are located at Otsego County Park (two miles upstream) and in Dayton at the confluence with the Crow River (Crow/Dayton Public Access, four miles downstream).

The proposed project includes an expansion of the existing Highway 101 Mississippi River crossing, including an additional structure parallel to the existing crossing. Recreational navigation may be temporary affected during reconstruction of the existing bridge and construction of the parallel crossing. No permanent impacts to recreational navigation of the river are anticipated as a result of the project. The reconstruction of the river crossing will accommodate small watercraft navigational clearance, and is not anticipated to have an adverse effect on the Mississippi River Canoe and Boating Route requirements.

Mississippi River Trail

The Mississippi River Trail (MRT) is a mulit-state transportation and bicycle recreation route that follows the Mississippi River that begins in Louisiana and ends in Minnesota, and is intended for use by experienced long-distance bicyclists. The MRT was recently designated and signed in the Mississippi National River and Recreation Area (MNRRA), south of the project area from Dayton to Hastings. The MRT often follows the Great River Road National Scenic Byway, which follows CSAH 39 just south of the project limits. No changes to the Great River Route designation along CSAH 39 in Otsego would occur with reconstruction of the Highway 101 north of the CSAH 39 interchange.

Grant-in-Aid Snowmobile Trail

The existing Highway 169 corridor from Highway 10 in Elk River to the City of Milaca, including the project area, is a DNR Grant-in-Aid snowmobile trail (identified as Trail 209 on DNR snowmobile maps).[15] The DNR Grant-in-Aid program provides financial assistance to local units of government for grooming and maintenance of snowmobile trails. According to information provided by the DNR, the Highway 169 corridor serves as a major snowmobile trail link to and from the northern suburbs of the Twin Cities.

Conversion of Highway 169 to a freeway facility does not require Mn/DOT to revoke the limited use permits that allow snowmobile use within the highway right of way. Freeway standards do not prohibit snowmobile use on Trunk Highway facilities. Snowmobile use could be allowed within the Highway 169 right of way under future Build conditions, unless future legislation or safety concerns required snowmobile use to be prohibited from the highway. The proposed design through rural Elk River, Livonia Township, and Zimmerman includes a rural section with ditches that would accommodate snowmobile use. Construction of Highway 169 in urban Elk River (Highway 10 and 197th Avenue) to

[15] Minnesota Department of Natural Resources. 2008. The Minnesota Department of Natural Resources Website (online). Snowmobile Trail Maps accessed 2008-06-25 at http://www.dnr.state.mn.us/snowmobiling/maps.html.

its full build-out condition (six-lane urban section with C-D roads; see Figure 5C in Appendix A) would prohibit snowmobile use.

The City of Elk River Snowmobile Regulations Map (2007-2008) identifies the Mn/DOT Park and Ride facility along the east side of Highway 169 south of Main Street as a snowmobile trailhead location. Access to the Park and Ride to/from Highway 169 will be closed with conversion to a freeway facility. As such, the Park and Ride would no longer be able to function as a trailhead facility.

As previously noted, the proposed project is not funded for construction within the immediate timeframe, and is not included in District 3's 20-year long-range plan. As such, there is time to evaluate alternative options or replacement facilities to the existing grant-in-aid trail with conversion of Highway 169 to a freeway facility.

Segment One: Urban Elk River

The City of Elk River's *Comprehensive Plan* (2004) shows existing sidewalks along Main Street, School Street, and 193rd Avenue at their intersections with Highway 169. Pedestrians and bicyclists may experience temporary impacts such as detours and longer routes during construction as these intersections are reconstructed as grade-separated interchanges. The proposed bridges over Highway 169 at Main Street, School Street, 193rd Avenue and 197th Avenue include sidewalks and/or trails. Separating pedestrian and bicycle traffic from motorized traffic on Highway 169 eliminates conflicts between these two modes, improving safety and connectivity for non-motorized modes of travel.

The existing pedestrian bridge over Highway 169 at 189th Avenue will be removed and replaced with sidewalk facilities approximately 0.2 miles to the south along the School Street bridge. Funding for construction of a replacement pedestrian bridge, if needed, would be identified prior to construction of the project (see Section VII.B.2).

The City of Elk River Park Map (July 2007) illustrates a future paved trail/sidewalk east of Highway 169 along Dodge Street. The north segment of Dodge Street at School Street would be relocated to the east to accommodate the Highway 169/School Street interchange. The proposed relocated segment of Dodge Street includes a sidewalk to maintain local pedestrian/bicycle system connectivity along the east side of the highway. The proposed design does not preclude the City of Elk River from providing a future trail/sidewalk connection along the remaining segment of Dodge Street between Main Street and School Street.

Baldwin Park is a one-acre neighborhood park located east of Highway 169 and north of Main Street. The proposed Highway 169 improvements are located within the existing highway right of way adjacent to Baldwin Park. The proposed design includes construction of retaining walls along Highway 169 to minimize impacts to adjacent properties These retaining walls would be located within the existing right of way limits.

Babcock Memorial Rest Area, also known as Babcock Memorial Park (17900 Highway 10) is a former highway rest area that was transferred from Mn/DOT to the DNR and City of

Elk River. It is located along the north bank of the Mississippi River in the southwest quadrant of the Highway 10/101/169 interchange within the Highway 10 right of way. The DNR supervises, operates, and maintains the easternmost portion of the site as a Water Access Site (WAS) through an interagency agreement and limited use permit with Mn/DOT. The City of Elk River supervises, operates, and maintains the remaining portion of the site as a wayside through a limited use permit with Mn/DOT. Vehicular access to this site from Highway 10 for the general public would be eliminated with the reconstruction of the Highway 10/101/169 interchange. An access along Highway 10 west of the Highway 10/101/169 system interchange provides access to the site for maintenance vehicles and emergency services. As discussed above, nearby sites will continue to provide access for recreational uses on the river.

Highway 10 is designated as the Great River Road "state alternate route" within the project area. "State alternate routes" are routes on the opposite side of the Mississippi River from the Great River Road.[16] Babcock Memorial Rest Area is located along the "state alternate route." As described above, vehicular access to Babcock Memorial Rest Area will be eliminated with reconstruction of the Highway 10/101/169 interchange.

The City of Elk River identifies a future paved trail along the Mississippi River through Babcock Memorial Rest Area to the City's southeast limits. The proposed project would not preclude construction of a future trail along the Mississippi River at this location.

Segment Two: Urban Elk River and Southern Livonia Township

There are no existing trails within the project area in this segment of the corridor.

An area along Highway 169 north of CSAH 25/19 has been identified in the *Livonia Township Parks, Trails, and Open Space Master Plan* (October 11, 2005) as a proposed trail search area. The proposed project is located outside of this proposed trail search area. The Livonia *Transportation Plan* identifies a future trail crossing over/under Highway 169 just south of 253rd Avenue. This project would not preclude this future crossing.

Sherburne County has identified an abandoned Burlington Northern Railroad corridor as a north-south regional trail facility from Elk River to Princeton (Great Northern Trail). This abandoned railroad corridor is located parallel to Highway 169, along the west side of the railroad corridor. A segment of the regional trail has been constructed in the City of Elk River from the Oak Knoll Athletic Complex (near Highway 10 and Proctor Avenue) to the northern City limits. As described in the *Sherburne County Parks, Trails, and Open Space Policy Plan* (2005), Sherburne County will pursue acquisition of abandoned railroad right of ways from willing sellers as opportunities arise. Sherburne County is pursuing federal funding to assist with construction of the remaining segments of the regional trail.

At its closest point (CSAH 25 in Livonia Township), the railroad corridor is located approximately 1,100 feet west of the Highway 169 corridor. As part of the proposed

[16] Mississippi River Parkway Commission of Minnesota. 2009. Minnesota Great River Road Website (online). Explore Minnesota's Great River Road accessed 2009-06-24 at http://www.mnmississippiriver.com.

project, a trail will be constructed west of Highway 169 at CSAH 25/19 as part of the future north-south trail corridor along the former Burlington-Northern railroad bed. The proposed CSAH 25/19 interchange design will accommodate a grade-separated crossing (i.e., underpass) for the future extension of the Great Northern Trail (see Figure 4D, Appendix A).

Segment Three: Zimmerman and Northern Livonia Township

Existing trails are located west of Highway 169 near the proposed CSAH 4 interchange. The City's 2001-2020 *Comprehensive Plan* (August 2001) (Figure 4-1, Parks, Trails and Open Spaces) identifies a proposed trail over Highway 169 along CSAH 4 providing an east-west connection through Zimmerman. As part of the proposed improvements, the CSAH 4 Bridge is designed to accommodate the future pedestrian/bicycle trail across Highway 169. The construction of the Highway 169/ CSAH 4 interchange will improve bicycle-pedestrian safety by eliminating the need to cross mainline Highway 169 traffic.

The Livonia *Transportation Plan* identifies a future trail crossing over/under Highway 169 at 273rd Avenue. This project would not preclude this future crossing. A concept for this local connection is illustrated in Figure 4E, Appendix A.

Other Unique Resources (Aggregate Resources)

In 2000, the Metropolitan Council, along with the DNR and the Minnesota Geological Survey, conducted an aggregate resources inventory of the seven-county metropolitan area to assist local decision makers in resolving issues of land use planning related to the construction aggregate industry. Urbanization increases the demand for construction aggregates while at the same time tends to remove aggregate-bearing lands from production through development and zoning decisions that preclude mining. The costs of construction rise significantly when sources of aggregate are eliminated locally and become more remote from places of need.

The proposed project is located in the cities of Elk River and Zimmerman in Sherburne County. Sherburne County has substantial aggregate resources, many of which are located along Highway 169 between Elk River and Zimmerman. There is a gravel mining district in northern Elk River adjacent to the Highway 169 corridor and directly north of the Elk River central business district. The property parcels within the district are owned by private parties and mining companies and operated by eight different mining operators. Operations in the project area include excavating, washing, crushing, and transporting gravel. Two of the mining companies currently operate hot mix asphalt and concrete plants in the area. Aggregate operations in the gravel mining district were identified from the *Elk River Gravel Mining District Environmental Impact Statement* (May 1994).

These operations would experience some changes in access along Highway 169 as a result of the proposed project. However, changes in access to gravel mining operations will be offset by safety and operations improvements along the project corridor.

26. Visual Impacts.

Will the project create adverse visual impacts during construction or operation? Such as glare from intense lights, lights visible in wilderness areas and large visible plumes from cooling towers or exhaust stacks?

__Yes _X_No

If yes, explain.

The proposed project will not create adverse visual impacts during construction or operation. The existing project environment includes roadways, traffic signals, and an existing interchange with bridges and ramps at CSAH 33, as well as the existing built and natural environment adjacent to the project corridor. The proposed project will result in changes to the existing visual character of the Highway 169 corridor and alter the existing visual elements with views of additional pavement, new retaining walls, new storm water ponds, and new bridges and ramps. Altered views include the following:

- Interchanges (overpasses and interchange ramps) that are higher than existing intersections.
- Construction of retaining walls at several locations along the project corridor and potential construction of a noise wall along the east side of Highway 169 south of the proposed 193rd Avenue interchange. (Decisions on noise mitigation to be included in the project will be based on the results of a future noise impact re-evaluation. Final mitigation decisions will also be subject to consultation with affected neighborhoods and final design considerations.)
- Highway 169 will be up to 25 feet lower than the existing roadway at certain locations to accommodate the grade-separated interchanges in the urban Elk River segment of the project corridor.
- In Zimmerman, CSAH 4 will be approximately 30 feet above Highway 169.
- Removal of buildings (homes and commercial businesses) acquired for right of way at several locations along the project corridor.

Mn/DOT will coordinate with affected communities prior to project implementation to identify appropriate aesthetic enhancements for the project corridor, consistent with Mn/DOT policies in place at that time.

27. Compatibility With Plans and Land Use Regulations.

Is the project subject to an adopted local comprehensive plan, land use plan or regulation, or other applicable land use, water, or resource management plan of a local, regional, state or federal agency?

__Yes _X_ No

If yes, describe the plan, discuss its compatibility with the project and explain how any conflicts will be resolved. If no, explain.

Work on the State Trunk Highway system is not subject to any adopted local plans. However, the project is consistent with the land use plans for the City of Otsego, City of Elk River, Livonia Township, and the City of Zimmerman. Current land use plans for the cities of Otsego, Elk River, and Zimmerman and the *Livonia Township Transportation Plan* (2005) were evaluated to assess compatibility with the proposed project. These plans support the long-term vision of Highway 169 as a limited access freeway facility.

One of the purposes of this project is to identify improvements to Highway 169 from Elk River to Zimmerman that will allow local units of government to plan development and local transportation networks, including trail and sidewalk networks, consistent with future roadway plans for Highway 169. Through the transportation planning process, local units of government can identify a local transportation network that addresses their needs.

<u>Highway 101/169 Corridor Management Plan</u>

In 2002, Mn/DOT, along with local planning partners, developed a *Corridor Management Plan* (*CMP*) for Highway 101 and Highway 169 from Rogers to Garrison. As part of this plan, the corridor partners concluded that the long-term vision should focus on converting Highway 169 to a freeway facility over time. The proposed interchange and overpass locations described in this environmental assessment were identified as part of the Highway 169 *CMP*.

The Otsego Comprehensive Plan recommends that the Highway 101 Corridor be promoted for the establishment of highway-oriented commercial and industrial businesses, which benefit from the high traffic and visibility along the roadway.[17]

<u>City of Elk River Comprehensive Plan</u>

In 2004, the City of Elk River updated its comprehensive plan to recognize a future corridor vision that includes limiting access to Highway 169 and transitioning the existing expressway to a freeway-type facility. The plan identified possible interchange locations at Main Street and 193rd/197th Avenues. It further recognized that development of regional road systems could require an interchange at 221st Avenue.

<u>Livonia Township Transportation Plan</u>

The *Livonia Township Transportation Plan* (2005) identifies Highway 169 as a proposed controlled access freeway facility with future, potential interchanges at CSAH 25/19, CSAH 4, and 277th Avenue NW, north of the City of Zimmerman.

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[17] Minnesota Department of Transportation Environmental Assessment/Environmental Assessment Worksheet for Grade Separations on Highway 101 and CSAHs 36, 37, 42, and 39 in Cities of Otsego and St. Michael. September 27, 2004. Conditions in the project area have not changed since the TH 101 study.

City of Zimmerman Comprehensive Plan

The City of Zimmerman *Comprehensive Plan 2001-2020* indicates that the City is anticipating and planning for the conversion of Highway 169 to a freeway facility. The City has adopted a policy to assist Mn/DOT in access management of Highway 169 by planning for local access consistent with the proposed project. The plan identifies potential interchange locations at CSAH 4, 249th Avenue, and 277th Avenue. The plan also provides for preserving and enhancing the scenic aesthetics along the freeway and establishing gateways at these interchanges.

As the proposed project is not programmed (i.e., not in Mn/DOT's 20-year plan), the planned land uses throughout the project corridor may change before any construction occurs. The communities within the proposed project area are currently planning for the proposed improvements and future land use developments are anticipated to be compatible with the proposed project.

28. Impact On Infrastructure and Public Services.

Will new or expanded utilities, roads, other infrastructure or public services be required to serve the project?

__ Yes _X_ No

If yes, describe the new or additional infrastructure or services needed. (Note: any infrastructure that is a connected action with respect to the project must be assessed in the EAW; see *EAW Guidelines* for details.)

Utilities, Other Infrastructure, or Public Services

No new or expanded utilities, other infrastructure, or public services will be required to serve the project.

BNSF Railway Realignment

Highway 169 Project (S.P. 7106-71)

Conversion of Highway 169 to a freeway facility will require realignment of the BNSF Railway to accommodate changes in the Highway 169 alignment and the proposed Highway 10/101/169 interchange. The BNSF Railway runs southeast-northwest through the project area, and crosses Highway 169 just north of the Highway 10/101/169 interchange. A 6,000-foot long segment of the BNSF Railway will be realigned to the north of its existing alignment, from Twin Lakes Road to the Great River Energy (GRE) Site (see Figure 8, Appendix A). The realignment of the BNSF Railway would include construction of a new railroad bridge over Highway 169. The proposed BNSF Railway alignment is located approximately 70 feet north of its existing alignment at Highway 169. The proposed railroad right of way width is 100 feet. The proposed railroad right of way is designed to accommodate a future third track.

Impacts associated with the BNSF Railway realignment as part of the Highway 169 Project are summarized below.

- **Impervious surface:** Realignment of the BNSF Railway from Twin Lakes Road to the GRE Site would create approximately seven acres of new impervious surface.
- **Great River Energy (GRE) Site:** A conveyor system that transfers fuel from a receiving building to the generation plant building spans the existing BNSF Railway alignment on the GRE Site. The proposed railroad alignment would require reconstruction of the conveyor system.
- **Wetlands:** A drainage ditch, stormwater pond, and associated wetlands are located along the north side of the BNSF Railway east of Highway 169. Two wetlands would be impacted by the proposed railroad alignment, resulting in a total of approximately 1.6 acres of fill impacts.
- **Right of way:** The proposed railroad realignment from Twin Lakes Road to the GRE Site would require approximately 11.5 acres of new BNSF Railway right of way along the north side of the existing railroad right of way from 4 parcels.
- **Railroad operations:** The proposed railroad alignment adds an additional curve in the BNSF Railway west of Highway 169. This curve is designed to minimum design standards and is a functional design. While the additional curve is a less than ideal situation that railroads typically avoid, meeting minimum design standards would allow normal railroad operations to remain unaffected.

The Elk River Station for the Northstar Commuter Rail is located 171st Avenue and Twin Lakes Road. The proposed realignment of the BNSF Railway begins just east of 173rd Avenue within the existing railroad right of way. The proposed railroad realignment is not anticipated to affect the park and ride lot or passenger platforms at the Elk River Station.

The acquisition and relocation of property due to railroad realignment will be conducted in accordance with the Uniform Relocation and Real Property Acquisition Act of 1970, as amended by the Surface Transportation Uniform Relocation Assistance Act of 1987 and 49 C.F.R. 24, effective April 1989 (revised January 2005).

Because the BNSF Railway would be constructed on a new alignment, the existing tracks would remain in operation during construction of the new alignment. When construction is complete, train traffic would be shifted to the new alignment and the existing tracks and railroad bridge could be removed.

Highway 10 Project within Elk River (S.P. 7102-123)

Mn/DOT District 3 is also proposing reconstruction of Highway 10 to a freeway facility through Elk River (S.P. 7102-123). The Highway 10 project corridor is located to the west of the Highway 169 project corridor. The Highway 10 project includes construction of the BNSF Railway on a new alignment to the north of its existing alignment in downtown Elk River. Realignment of the BNSF Railway segment with the Highway 10 project would begin at the GRE site and extend west to Proctor Avenue within downtown Elk River. The location of the BNSF Railway realignment with the Highway 10 Project relative to the Highway 169 Project is illustrated in Figure 8, Appendix A.

Under the Highway 10 Project, grade separations will replace the existing at-grade crossings at Main Street, Jackson Avenue, and Proctor Avenue. Construction of the BNSF Railway on a new alignment allows the existing tracks and bridge to remain in operation while the new tracks and grade separations are under construction. Following construction, train traffic will be shifted to the new tracks and bridge, and the existing BNSF Railway facilities removed. The impacts associated with the realignment of the BNSF Railway within Elk River between Proctor Avenue and the GRE Site are described in the Highway 10 EA/EAW.

The BNSF Railway realignment associated with the Highway 169 Project and the Highway 10 Project have been designed so that it is feasible for each to be constructed to match existing conditions or proposed future conditions on the BNSF Railway. However, it is likely that construction of the proposed BNSF Railway alignment and new bridge over Highway 169 associated with the Highway 169 Project, and construction of the proposed BNSF Railway alignment and grade separations associated with the Highway 10 Project, would occur at the same time as one project.

29. Cumulative Impacts.

Minnesota Rule part 4410.1700, subpart 7, item B requires that the RGU consider the "cumulative potential effects of related or anticipated future projects" when determining the need for an environmental impact statement. Identify any past, present or reasonably foreseeable future projects that may interact with the project described in this EAW in such a way as to cause cumulative impacts. (Such future projects would be those that are actually planned or for which a basis of expectation has been laid.) Describe the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to cumulative effects *(or discuss each cumulative effect under appropriate item(s) elsewhere on this form).*

In addition to the state definition of cumulative potential effects described above, cumulative impacts are defined by the federal Council on Environmental Quality (CEQ) as "impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 158.7). The findings below pertain to both cumulative potential effects and cumulative impacts. In the discussion that follows, the terms "cumulative potential effects" and "cumulative impacts" are used interchangeably.

Cumulative potential effects are not necessarily causally linked to the reconstruction of the Preferred Alternative and related improvements. Rather, they are the total effect of all known actions (past, present, and future) in the vicinity of the proposed project with impacts on the same types of resources. The purpose of cumulative potential impacts analysis is to look for impacts that may be individually minimal, but which could accumulate and become significant and adverse when combined with the effects of other actions.

Scope of Cumulative Potential Effects Analysis

The cumulative potential effects analysis is limited to those resources, ecosystems, and human communities affected by the proposed Build Alternative: contaminated properties; protected species; wetlands and public waters, including the Mississippi River; floodplains; water quality; traffic noise; cultural resources; and farmland.

The geographic scope of this analysis varies by the resource under examination, but in general is limited to an area proximate to the project limits.

The temporal scope of the analysis attempts to consider previous impacts to resources in the past, as well as anticipating events extending to 2030, which is the Build analysis year for traffic operations described in this document.

Actions

Past actions in the project area include decades of residential and commercial/industrial development, as well as highway and other infrastructure construction, which has created the existing built environment. The City of Otsego has experienced commercial/retail development adjacent to the Highway 101/CSAH 39 interchange. Highway 101 was recently constructed as a four-lane freeway in Wright County from the Crow River to the Mississippi River. The City of Elk River has experienced a substantial amount of retail development in the urban section south of 197th Avenue at major intersections with Highway 169 in recent years. A substantial amount of commercial development has also occurred in the City of Zimmerman at the Highway 169/CSAH 4 intersection.

The projects listed below that were considered as future actions in this analysis are consistent with the recent Minnesota State Supreme Court Ruling regarding cumulative potential effects. The projects: 1) are either existing, actually planned for, or for which a basis of expectation has been laid; 2) are located in the surrounding area; and 3) might reasonably be expected to affect the same natural resource.

The Elk River Gravel Mining District covers an area of 2,743 acres in the northern portion of the City, directly north of the proposed 197th Avenue interchange. The Gravel Mining District is primarily located along the west side of Highway 169, although portions extend east of the highway near 221st Avenue. The City of Elk River completed an environmental impact statement (EIS) for the Gravel Mining District in 1994. As described in the Gravel Mining District EIS, gravel mining activities are anticipated to remain in operation for the next 60 years out to year 2070.

Over the planning timeframe for the proposed project, development of agricultural land and open space into residential, commercial, and industrial land uses can be expected to continue, consistent with local land use plans. Redevelopment of currently developed land in Elk River and Zimmerman can also be expected to occur. Reclamation of areas along the project corridor currently used for aggregate mining is also likely to occur. However, no specific projects are planned over the 20-year timeframe of this assessment. Therefore, for the purposes of this assessment, only the cumulative impacts associated with development of lands affected by project right of way impacts will be considered.

Preliminary design and environmental review are underway for conversion of Highway 10 within Elk River to a freeway facility. This project would extend from west of the Highway 10/101/169 interchange through downtown Elk River to west of Upland Avenue. This project is not funded for construction and the timeframe for project implementation is unknown.

Local roadway system improvements are planned or identified as potential connections and include:

Sherburne County

- Extension of CR 121 to intersect Highway 169 at 221st Avenue.
- Construction of future north-south trail on the former Burlington-Northern railroad bed (Great Northern Trail) to northern Elk River limits.

Elk River

- Extension of 193rd Avenue to intersect with Twin Lakes Road east of Highway 169.
- Construction of southbound right turn lane from Jackson Road to westbound School Street.
- Construction of a pedestrian trail along 197th/198th Avenue from Highway 169 to Tyler Street.
- Reconstruction/realignment of CSAH 33 east of Highway 169.
- Construction of future north-south trail on the former Burlington-Northern railroad bed.
- Extension of Elk Hills Drive to intersect with Twin Lakes Road.
- Reconstruction of TH 10 in Elk River.

Livonia Township

- An extension of 277th Avenue NW.
- Construction of frontage roads east and west of Highway 169 between 257th Avenue NW and CR 121.
- Several expansions of local collectors to connect to Highway 169 frontage roads and interchanges.

<u>Evaluation of Cumulative Potential Effects</u>

Contaminated Properties

Properties along the Highway 169 in the project vicinity have been identified as having a potential for contamination. Some properties have been identified to have a high risk, whereas other properties have a low risk potential. The project may disturb 18 of these contaminated sites. A majority of these sites are affected by minor right of way takings). These sites could also be impacted by future development and/or redevelopment activities. Any contamination identified during development or redevelopment activities would be subject to MPCA regulatory requirements. Therefore, adverse cumulative impacts are not anticipated to result.

Protected Species

Blanding's turtles, a state threatened species, have been identified in the vicinity of the project. Blanding's turtle habitat requirements include larger wetlands for overwintering, sandy areas for nesting, and summer use of larger type 3 (shallow marsh) or type 6 (shrub swamp) wetland areas. Sherburne County is identified as a Blanding's turtle priority area (i.e., habitat protection). Over the next 20 years (the planning timeframe of the proposed project), residential development and roadway improvements and/or construction are expected to continue.

Regulatory programs available to help avoid, minimize, and/or mitigate impacts to Blanding's turtle include: State environmental review for projects that meet or exceed regulatory thresholds, discretionary reviews, or petition-initiated reviews; local zoning ordinances and development controls; and protection of habitat through conservation easements and other strategies to preserve habitat as open space. Therefore, adverse cumulative impacts to Blanding's turtle are not anticipated to result from the proposed project in combination with other reasonably foreseeable future actions.

Black sandshell mussels (species of concern) have been identified in the Mississippi River. The exact location of mussel populations is not known. Because this project involves a river crossing, it may have a potential for impacts to mussel populations. The need for mussel surveys will be determined prior to construction. If mussel populations are identified, mitigation will be addressed through regulatory agency review. Other foreseeable future actions in the area will not involve work in the Mississippi River. Therefore, adverse cumulative impacts are not anticipated.

Wetlands and Public Waters (Mississippi River)

Approximately 39 acres of wetland impacts are expected with the proposed project. The proposed action will also result in impacts to the Mississippi River. These impacts are likely to include fill, excavation/dredging, dewatering, and other related impacts associated with reconstruction of the Highway 101 river crossing.

Previous actions may have resulted in filling of wetlands in the vicinity of the project area. Current local, state, and federal regulations have strictly controlled recent wetland filling activities. As noted above, it is anticipated that land in the vicinity of the project will likely continue to develop from rural land uses to residential, commercial, and industrial land uses can be expected to continue, consistent with local land use plans. Wetlands in the project vicinity may be affected by anticipated future local roadway system improvements identified above.

Wetlands in Minnesota are protected by federal law (Section 404 of the CWA) and state law (WCA) that mandate the "no net loss" concept of wetland functions and values. These laws require the avoidance of wetland impacts when possible, and when avoidance is not possible, impacts must be minimized and mitigated. Both the DNR and the WCA require mitigation of wetland impacts at a minimum of a 2:1 ratio. Therefore, no substantial cumulative wetland impacts are anticipated to result from the Highway 169 project in combination with other reasonably foreseeable future actions.

Floodplains

The Mississippi River floodplain has been impacted by past development and other activities within the project vicinity. The Highway 169 Project would result in a 620-foot transverse encroachment of the Mississippi River floodplain with reconstruction of the Highway 101 river crossing. Construction of the project may also result in temporary encroachments into the floodplain. However, as discussed in the floodplain assessment (see Appendix F), significant impacts are not expected as a result of the project.

Future actions that may affect floodplain areas are subject to review by the DNR and Corps of Engineers. Other foreseeable future actions in the area will not involve work in the river. The City of Elk River Park and Trails Plan identifies a future trail between Highway 10 and the Mississippi River east of downtown. If impacts were identified as a result of a future trail, mitigation would be required. Because of review and regulation of floodplains by the DNR and Corps of Engineers, no substantial cumulative floodplain impacts are anticipated to result.

Stormwater Quality and Quantity

Stormwater runoff from impervious surfaces in the project area drains to various receiving water bodies (e.g., Mississippi River, Tibbits Brook, County Ditch 32, Lake Fremont). The project will increase the amount of impervious surface in the corridor, thereby increasing stormwater runoff carrying common roadway pollutants. Stormwater management will utilize BMPs, including conveyance of runoff to stormwater detention ponds.

Land development and extension of local roadway systems will continue to convert farmland and open space to impervious surface (structures and pavement), also increasing potential for stormwater quality/quantity effects. These projects will be required to provide mitigation in conformance with NPDES regulations.

Federal, state, and local water management regulations require mitigation in conjunction with development. Given the design standards and management practices available for protecting water quality and quantity, it is likely that potential impacts from the project, along with other foreseeable actions, would be minimized. Therefore, adverse cumulative impacts on water quality and quantity are not anticipated.

Traffic Noise

In general, construction of the proposed project is predicted to increase traffic noise levels in some locations, and decrease traffic noise levels in other locations where roadway alignments are shifted away from receiver locations. Because the noise analysis was based on forecasted 2030 Build traffic volumes, the impacts from other foreseeable future development in the project vicinity have already been accounted for in the noise modeling results. Therefore, no additional cumulative noise impacts would result beyond those described for 2030 project Build conditions.

Cultural Resources

No National Register-archaeological properties are located within the project area, although several areas have yet to be surveyed. Historic properties eligible for the National Register of Historic Places within the project vicinity include the St. Paul and Pacific (BNSF) Railroad Corridor.

Effects to the St. Paul and Pacific (BNSF) Railroad Corridor include realignment of approximately 6,000 feet of the railroad corridor, resulting in adverse effects to the property. A Memorandum of Agreement between the FHWA, SHPO and Mn/DOT has been established under the federal Section 106 process to document mitigation for adverse effects.

The planned Highway 10 Project within downtown Elk River will require realignment of the St. Paul and Pacific (BNSF) Railroad Corridor. This project is being reviewed under the federal Section 106 process. As such, cultural resources review, coordination, and mitigation are being undertaken, consistent with Section 106 requirements.

Local units of government have the ability to protect historic resources through comprehensive planning and zoning controls. Local communities can also enact further controls to protect historic resources, such as designation of historic properties as well as design reviews. Changes to National Register-listed or eligible properties will be reviewed under the Section 106 process if federal funds, permits, licenses, or approvals are required as part of an undertaking. Therefore, adverse cumulative effects on cultural resources in the project vicinity, and with respect to the St. Paul and Pacific (BNSF) Railroad Corridor (NRHP-eligible property), are not anticipated.

Prime Farmland

Farmland has been affected by past development within the vicinity of the Highway 169 project corridor. The proposed project will convert approximately 5.7 acres of prime farmland and 2.5 acres of statewide and locally important farmland to roadway and/or highway right of way. A majority of this farmland is located at the proposed CSAH 25/19 interchange in Livonia Township, outside of the Elk River urban service district and the Zimmerman annexation area. The acquisition of farmland will be conducted in accordance with state and federal regulations in place at the time of right of way acquisition.

Over next 20 years (the planning timeframe of the proposed project), development of agricultural land and open space within the vicinity of the proposed CSAH 25/19 interchange can be expected to continue, consistent with local land use plans. Livonia Township, in partnership with Sherburne County and Baldwin Township, has identified a Highway 169 Corridor Overlay District to direct development along the highway corridor. This overlay district directs land uses at the proposed CSAH 25/19 interchange towards commercial/industrial uses.

Conversion of farmland as a result of actions that involve federal approval are subject to regulatory requirements of the Farmland Protection Policy Act of 1981. Local planning efforts, comprehensive plans, and local zoning regulations adopted to protect prime farmlands establish a community's goals, objectives, and vision for development and protection of agricultural resources such as prime farmland. Therefore, substantial adverse cumulative impacts on prime farmland are not anticipated.

<u>Conclusions</u>

The potential impacts to resources identified can be avoided or minimized through existing regulatory controls, as described above. During the development of this EA/EAW, no potential significant cumulative impacts to the resources affected by the Highway 169 (Elk River to Zimmerman) project have been identified.

30. Other Potential Environmental Impacts. If the project may cause any adverse environmental impacts not addressed by items 1 to 28, identify and discuss them here, along with any proposed mitigation.

No additional potential environmental impacts are anticipated other than those discussed above and in Section VII.B (Additional Federal Issues).

31. Summary of Issues. ***Do not complete this section if the EAW is being done for EIS scoping; instead, address relevant issues in the draft Scoping Decision document, which must accompany the EAW.*** **List any impacts and issues identified above that may require further investigation before the project is begun. Discuss any alternatives or mitigative measures that have been or may be considered for these impacts and issues, including those that have been or may be ordered as permit conditions.**

Table ES-3 in the Executive Summary provides an overview of project impacts and a summary of mitigation measures. The following outlines the impacts and issues that will require further action. Where applicable, mitigation measures have been identified.

<u>Item No. 9: Contaminated Properties</u>

A Phase I Environmental Site Assessment found 50 sites of documented or potential contamination within the current study area. Four (4) sites were identified as having high risk potential for contamination and 41 were identified as medium risk potential sites.

Eighteen (18) of these properties will be affected by right of way impacts; many of these are partial “strip” takings along the roadway.

Prior to construction, these properties will be drilled and sampled if necessary to determine the extent and magnitude of contaminated soil or groundwater. If necessary, a plan will be developed for properly handling and treating contaminated soil and/or groundwater during construction. Once actual ponding locations are identified and further investigation of sites is completed, it will be determined whether any ponds should be lined to avoid flushing any existing contaminants into the groundwater.

Item No. 11: Fish, Wildlife, and Ecologically Sensitive Resources

The Highway 101 bridge over the Mississippi River will be inspected for swallows prior to construction. If nesting swallows are present on the bridge, measures will be taken to avoid the destruction of swallows during bridge reconstruction. The destruction of swallows will be avoided by conducting the work outside of the nesting season (September 1 to May 15) or preventing the birds from nesting using techniques such as netting until completion of the project.

Blanding’s turtles, a state threatened species, have been identified in the project vicinity. The contractor will be provided with a copy of the Blanding’s Turtle Fact Sheet to make them aware of the possible presence of these turtles, and to help the contractor recognize the turtle in the field, consistent with standard practices in place at the time of project construction. The need for measures such as fencing will be evaluated prior to construction in consultation with DNR.

Black sandshell mussels, a state species of special concern, have been identified in the Mississippi River at the southern terminus of the project area. The project includes reconstruction of the existing Highway 101 Mississippi River crossing, as well as construction of a new structure parallel to the existing crossing. Any mussels within the project area could be impacted by construction activities. Potential impacts on the river environment resulting from construction actions discussed includes increased turbidity, erosion, and sedimentation impacts associated with construction activities in the river, along the shore, and from stormwater discharges to the river from construction areas. Prior to construction, a mussel survey may be necessary to determine the possible occurrence of any mussel species within the Mississippi River portion of the project area.

Item No. 12: Physical Impacts On Water Resources

Approximately 39.1 acres of wetland impacts will result from the proposed project. Of the 39.1 acres, 28.8 will result from construction of interchanges, 8.7 acres of impact will result from construction of frontage roads, and 1.6 acres will result from construction of the BNSF Railway alignment. The proposed action will also result in impacts to the Mississippi River. These impacts are likely to include fill, excavation/dredging, dewatering, and other related impacts associated with reconstruction of the Highway 101 river crossing. Application for permits for wetland impacts will be submitted to the COE and DNR consistent with requirements in place at the time of project construction.

Item No. 14: Water-Related Land Use Management District

Floodplains

The project will result in fill impacts to the Mississippi River floodway. Approximately 620 feet of transverse impact to the floodplain is anticipated. A floodplain assessment is included in Appendix F. No significant floodplain impacts are anticipated as a result of the project.

Item No. 17: Water Quality

The project will increase impervious surface which will result in additional stormwater runoff. To convey and treat surface stormwater runoff, both urban and rural stormwater conveyance systems will be used, each discharging to designated stormwater treatment facilities. Management of stormwater quality and quantity will follow the standards and rules required by the NPDES Construction Stormwater Permit.

Item No. 21: Traffic (Access Changes)

The proposed project will result in the closure/consolidation of several access points along Highway 169. Direct access to Highway 169 will be limited for safety and operational reasons, with many access points being eliminated when improvements are constructed. Many properties will be provided access via proposed frontage/backage roads. Compensation will be provided to those parcels where access is not replaced as part of the proposed project.

Item No. 24: Odors, Noise and Dust

Construction of the project will result in increases in traffic noise due to increased traffic and changes in the vertical and horizontal alignment of project-area roadways. Some locations are predicted to experience decreases in traffic noise largely due to depression of the Highway 169 roadway through the urban Elk River area. Noise impacts of the project are discussed in detail in Appendix G.

Cost-effectiveness of noise barriers was calculated; one location adjacent to single-family residences along the east side of Highway 169 near the Highway 169/193rd Avenue interchange that achieved a 5 dBA reduction was found to be cost-effective and is proposed. Traffic noise impacts and mitigation will be re-assessed in the future at the time of project implementation, based on conditions and land uses in place at that time. Final mitigation decisions will be subject to input from affected property owners and final design considerations.

Item No. 25: Nearby Resources

Farmland

The proposed project will convert approximately 5.7 acres of prime farmland and 2.5 acres of statewide and locally important farmland to roadway and/or highway right of way. A majority of this farmland is located at the proposed CSAH 25/19 interchange in Livonia

Township. The acquisition of farmland will be conducted in accordance with state and federal regulations in place at the time of right of way acquisition.

Archaeological, Historic, and Architectural Resources

This project would result in an adverse effect to the St. Paul and Pacific (BNSF) Railroad Corridor, a historic resource eligible for listing in the NRHP. A memorandum of agreement (MOA) has been drafted that establishes mitigation for adverse effects to the St. Paul and Pacific (BNSF) Railroad Corridor. The MOA will govern mitigation for adverse effects as a result of the proposed project. The mitigation for adverse effectsto the St. Paul and Pacific (BNSF) Railroad Corridor will include an interpretive display to be located at the Northstar Commuter Rail Station in Elk River. The display will include information regarding the history of the St. Paul and Pacific (BNSF) Railroad Corridor. The content of the display will be developed in consultation with SHPO at the time of project implementation.

A Phase I archaeological investigation was conducted within areas of pre-contact archaeological concern. No eligible archaeological sites were found during the surveys; however, six parcels could not be surveyed in the Zimmerman area because property access was not granted. These parcels will be surveyed in the future prior to construction when access can be obtained.

Item No. 26: Visual Impacts

The proposed project will result in changes to the existing visual character of the Highway 169 corridor and alter the existing visual elements with views of additional pavement, new retaining walls, new storm water ponds, and new bridges and ramps. Mn/DOT will coordinate with affected communities prior to project implementation to identify appropriate aesthetic enhancements for the project corridor, consistent with Mn/DOT policies in place at that time.

Section VII.B.7: Right of Way

A total of approximately 507 acres of right of way (306 affected parcels), will be acquired for the proposed project. Based on preliminary engineering and design, 34 single-family residences would be relocated and 44 commercial businesses (commercial businesses, professional offices) would be relocated as part of the proposed project.

The acquisition and relocation will be conducted in accordance with federal regulations. Because the proposed project is not programmed for construction and may not be constructed for many years, changes in current land use are anticipated and right of way impacts will be re-evaluated closer to the time of construction.

RGU CERTIFICATION. *(The Environmental Quality Board will only accept SIGNED Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9b and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature _Frank Pafko_ **Date** _7/22/10_

Title _Mn/DOT Chief Environmental Officer_

Environmental Assessment Worksheet was prepared by the staff of the Environmental Quality Board at the Minnesota Department of Administration, Office of Geographic and Demographic Analysis. For additional information, worksheets or for *EAW Guidelines*, contact: Environmental Quality Board, 658 Cedar St., St. Paul, MN 55155, 651-201-2492, or http://www.eqb.state.mn.us

B. ADDITIONAL FEDERAL ISSUES

Discussed below are additional federal issues not discussed in the EAW.

1. Social Impacts

The existing Highway 169 at-grade facility bisects the City of Elk River and the City of Zimmerman. By separating regional traffic, this project would improve safety for local traffic, pedestrians, and bicyclists; improve traffic operations; and improve connectivity across Highway 169 for all modes crossing Highway 169.

Businesses and residents within the project area will experience changes in roadway access as a result of the proposed project. These impacts are discussed in detail in Section VII.A.21. Although these access changes result in more circuitous travel routes for some properties, the increased travel distances are offset by overall improved safety and traffic operations within the study area (compared to the No-Build Alternative). The proposed project is not expected to cause any adverse impact to any community or neighborhood.

Pedestrian and bicycle considerations are discussed in Section VII.B.3. Parks are discussed in Section VII.A.25 and in Section VII.B.2. Community facilities adjacent to the project corridor include the following:

<u>Segment One: Urban Elk River</u>

- Guardian Angels (280 Evans Avenue NW, 300 Evans Avenue NW, 350 Evans Avenue NW, and 400 Evans Avenue NW). A senior housing facility (The Guardian Angels of Elk River) is located next to a commercial area in Elk River in the northeast quadrant of the proposed Highway 169/Main Street interchange. The facility is outside the construction limits for the proposed project. Access to Guardian Angels facilities from Evans Avenue will not be impacted by the project. There is no pedestrian facility along the north side of existing Main Street, near the Guardian Angels facility. The proposed improvements include pedestrian facilities (trails and sidewalks) along both sides of Main Street. These facilities, along with the grade-separated crossing of Highway 169 at Main Street, will improve pedestrian and mobility scooter access and safety near the Guardian Angels site.

- Schools within an approximate half-mile radius of the project include:
    - Elk River Senior High School, 900 School Street NW
    - Lincoln Elementary School, 600 School Street NW
    - Parker Elementary School, 500 School Street
    - Salk Middle School, 11970 Highland Road NW

  These schools are not anticipated to be impacted by the proposed project.

<u>Segment Two: Rural Elk River and Livonia Township</u>

There are no community facilities located along Highway 169 in the rural Elk River and Livonia Township segment of the project area.

Segment Three: Zimmerman

- Faith Community Church (12266 255th Ave). Access to this property from Highway 169 would be closed as part of the proposed project and replaced with access from a backage road.
- Church of God of Prophecy (12515 Fremont Ave). Approximately 0.06 acres of this parcel will be acquired for highway right of way.
- Schools within an approximate half-mile radius of the project include:
  - Zimmerman Elementary School, 25959 4th Street W
  - Zimmerman Middle School, 25900 4th Street W

These schools are not anticipated to be impacted by the proposed project

2. Section 4(f) Resources and Section 6(f) Involvement

Section 4(f) Resources

The project has been reviewed for Section 4(f) involvement. No Section 4(f) involvement with respect to parks and recreation areas exists on this project as described below. The project will result in an adverse effect to the St. Paul and Pacific (BNSF) Railroad Corridor, a property that has been determined eligible for listing in the National Register of Historic Places (see Section VII.A.25). A Draft Section 4(f) Evaluation is included in Appendix I.

Babcock Memorial Rest Area

Babcock Memorial Rest Area, also known as Babcock Memorial Park (17900 Highway 10) is a former highway rest area that was transferred from Mn/DOT to the DNR and City of Elk River for supervision, operation, and maintenance. Babcock Memorial Park is located along the north bank of the Mississippi River in the southwest quadrant of the Highway 10/101/169 interchange within the Highway 10 right of way. The DNR supervises, operates, and maintains the easternmost portion of the site as a Water Access Site (WAS) through an interagency agreement and limited use permit with Mn/DOT. The City of Elk River supervises, operates, and maintains the remaining portion of the site as a wayside through a limited use permit with Mn/DOT.

According to DNR and Elk River Limited Use Permits, use of the highway rest area does not establish a permanent park or recreation area or wildlife or waterfowl refuge facility that would become subject to Section 4(f) of the Federal-Aid Highway Act of 1968.

Baldwin Park

Baldwin Park (371 Baldwin Avenue) is a City of Elk River-owned parcel located along the east side of Highway 169 to the north of Main Street. Baldwin Park is identified as a neighborhood park facility in the City's Park Comprehensive Plan Map (updated February 20, 2008). The west parcel boundary for Baldwin Park is located along the existing Highway 169 right of way limits. Amenities at Baldwin Park include a picnic table and limited playground equipment. The park primarily serves adjacent residential uses. There are no planned improvements to Baldwin Park.

The proposed Highway 169 improvements are located within the existing highway right of way adjacent to Baldwin Park. The proposed design includes construction of retaining walls along Highway 169 to minimize impacts to adjacent properties. These retaining walls would be located within the existing right of way limits.

Grant-in-Aid Snowmobile Trail

As described in Section VII.A.25, the existing Highway 169 corridor from Highway 10 in Elk River to the City of Milaca, including the project area, is a DNR Grant-in-Aid snowmobile trail.

Mn/DOT has granted limited-use permits to local governments (Elk River, Sherburne County) for snowmobile use within the Highway 169 right of way. This limited use permit stipulates that the use of the right of way does not establish a permanent park or recreation area or wildlife or waterfowl refuge facility that would become subject to Section 4(f) of the Federal-Aid Highway Act of 1968.

Section 6(f) Involvement

The project has been reviewed for potential 6(f) involvement. The project will not cause the conversion of any land acquired, planned or developed with funds from the Land and Water Conservation Fund (LAWCON). No Section 6(f) involvement exists on this project.

3. Considerations Relating to Pedestrians and Bicyclists

A discussion of existing and proposed trails within the project area can be found in Section VII.A.25. There are also sidewalks proposed as part of this project. Proposed trails and sidewalks along local roadways within the project area will be within public right of way. These facilities will serve to connect neighborhoods and residential land uses with other land uses (commercial, business) on both sides of the Highway 169 project corridor.

The proposed action would result in increased circuity for some pedestrian and bicycle routes. However, the proposed action would also improve safety by providing grade-separated crossings of Highway 169 for pedestrians and bicyclists at interchanges and grade separations described above. Moreover, the Highway 169 improvements described in this document will allow Elk River, Livonia Township, and Zimmerman to plan their local transportation networks, consistent with future highway plans, including identifying locations for pedestrian and bicycle facilities. Through the planning process, local governments will identify the appropriate trail, bicycle and pedestrian networks that addresses their transportation needs (see also Section IV.B.2).

Pedestrian Bridge over Highway 169

A pedestrian bridge is located along Highway 169 in the City of Elk River north of School Street at 189th Avenue. This pedestrian bridge is owned by the City of Elk River and was constructed in response to pedestrian safety needs for crossing Highway 169. The pedestrian bridge provides a grade-separated crossing over Highway 169, connecting sidewalks along Freeport Street (west of Highway 169) to sidewalks along Dodge Avenue (east of Highway 169). The pedestrian bridge does not connect to any recreational trails within the project area; however, this connection is identified as an existing paved trail/sidewalk in the City's Park Comprehensive Plan Map (updated February 20, 2008). The pedestrian bridge serves to connect residential land uses along the east side of Highway 169 to schools and commercial land uses located along the west side of Highway 169.

The proposed Highway 169 improvements include construction of sidewalks along the School Street bridge over Highway 169 (approximately one block south of the existing bridge), along with sidewalk connections to existing City facilities. Sidewalks along the proposed School Street bridge and the proposed 193rd Avenue bridge will function similarly to the existing pedestrian bridge (e.g., grade-separated crossing of Highway 169).

Because of expansion of Highway 169 to a six-lane facility and changes to the profile of the highway, the existing pedestrian bridge will be removed with conversion of the Highway 169 to a freeway-type facility. The pedestrian bridge, if needed, could be replaced with construction of the proposed project. It is possible that the pedestrian bridge could be replaced in a new location, based on the needs of the City of Elk River. The location for the new pedestrian bridge will be determined in the future in coordination with the City of Elk River, as the City updates their transportation plans and identifies their pedestrian and bicycle facility needs.

Funding for construction of a replacement pedestrian bridge, if needed, would be identified prior to construction of the project.

Americans with Disabilities Act

Trail facilities and sidewalks associated with the project must comply with provisions set by the Americans with Disabilities Act (ADA) of 1990. The proposed project meets current Mn/DOT design standards and will be designed to be consistent with ADA accessibility requirements in place at the time of final design and construction.

4. Indirect Effects to Land Use

Indirect effects are defined as project impacts caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.[18]

No changes to the future land use as a result of the improvements to Highway 169 are anticipated by corridor communities as discussed in Section VII.A.27 and Section VII.A.9. While access closures and the construction of interchanges will change the configuration of existing development adjacent to Highway 169, no change is anticipated in the type or intensity of land use. Because some areas will lose direct access to Highway 169, land use patterns in the corridor will likely be characterized by businesses and services being grouped at interchanges rather than being spread throughout the corridor.

[18] Council on Environmental Quality (CEQ). 40 CFR 1508.7.

Segment One: Urban Elk River

In this segment of the project corridor, the proposed interchanges will replace signalized intersections at nodes of existing commercial activity. It is not anticipated that these interchanges will result in changes to current or planned land use patterns.

Segment Two: Rural Elk River and Southern Livonia Township

The majority of the area in this segment is active as gravel mining operations or the Elk River Landfill, and continuation and expansion of mining operations is anticipated for at least the next 20 years. The *Elk River Gravel Mining District FEIS* (1994) documented that the majority of the resources in the gravel mining area would be extracted over the next 60 years. While construction of the proposed 221st Street interchange will change access to this area, it is not expected to affect the future land use types or densities in this area. The City of Elk River is currently studying the area for future land uses that can be established following the completion of gravel mining activities.

Existing land use in proximity to the proposed CSAH 25/19 interchange in Livonia Township is rural residential and agriculture with limited commercial activity. Limitation of access to Highway 169 in this segment to the interchange area may foster interest in commercial development at for commercial and industrial uses (Livonia Township. *Community Vision for Land Use*. Final Report. February 2006). Changes to current uses, however, is limited by the zoning regulations governed by Sherburne County as the interchange area is currently zoned general rural.

Segment Three: Zimmerman and Northern Livonia Township

The proposed interchange at CSAH 4 will replace a signalized intersection at a commercial node. The City of Zimmerman plans for continued commercial use in this area with the old Highway 169 alignment continuing to be used as a primary roadway with the business district. Construction of the proposed interchange at CSAH 4 is not expected to change overall land use patterns or the level of density and/or intensity of development.

5. Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," dated February 1, 1994, requires that environmental justice be addressed (to the greatest extent practicable and permitted by law) in all federal planning and programming activities. The purpose of Executive Order 12898 is to identify, address, and avoid disproportionately high and adverse human health or environmental effects of programs, policies, and activities on minority populations and low-income populations. The proposed project has federal permit requirements and will receive federal funding. As such, it is considered a federal project for the purpose of compliance with this Executive Order.

Executive Order 12898 requires that the proposed actions be reviewed to determine if there are 'disproportionately' high or adverse impacts on these populations. 'Disproportionate' is defined in two ways: the impact is 'predominantly borne' by the minority or low-income population group, or the impact is 'more severe' than that experienced by non-majority or non-low income populations. The steps for defining environmental justice impacts include the following:

1. Identification of low-income and/or minority populations in the project area;

2. Identification of the impacts of the project upon identified low-income and/or minority populations; and

3. Determination of whether or not the impacts are disproportionately high or adverse.

Project Area Demographics

The first step in the environmental justice determination process is to determine whether any minority and/or low-income persons are present within the project area. For the purpose of environmental justice, a low-income population or minority population is defined as a population of people or households located in close geographic proximity that meet the racial and income criteria set forth in Executive Order 12898.

Information on population characteristics of the project area was obtained from Census 2000 data and discussions with local planning staff. For purposes of this analysis, data were examined at the Census block group level (Figure 9, Appendix A).

Data concerning total population and racial composition within the project area is shown in Table 19.

Identification of Minority Populations

The term "minority" is defined using race and ethnicity definitions from Census 2000. Minority populations were identified where the minority percentage in a given block group exceed the minority percentage of Sherburne County. As indicated in Table 19, the 2000 population of the study area is predominantly white. For identified block groups within the project area, Census 2000 reported minority populations between 1.8 and 3.7 percent, with Hispanic population levels between 1.1 and 1.4 percent. These percentages are similar to those in the cities of Elk River and Zimmerman, and in Sherburne County.

TABLE 19
POPULATION, HOUSEHOLDS, AND RACE – 2000 CENSUS

Demographic Group	Tract 305.1 Block Group 2 (Elk River)		Tract 305.2 Block Group 1 (Elk River)		Tract 305.2 Block Group 2 (Elk River)		Tract 305.2 Block Group 3 (Elk River)		Tract 301 Block Group 3 (Zimmerman)		Tract 301 Block Group 3 (Zimmerman)	
	Number	% of Population	Number	% of Population	Number	% of Population	Number	% of Population	Number	% of Population	Number	% of Population
Households	1,501	N/A	643	N/A	1,045	N/A	589	N/A	1,675	N/A	1,162	N/A
Population	2,829	100.0%	2,059	100.0%	3,175	100.0%	1,673	100.0%	5,210	100.0%	3,506	100.0%
▪ White	2,751	97.2%	2,010	97.6%	3,058	96.3%	1.633	97.6%	5,117	98.2%	3,429	97.8%
▪ Minorities	78	2.8%	49	2.4%	117	3.7%	40	2.4%	93	1.8%	77	2.2%
- Black	5	0.2%	1	0.0%	22	0.7%	13	0.8%	11	0.2%	3	0.1%
- AIAN[1]	9	0.3%	3	0.1%	11	0.3%	7	0.4%	15	0.3%	8	0.2%
- Asian	13	0.5%	9	0.4%	32	1.0%	1	0.1%	18	0.3%	11	0.3%
- NHPI[2]	1	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
- Other Race	16	0.6%	10	0.5%	13	0.4%	4	0.2%	16	0.3%	10	0.3%
- Two or More Races	34	1.2%	26	1.3%	39	1.2%	15	0.9%	33	0.6%	45	1.3%
▪ Hispanic[3]	31	1.1%	18	0.9%	34	1.1%	24	1.4%	38	0.7%	38	1.1%

Demographic Group	Sherburne County		City of Elk River		City of Zimmerman	
	Number	% of Population	Number	% of Population	Number	% of Population
Households	21,581	N/A	5,664	N/A	963	N/A
Population	64,417	100.0%	16,447	100.0%	2,851	100.0%
▪ White	62,308	96.7%	15,984	97.2%	2,783	97.6%
▪ Minorities	2,109	3.3%	463	2.8%	68	2.4%
- Black	550	0.9%	73	0.4%	3	0.1%
- AIAN[1]	287	0.4%	61	0.4%	7	0.2%
- Asian	372	0.6%	81	0.5%	8	0.3%
- NHPI[2]	14	0.0%	2	0.0%	0	0.0%
- Other Race	276	0.4%	79	0.5%	10	0.4%
- Two or More Races	610	0.9%	167	1.0%	40	1.4%
▪ Hispanic[3]	709	1.1%	219	1.3%	37	1.3%

[1] AIAN = American Indian or Alaska Native
[2] NHPI = Native Hawaiian & Other Pacific Islander
[3] Those of Hispanic origin may also consider themselves white or of another race; therefore, population totals and percentages will be greater than 100 percent
Source: Year 2000 U.S. Census

TABLE 20
INCOME AND POVERTY – 2000 CENSUS

Demographic Group	Tract 305.01 Block Group 2 (Elk River)	Tract 305.02 Block Group 1 (Elk River)	Tract 305.02 Block Group 2 (Elk River)	Tract 305.02 Block Group 3 (Elk River)	Tract 301 Block Group 3 (Zimmerman)	Tract 301 Block Group 4 (Zimmerman)	Sherburne County	City of Elk River	City of Zimmerman
Households	1,051	643	1,045	589	1,675	1,162	21,581	5,664	963
Population	2,829	2,059	3,175	1,673	5,210	3,506	64,471	16,447	2,851
Median household income in 1999 (dollars)	$52,500	$73,355	$61,516	$29,792	$62,975	$50,942	$57,014	$58,114	$49,332
Per capita income in 1999 (dollars)	$24,446	$23,175	$19,532	$19,159	$22,471	$19,566	$21,322	$21,808	$18,528
Population for whom poverty status is determined – all ages[(1)]	209	11	64	91	88	178	2,776	514	178
Percent of population for whom poverty status is determined	7.4%	0.5%	2.0%	5.4%	1.7%	5.1%	4.3%	3.1%	6.2%

Source: Year 2000 U.S. Census

[(1)] Numbers are less/more than population numbers, as poverty status determined for smaller areas such as block groups use weighted samples.

Identification of Low-Income Populations

The term “low-income” is defined for the purposes of the study as persons with incomes below poverty level.[19] Census 2000 reported a household median income of $57,014 for Sherburne County with 4.4 percent of persons with income below the 1999 poverty level. In Elk River, the median income is $58,114 with 3.2 percent of persons below the 1999 poverty level. In Zimmerman, the median income is $49,332 with 6.3 percent of persons below the 1999 poverty level (see Table 20).

The Census Tracts and Block Groups with the highest percentage of low-income persons are described below:

- Census Tract 305.01, Block Group 2 reported a 2000 low-income population level of 7.4 percent, exceeding that of both Sherburne County and Elk River – more than double the City poverty rate of 3.1 percent.
- Census Tract 305.02, Block Group 3 reported a low-income population level of 5.4 percent, exceeding that of Sherburne County and Elk River.
- The City of Zimmerman is located entirely within Census Tract 301, Block Group 4, which reported a low-income population level of 5.1 percent, exceeding that of Sherburne County.

The portion of the project area along Highway 101 from CSAH 39 to the Mississippi River was previously a part of the Highway 101 Grade Separation EA/EAW. The Highway 101 Grade Separation EA/EAW concluded that there were no low-income populations within this portion of the project area. Conditions in this portion of the project area have not changed since publication of the Highway 101 Grade Separation EA/EAW in 2004.

There are two Section 202 senior housing facilities located in Census Tract 305.02, Block Group 3. They are operated by Guardian Angels of Elk River, a comprehensive senior care organization, and offer subsidized housing for income qualifying seniors. The two senior housing facilities are: Angel Ridge (280 Evans Avenue NW, Elk River) and Guardian Oaks (350 Evans Avenue NW, Elk River). These facilities are located in the project area adjacent to the northwest quadrant of the proposed Highway 169/Main Street interchange.

Lanesboro Heights (11798 Highland Road, Elk River), a Section 8 based housing facility with 30 units, is located in Census Tract 305.01, Block Group 2. This housing facility is located west of Jackson Street and Highway 169, outside of the project area.

City staff was consulted in November 2007 to determine if there were any known concentrations of low income and/or minority persons within the project area.

[19] The responses of households reporting income data are weighted to reflect the entire population. The result is that the weighted total population numbers do not match those numbers used in determining minority populations. Low-income populations were identified where the percentage of low-income persons in a given block group exceeded the percentage of low-income persons of Sherburne County.

City of Elk River Community Development staff did not have knowledge of any low-income or minority populations in the project area beyond those discussed above. According to Elk River city staff, there are three Section 8 residential facilities located in the City, all of which are located more than one-half mile from the project corridor. While there are a number of apartment units within the study area near Highway 169/Main Street, staff indicated that these facilities are market rate apartments and staff has no demonstrable knowledge that there is a concentration of low-income persons residing at these locations.

City of Zimmerman staff did not have knowledge of any specific areas of low-income or minority populations. The City does have some lower-priced housing stock located east of CR 45 on both sides of Highway 169, but this housing is not formally designated as low-income housing. Staff also indicated that the minority population level in Zimmerman is very low and they have no knowledge of any concentration of minority population beyond data reported in the 2000 Census 2000. A 99-unit mobile home park, Zimmerman Terrace, is located west of Highway 169 north of CSAH 4; City staff indicated that they had no knowledge of a low-income or minority population at this location.

Livonia Township staff did not have knowledge of any specific areas of low-income or minority populations that would be affected by the proposed project. The project area located in Livonia Township is primarily single-family homes, some commercial businesses, and agriculture.

Environmental Justice Determination

Available US Census data at the block group level indicate that low-income populations may be located in the project area in Segment One: Urban Elk River and in Segment Three: Zimmerman. However, block groups represent larger areas beyond the immediate project limits. As such, City officials were consulted regarding areas adjacent to the Highway 169 corridor. Information from City staff indicate that there are no concentrations of low-income or minority persons within the project area. Thus, the proposed action will not have disproportionately high and adverse human health or environmental effects to any minority population or low income population

6. Economic Impacts

The proposed improvements are not anticipated to result in any broad changes in existing land use patterns that could result in economic impacts, or diversion of large traffic volumes from commercial routes. However, the Build Alternative would result in the conversion of commercial and residential property to public right of way and result in access changes to local businesses. These impacts are discussed below.

Fiscal Impacts

Sherburne County

Right of way impacts for the proposed project will result in the total acquisition of 76 properties in Sherburne County. Year 2007 taxes payable for the properties that would be total acquisitions was approximately $475,000. Total year 2007 property tax revenue for Sherburne County was

$35.2 million. Total general revenues for 2007 in Sherburne County exceeded $76 million.[20] Tax losses due to property acquisition for the proposed project are less than 1.5 percent of the year 2007 property tax revenue and less than one percent of year 2007 Sherburne County general revenue, which represents a minor amount of the overall tax base.

City of Otsego

The proposed project will not result in any relocation (commercial or residential) along Highway 101. It is anticipated that partial acquisition of right of way (approximately 2.5 acres) will be necessary along the east side of existing Highway 101, south of the Mississippi River. This partial acquisition is not anticipated to result in a substantial fiscal impact to the City of Otsego.

City of Elk River

Right of way impacts for the proposed project will result in the total acquisition of 42 properties in the City of Elk River. Year 2007 taxes payable for the properties that would be total acquisitions was approximately $375,000. Total year 2007 property tax revenue for Elk River was $10.7 million. Tax losses due to property acquisition for the proposed project are 3.5 percent of the year 2007 property tax revenue. Some properties identified for total acquisition in Elk River, particularly at the proposed 221st Avenue interchange, may ultimately be available for redevelopment following right of way acquisition and construction. Properties that are made available for redevelopment would contribute to future property tax revenue for the City of Elk River.

City of Zimmerman

Right of way impacts for the proposed project will result in the total acquisition of 24 properties in the City of Zimmerman. Year 2007 taxes payable for the properties that would be total acquisitions was more than $82,000. Total year 2007 property tax revenue for Zimmerman was $1.1 million. Tax losses due to property acquisition for the proposed project are less than 7.5 percent of the year 2007 property tax revenue. Construction of the proposed Highway 169/CSAH 4 interchange on a new alignment would create an opportunity for redevelopment of the existing highway right of way and expansion of the downtown Zimmerman business district. While property acquisition for the proposed project would result in tax loses for the City of Zimmerman, these losses would be offset by future property tax revenue as a result of redevelopment of existing highway right of way.

Impacts to Commercial Businesses

As discussed below, the Build Alternative could result in the relocation of 44 commercial businesses, 34 of which are located in the in urban Elk River segment, seven in rural Elk River, and three in Zimmerman. Because this project is not funded for constructed within the current 20-year planning horizon, it is expected that businesses at these locations will change over time; some of the affected commercial parcels may undergo total redevelopment during the planning

[20] Sherburne County. June 2008. The Wright County Web Site (online). Comprehensive Annual Financial Report for Sherburne County, Minnesota. For the year ended December 31, 2007 accessed 2008-09-03 at http://www.co.sherburne.mn.us/auditor/default.htm

timeframe of the project. Where redevelopment does occur, it will provide the opportunity for Mn/DOT to work with local communities to preserve right of way with minimal impact to existing business owners and employees. Negative business impacts will be offset by improvements to safety, traffic operations, mobility, and access within the project corridor, as well as opportunities for redevelopment.

7. Right of Way and Relocation

The proposed project would require the potential acquisition of land for right of way to accommodate the construction of interchanges along the entire project corridor and construction of frontage/backage roads in rural Elk River, Livonia Township, and Zimmerman. Approximately 507 acres of right of way (306 affected parcels) would potentially be required for the proposed project.

As noted in Section VII.A.28, realignment of the BNSF Railway would require approximately 12 acres (4 affected parcels) of right of way.

This number is a conservative estimate and includes properties that may potentially be acquired for the construction of frontage/backage roads. However, the locations shown for frontage and backage roads for the purposes of this document are preliminary. The Cities of Elk River and Zimmerman and Sherburne County will make the final decisions on locations and alignments for frontage and backage roads in the context of the larger local transportation system and development patterns at the time of frontage/backage road construction. Right of way impacts resulting from frontage/backage roads will be re-evaluated if proposed alignments change from those shown in this document.

Segment One: Urban Elk River

Improvements to Highway 101 between the CSAH 39 interchange and the Mississippi River would require approximately 2.5 acres of right of way.

Approximately 65 acres of right of way would be required within the urban Elk River segment (Highway 10/101/169 interchange to 197th Avenue interchange).

Based on the current design concept, there are potentially 35 total parcel acquisitions; 23 parcels are commercial land uses and eight are residential land uses within the urban Elk River segment (the remaining four parcels are current right of way). These properties are illustrated in Figures 10A and 10B (Appendix A) and described in Tables J-1 through J-7 (Appendix J).

Segment Two: Rural Elk River and Southern Livonia Township

Approximately 270 acres of right of way would be required within the rural Elk River and Livonia Township segment (221st Street interchange, CSAH 25/19 interchange, and associated frontage/backage roads).

Based on the current design concept, there are potentially 17 total parcel acquisitions within the rural Elk River and Livonia Township segment; 13 parcels are commercial or agricultural land parcels and four are residential land uses. These properties are illustrated in Figures 10C and 10D (Appendix A) and described in Tables J-8 through J-10 (Appendix J).

<u>Segment Three: Zimmerman and Northern Livonia Township</u>

Approximately 158 acres of right of way would be required within the Zimmerman segment (CSAH 4 interchange and associated frontage/backage roads).

Based on the current design concept, there are potentially 24 total parcel acquisitions; three are commercial parcels and 21 are residential parcels. These properties are illustrated in Figure 10E (Appendix A) and described in Tables J-11 and J-12 (Appendix J). While acquisition of right of way for Highway 169 and the CSAH 4 interchange in Zimmerman would not require the total take of all impacted commercial properties, it was assumed that right of way impacts would require relocation of the affected businesses.

<u>Relocation</u>

Total residential relocations include 33 single-family residences. Total commercial relocations include 44 businesses (commercial businesses, professional offices).

The acquisition and relocation of property due to the proposed project will be conducted in accordance with the Uniform Relocation and Real Property Acquisition Act of 1970, as amended by the Surface Transportation Uniform Relocation Assistance Act of 1987 and 49 C.F.R. 24, effective April 1989 (revised January 2005), and/or other regulations in place at the time of project implementation.

Two booklets titled *Relocation: Your Rights and Benefits* and the *Guidebook for Property Owners* have been produced by Mn/DOT to provide information to potential displacees on their rights and benefits under the Relocation Assistance Program. These documents are available to provide information on programs and benefits and to develop individual relocation plans to relocatees. Relocation resources are available to all residential and business relocatees without discrimination.

Where business relocations are necessary, Mn/DOT, along with the Cities along the corridor, will work with business owners to try to find a suitable relocation site. In addition to these advisory services, payment may be made for expenses pertaining to:

- Actual, reasonable, and necessary moving costs
- Loss of tangible personal property as a result of relocation or discontinuance of a business
- Certain reestablishment expenses
- Costs incurred in searching for a replacement site
- Fixed payments in lieu of moving and reestablishment costs

Changeover is expected in businesses at these locations over time; some of the affected commercial parcels may undergo redevelopment during the planning timeframe for this project.

Where redevelopment does occur, it will provide the opportunity to work with local communities to reserve or acquire right of way with minimal impact to existing business owners and employees. Negative business impacts will be offset by improvements to access and safety within the corridor, which will benefit employees, customers, and goods movement.

Those whose housing is displaced as part of the project are entitled to reimbursements for certain expenses such as moving costs, replacement housing costs, appraisal fees, and relocation assistance services. Replacement housing units must be "decent, safe, and sanitary" and must be functionally equivalent to the present dwelling with respect to the number of rooms and living space, location, and general improvements. Although an adequate supply of comparable replacement housing sites can generally be found, an administrative process called Last Resort Housing is available to address situations where the supply of replacement sites is inadequate. Mn/DOT is committed to Last Resort Housing, which guarantees that comparable housing will be provided before the owner is required to move.

8. Construction Impacts

Construction of the proposed improvements will be staged to minimize impacts associated with construction such as traffic and access impacts, air quality, and noise.

Traffic and Access Impacts

Traffic patterns will be affected during construction of the proposed project. It is feasible to construct the proposed improvements under traffic; however, there may be temporary roadway closures to accommodate certain construction activities.

Temporary access changes will be necessary during reconstruction. This may disrupt travel patterns to and from businesses and community facilities. These changes may cause driver confusion, particularly for those who do not regularly travel through the area.

- Reconstruction of Highway 169 in urban Elk River will require the construction of temporary bypasses as the mainline is reconstructed and depressed to accommodate the proposed interchanges.
- Construction of the proposed project will be staged such that as intersections are closed, adjacent intersections will remain open to traffic. As newly constructed interchanges are opened, other intersections can be closed for interchange construction.
- Short detours may be required for construction of local roadways, and temporary local road bypasses will be constructed to maintain local road connections with Highway 169.

Travelers will be informed of on-going construction activities and traffic conditions. Whenever possible, motorists will be advised of upcoming reconstruction activities that may impact their travel plans.

Air Quality

Construction activities will result in the following temporary air quality impacts:

- Emissions from construction-related equipment and vehicles.
- Construction/grading activities disrupting ground cover, resulting in fugitive dust emissions.

These impacts will be temporary and will be limited by the staging of construction activities. Emissions from construction equipment will be dispersed over relatively large construction areas, and any single piece of equipment will not result in adverse impacts to the project area.

Construction contractors will be required to control dust and other airborne particulates in accordance with Mn/DOT specifications. This will include measures such as applying water to exposed soils and limiting the extent and duration of exposed soil conditions. Contractors will be required to conform with all applicable federal, state, and local regulatory requirements.

Noise

See Section VII.A.24 for a discussion of noise during construction.

Railroad Operations

As described in Section VII.A.28, construction of the Highway 10/101/169 system interchange and construction of Highway 169 as a freeway facility would necessitate relocating approximately 6,200 feet of the BNSF Railway mainline to the north of its existing alignment, including construction of a new bridge over Highway 169. This railroad relocation is illustrated in Figure 4A, Appendix A. The existing BNSF Railway mainline would remain in operation during construction of the new alignment. After the new alignment has been constructed, train traffic would be shifted to the new alignment and the existing BNSF Railway mainline tracks would be removed. No other impacts to rail operations are expected during the construction period. Continued coordination with BNSF Railway will be necessary through final design and construction.

Borrow/Disposal of Excess Material

A plan for management and disposal of any excess materials associated with construction of the project will be developed as needed. Recycled materials can be utilized in the roadway reconstruction to minimize the need for use of new mineral resources. This decreases the amount of excess material produced by the roadway reconstruction. Excess materials will be recycled for reuse whenever viable.

Regulated materials/waste will be managed on this project on this project in accordance with Mn/DOT special provisions.

VIII. PUBLIC AND AGENCY INVOLVEMENT (AND PERMITS/APPROVALS)

A. PUBLIC AND AGENCY INVOLVEMENT

1. Public Information Process Summary

A variety of stakeholder groups have been involved with the proposed project, including a project management team, a local advisory committee, local stakeholder contacts, agency stakeholder contacts, affected property owners, and the general public.

<u>Project Management Team</u>

The project management team (PMT) consists of Mn/DOT representatives and consultant staff. The PMT met periodically to provide contract administration and review throughout the study process.

<u>Local Advisory Committee</u>

Two Local Advisory Committees (LACs) were organized, one focused on the Elk River area and the other focused on the Zimmerman area. These committees were responsible for guiding the study, evaluating input from the public, participating in the technical analysis, and making recommendations to Mn/DOT. Members of these committees included officials representing Mn/DOT, Sherburne County, the City of Elk River, the City of Zimmerman, and Baldwin and Livonia Townships.

<u>Meetings with Key Stakeholders</u>

Small group meetings were conducted with key property owners on May 17, 2007, to identify issues and concerns. These meetings included Great River Energy, Burlington Northern Railroad, Guardian Angels Senior Housing facility, Elk River Citizens League, Elk River Chamber of Commerce, Elk River emergency service providers, and heavy industrial users.

Meetings were also conducted with local organizations and elected officials in Elk River and Zimmerman.

- Meetings with Zimmerman area local officials, including the Zimmerman City Council, Livonia Township Board, Baldwin Township Board, and Sherburne County Board were held on December 19, 2006, and August 1, 2006.
- A meeting with the Zimmerman Chamber of Commerce was held on February 1, 2007.
- A meeting with local officials including the Elk River City Council, Livonia Township Board, and Sherburne County Board was held on May 7, 2007.
- A meeting with local officials from Elk River and Sherburne County was held on April 14, 2008. Local officials identified the single-point interchange as the preferred alternative interchange-type for the Highway 169/Main Street interchange at this meeting.

- Additional work session meetings were held on several occasions with the Elk River City Council and City Staff in 2008 during the development and review of Highway 169 interchange concepts and refinement of the preliminary design.

<u>Public Involvement Meetings</u>

A public open house was held on February 1, 2007, at the Livonia Town Hall. The open house was publicized with a press release and a meeting notice that was mailed to area property owners along the Highway 169 corridor. More than 250 individuals attended this meeting.

A second public open house was held on May 17, 2007, at the Elk River City Hall. The open house was publicized with press releases and newsletters that were mailed to area property owners along the Highway 169 corridor. Mn/DOT representatives were available at the meeting to explain the project and answer questions. More than 40 Elk River residents and business owners attended the open house.

<u>Newsletters</u>

A project newsletter was distributed to area property owners in May 2007 to announce the open house held on May 17, 2007. Addresses for other interested community members were solicited at the open houses.

<u>Press Releases</u>

Mn/DOT Public Affairs personnel distributed press releases to announce the February 1 and May 17 open houses. A press release announcing the public hearing will be issued in conjunction with the release of the EA/EAW.

<u>Website</u>

A website was developed on Mn/DOT's home page to provide the public with information about the project. This web site is located at http://projects.dot.state.mn.us/srf/169elkriver/. Information on this site continues to be updated. The website provides links to maps, layouts, newsletters, and updates on the project's progress.

2. Summary of Early Coordination Comments

Copies of agency correspondence are included in Appendix D, and are discussed in relevant sections of this EA/EAW. The following agencies were contacted regarding the proposed project:

- United States Coast Guard
- US Department of Agriculture – Natural Resource Conservation Service
- DNR Natural Heritage Program
- Minnesota SHPO

B. PERMITS AND APPROVAL REQUIREMENTS

Table 21 identifies the permits and approvals anticipated for the construction of the proposed project.

TABLE 21
PERMITS AND APPROVALS

Permit/Approval	Agency	Action Required
Federal		
Environmental Assessment	FHWA	Approval
EIS Need Decision	FHWA	Determination
Section 404 – Individual Permit	U.S. Army Corps of Engineers	Permit
Section 10 [(1)]	U.S. Army Corps of Engineers	Permit
Section 106	FHWA Mn/DOT Cultural Resources Unit (CRU)	Determination of Effect
As-built drawings of replacement bridge (after construction)	U.S. Coast Guard	Coordination
State		
Environmental Assessment	Mn/DOT	Approval
EIS Need Decision	Mn/DOT	Approval
Section 401	Minnesota Pollution Control Agency	Certification
Public Waters Work Permit [(1)]	DNR	Permit
Wetland Conservation Act (Replacement Plan) for new roads and capacity expansion projects	Mn/DOT with review by Board of Soil and Water Resources, and Minnesota Department of Natural Resources	Approval/Review
Temporary Water Appropriation Permit (if needed)	DNR	Permit
Mussel Relocation Permit (if needed) [(1)]	DNR	Permit
National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit	MPCA	Permit
Section 106 (Historic / Archeological)	Minnesota State Historic Preservation Officer (SHPO)	Concurrence
Local		
Municipal Consent	City of Zimmerman City of Elk River City of Otsego	Approval
County Ditch Permit	Sherburne County	Approval
Other		
Railroad Agreement	Mn/DOT and BNSF Railway	Written Agreement
Railroad Permit	Mn/DOT and BNSF Railway	Permit (stand-alone or part of Agreement)

[(1)] Associated with reconstruction of Highway 101 Bridge over the Mississippi River.

C. PUBLIC COMMENT PERIOD AND PUBLIC HEARING

A public hearing will be held during the public comment period for the EA/EAW.

D. REPORT DISTRIBUTION

Copies of this document have been sent to agencies, local government units, libraries, and others as per Minnesota Rule 4410.1500 (Publication and Distribution of an EAW).

E. PROCESS BEYOND THE EA/EAW PUBLIC COMMENT PERIOD

Following the comment period, Mn/DOT and FHWA will make a determination as to the adequacy of the environmental documentation. If further documentation is necessary, it could be accomplished by preparing an Environmental Impact Statement (EIS), by revising the EA/EAW, or providing clarification in the Findings of Fact and Conclusions, as appropriate.

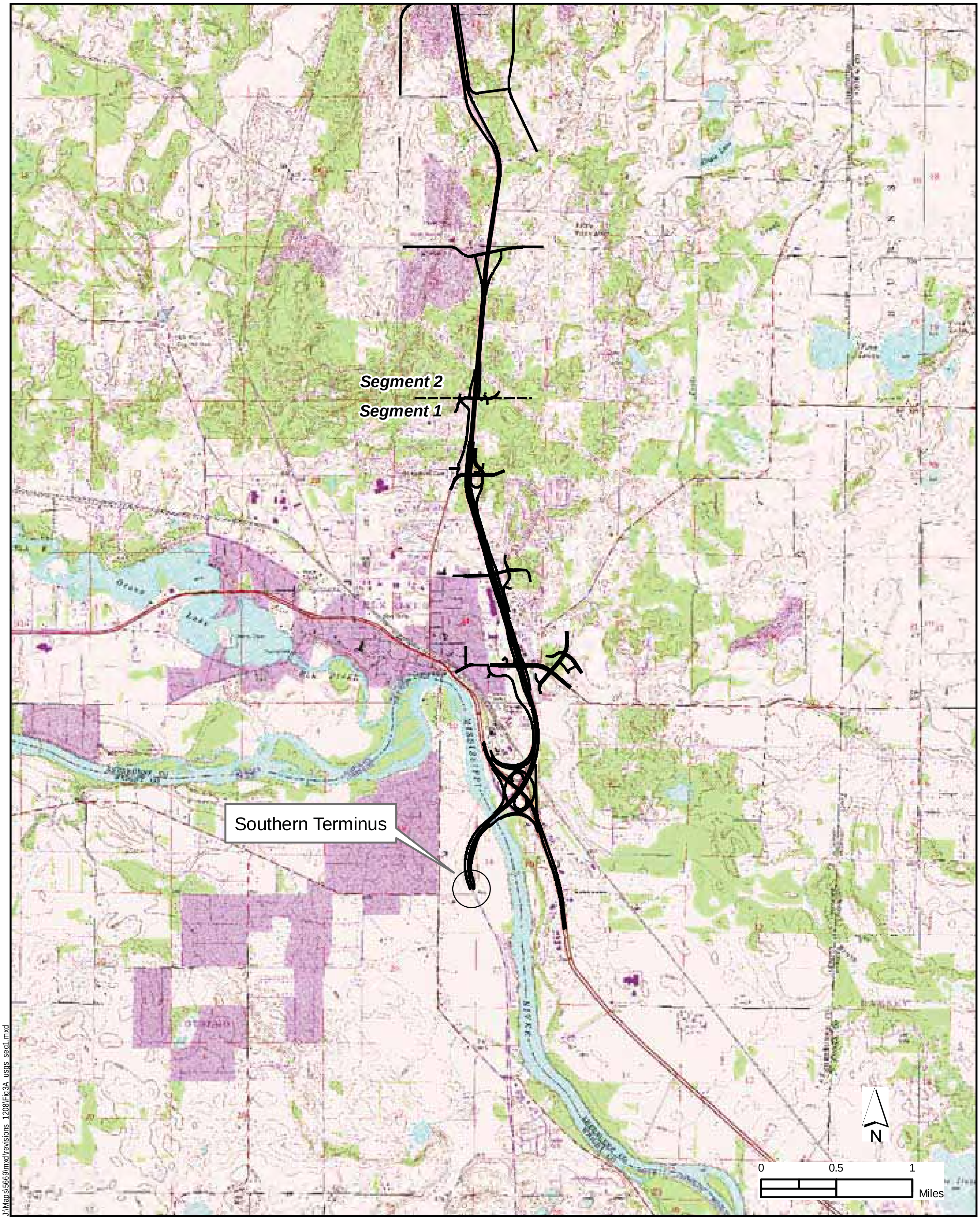
If an EIS is not necessary, Mn/DOT will prepare a "Negative Declaration" in accordance with state environmental requirements. Mn/DOT will also prepare a request for a "Finding of No Significant Impact" (FONSI) that will be submitted to FHWA. If FHWA agrees that this finding is appropriate, it will issue a FONSI, concluding the federal NEPA process.

Notices of the federal and state decisions and availability of the above documents will be placed in the Minnesota Environmental Quality Board (EQB) *Monitor*. Mn/DOT will distribute the Negative Declaration and FONSI, or send notification of their availability, to the Environmental Assessment Worksheet (EAW) distribution list. Public notices will be placed in local newspapers notifying the public of the environmental and project decisions that were made.

APPENDICES

APPENDIX A

Figures



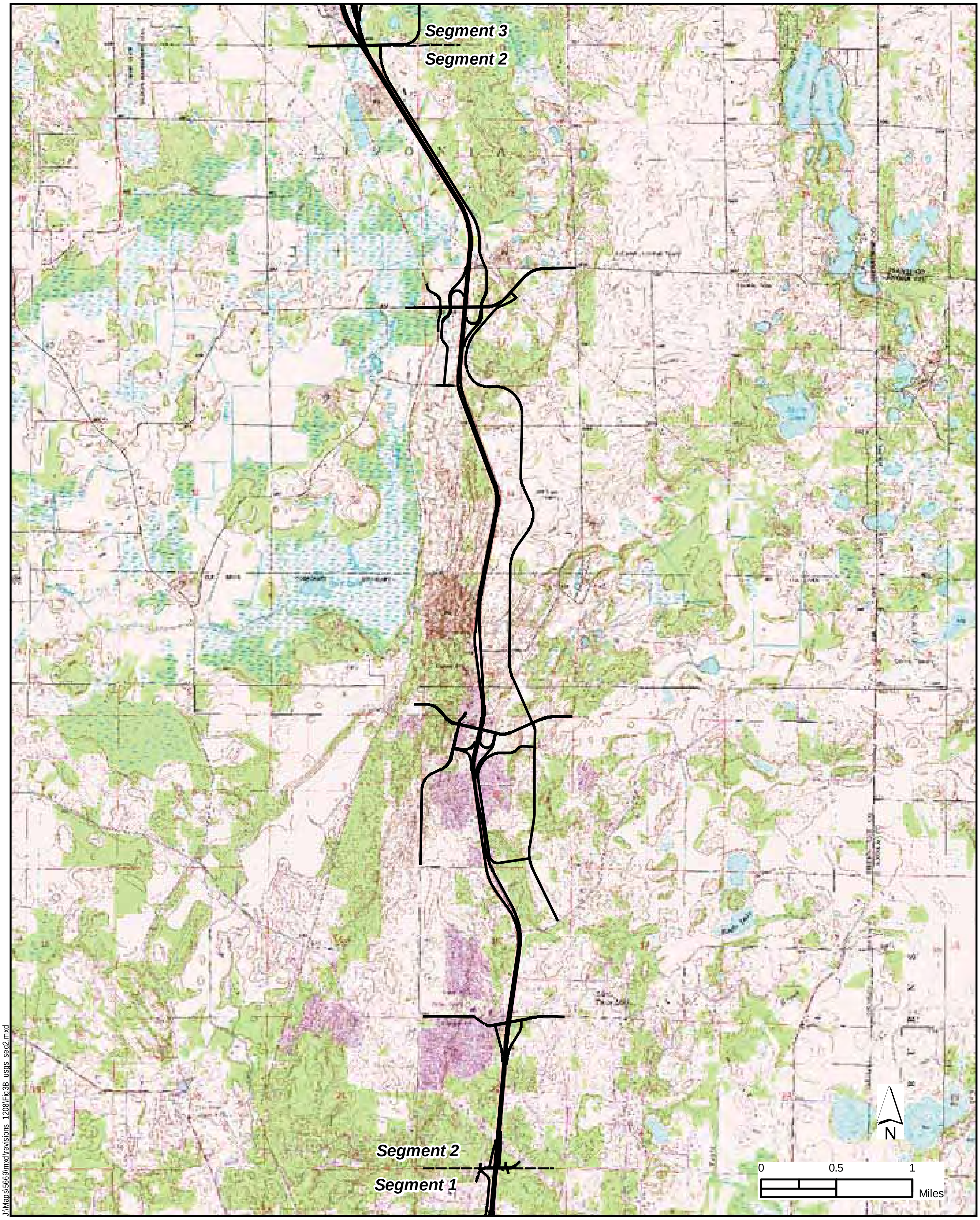
PROJECT LOCATION: SEGMENT ONE - USGS

Figure 3A

Segment One: CSAH 39 to197th Avenue NW

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71



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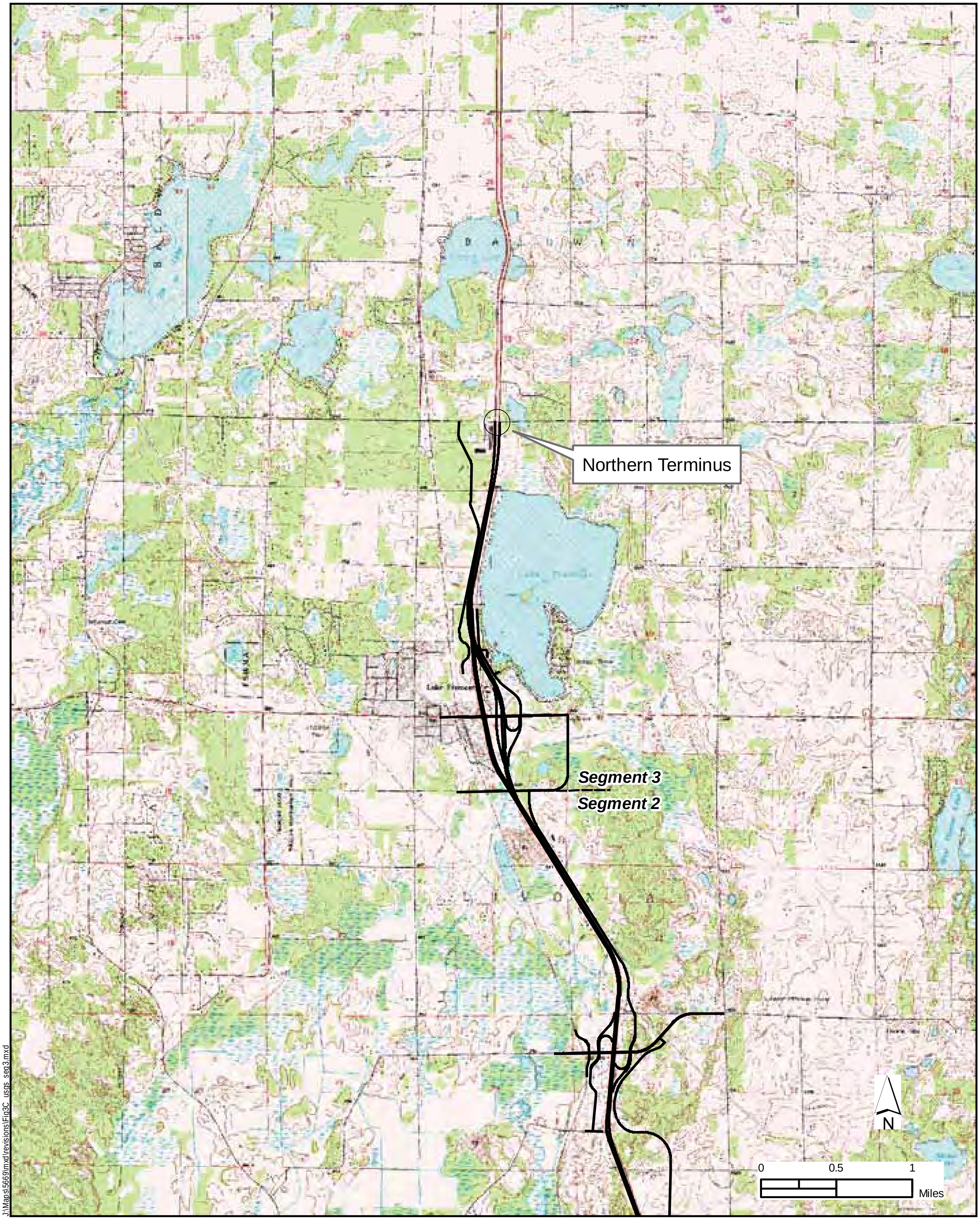
PROJECT LOCATION: SEGMENT TWO - USGS

Figure 3B

Segment Two: 197th Avenue NW to Livonia Township/City of Zimmerman Boundary

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71



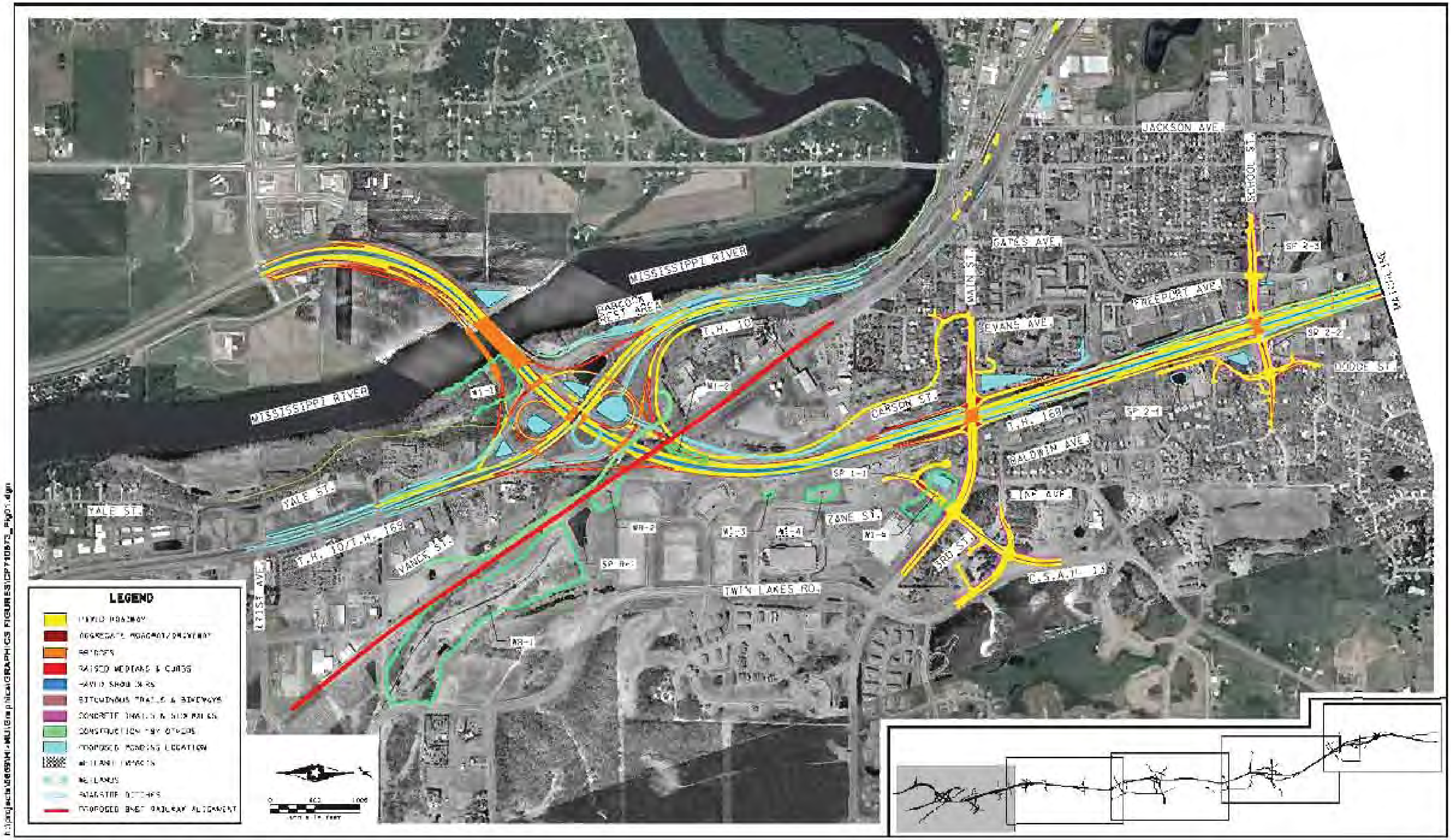
PROJECT LOCATION: SEGMENT THREE - USGS

Figure 3C

Segment Three: City of Zimmerman municipal boundary to 277th Avenue in Livonia Township

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

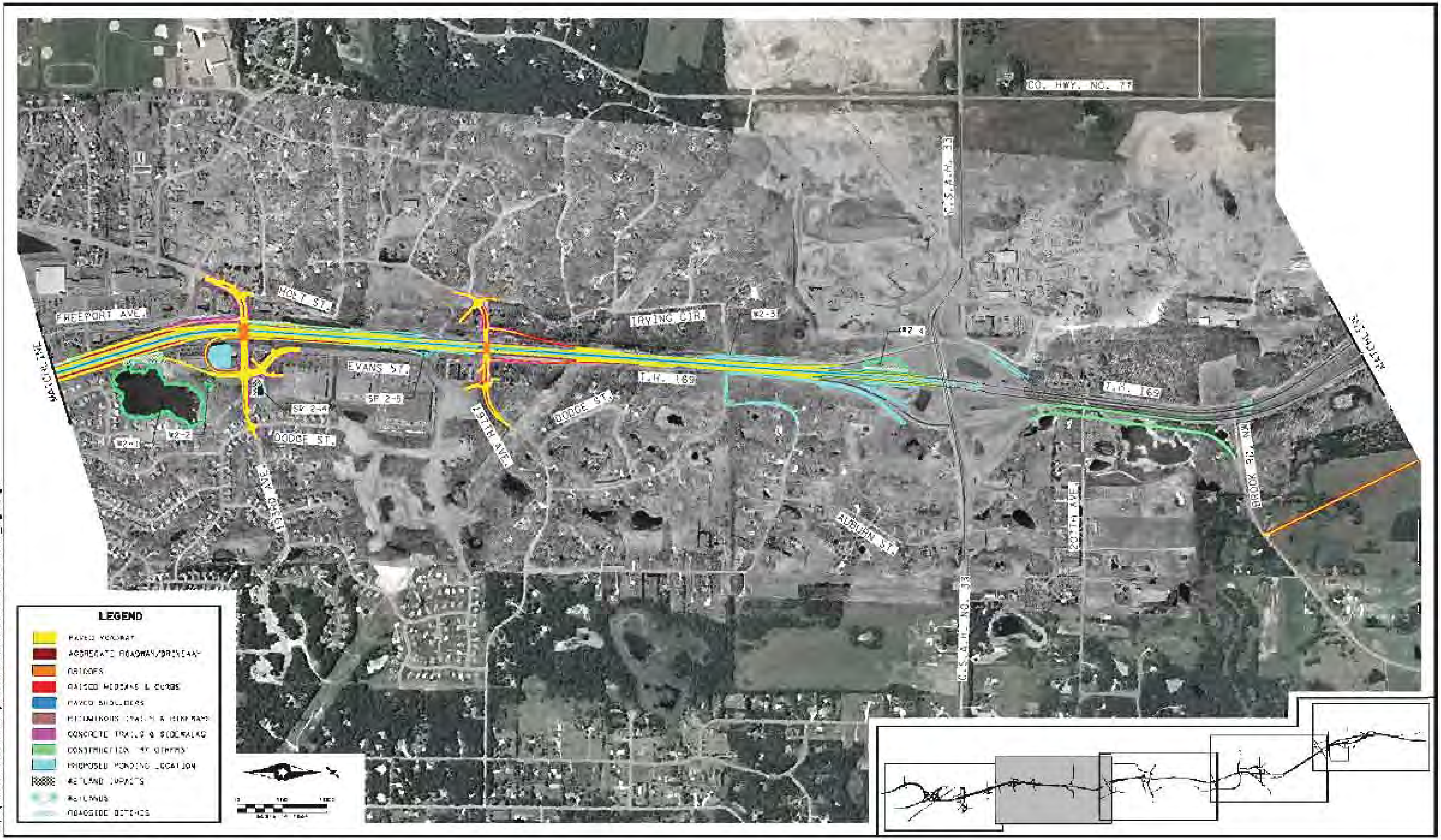


PROPOSED IMPROVEMENTS / WETLAND IMPACTS

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 4A

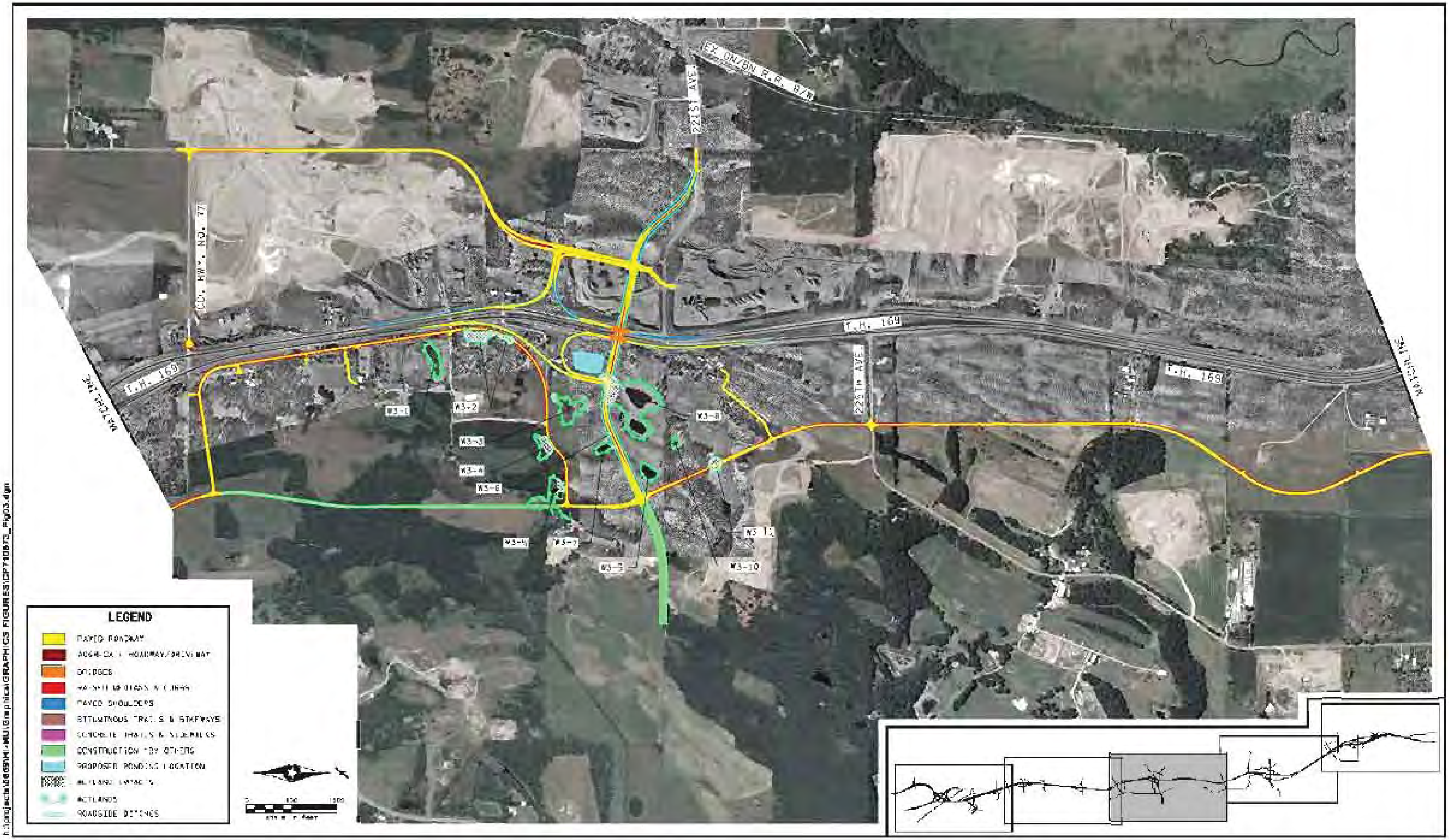


PROPOSED IMPROVEMENTS / WETLAND IMPACTS

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 4B

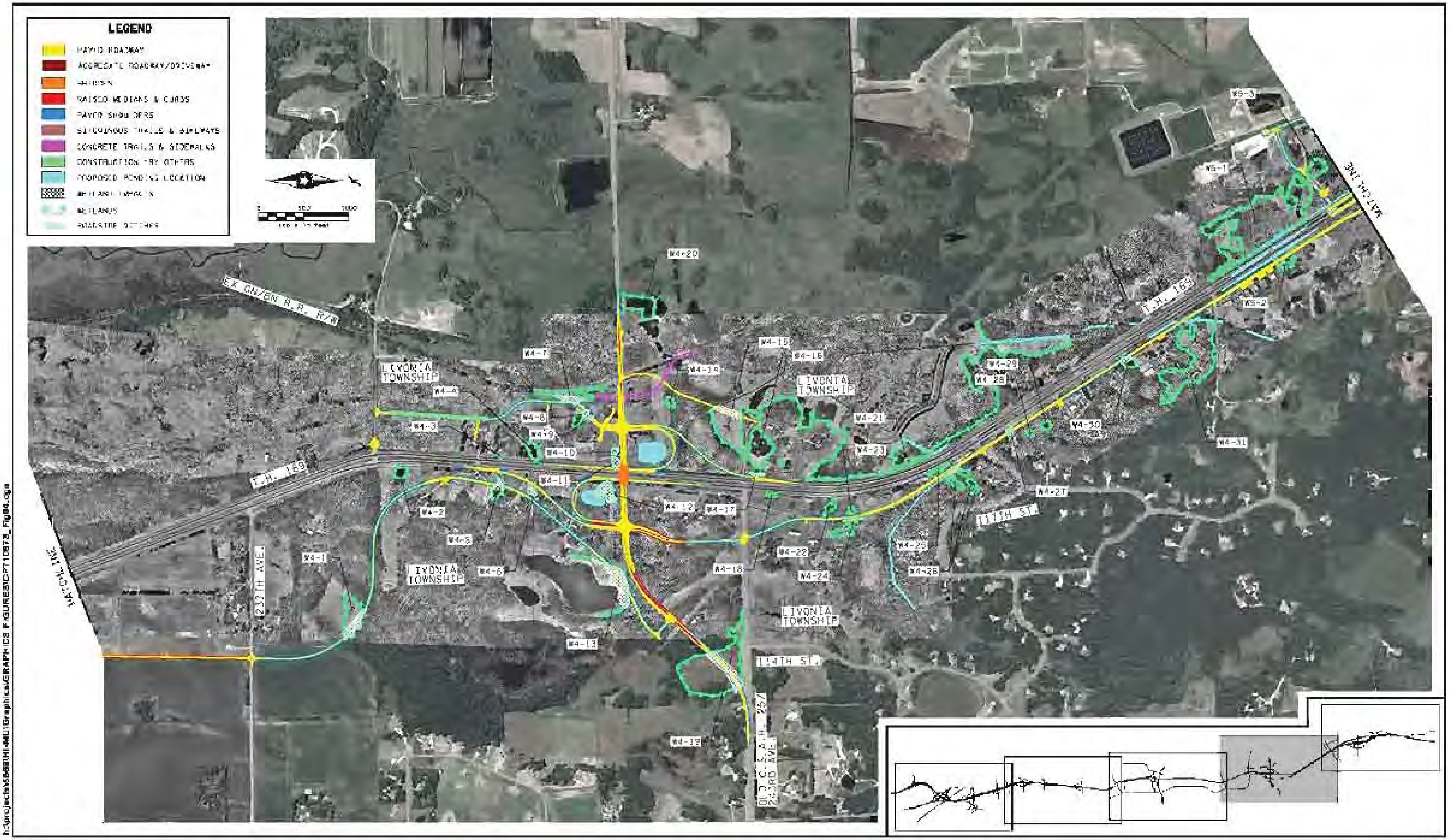


PROPOSED IMPROVEMENTS / WETLAND IMPACTS

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 4C

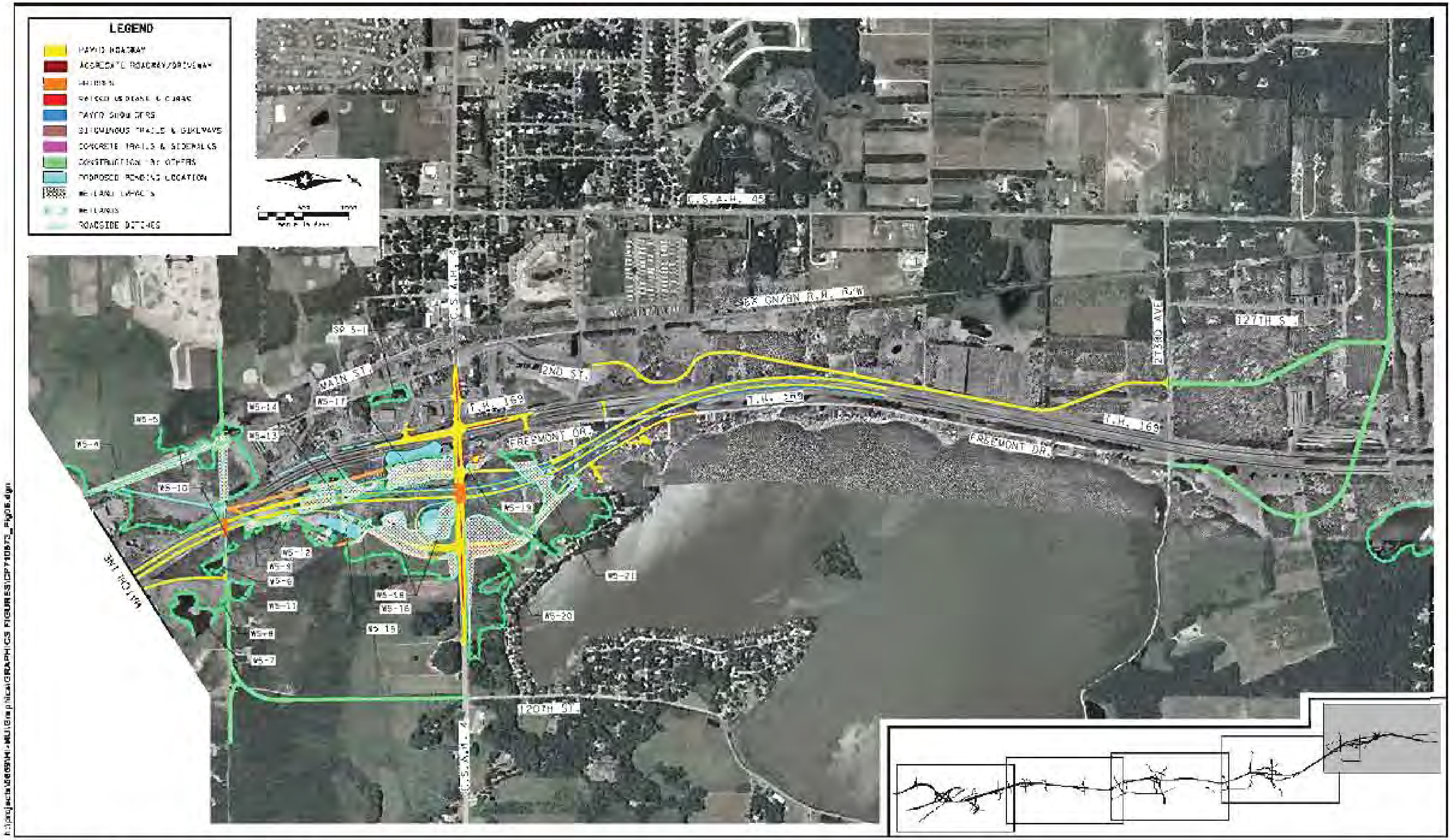


PROPOSED IMPROVEMENTS / WETLAND IMPACTS

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

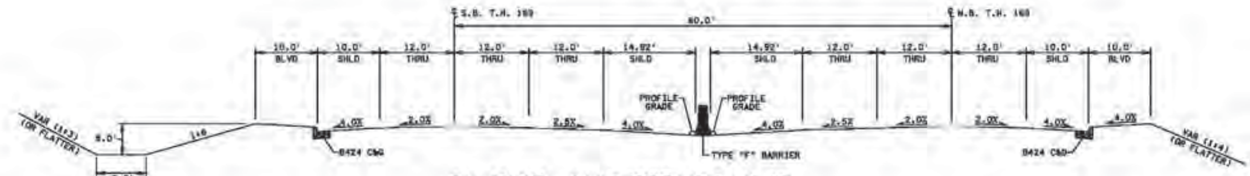
Figure 4D



PROPOSED IMPROVEMENTS / WETLAND IMPACTS

ENVIRONMENTAL ASSESSMENT
T.H. 169 - SP 7106-73 and 7106-71

Figure 4E



T.H. 101/169 - 6 LANE SECTION (C.S.A.H. 39)
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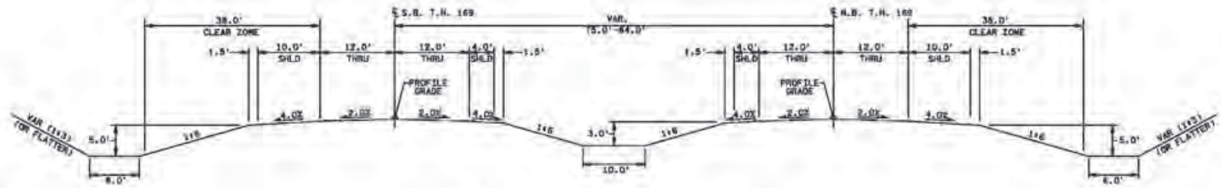
ROAD DESIGN MANUAL TABLE 2-7.01D OR 2-7.01F, 4-4.01A & 4-4.01B



T.H. 169 - 4-LANE TYPICAL SECTION
(RURAL ELK RIVER, LIVONIA TOWNSHIP, ZIMMERMAN)
DESIGN SPEED = 70 MPH
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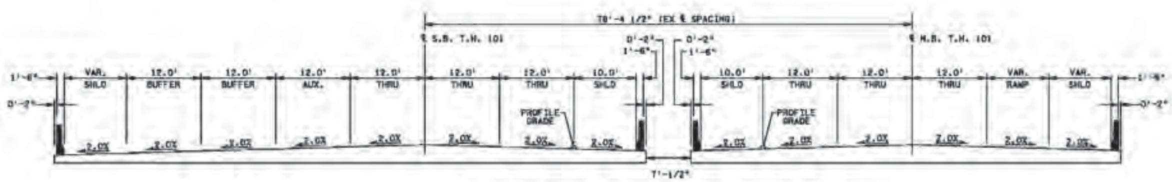

T.H. 101 - RIVER CROSSING BRIDGE (MISSISSIPPI RIVER)
DESIGN SPEED = 70 MPH
ROAD DESIGN MANUAL TABLE 9-2.01A AND FIG. 9-2.01A OR B AND 9-2.03A
BRIDGE DESIGN FIG A OR B 5-392.203 (T.H.)
BRIDGE DESIGN FIG I 5-392.203 (LOCAL)

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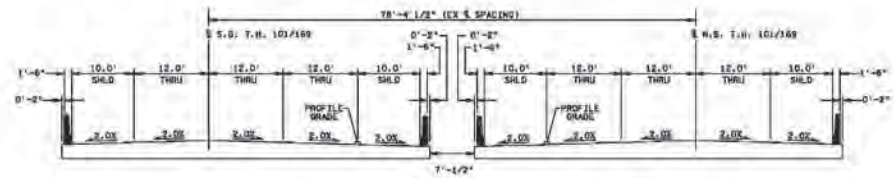
TYPICAL SECTIONS - T.H. 169

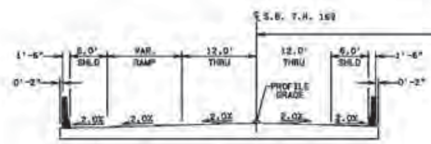
ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

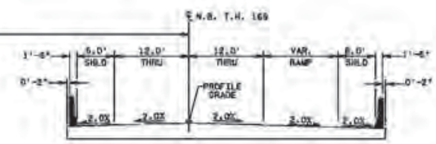
Figure 5A



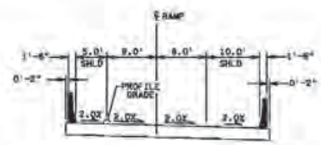
T.H. 101 / T.H. 169 – INTERCHANGE BRIDGE (T.H. 169 OVER T.H. 10)
DESIGN SPEED = 70 MPH
ROAD DESIGN MANUAL TABLE 9-2.01A AND FIG. 9-2.01A OR B AND 9-2.03A
BRIDGE DESIGN FIG A OR B 5-392.203 (T.H.)
BRIDGE DESIGN FIG I 5-392.203 (LOCAL)



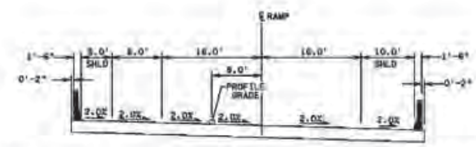
S.B. T.H. 169 OVER 221ST
DESIGN SPEED = 70 MPH
ROAD DESIGN MANUAL TABLE 9-2.01A AND FIG. 9-2.01C AND 9-2.01D
BRIDGE DESIGN FIG C OR D 5-392.203



N.B. T.H. 169 OVER 221ST
DESIGN SPEED = 70 MPH
ROAD DESIGN MANUAL TABLE 9-2.01A AND FIG. 9-2.01C AND 9-2.01D
BRIDGE DESIGN FIG C OR D 5-392.203



RAMP FLYOVER BRIDGE (TH 10/101/169)
DESIGN SPEED = 40 MPH
ROAD DESIGN MANUAL FIG. 9-2.02A
BRIDGE DESIGN FIG H 5-392.203



RAMP – RIVER CROSSING BRIDGE (N.B. T.H. 101 TO E.B. T.H. 10)
DESIGN SPEED = 40 MPH
ROAD DESIGN MANUAL FIG. 9-2.02A
BRIDGE DESIGN FIG H 5-392.203

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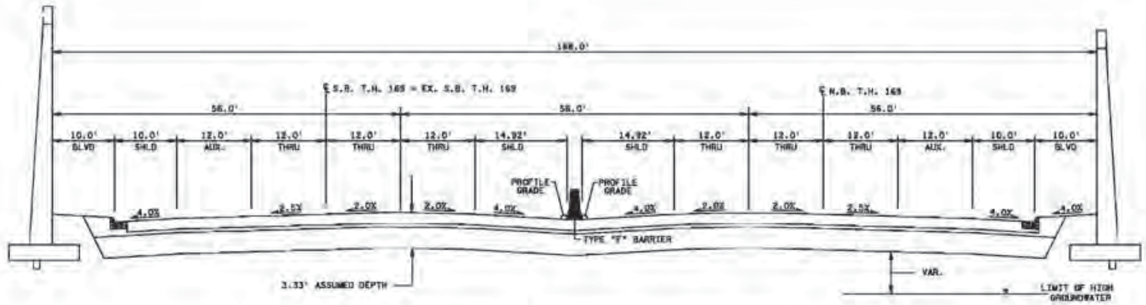
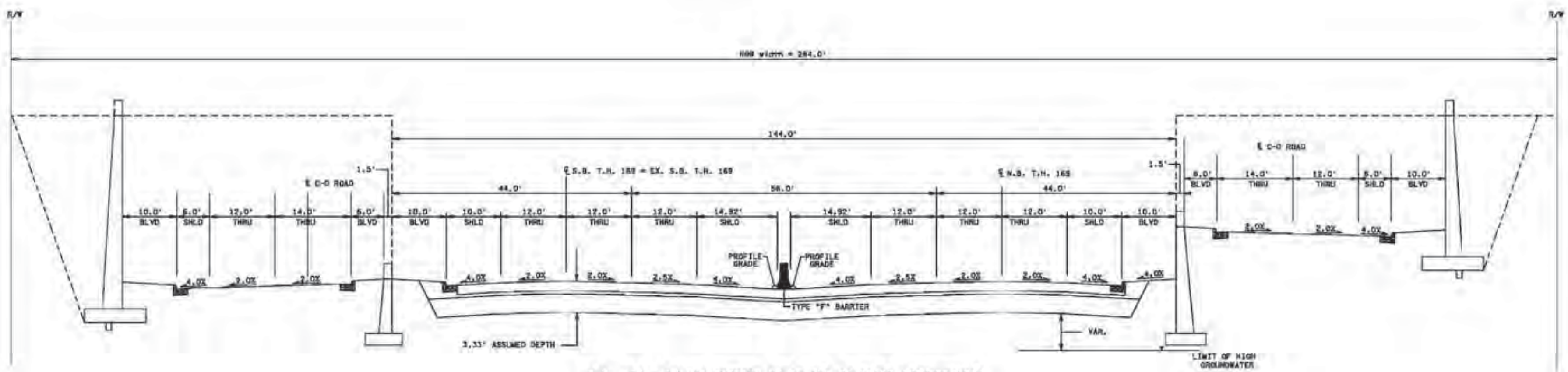
TYPICAL SECTIONS - T.H. 169 BRIDGES

ENVIRONMENTAL ASSESSMENT
T.H. 169 - SP 7106-73 and 7106-71

Figure 5B



T.H. 169 FUTURE 3 LANE SECTION WITH AUXILIARY LANES
(SCHOOL STREET)
DESIGN SPEED = 70 MPH
ROAD DESIGN MANUAL TABLE 2-7.01D OR 2-7.01F, 4-4.01A & 4-4.01B



T.H. 169 - 3 LANE SECTION W/ 2-LANE CD ROADS (COMPRESSED)
(MAIN STEET, 193RD STREET, 197TH STREET)
DESIGN SPEED = 70 MPH
ROAD DESIGN MANUAL TABLE 2-7.01D OR 2-7.01F, 4-4.01A & 4-4.01B

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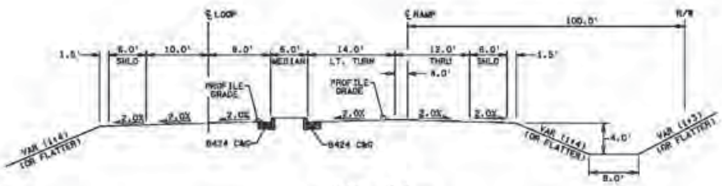
TYPICAL SECTIONS - T.H. 169 (URBAN ELK RIVER)

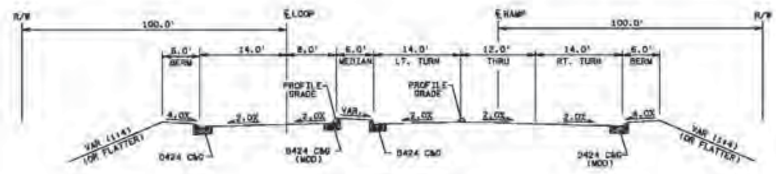
ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 5C

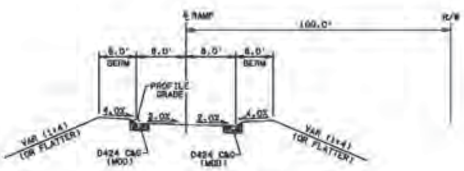


RURAL RAMPS
DESIGN SPEED = 50 MPH
ROAD DESIGN MANUAL TABLE 6-3.04C

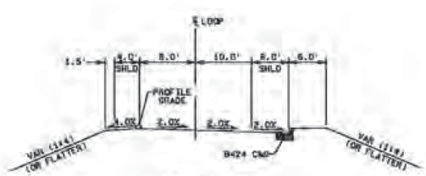


URBAN RAMPS
DESIGN SPEED = 50 MPH
ROAD DESIGN MANUAL TABLE 6-3.04C

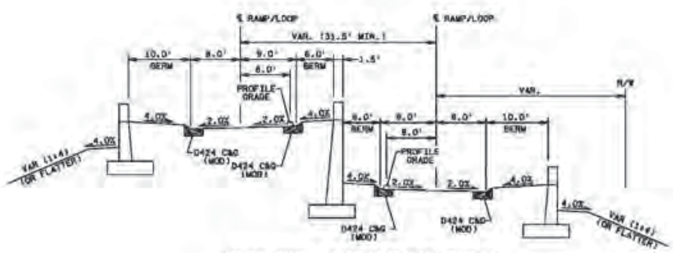
RURAL RAMPS
DESIGN SPEED = 50 MPH
ROAD DESIGN MANUAL TABLE 6-3.04C



URBAN RAMPS
DESIGN SPEED = 50 MPH
ROAD DESIGN MANUAL TABLE 6-3.04C



RURAL LOOPS
DESIGN SPEED = 25 MPH
ROAD DESIGN MANUAL TABLE 6-3.04C



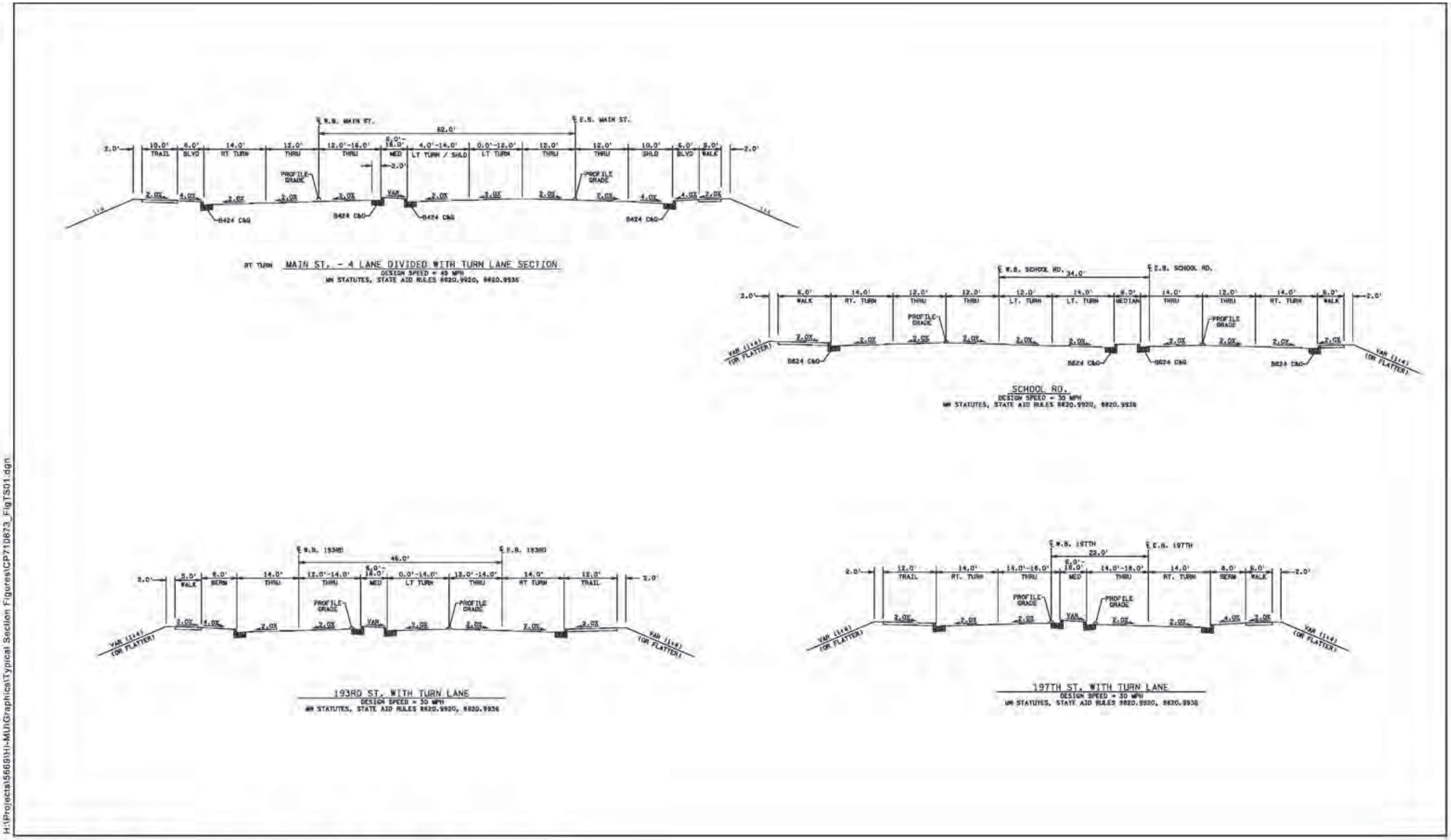
URBAN RAMPS (WITH RETAINING WALLS)
DESIGN SPEED = 50 MPH
ROAD DESIGN MANUAL TABLE 6-3.04C

TYPICAL SECTIONS - T.H. 169 INTERCHANGE RAMPS & LOOPS

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 5D



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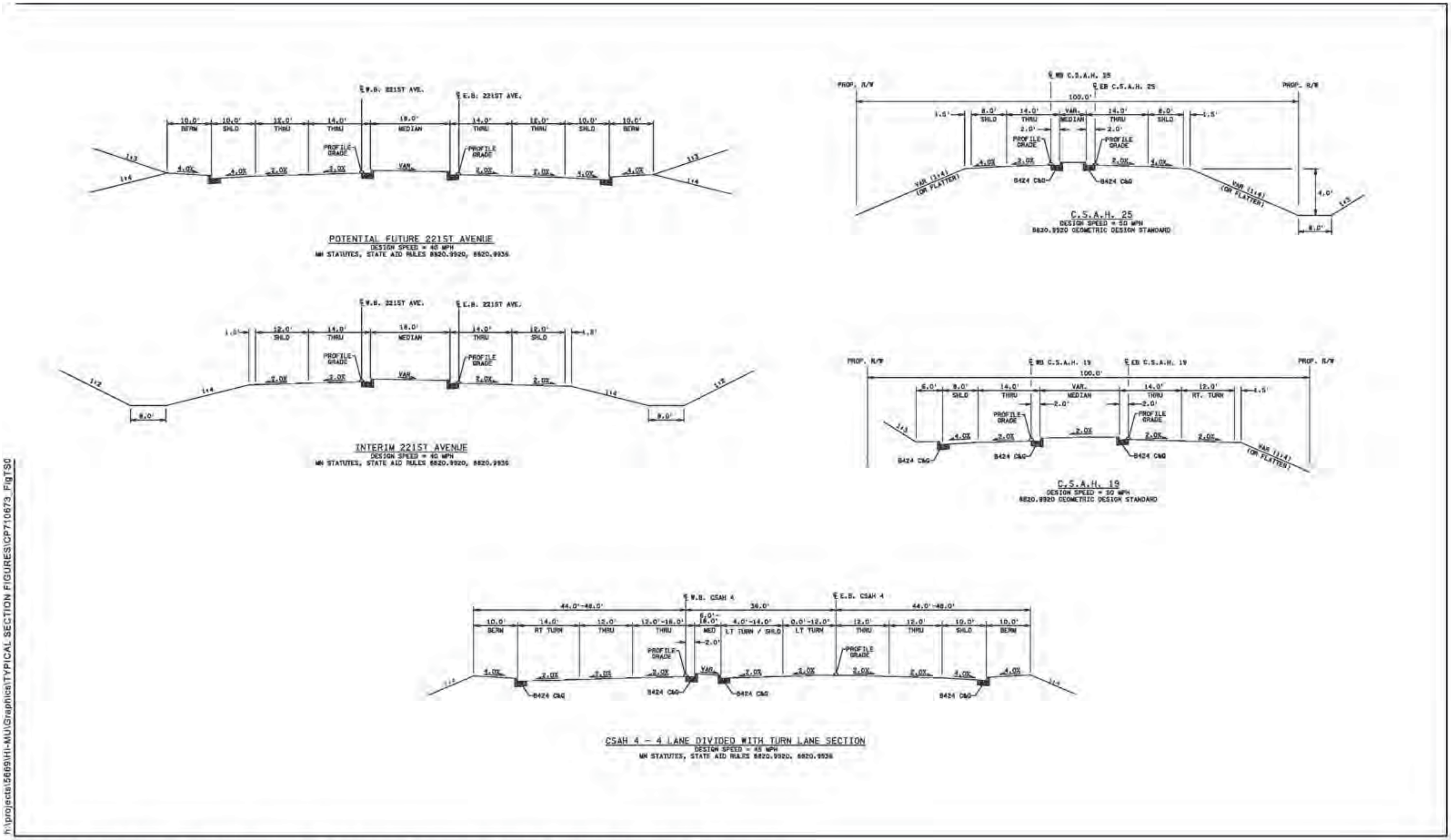
TYPICAL SECTIONS - INTERSECTING LOCAL ROADWAYS (URBAN ELK RIVER)

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 5E



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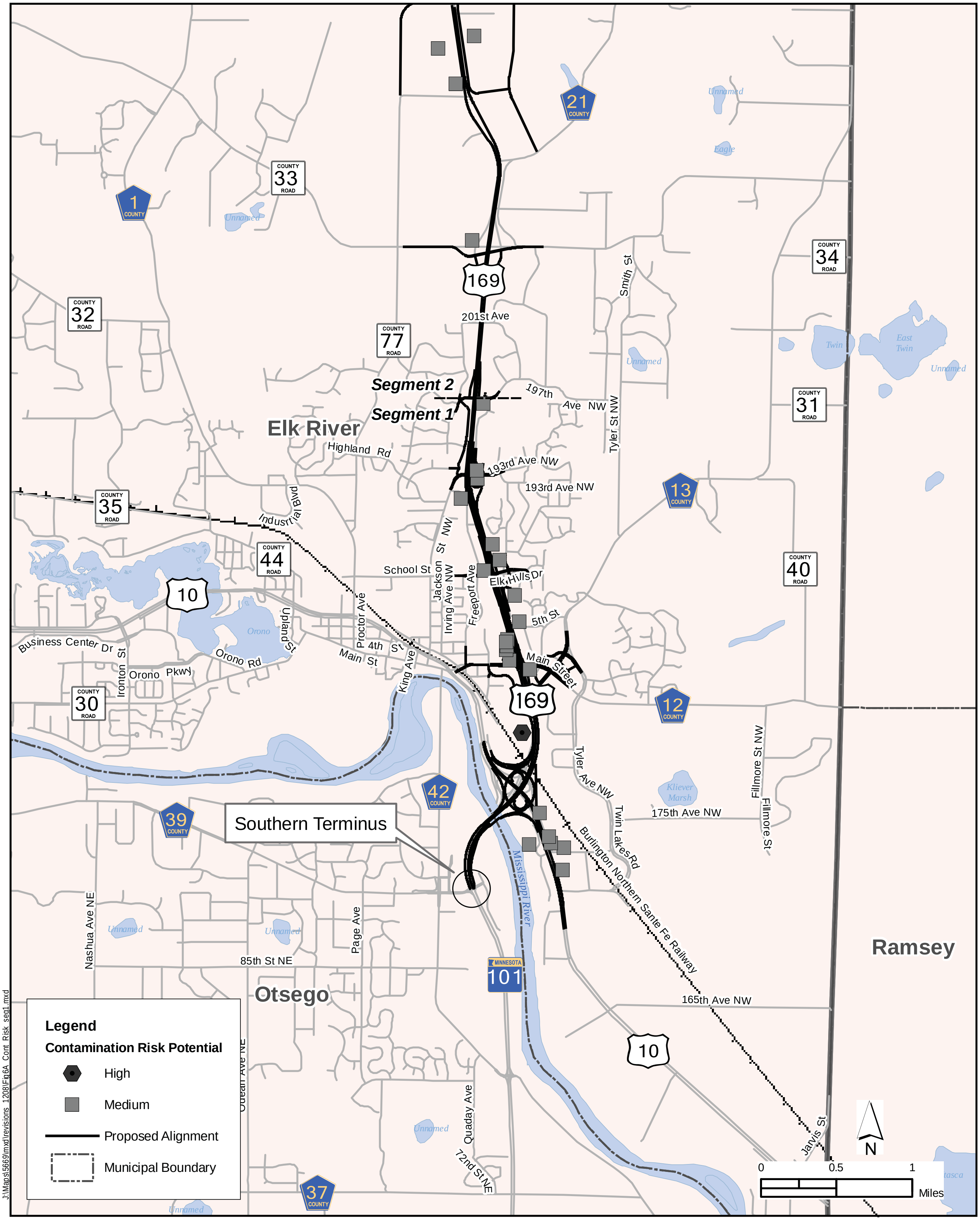
TYPICAL SECTIONS - INTERSECTING LOCAL ROADWAYS (RURAL ELK RIVER, LIVONIA TOWNSHIP, ZIMMERMAN)

Figure 5F

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71



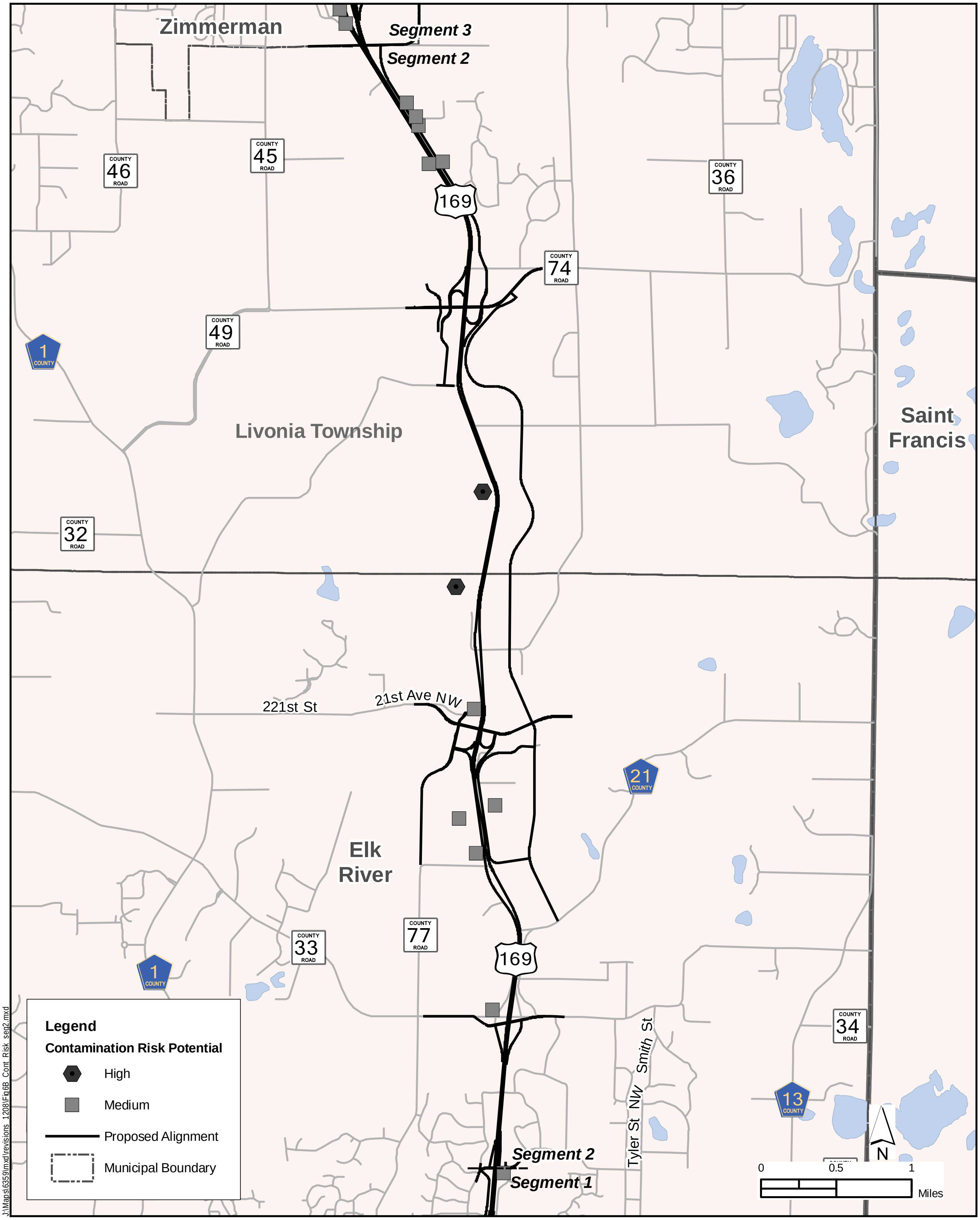
CONTAMINATION RISK POTENTIAL: SEGMENT ONE

Figure 6A

Segment One: CSAH 39 to197th Avenue NW

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71



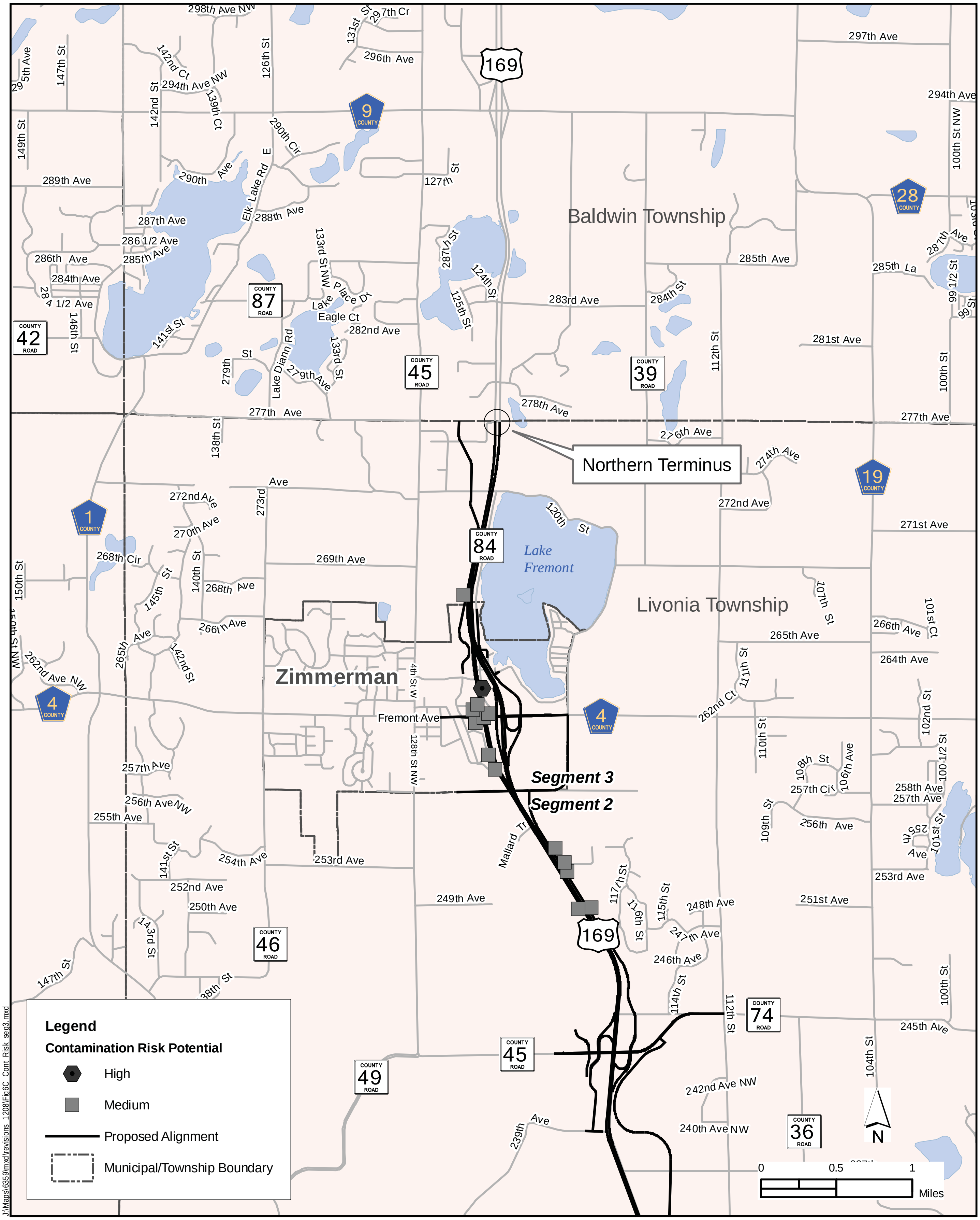
CONTAMINATION RISK POTENTIAL: SEGMENT TWO

Figure 6B

Segment Two: 197th Avenue NW to Livonia Township/City of Zimmerman Boundary

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71



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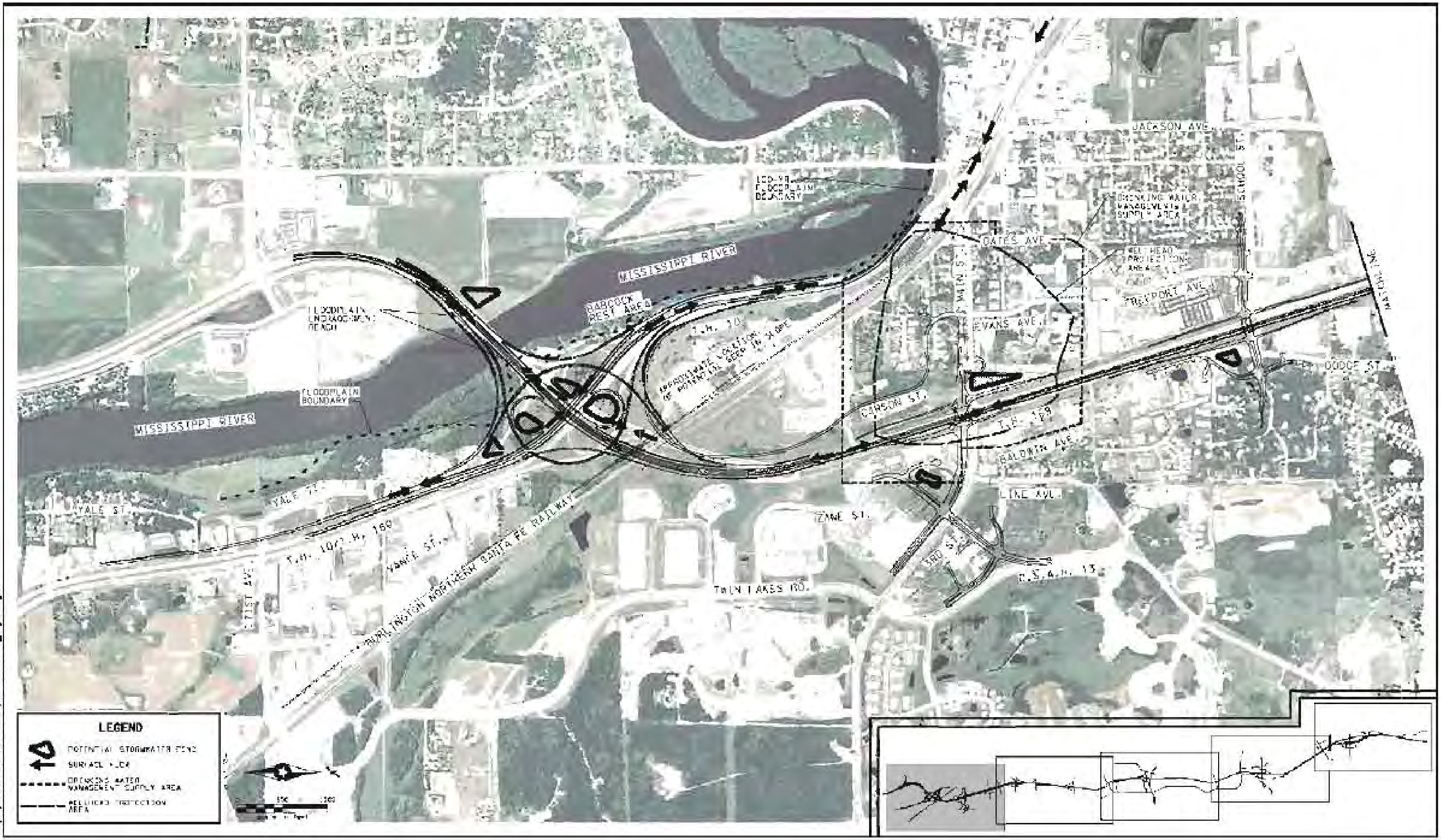
CONTAMINATION RISK POTENTIAL: SEGMENT THREE

Figure 6C

Segment Three: City of Zimmerman municipal boundary to 277th Avenue in Livonia Township

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

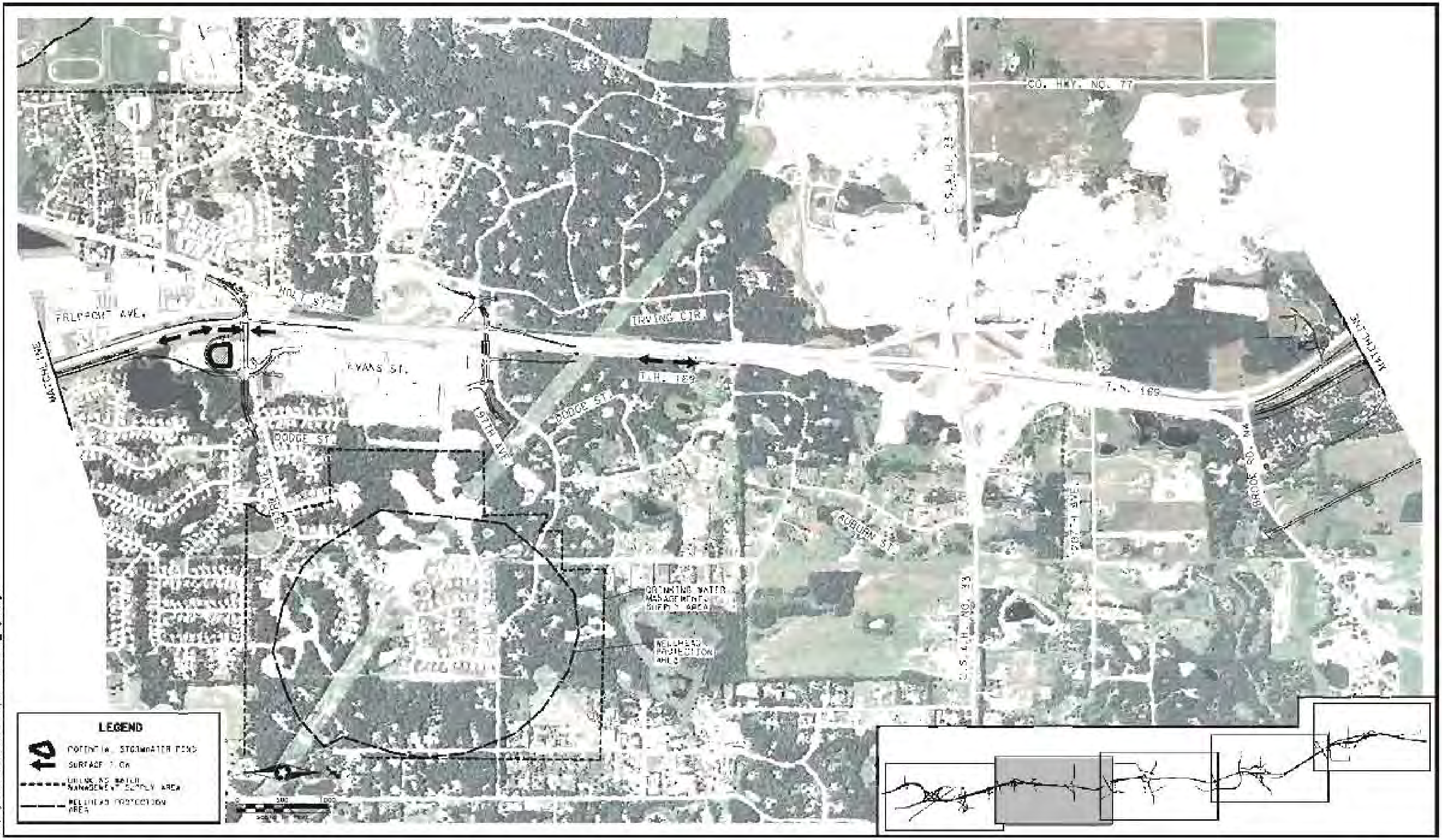


HIGHWAY 169: WATER RESOURCES ISSUES MAP

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 7A



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HIGHWAY 169: WATER RESOURCES ISSUES MAP

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

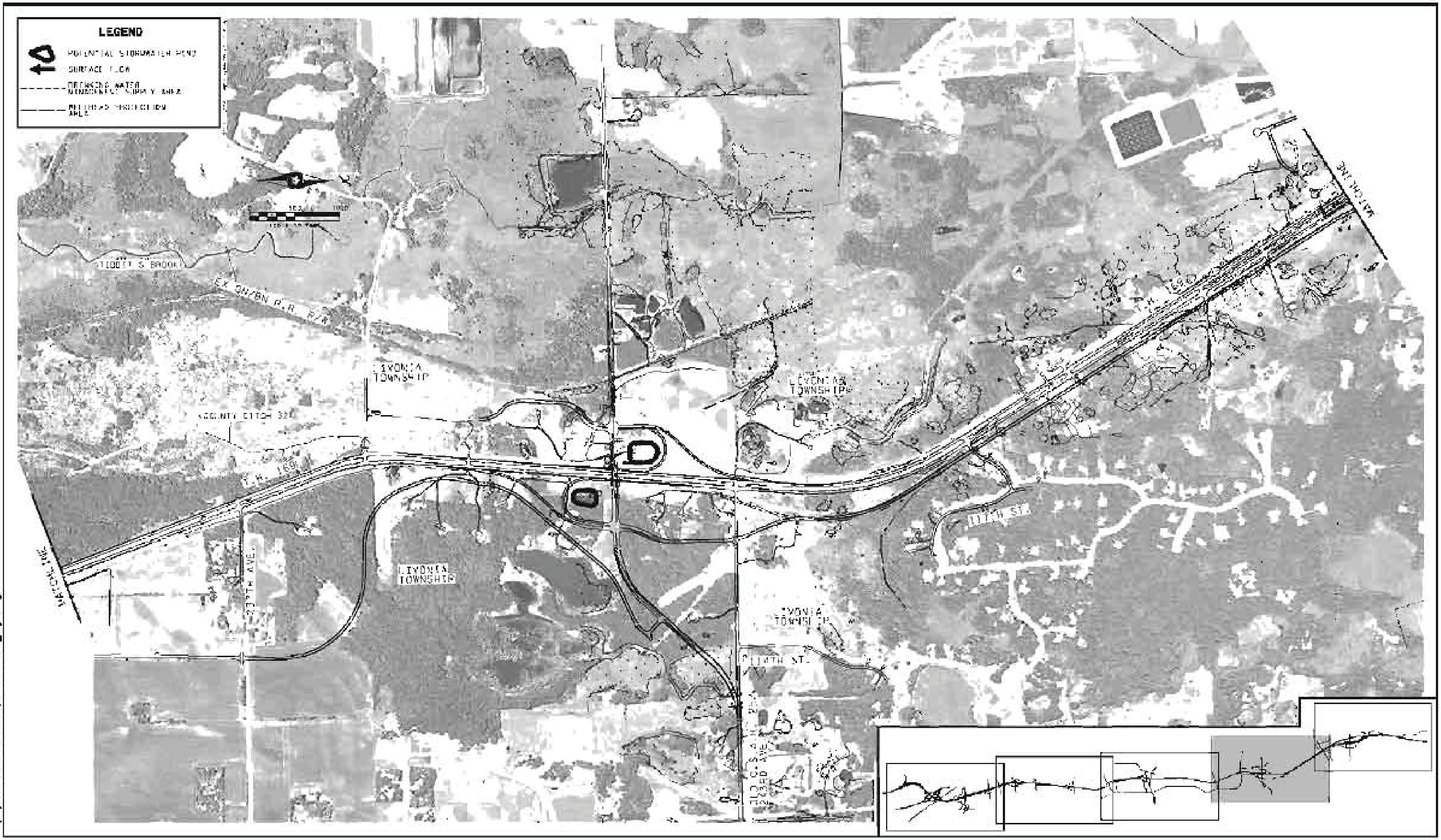
Figure 7B

HIGHWAY 169: WATER RESOURCES ISSUES MAP

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 7C



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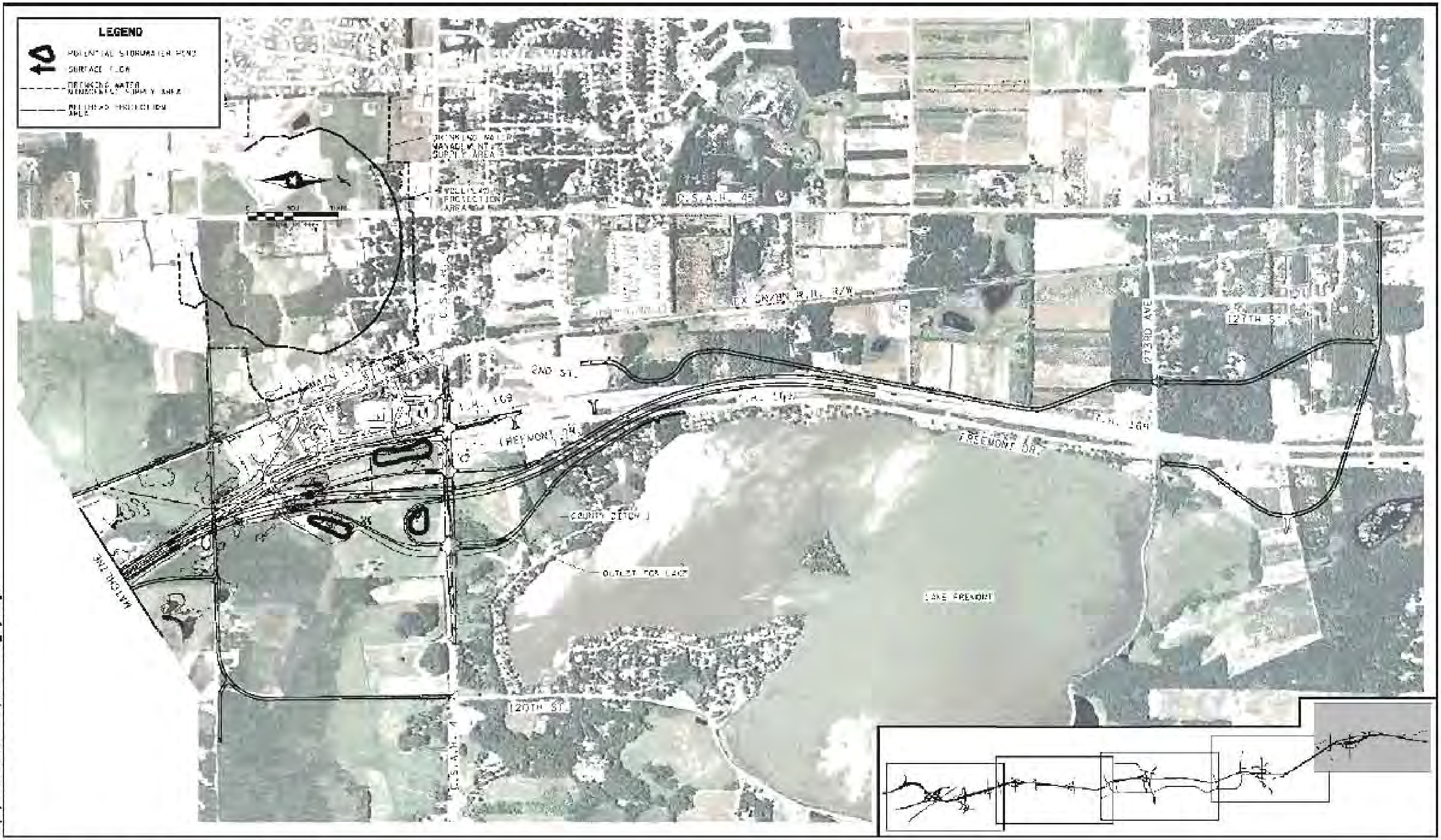
HIGHWAY 169: WATER RESOURCES ISSUES MAP

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 7D



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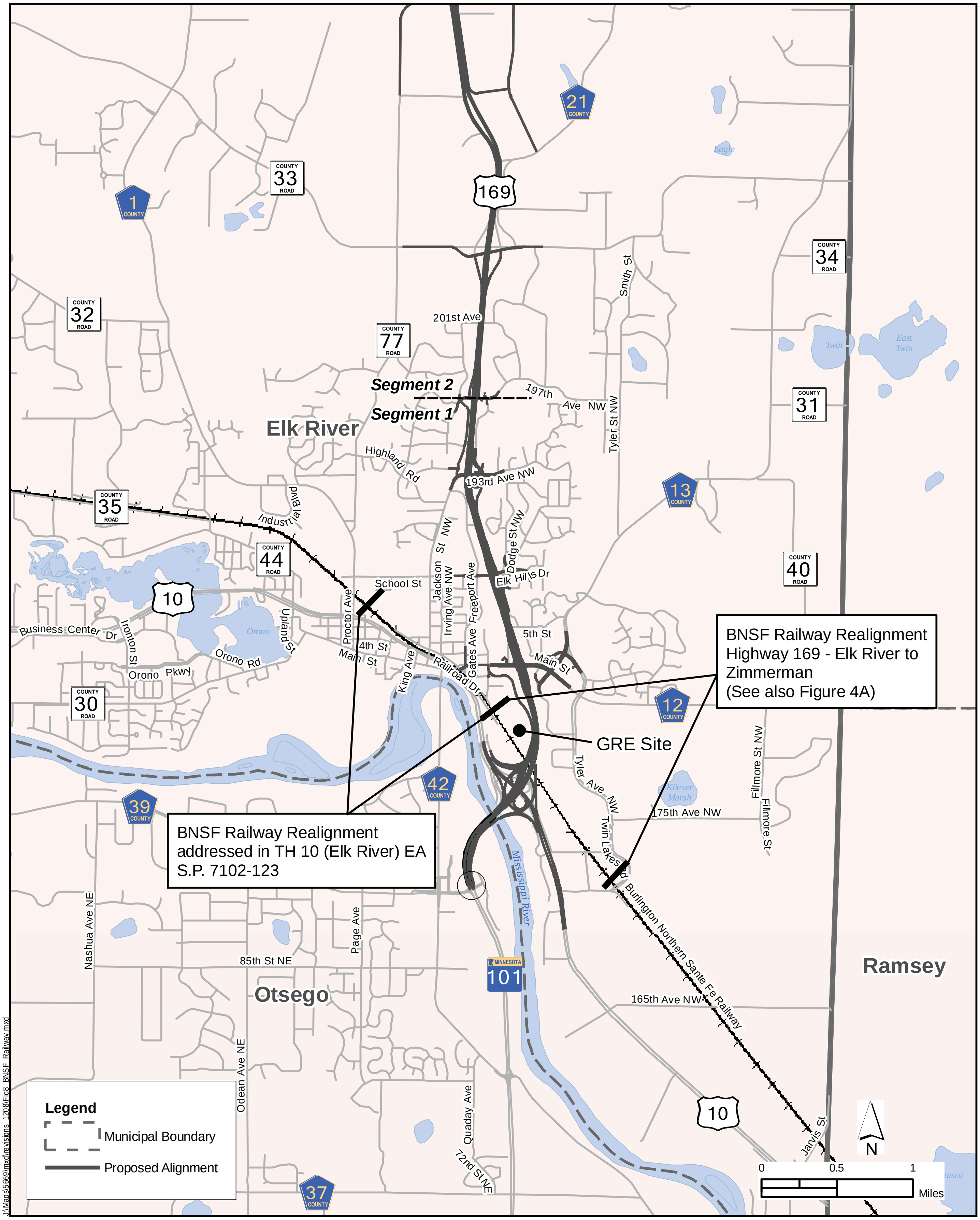
HIGHWAY 169: WATER RESOURCES ISSUES MAP

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 7E

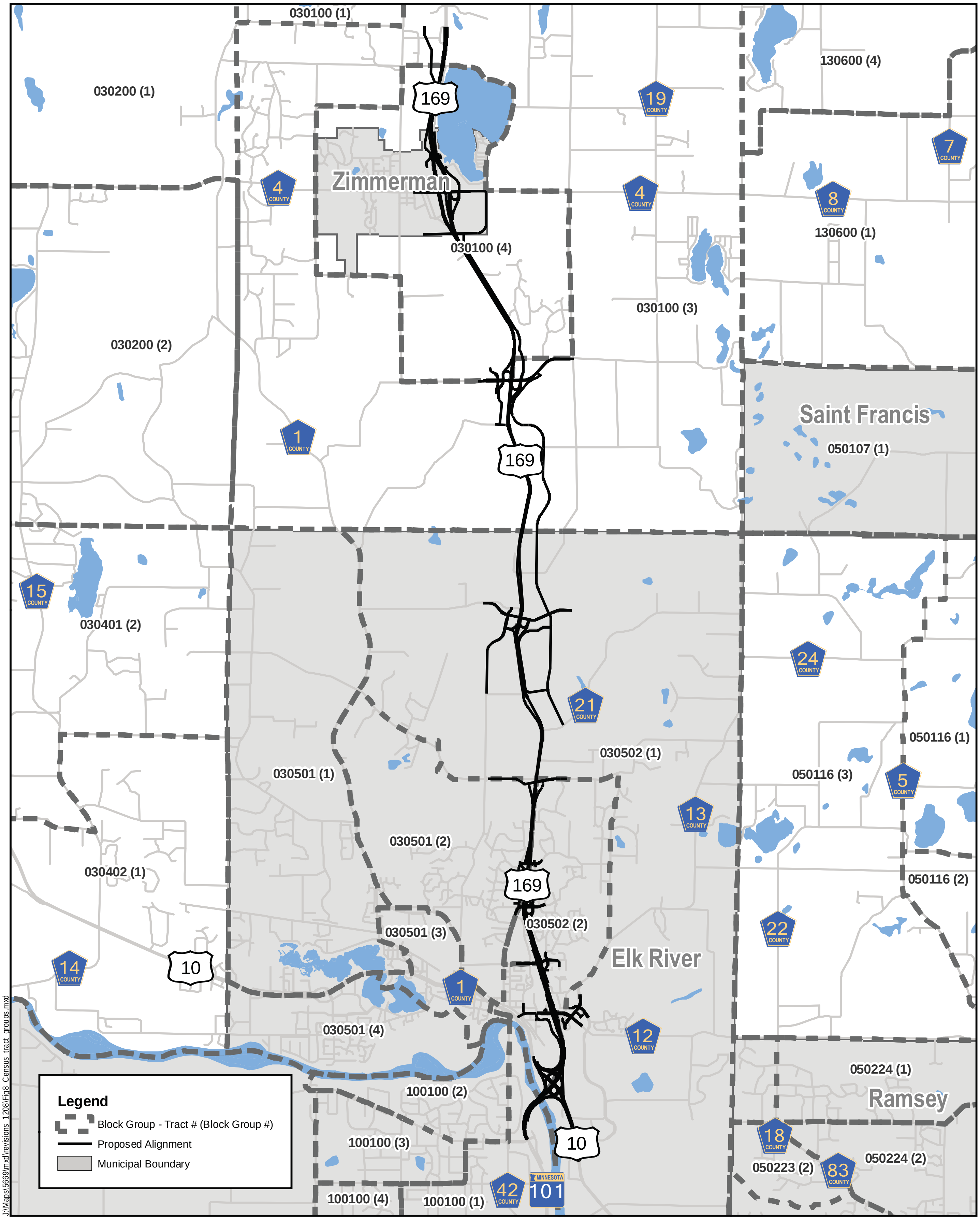


BNSF Railway Realignment

Figure 8

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71



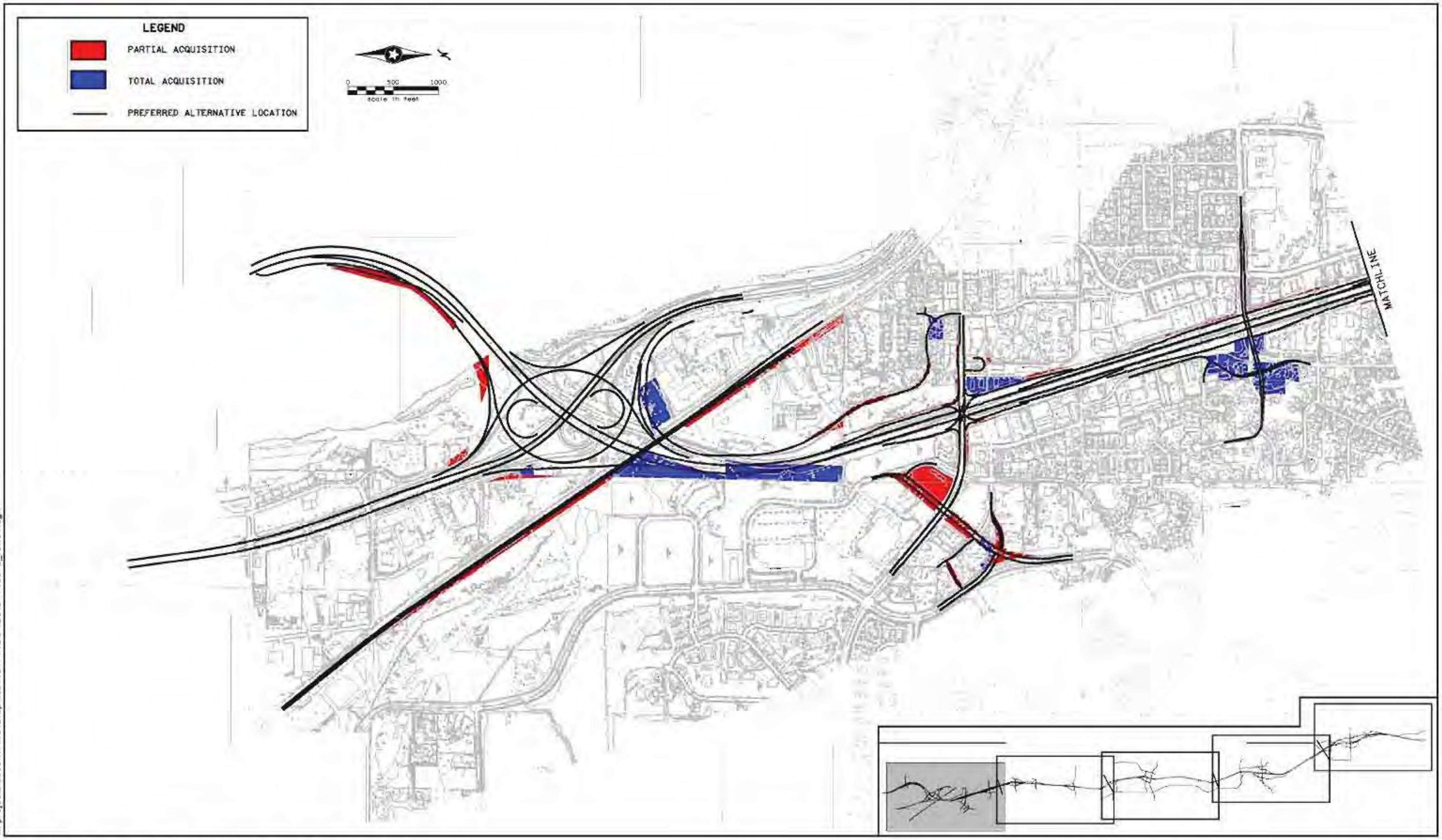
CENSUS BLOCK GROUPS

TH 169 - Elk River to Zimmerman

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 9



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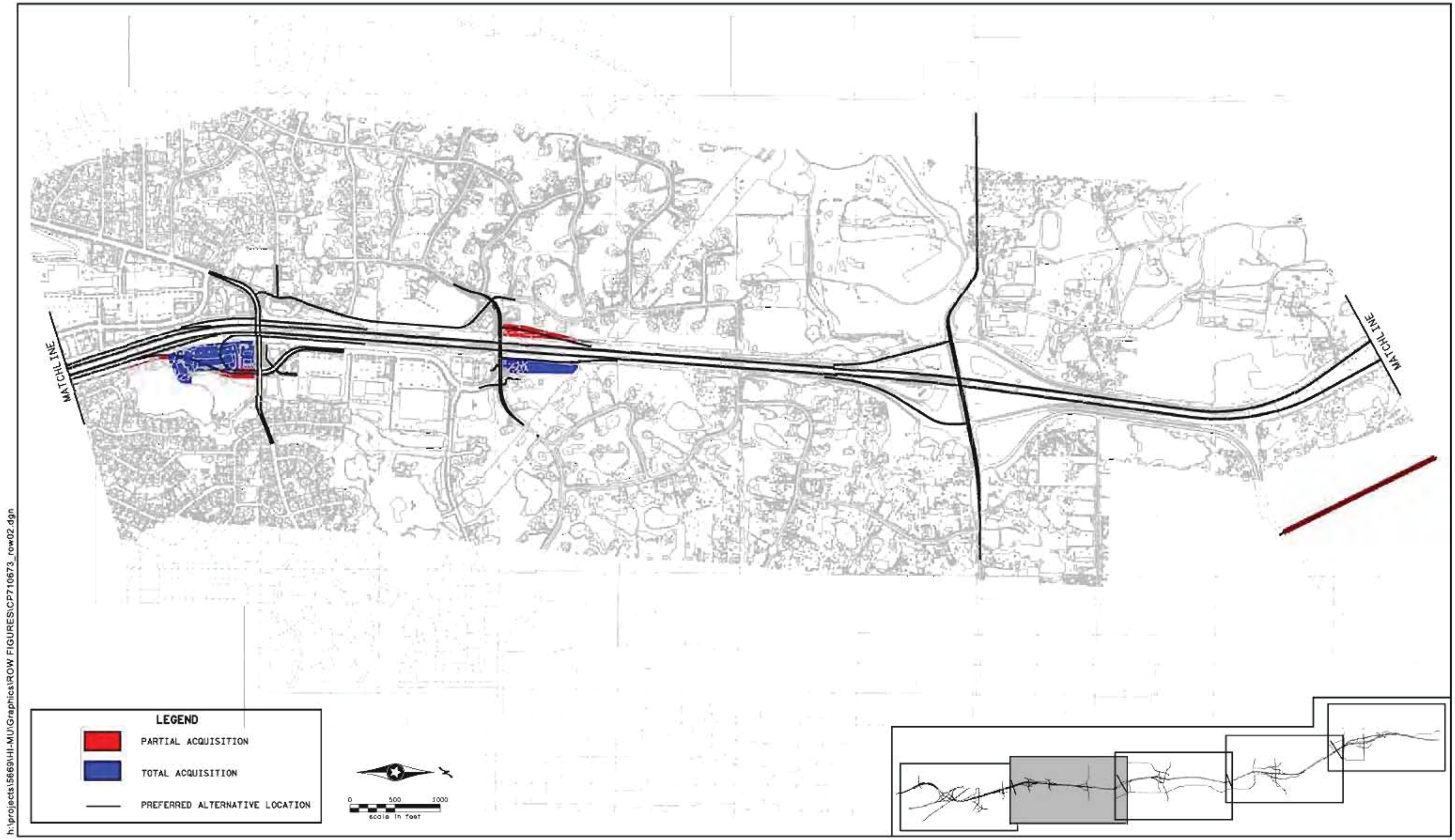
RIGHT-OF-WAY IMPACTS - (TOTAL/PARTIAL ACQUISITIONS)

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 10 A

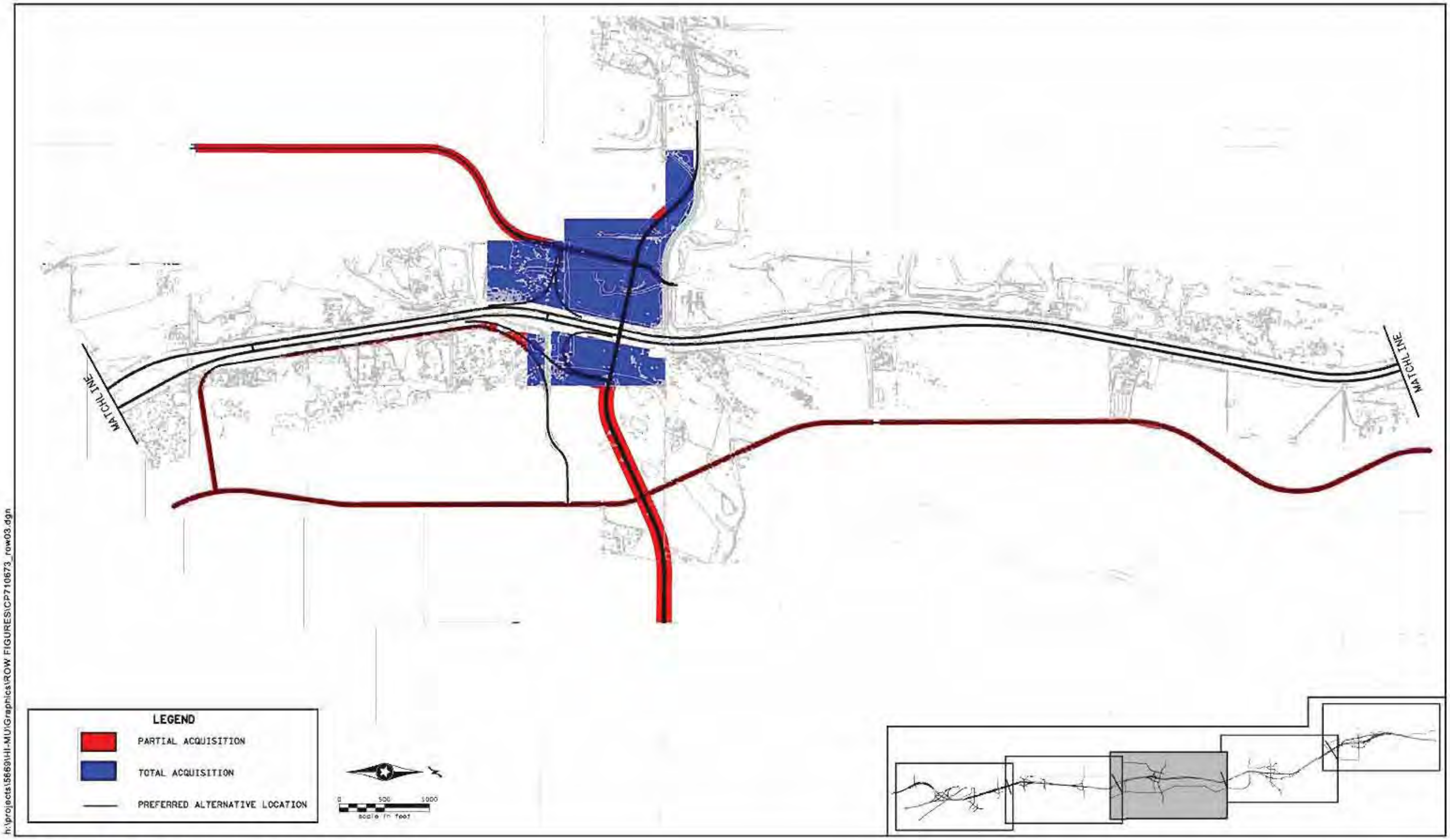


RIGHT-OF-WAY IMPACTS - (TOTAL/PARTIAL ACQUISITIONS)

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 10B

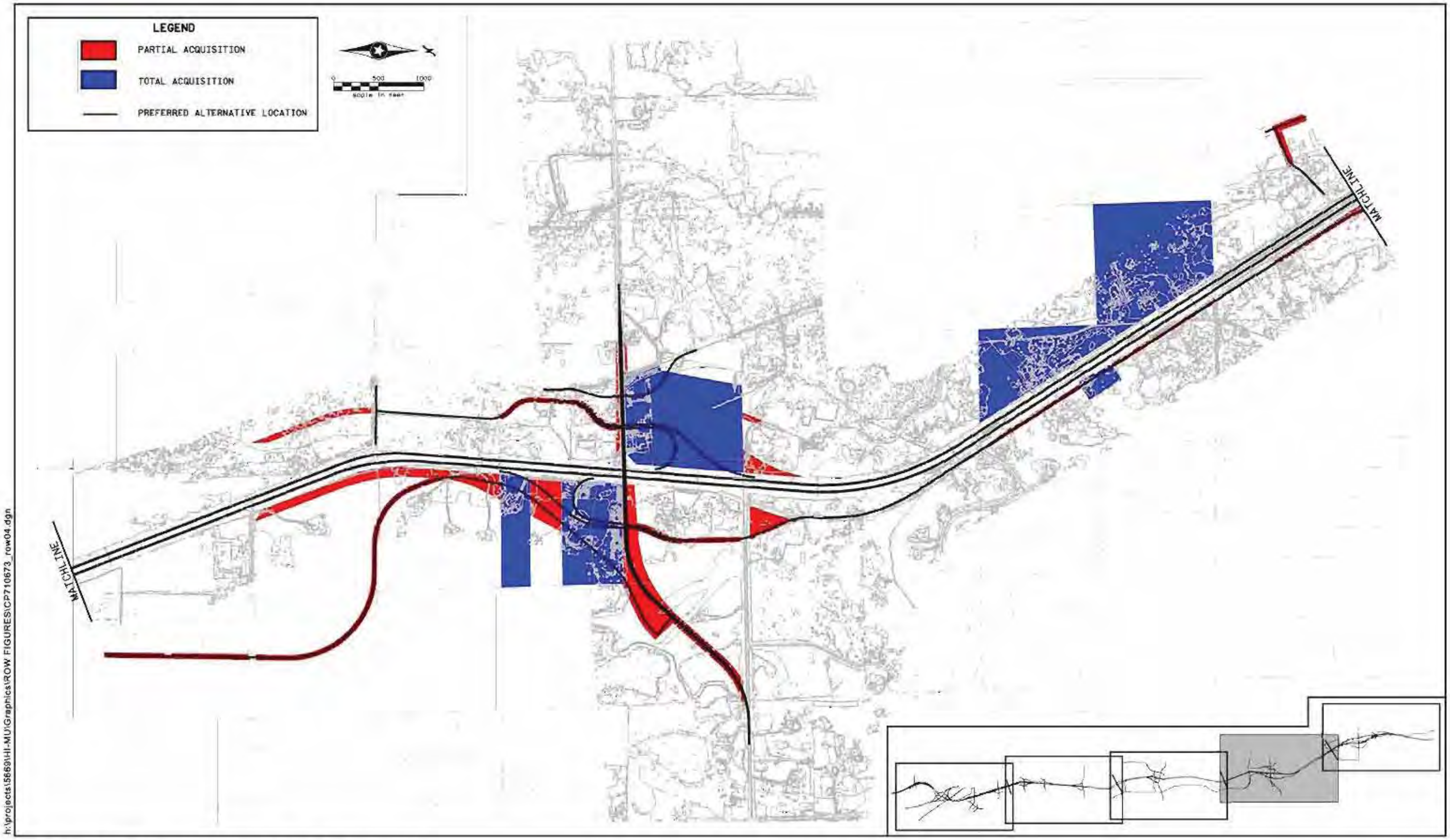


RIGHT-OF-WAY IMPACTS - (TOTAL/PARTIAL ACQUISITIONS)

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 10C



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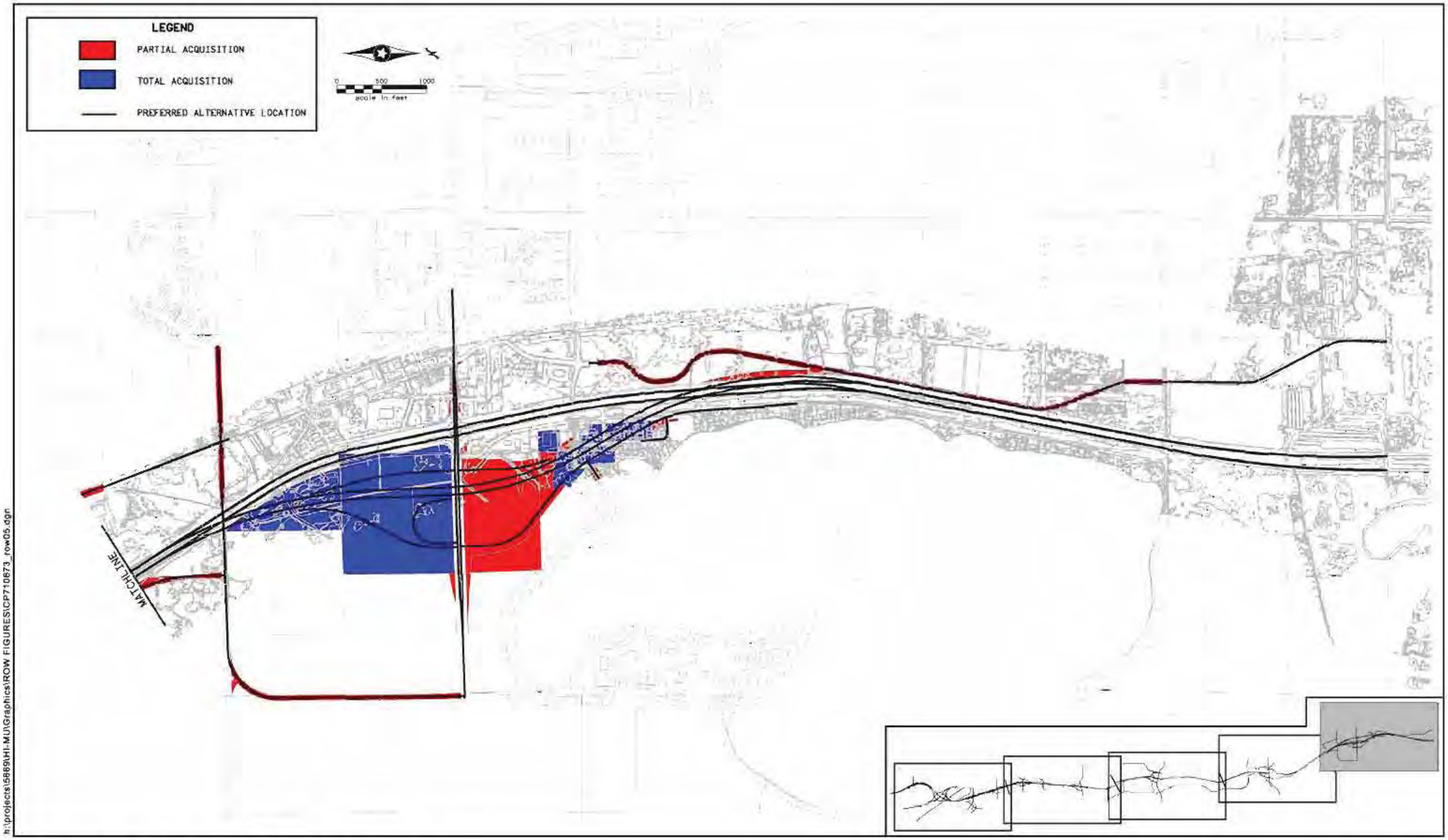
RIGHT-OF-WAY IMPACTS - (TOTAL/PARTIAL ACQUISITIONS)

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 10D



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RIGHT-OF-WAY IMPACTS - (TOTAL/PARTIAL ACQUISITIONS)

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 10E

APPENDIX B

Technical Memorandum 5: Alternatives Development, Evaluation and Selection of Preferred Alternative

TECHNICAL MEMORANDUM 5 – ALTERNATIVES DEVELOPMENT, EVALUATION AND SELECTION OF PREFERRED ALTERNATIVE
JANUARY 28, 2009

INTRODUCTION

This technical memorandum describes the alternatives development and evaluation process and selection of the Preferred Alternative interchange types for Highway 169 from Elk River to Zimmerman.

The *Highway 101/169 CMP* (2002) determined that Highway 169 from TH 10 through Zimmerman must be converted to a freeway facility in order to meet IRC mobility goals, improve operations, and improve safety. The alternatives development process for the Highway 169 project through Elk River and Zimmerman involved the consideration of Highway 169 cross sections and vertical alignments as well as interchange and local access alternatives as described below.

The evaluation of interchange concepts and the identification of preferred interchange types throughout the project corridor was a collaborative effort that included input from Mn/DOT staff, Local Advisory Committees (Elk River, Livonia, Zimmerman, and Sherburne County staff) and local officials. Input from the public and business community throughout the project development process was also important in identifying preferred alternative interchange types.

ALTERNATIVES DEVELOPMENT AND EVALUATION
NO BUILD ALTERNATIVE

The No Build Alternative would maintain Highway 169 as an at-grade expressway with no changes in access from the Highway 10/101/169 interchange in Elk River to the 273rd Avenue intersection in Zimmerman. The No Build Alternative would not address the purpose and need of the project as described below, and is not identified as the preferred alternative for the project.

- The No Build Alternative would not address safety concerns along Highway 169. Maintaining the existing number of at-grade access points along the highway would perpetuate turning movement conflicts that contribute to the crash and severity rates observed on Highway 169.
- The No Build Alternative would not address traffic operations on Highway 169. A majority of intersections evaluated on Highway 169 from Elk River to Zimmerman are projected to operate at an unacceptable LOS D or worse under year 2030 No Build conditions.
- The No Build Alternative would not provide adequate capacity to accommodate future traffic volumes on Highway 169. Future ADTs on Highway 169 are forecast to range from 77,000 in Elk River to 49,000 in Zimmerman. The increased traffic volumes will result in congestion throughout the project corridor.

- The No Build Alternative would not meet travel speed performance goals for a High Priority IRC as identified by the *IRC Study*. The travel speed performance goal for a High Priority IRC is 60 mph. The travel speed for the Highway 169 corridor from Elk River to Zimmerman under future (2025) No Build conditions, based on studies completed with the *Highway 101/169 CMP* (2002), is predicted to be 26.2 mph, below the performance goal for High Priority IRCs.

- The No Build Alternative would perpetuate the 44 existing access points along Highway 169 in Elk River, Livonia Township, and Zimmerman, which is inconsistent with Mn/DOT guidelines for principal arterial/High Priority IRCs.

The No Build Alternative was used as the basis for comparison of social, economic, and environmental impacts of the Preferred Alternative.

ALTERNATIVES DEVELOPMENT AND EVALUATION
HIGHWAY 169 CORRIDOR

1. Highway 169 Design Concept

The *Highway 101/169 CMP* (2002) evaluated several design concepts for the Highway 169 corridor. These concepts included a six-lane expressway alternative, a four-lane freeway alternative, and a six-lane freeway alternative (Highway 10 to 197th Avenue through Elk River). The CMP included traffic analyses documenting that an expressway facility will not meet target speed performance criteria for a High Priority IRC, and that signalized intersections would operate at an unacceptable LOS F under future conditions. In addition, an expressway facility would not enhance safety because at-grade intersections would remain in-place.

The analysis documented in the CMP determined that conversion of Highway 169 to a freeway facility from Elk River to Zimmerman is necessary from to meet High Priority IRC performance targets. Conversion of Highway 169 to a freeway facility through Elk River to CSAH 4 in Zimmerman will address the transportation need as identified in the CMP and as summarized below.

- **Safety:** Eliminating the at-grade signalized intersections through Elk River, conversion of Highway 169 from at-grade expressway facility to a grade-separated freeway facility, and eliminating the at-grade intersection at CSAH 4 in Zimmerman will meet safety goals and enhance safety. In general, freeway facilities are safer than expressway facilities because intersecting roadways are grade-separated. The proposed Highway 169 freeway facility will eliminate conflicting movements at at-grade intersections and eliminate at-grade access points.

- **Traffic Operations:** Conversion of Highway 169 to a freeway facility will eliminate at-grade intersections through Elk River and Zimmerman. As such, delays and congestion associated with at-grade intersections will be eliminated with conversion to a freeway facility. As shown in Table 1 below, the Highway 169 freeway is forecast to operate at an acceptable level of service C under future Build conditions.

- **Mobility (IRC Performance Targets):** Conversion of Highway 169 to a freeway facility will eliminate at-grade signalized intersections and subsequently, will eliminate the major performance problems created by the delays and congestion associated with the existing at-grade signalized intersections. Under future Build conditions, Highway 169 as a freeway facility is forecast to meet travel speed performance criteria for High Priority IRCs as shown in Table 1.

TABLE 1
HIGHWAY 101/169 CMP – HIGHWAY 169 FREEWAY PERFORMANCE [1]

Location Along Highway 169 Corridor	Four-Lane Freeway		Six-Lane Freeway	
	Speed (mph) (Year 2025)	**LOS (Year 2025)**	**Speed (mph) (2025)**	**LOS (2025)**
Highway 10 to warning flasher north of 197th Avenue	61	D	64	C
Warning flasher north of 197th Avenue to North Elk River city limits	67	C	N/A	N/A
North Elk River city limits to warning flasher south of Zimmerman	NC	C	N/A	N/A
Warning flasher south of Zimmerman to warning flasher north of Zimmerman	67	C	N/A	N/A

N/A = not applicable
NC = Speed performance for this portion of the project area was 69 mph under future No-Build conditions. As such, speed performance was not calculated for future Build conditions.
[1] Adapted from Table 4-3 and Table 4-5 of the *TH 101-TH 169 Corridor Management Plan* (April 2002).

- **Access:** Conversion of Highway 169 to a freeway facility will eliminate all existing at-grade access to Highway 169. Access to Highway 169 will be accommodated at grade-separated interchanges connected by a system of frontage roads east and west of Highway 169. Existing local roads and the proposed frontage road system would maintain accessibility to parcels where existing at-grade access is eliminated. Removal of all at-grade access with conversion to a freeway facility is consistent with Mn/DOT guidelines for High Priority IRCs and principal arterial roadways.

2. Urban Elk River: Freeway Cross Section, Interchange Spacing, and Operations

Freeway Cross Section

As described in the *Highway 101/169 CMP* (2002), the speed performance of a four-lane freeway facility (two lanes in the both the north- and southbound directions) through the urban Elk River segment is near the High Priority IRC speed performance goal of 60 mph. As acknowledged in the CMP, the conversion of Highway 169 from the existing signalized at-grade expressway to a four-lane freeway facility is “a reasonable first-step to address long-term mobility needs.”

However, the *Highway 101/169 CMP* (2002) also considered a six-lane freeway facility (three lanes in both the north- and southbound directions) on Highway 101 and Highway 169 through Elk River to 197th Avenue. As shown in Table 10 above, there is the potential for some congestion with the four-lane freeway as the urban Elk River segment (Highway 10 to 197th Avenue) is forecast to operate at LOS D under future Build conditions. The six-lane freeway is forecast to operate at LOS C with speed performance above the goal for a High Priority IRC. The six-lane freeway represents an option for improving the Highway 169 corridor through Elk River with less congestion under future Build conditions relative to the four-lane freeway.

The ultimate, long-term vision for Highway 169 through urban Elk River (Highway 101 and the Highway 10/101/169 interchange to 197th Avenue) is a six-lane section. A six-lane section provides adequate capacity to accommodate forecast traffic volumes and provides a greater margin to absorb increases in future travel demand. It is feasible to accommodate a phased approach for this section of the project corridor. Highway 169 would first be constructed as a four-lane freeway facility, with conversion to a six-lane facility in the future when warranted. The proposed design has been engineered to accommodate initial construction as a four-lane section with expansion to a six-lane facility through urban Elk River when warranted.

<u>Interchange Spacing and Freeway Operations</u>

In the urban Elk River segment of the project area, the location of Highway 169 access points also played a role in determining the Highway 169 design necessary to accommodate future traffic volumes at an acceptable level of operation. The existing interchange spacing along Highway 101 from CSAH 39 in Otsego to Highway 10/101/169 in Elk River is less than one mile. Through the urban Elk River segment of the project area, intersecting cross streets along Highway 169 (Main Street, School Street, Jackson Avenue/193rd Avenue, 197th Avenue) are located less than one mile apart from one another. The distance between intersecting cross streets on Highway 169 is summarized below.

- CSAH 39 (Otsego) to Highway 10/101/169: 0.8 miles (4,200 feet)
- Highway 10 to Main Street: 0.9 miles (4,700 feet)
- Main Street to School Street: 0.6 miles (3,200 feet)
- School Street to Jackson Avenue/193RD Avenue: 0.7 miles (3,500 feet)
- Jackson Avenue/193rd Avenue to 197th Avenue: 0.5 miles (2,600 feet)

Mn/DOT has established access guidelines for high priority IRC and principal arterial roadways. Mn/DOT access guidelines recommend that high priority IRCs such as Highway 169 be grade-separated facilities, with interchange access at select locations. According to Mn/DOT access spacing guidelines, typical interchange spacing in urban and urbanizing areas is a minimum of one mile. Interchange access points, without mainline auxiliary lanes, should ideally be spaced at least one mile apart to provide for lane changes associated with entering and exiting traffic between adjacent interchanges (i.e., weave movements). The following describes the Highway 169 mainline evaluation process with respect to interchange locations and mainline operations (i.e., weave movements).

Highway 101: CSAH 39 to Highway 10/101/169 Interchange

Design concepts were evaluated for the Highway 10/101/169 interchange to accommodate free-flow conditions for all movements at the interchange. Initially, the proposed project was to terminate at Highway 10 and the Highway 10/101/169 system interchange. However, during development of Highway 10/101/169 interchange concepts, operational problems were identified because of the forecast volumes for weave movements on Highway 101 between CSAH 39 and Highway 10, and the spacing between the Highway 10/101/169 interchange and the CSAH 39 interchange south of the Mississippi River in Otsego.

As such, the project was expanded to the south to CSAH 39 to evaluate weave movements between CSAH 39 and the Highway 10/101/169 interchange. Each of the Highway 10/101/169 interchange concepts included an exit ramp from westbound Highway 10 to southbound Highway 101 tying in to the Mississippi River bridge along the north side of the river. However, several concepts were considered for the exit ramps from northbound Highway 101 to east- and westbound Highway 10 ramps. In order to accommodate the northbound Highway 101 to east- and westbound Highway 10 free-flow movements, several design concepts were considered:

- Flyover ramp from northbound Highway 101 to westbound Highway 10 combined with an exit ramp from northbound Highway 101 to eastbound Highway 10. This flyover and exit ramp would diverge from northbound Highway 101 south of the Mississippi River and require a parallel bridge over the river. Under this concept, the weave distance between the CSAH 39 entrance ramp and Highway 10 exit ramps is less than 500 feet.
- Flyover ramp from northbound Highway 101 to westbound Highway 10 combined with an exit ramp from northbound Highway 101 to eastbound Highway 10. This flyover and exit ramp would diverge from northbound Highway 101 from the existing Mississippi River bridge north of the Mississippi River. Under this concept, the weave distance between the CSAH 39 entrance ramp and Highway 10 exit ramps is approximately 1,500 feet. The intent with this concept was to increase the weave distance between CSAH 39 and Highway 10 ramps.
- Loop ramp from northbound Highway 101 to westbound Highway 10 in the northeast quadrant of the Highway 10/101/169 interchange and exit ramp from northbound Highway 101 to eastbound Highway 10. The exit ramp to eastbound Highway 10 would diverge north of the Mississippi River. Under this concept, the weave distance between the CSAH 39 entrance ramp and Highway 10 exit ramps is approximately 1,500 feet. The intent with this concept was to increase the weave distance while also providing additional space for westbound Highway 10 traffic to sort out with northbound Highway 101/169 traffic.

The intent of this process was to analyze the weave movements between CSAH 39 traffic entering northbound Highway 101 and northbound Highway 101 traffic exiting to Highway 10 (east- and westbound) and to analyze the weave movement between Highway 10 traffic entering southbound Highway 101 and southbound Highway 101 traffic exiting to CSAH 39. The three concepts listed above for northbound Highway 101 were considered with and without an auxiliary lane. The southbound movement was considered with and without an auxiliary lane. Operational levels of service were computed for the weave movements during the a.m. and p.m. peak hours. The results of this weave analysis (level of service) are shown in Table 2.

The results of this analysis show that while an auxiliary lane on southbound Highway 101 across the Mississippi River to CSAH 39 would provide an acceptable level of service for weave movements in the a.m. and p.m. peak hours, an acceptable level of service could not be met for the northbound weave movement with the alternative concepts identified above. While an auxiliary lane on northbound Highway 101 would operate at LOS B during the a.m. peak hour, the weave movement would operate at an unacceptable LOS E during the p.m. peak hour, even with an increased weave distance (see Table 2).

TABLE 2
HIGHWAY 101 OPERATIONS: WEAVE ANALYSIS (CSAH 39 TO HIGHWAY 10/169)

	Build (2030) Conditions[1]			
	Northbound Hwy 101		**Southbound Hwy 101**	
Weave Distance (CSAH 39 to Hwy 10/101/169)	**No Auxiliary Lane AM Peak (PM Peak)**	**With Auxiliary Lane AM Peak (PM Peak)**	**No Auxiliary Lane AM Peak (PM Peak)**	**With Auxiliary Lane AM Peak (PM Peak)**
<500’ (CSAH 39 entrance to Hwy 10 exit)	D (**F**)	C (**F**)	--	--
1,500’ (CSAH 39 entrance to Hwy 10 exit) (with NB 101 to WB 10 flyover ramp)	C (**F**)	B (**F**)	--	--
1,500’ (CSAH 39 entrance to Hwy 10 exit) (with NB 101 to WB 10 flyover ramp)	C (**F**)	B (**E**)	--	--
1,525’ (WB Hwy 10 exit to CSAH 39 exit)	--	--	**E** (C)	C (B)
Braided Ramp Alternative [3]	N/A	N/A	N/A	N/A

(1) Assumes Highway 101 is a six-lane section from CSAH 39 to Highway 10/169.
(2) LOS for weave movements on Highway 101 between CSAH 39 and the Highway 10/101/169 interchange. LOS D or better is considered acceptable. LOS E and F are considered unacceptable.
(3) Weave analysis level of service not applicable for braided ramp alternative because it eliminates the weave movement between NB Highway 101 to Highway 10 traffic and CSAH 39 to NB Highway 101 traffic.

In order to address the weave movement operations for northbound Highway 101, a braided ramp concept was developed (see Figure 4A, Appendix A). Under the braided ramp concept, CSAH 39 entrance traffic would bridge over exiting traffic and merge into northbound Highway 101 at the Mississippi River bridge. Northbound Highway 101 traffic exiting to Highway 10 (east- and westbound) would exit Highway 101 between CSAH 39 and the Mississippi River, cross the river on a bridge parallel to the mainline bridge, and diverge to the east- and westbound Highway 10 ramps north of the river. A ramp would connect the CSAH 39 entrance ramp to the Highway 10 exit ramp before the ramp braid to accommodate the movement from CSAH 39 to east- or westbound Highway 10.

While this concept would potentially have greater construction costs because of the additional bridges, it is consistent with transportation goals for the project because it addresses traffic operations associated with the weave movement between CSAH 39 and Highway 10. While it would also require a new structure in the Mississippi River, the structure is within the existing Highway 101 crossing corridor. The braided ramp concept eliminates the weave movement for entering and exiting traffic between CSAH 39 and Highway 10. As such, delays and congestion associated with the weave movement would be eliminated with the braided ramp concept. Because it was considered more important to accommodate the weave movements at acceptable levels of service, increased costs represented a trade-off to the transportation goals of the project.

The Highway 101 braided ramp design and Highway 10/101/169 interchange design is illustrated in Figure 4A, Appendix A. Additional detail regarding the Highway 101 weave analysis can be found in the traffic operations technical memorandum.

In addition to the challenges presented by the Highway 101 corridor from the Highway 10/101/169 interchange and Mississippi River crossing to CSAH 39 in Otsego, the Highway 169 corridor in Elk River also presented unique challenges because of the interchange spacing noted above. The project development process for Highway 169 through urban Elk River is described below.

Highway 169: Urban Elk River Segment

The interchange development process initially included the evaluation of overpasses only (e.g., School Street) and partial access only (e.g., 193rd Avenue/197th Avenue) to accommodate a corridor that would be consistent with the *Highway 101/169 CMP* (2002) recommendations and consistent with Mn/DOT interchange spacing guidelines. However, the in-depth traffic analysis that was completed as part of the project development process showed that providing Highway 169 access at select locations identified in the CMP resulted in overloading these interchanges (i.e., unacceptable levels of traffic operations). As such, interchange concepts were identified that would provide Highway 169 access at Main Street, School Street, Jackson/193rd Avenue and a partial access at 197th Avenue. While interchanges at these locations may not be consistent with Mn/DOT access guidelines, it allows for better distribution of traffic throughout the transportation network in Elk River, resulting in acceptable interchange operations. Options were then explored to mitigate the access spacing and weaving concerns by providing auxiliary lanes and collector-distributor lanes on the Highway 169 mainline.

Several design concepts were evaluated for the Highway 169 corridor to address traffic operations concerns associated with weaving movements between consecutive interchanges. This included the addition of auxiliary lanes on northbound and southbound Highway 169, and consideration of a collector-distributor roadway and braided ramps between the Main Street and School Street interchanges. Under the collector-distributor (C-D) alternative, a parallel roadway would separate Main Street and School Street ramp movements from the Highway 169 mainline. The braided ramp alternative would separate the Main Street and School Street ramp movements by bridging the Main Street southbound off-ramp and northbound on-ramp movements over the School Street southbound on and northbound off movements (see Figure C-6, Appendix C).

An operations analysis was completed for north- and southbound Highway 169 with auxiliary lanes. The results of this analysis are shown in Table 12. The Highway 169 mainline with auxiliary lanes is forecast to operate at an acceptable LOS D or better during a.m. and p.m. peak periods under future (2030) Build conditions.

The braided ramp concept between Main Street and School Street would eliminate the weave movement for entering and exiting traffic. As such, delays and congestion associated with the weave movement between Main Street and School Street would be eliminated. However, the braided ramp concept would likely increase construction costs (relative to the C-D alternative) because of the additional costs associated with the bridge structures. As shown in Table 3, the C-D road is forecast to operate at acceptable LOS B under future (2030) Build conditions. Because the C-D road alternative is forecast to operate at acceptable levels of service, and is a less expensive option, it was identified as part of the preferred alternative design between Main Street and School Street.

TABLE 3
HIGHWAY 169 OPERATIONS: HIGHWAY 10 TO 197TH AVENUE

Highway Segment	Build (2030) Conditions(1)			
	Auxiliary Lanes Only(2)		CD Road + Auxiliary Lanes(3)	
	Northbound AM Peak (PM Peak)	Southbound AM Peak (PM Peak)	Northbound AM Peak (PM Peak)	Southbound AM Peak (PM Peak)
South of Hwy 10	A(D)	B(A)	A(D)	B(A)
Hwy 10 to Main	A(C)	B(A)	A(C)	B(A)
Main to School	A(C)	B(A)	A(C)	B(A)
C-D Road between Main and School	- -	- -	A(B)	A(B)
School to 193rd	A(C)	B(A)	A(C)	B(A)
C-D Road between School and 193rd	- -	- -	A(A)	B(B)
193rd to 197th	A(C)	B(A)	A(C)	B(A)
North of 197th	A(C)	B(A)	A(C)	B(A)

(1) Assumes Highway 169 is a six-lane section from Highway 10 to north of 197th Avenue.
(2) Assumes auxiliary lanes on Highway 169 between interchanges from Highway 10 to 193rd Avenue.
(3) Assumes auxiliary lanes on Highway 169 between Highway 10 and Main Street and between School Street and 193rd Avenue. Assumes CD road (collector-distributor roadway) between Main Street and School Street, as well as between School Street and 193rd Avenue.

The Highway 169 design through Elk River is illustrated in Figures 4A and 4B, Appendix A. The Highway 169 typical section through Elk River is illustrated in Figure 5C, Appendix A.

ALTERNATIVES DEVELOPMENT AND EVALUATION
HIGHWAY 169 INTERCHANGES

Conversion of Highway 169 to a freeway facility would close all existing at-grade access points within the project area. As described in the *Highway 101/169 CMP* (2002), a freeway facility was identified to address safety, operations, mobility, and access needs. However, the *Highway*

101/169 CMP (2002) did not and was not intended to define specific interchange designs, over-/underpass designs, or linkages to local roadway systems. The following section describes the interchange development and selection process for the proposed conversion of Highway 169 from the existing expressway facility to a freeway facility.

Highway 169 interchange locations within the study area are described in the *Highway 101/169 CMP* (2002) and are summarized in Table 4. These locations were used as an initial guide in the interchange development process.

Interchange types considered for Highway 169 at the locations indicated in Table 4 would address the project need by providing grade-separated crossings and would eliminate existing at-grade intersections, consistent with Mn/DOT access guidelines for High Priority IRC roadways. Frontage roads between interchange locations would eliminate other at-grade access points and maintain access to Highway 169 for adjacent lands. Providing grade-separated interchanges would eliminate congestion and delays associated with the existing at-grade intersections and would address safety problems by eliminating conflicting movements along the Highway 169 mainline. Other transportation and social, economic, and environmental objectives were more important in identifying the preferred interchange-types at proposed interchange locations along the Highway 169 project corridor.

TABLE 4
HIGHWAY 169 INTERCHANGE LOCATIONS
(As Initially Identified in Highway 101/169 CMP)

Project Name (as identified in Highway 101/169 CMP)	**Project Location**	**Project Description**
Segment One: Urban Elk River		
Elk River A	Highway 10 Interchange (existing)	Improved Highway 10 interchange
Elk River B	Near Main and School Streets	New interchange at Main Street; overpass at School Street
Elk River C	Near Jackson and 197th Avenue	New interchange at Jackson/197th Ave., south of existing CR 33 interchange
Segment Two: Rural Elk River and Livonia Township		
Elk River D	CSAH 21 to 225th Avenue	New interchange at 221st Ave.
South of Zimmerman	225th Avenue to 247th Avenue	New interchange at CSAH 25/19
Segment Three: Zimmerman		
Zimmerman	Near CSAH 4	New interchange at CSAH 4

Source: Minnesota Department of Transportation. April 2002. *TH 101-TH 169 Corridor Management Plan*. Table 5-1 – Potential Highway Capacity Improvement Projects. Page 5-3.

The evaluation of interchange concepts and the identification of preferred interchange types throughout the project corridor was a collaborative effort that included input from Mn/DOT staff, Local Advisory Committees (Elk River, Livonia, Zimmerman, and Sherburne County staff) and local officials. Input from the public and business community throughout the project development process was also important in identifying preferred alternative interchange types.

The project corridor has been divided into three segments: urban Elk River (Segment One), rural Elk River and Livonia Township (Segment Two), and Zimmerman (Segment Three). These segments were identified based on existing land use patterns and development along the Highway 169 corridor. The interchange alternative evaluation process described below is organized based on these three segments, beginning with the Highway 10/101/169 interchange in Elk River and ending with the Highway 169/ CSAH 4 interchange in Zimmerman. Interchange concepts described in the following sections are illustrated in Figures C-1 through C-12, Appendix C.

1. Segment One: Urban Elk River Interchanges

Highway 10/101/169 Interchange

The existing Highway 10/101/169 interchange is a partial cloverleaf interchange. A loop is located in the southwest quadrant of the existing interchange to accommodate the southbound Highway 169 to eastbound Highway 10 movement. The eastbound Highway 10 to northbound Highway 169 movement is controlled by a stop sign at the intersection of the eastbound ramp and Highway 101/169. The westbound Highway 10 to southbound Highway 101 movement is controlled by a traffic signal at the intersection of the westbound ramp and Highway 101/169. Highway 101 south of the interchange is a freeway facility; Highway 169 north of the interchange through Elk River is an expressway facility.

Free-flow conditions are necessary through the Highway 10/101/169 interchange to address mobility and traffic operations needs. Highway 10/101/169 interchange intersections currently operate at an unacceptable LOS E or worse during the p.m. peak hour. Under future No-Build conditions, these intersections are forecast to operate at an unacceptable LOS F during the a.m. and p.m. peak hours. Eliminating at-grade ramp intersections will increase efficiency by decreasing vehicle delay associated with the existing at-grade intersections and increase safety by decreasing unexpected slowing in traffic. Free-flow conditions through the Highway 10/101/169 interchange are consistent with conversion of Highway 169 to a freeway facility.

As part of the project development process, several interchange concepts were evaluated for the Highway 10/101/169 interchange that would provide free-flow movements between Highways 10, 101 and 169. The identification of a preferred Highway 10/101/169 interchange type was driven by a qualitative evaluation (relative to each alternative) of other transportation goals and environmental objectives: right-of-way impacts and project costs.[1]

Highway 10/101/169 Interchange Design Types Considered But Rejected

Alternative A1 (Full Regional Interchange – Four Level): Alternative A1 would provide high speed, free flow for all interchange movements (see Figure C-1, Appendix C). Accommodating high speeds for all movements would result in higher costs due to the number, height (four-level

[1] Right of way and project cost estimates are conservative estimates based on concept-level design for the proposed Highway 10/101/169 interchange.

structures), and lengths of new bridges over the Mississippi River, BNSF Railway and other roadways. Compared to the other two alternatives, Alternative A1 was estimated to require the greatest amount of new right of way, primarily in the southwest and southeast quadrants of the interchange. The eastbound Highway 10 to northbound Highway 169 ramp would impact Babcock Rest Area, and potentially encroach the Mississippi River shoreline and its associated floodway. Because of these impacts, along with the high costs associated with the extensive height and number of structures (relative to other alternatives), Alternative A1 was eliminated from further consideration.

Alternative A2 (Interchange with Loops – Three Level): Alternative A2 would provide free-flow conditions for all interchange movements. High speed ramps would be provided for major traffic movements, and lower speed loops would be provided for minor traffic movements (see Figure C-2, Appendix C). Accommodating high speeds for major traffic movements results in lower costs relative to Alternative A1, but still higher costs result due to the number, height (three-level structures), and lengths of new bridges over the Mississippi River, BNSF Railway and other roadways. The northbound Highway 101 to eastbound Highway 169 ramp would also require additional right of way in the southeast quadrant of the interchange, although these right of way impacts would likely be similar in magnitude to Alternative A3 (see below). Because of the higher costs associated with three-level structures, Alternative A2 was eliminated from further consideration.

Highway 10/101/169 Build (Preferred) Alternative Interchange Type

Alternative A3 (Interchange with Loops – Two Level): A two-level, free-flow interchange with loops (Alternative A3) was identified as the preferred Highway 10/101/169 interchange type. Alternative A3 would provide for free-flow conditions for all major interchange movements. High speed ramps would be provided for selected major traffic movements. Lower speed loops would be provided in the southeast and northwest quadrants of the interchange for minor traffic movements (see Figure 4A, Appendix A).

The two-level interchange with loops was identified as the preferred Highway 10/101/169 interchange because it provides a free flow connection for a lower cost than other alternatives. Because Alternative A3 requires only two-level structures, the height and lengths of new (or widened) bridges over the Mississippi River, BNSF Railway, and other roadways is reduced compared to Alternatives A1 and A2. This results in lower costs for Alternative A3 relative to the other alternatives considered.

Highway 169/Main Street Interchange

The Highway 169/Main Street interchange was the subject of an exhaustive study process. Ultimately, the decision for a preferred Highway 169/Main Street interchange was based on input received from the Elk River City Council. The Highway 169/Main Street interchange-type design and evaluation process is summarized below.

Main Street presently intersects Highway 169 at a signalized intersection located 0.9 miles north of the Highway 10/101/169 interchange and 0.6 miles south of School Street. Other access to Highway 169 in the area includes: 5th Street (right-in/right-out only intersection 0.3 miles north of Main Street along northbound Highway 169), driveway access to Great River Energy (right-in/right-out only intersection 0.3 miles south of Main Street along southbound Highway 169), and a full-access driveway to a Park and Ride south of Main Street.

Four interchange concepts were considered for the Highway 169/Main Street interchange. Each concept would remove the existing Main Street signalized intersection and close the adjacent access points to Highway 169. Interchange concepts evaluated for the Main Street interchange are listed below.

1. Standard Diamond Interchange (Figure C-3, Appendix C)
2. Folded Diamond Interchange with Loops in NW and NE Quadrants (Figure C-4, Appendix C)
3. Folded Diamond Interchange with Loops in the NW and SE Quadrants (Figure C-5, Appendix C)
4. Single Point Interchange (Figure 4A, Appendix A)

Interchange concepts considered for Main Street would address the transportation purpose and need by eliminating traffic operations and safety concerns associated with the existing signalized intersection. Existing land uses at Main Street consist primarily of commercial land uses. New commercial development is located in the southwest and southeast quadrants of the Main Street intersection. Guardian Angels, a senior-living community, is located in the northwest quadrant of the Main Street intersection. Commercial land uses are located between the Guardian Angels facility and Highway 169. Residential land uses are also located near the Main Street intersection, behind commercial land uses in the southwest and northeast quadrants of the intersection.

Each interchange concept would impact adjacent properties, although the magnitude and type of impact varied among alternatives. These impacts, combined with other transportation considerations, were critical in identifying a preferred alternative for the Main Street interchange. The evaluation of Main Street interchange concepts is described below.

Highway 169/Main Street Interchange Design Types Considered But Rejected

Standard Diamond Interchange: The standard diamond interchange concept would provide a single directional ramp for each entrance and exit movement to and from Highway 169 at a realigned Main Street. Under the standard diamond interchange concept, Main Street would be realigned to the north of its existing alignment to connect to CSAH 13 east of Highway 169. This alignment of Main Street would allow for a near perpendicular crossing of Highway 169 (see Figure C-3, Appendix C).

The standard diamond interchange concept was the first concept considered for the Main Street interchange. The standard diamond interchange concept would result in substantial right of way impacts in all four quadrants of the interchange. Because of these right of way impacts, the standard diamond interchange concept was dismissed from further consideration.

After the initial consideration of a standard diamond interchange, additional interchange concepts were identified for the Main Street interchange. The goal of Main Street interchange evaluation was to minimize right of way impacts and commercial business impacts while also addressing transportation goals and objectives.

Folded Diamond Interchange (Loops in NW and NE Quadrants): This interchange concept was initially considered with the School Street overpass concept. The modified diamond interchange concept would provide a single directional ramp for the entrance and exit movements from northbound Highway 169. A loop ramp in the northeast quadrant of the interchange would provide access from northbound Highway 169 to eastbound Main Street (major movement when no access is provided at School Street). A ramp would be provided in the northwest quadrant of the interchange for the southbound exit to Main Street. A loop ramp would be provided in the northwest quadrant for the eastbound Main Street to southbound Highway 169 movement, whereas a ramp in the southwest quadrant would accommodate the westbound Main Street to southbound Highway 169 movement (see Figure C-4, Appendix C).

The folded diamond interchange (loops in NW and NE quadrants) concept included a local road connection between the northbound Highway 169 entrance ramp and Baldwin Avenue (see Figure C-4, Appendix C). This local road connection would allow northbound traffic destined for School Street to exit at Main Street and connect to School Street via Baldwin Avenue and Dodge Avenue.

The folded diamond interchange (loops in NW and NE quadrants) concept would result in right of way impacts in all four quadrants of the interchange. The local road connection from the northbound entrance ramp is not consistent with Mn/DOT standard practice of not permitting local roadway connections to interchange ramps. Without the local road connection to the northbound entrance ramp, accessibility to the northeast quadrant of the interchange is more limited. Because of these reasons, the modified diamond interchange was dismissed from further consideration.

Two additional concepts were evaluated for the Main Street interchange: a modified folded diamond interchange with loops in the NW and SE quadrants and a single-point interchange. These concepts were initially developed and presented to the Elk River local advisory committee (LAC) and local officials for consideration. The LAC and local officials requested additional detailed design before identifying a preferred alternative interchange type. Part of these additional design studies included evaluating stormwater treatment needs, accounting for potential stormwater ponding locations, and refining local access needs from Main Street within the interchange area.

Following additional design and studies, the Main Street interchange concepts were presented to the Elk River City Council in April 2008. Because both interchange concepts would provide acceptable levels of service, the decision on a preferred alternative was influenced by social, economic and environmental concerns. The Elk River City Council identified the single-point interchange as the preferred alternative for Main Street. The evaluation of the folded diamond (loops in the NW and SE quadrants) and single-point concepts is summarized in Table 5, and these concepts are described in the following sections.

TABLE 5
MAIN STREET INTERCHANGE ALTERNATIVES

Evaluation Criteria	Highway 169/Main Street Alternatives		
	No-Build Alternative	**Folded Diamond Interchange (Loops in the NW and SE Quadrants)**	**Build (Preferred) Alternative Single-Point Interchange**
Transportation Goals and Objectives			
Intersection LOS A.M. Peak (P.M. Peak)	LOS F(F)	West Ramps: LOS A(B) East Ramps: LOS C(D)	LOS B(B)
Interchange Capacity	N/A	Provides most reserve capacity for constraining, high demand movement (e.g., WB Main to SB 169)	Provides limited reserve capacity for constraining, high demand movement (e.g., WB Main to SB 169)
Local Access (general)	Maintains existing access to all quadrants of the intersection	Provides full access to all quadrants of the interchange	Provides full access to all quadrants of the interchange
Local Access (commercial areas east of Hwy 169 and south of Main Street)	Maintains existing access	Right-in/right-out intersection and full access intersection to commercial area south of Main Street	Two full access intersections east of Hwy 169 to commercial area south of Main Street
Social, Economic and Environmental Considerations			
Right-of-Way Impacts (Acres) [(1)]	0	13 – 17 Acres	17 – 21 Acres
Right of Way Impacts (Total and partial commercial and residential acquisitions) [(1)]			
Commercial – Total Takes	0 Parcels 0 Businesses	10 – 14 Parcels 18 – 22 Businesses	16 – 20 Parcels 11 – 15 Businesses
Commercial – Partial Takings	0 Parcels	10 – 14 Parcels	16 – 20 Parcels
Residential – Total Takes	0 Parcels	None anticipated	2 – 6 Parcels
Residential – Partial Takings	0 Parcels	6 – 10 Parcels	11 – 15 Parcels

(1) Right of way impacts (acres and commercial/residential acquisitions) for Main Street Build Alternatives includes the interchange and associated local road improvements. The Preferred Alternative was identified to impact a greater number of parcels in part because of local road improvements east of Main Street at CSAH 13 and Twin Lakes Road. These local road improvements accommodate full access to the northeast quadrant of the interchange and increase intersection spacing east of Main Street, thereby improving operations of the single-point interchange intersection.

TABLE 5
MAIN STREET INTERCHANGE ALTERNATIVES

Evaluation Criteria	Highway 169/Main Street Alternatives		
	No-Build Alternative	**Folded Diamond Interchange (Loops in the NW and SE Quadrants)**	**Build (Preferred) Alternative Single-Point Interchange**
Accommodates redevelopment (NE quadrant of Main St interchange)	Yes (NE quadrant of existing interchange could be redeveloped under future No-Build conditions)	Yes (NB entrance ramp folded to south avoids NE quadrant. Local access to NE quadrant via Baldwin Avenue across from ramp intersection.)	Yes (Single point design minimizes impacts to NE quadrant. Local access to NE quadrant via CSAH 13 to the east)
Construction Cost [2] (million $)	$0	Difference: 0 $23 – $28 million	Difference: +$6 million $29 – $34 million

N/A: not applicable

[2] Construction costs do not include costs associated with right-of-way. Difference is the comparison between the folded diamond interchange alternative and the single-point interchange alternative.

Folded Diamond Interchange (Loops in the NW and SE Quadrants): The folded diamond interchange (loops in the NW and SE quadrants) concept would provide a single directional ramp for the exit movements from northbound and southbound Highway 169. The northbound Highway 169 entrance ramp would be folded to the southeast quadrant of the interchange, and the southbound Highway 169 would be folded to the northwest quadrant of the interchange (see Figure C-5, Appendix C).

The folded diamond interchange (loops in the NW and SE quadrants) would provide acceptable levels of operation and would provide the most reserve capacity for the highest demand movement. Folding the northbound Highway 169 entrance ramp to the south avoids right of way impacts to the northeast quadrant of the interchange and provides better access to the northeast quadrant (i.e., redevelopment considerations). The folded diamond interchange (loops in the NW and SE quadrants) concept would minimize impacts to residential properties (relative to the single-point interchange) and would require less new right of way. This interchange was also estimated to have lower construction costs because the bridge area needed for the Main Street overpass is much smaller compared to single-point interchange.

While the folded diamond interchange (loops in the NW and SE quadrants) would minimize impacts to residential properties, was the least costly of the two alternatives, and would provide good connectivity to the commercial areas in northeast and southwest quadrants of the Main Street interchange, it was not identified as the preferred alternative. The folded diamond interchange would require the relocation of 18 to 22 businesses (northwest and southeast quadrants of the interchange) and would provide limited access to the commercial areas in the southeast quadrant of the interchange. Under the folded diamond (loops in the NW and SE quadrants) alternative, the first local intersection on Main Street east of Highway 169 would be restricted to right-in/right-out, and the first full access intersection would be located further to the east of the commercial area at Twin Lakes Road. Because of these impacts, the folded diamond alternative (loops in the NW and SE quadrants) was dismissed from further consideration.

Highway 169/Main Street Build (Preferred) Alternative Interchange Type

Single Point Interchange: The single-point interchange was identified as the preferred Main Street interchange type. The single-point interchange would provide a single directional ramp for the entrance and exit movements to and from Highway 169. However, unlike a standard diamond interchange, with a single-point interchange, the ramps are compressed towards the mainline and intersect at a single intersection at the ramp termini over the mainline (see Figure 4A, Appendix A). This single intersection over the mainline is located on a bridge and requires a larger structure to accommodate all movements, relative to other interchange types.

The single-point interchange was identified as the Main Street Build Alternative for the following reasons:

- The single point interchange would result in the relocation of 11 to 15 businesses, fewer than the folded diamond interchange alternative.

- The single-point interchange would provide full access to commercial areas in the southeast quadrant of the Main Street interchange. The two intersections east of the Main Street interchange would be full access intersections. Under the folded diamond interchange concept, the first intersection east of Highway 169 would be a right-in/right-out only intersection.
- The folded diamond interchange would provide greater reserve capacity for the heaviest traffic movement (westbound Main Street to southbound Highway 169). However, the single-point interchange was forecast to operate at LOS B during the p.m. peak hour, slightly better than the LOS D for the east ramps under the folded diamond concept. Because both the single-point interchange and folded diamond interchange would operate at acceptable levels of service (see Table 5), this was not a determining factor in identifying the preferred alternative.
- Both the folded diamond interchange and single-point interchange would accommodate redevelopment in the northeast quadrant of the interchange, although the folded diamond interchange would provide more direct access to the northeast quadrant via the north leg of the ramp intersection. Local road improvements at CSAH 13 and Twin Lake Road with the single-point alternative would accommodate full access to the northeast quadrant of the interchange (see Figure 4A, Appendix A). Because both interchanges would accommodate redevelopment, this was not a determining factor in identifying the preferred alternative.
- The single-point interchange would result in potentially higher construction costs and greater residential relocation impacts. However, neither the folded diamond interchange nor single-point interchange would minimize both commercial and residential impacts at a comparable construction cost. Residential and commercial impacts represented a trade-off in identifying a preferred alternative (i.e., minimizing commercial impacts at the expense of residential impacts and vice versa). Because it was considered more important to minimize commercial/business relocations and provide adequate access to the southeast quadrant of the Main Street interchange, the Elk River City Council identified the single-point interchange as the preferred alternative for the Main Street interchange.

School Street Interchange

School Street currently intersects Highway 169 at a signalized intersection located 0.6 miles north of the Main Street intersection and 0.7 miles south of the Jackson/193rd Avenue intersection. Other access to Highway 169 near School Street includes 191st Avenue, which intersects southbound Highway 169 at a right-in/right-out only intersection located 0.4 miles north of School Street. Fifth Street intersects northbound Highway 169 at a right-in/right-out only intersection 0.4 miles south of School Street.

Three interchange concepts were considered for the Highway 169/School Street interchange. Each concept would remove the existing at-grade signalized intersection and close the adjacent right-in/right-out access to Highway 169. Interchange concepts evaluated for the School Street interchange are listed below.

1. School Street overpass (overpass only – no access to Highway 169) (Figure C-4, Appendix C)

2. Compressed Diamond Interchange with Braided Ramps (Figure C-6, Appendix C)
3. Compressed Diamond Interchange with Collector-Distributor Roads (Figure 4A, Appendix A)

Interchange concepts considered for School Street would address the transportation purpose and need by eliminating traffic operations and safety concerns associated with the existing signalized intersection. Existing land uses at School Street west of Highway 169 are primarily commercial. Land uses at School Street east of Highway 169 are a mix of commercial and residential land uses. Each interchange concept could be, for the most part, located within the existing highway right of way to minimize impacts to adjacent properties. However, shifting the Dodge Street alignment to the east to increase intersection spacing from the interchange ramps would require the acquisition of several properties in the northeast and southeast quadrants of the interchange. The realignment of Dodge Street would be necessary for each School Street concept. As such, transportation goals and objectives were more important in identifying a preferred interchange concept for School Street.

The evaluation of School Street concepts is described below.

Highway 169/School Street Interchange Design Type Considered But Rejected

School Street Overpass: Several initial design concepts for School Street included a bridge over Highway 169 with no direct access to Highway 169, consistent with recommendations from the *Highway 101/169* CMP (2002). Because the distance between Main Street and School Street is approximately 0.6 miles, an overpass only at School Street would increase the distance between consecutive interchanges along Highway 169 in Elk River, which is more consistent with Mn/DOT interchange spacing guidelines for urban areas (see Figure C-4, Appendix C). However, an analysis of existing traffic volumes and forecast (2030) volumes under Build conditions at School Street without access to Highway 169 found that the local roadway system and adjacent interchange access points would be over capacity without access at School Street. Because of these impacts, the overpass only concept at School Street was dismissed from further consideration.

Compressed Diamond Interchange with Braided Ramps: The compressed diamond interchange with braided ramps would provide a single directional ramp for each entrance and exit movement to and from Highway 169 at School Street (i.e., full access interchange). The interchange ramps would be compressed towards the Highway 169 mainline to minimize right of way impacts to adjacent properties.

Under the braided ramp concept, the northbound entrance movement from Main Street and the northbound exit movement to School Street would cross over one another north of the proposed Main Street interchange. Likewise, the southbound Main Street exit ramp and the southbound School Street entrance ramp would cross over one another north of the Main Street interchange. Drivers exiting to School Street from northbound Highway 169 would access the School Street exit ramp near Main Street, remaining separated from the mainline traffic up to School Street (see Figure C-6, Appendix C).

The braided ramps would require two additional bridges to separate the Main Street and School Street ramp movements. The additional structures associated with the braided ramp concept would increase project costs relative to other alternatives considered for School Street. In addition, multiple comments were received from the Elk River business community concerning access to/from Highway 169 at School Street. Under the braided ramp concept, northbound motorists destined for the School Street area would have to access the School Street exit ramp south of Main Street. If a motorist inadvertently passes this exit, there is no opportunity to access School Street without "backtracking" from the Jackson/193rd Avenue interchange. Because of increased costs and concerns from the business community, the braided ramp concept was dismissed from further consideration.

Highway 169/School Street Build (Preferred) Alternative Interchange Type

Compressed Diamond Interchange with Collector-Distributor Roads: The compressed diamond interchange concept with collector-distributor roads was identified as the preferred alternative concept for the School Street interchange. The compressed diamond interchange with collector-distributor roads would provide a single directional ramp for each entrance and exit movement to and from Highway 169 at School Street (i.e., full access interchange). The interchange ramps would be compressed towards the Highway 169 mainline to minimize right of way impacts to adjacent properties (see Figure 4A, Appendix A).

Under the collector-distributor road concept, a collector-distributor road would connect the Main Street and School Street interchanges. A collector-distributor road functions to separate ramp entrance and exit movements from the mainline through traffic. For northbound Highway 169, exit movements to School Street would access the collector-distributor road north of Main Street. The entrance movements from the Main Street interchange would merge with the exit movements to School Street on the collector-distributor road. South of School Street, traffic from Main Street accessing Highway 169 would merge onto the mainline; traffic accessing School Street would continue north to the School Street overpass. A similar configuration would be located to the west for southbound Highway 169. As shown in Section IV.B.2, the collector-distributor road and Highway 169 mainline are forecast to operate at acceptable levels of service under future Build conditions.

The compressed diamond interchange with collector-distributor roads was identified as the Build (preferred) Alternative for the School Street interchange because it provides full access to Highway 169 and separates ramp movements from the mainline at a lower cost relative to the braided ramp concept.

Jackson Avenue/193rd Avenue/197th Avenue Interchanges

Jackson/193rd Avenue and 197th Avenue presently intersect Highway 169 at signalized intersections spaced approximately 0.5 miles apart, and 191st Avenue intersects Highway 169 on its west side at a right-in/right-out only intersection 0.3 miles south of the Jackson/193rd Avenue intersection.

Two interchange concepts were considered for the Highway 169/Jackson/193rd Avenue interchange and the Highway 169/197th Avenue interchange. Both interchange concepts would remove existing at-grade signalized intersections and close the 191st Avenue right-in/right-out access. Interchange concepts considered for the Jackson/193rd Avenue and 197th Avenue are listed below.

1. Split Diamond Interchange with Partial Access at Jackson/193rd Avenue (Figure C-7, Appendix C)
2. Split Diamond Interchange with Full Access at Jackson/193rd Avenue (Figure 4B, Appendix A)

Both the interchange concepts considered for Jackson/193rd Avenue and 197th Avenue would address the transportation need by eliminating traffic operations and safety concerns associated with the existing at-grade intersections. Because of the spacing between Jackson/193rd Avenue and 197th Avenue, both alternatives include a split diamond concept (i.e., no south ramps at 197th Avenue), which is more consistent with Mn/DOT guidelines of one-mile interchange spacing in developed areas. The analysis of Jackson/ 193rd Avenue and 197th Avenue interchange concepts was completed at a scoping, qualitative level of analysis. Impacts associated with each interchange concept were compared relative to the other concept.

Land uses adjacent to Jackson/193rd Avenue and 197th Avenue consist of a mix of commercial and residential land uses. Both concepts would impact parcels along the proposed 197th Avenue interchange ramps, require relocation of buildings and businesses in the southeast quadrant of the Jackson/193rd Avenue interchange, and require removal of driveway access to 193rd Avenue between Evans Street and Dodge Avenue (see Figure 4B, Appendix A). Transportation considerations were more important in identifying a preferred interchange concept for Jackson/193rd Avenue and 197th Avenue.

The evaluation of Jackson Avenue/193rd Avenue interchange concepts is described below.

Highway 169/Jackson/193rd/197th Avenue Interchange Design Type Considered But Rejected

Split Diamond Interchange with Partial Access at Jackson/193rd Avenue: The split diamond interchange with partial access at Jackson/193rd Avenue would provide a bridge over Highway 169 at 197th Avenue and at Jackson/193rd Avenue. At 197th Avenue, access to Highway 169 would be provided by a half-diamond interchange oriented to the north (i.e., interchange ramps to and from the north). A southbound slip ramp would allow traffic exiting Highway 169 to directly access Holt Avenue (west frontage road) at 197th Avenue. At Jackson/193rd Avenue, a single directional ramp provides access from northbound Highway 169 and to southbound Highway 169. A loop ramp in the southeast quadrant of the interchange accommodates the entrance movement to northbound Highway 169 (see Figure C-7, Appendix C). This concept does not accommodate southbound exits from Highway 169 to Jackson/193rd Avenue.

This concept provides only partial access to Highway 169 at Jackson/193rd Avenue. As noted above, the split diamond with partial access concept does not accommodate southbound exits from Highway 169 to Jackson/193rd Avenue. Therefore, all southbound Highway 169 traffic destined for attractions at Jackson/193rd Avenue would have to exit at 197th Avenue, using the local roadway system to access Jackson/193rd Avenue. Because this concept concentrates southbound exiting traffic at 197th Avenue, it was dismissed from further consideration.

Highway 169/Jackson/193rd/197th Avenue Build (Preferred) Alternative Interchange Type

Split Diamond Interchange with Full Access at Jackson/193rd Avenue: The split diamond interchange with full access at Jackson/193rd Avenue was identified as the preferred interchange concept for Jackson/193rd Avenue and 197th Avenue. At 197th Avenue, access to Highway 169 would be provided by a half-diamond interchange oriented to the north. At Jackson/193rd Avenue, full access would be provided to Highway 169. Ramps west of Highway 169 accommodate entrance and exit movements to southbound Highway 169. These ramps would be compressed towards the Highway 169 mainline to minimize impacts to adjacent properties. A single directional ramp would provide for the exit movement from northbound Highway 169 at Jackson/193rd Avenue. The northbound Highway 169 entrance ramp would be folded to the south, providing a loop in the southeast quadrant of the interchange (see Figure 4B, Appendix A).

The split diamond interchange with full access at Jackson/193rd Avenue was identified as the Build (preferred) Alternative for the Highway 169/Jackson/193rd Avenue and 197th Avenue interchanges because this concept provides for full access at Jackson/193rd Avenue. Full access to/from Highway 169 at Jackson/193rd Avenue would better distribute traffic between the Jackson/193rd Avenue and 197th Avenue interchanges and associated intersections, providing acceptable traffic operations in this portion of the study area. As noted in Section VII.A.21, ramp intersections and adjacent local road intersections at Jackson/193rd Avenue and 197th Avenue are predicted to operate at an acceptable LOS B or better during a.m. and p.m. peak hours.

A collector-distributor road will connect the School Street and Jackson/193rd Avenue interchanges. This collector-distributor road functions to separate ramp entrance and exit movements from the mainline through traffic. For northbound Highway 169, exit movements to Jackson/193rd Avenue would access the collector-distributor road north of School Street. The entrance movements from the School Street interchange would merge with the exit movements to School Street on the collector-distributor road. South of Jackson/193rd Avenue, traffic from School Street accessing Highway 169 would merge onto the mainline; traffic accessing Jackson/193rd Avenue would continue north to the Jackson/193rd Avenue overpass. A similar configuration would be located to the west for southbound Highway 169. As shown in Section IV.B.2, the collector-distributor road and Highway 169 mainline are forecast to operate at acceptable levels of service under future Build conditions.

2. Segment Two: Rural Elk River Livonia Township Interchanges

221st Avenue/Future CR 121 Interchange

Sherburne County, as identified in the *Sherburne County Transportation Plan* (2007), plans to extend CR 121 to the west to intersect with 221st Avenue at Highway 169. The CR 121 extension, together with 221st Avenue west of Highway 169, would create a continuous east-west roadway through northern Elk River. The 221st Avenue/CR 121 (221st Avenue) corridor is identified as a future urban collector roadway in the *Sherburne County Transportation Plan* (2007).

Four interchange concepts were developed and considered for the Highway 169/221st Avenue interchange. All interchange concepts would replace direct access to Highway 169 at 221st Avenue and at the Elk River Landfill, located west of Highway 169 and directly north of 221st Avenue. The Elk River Landfill is located in the northwest quadrant of all interchange alternatives. The interchange concepts considered for the Highway 169/221st Avenue interchange are listed below.

1. Standard diamond interchange (Figure C-8, Appendix C)
2. Hybrid tight diamond interchange
3. Folded diamond interchange (ramps folded to the south)
4. Interchange with buttonhook ramp configuration in the SW quadrant and folded diamond ramps in the SE quadrant (referred to as the “buttonhook concept”) (Figure 4C, Appendix A)

All of the interchange type concepts considered for 221st Avenue/future CR 121 would address the project transportation need. Other transportation, social, economic, and environmental considerations were more important in identifying a preferred alternative interchange type for a Highway 169/221st Avenue interchange. The analysis of 221st Avenue interchange-types was completed at a scoping, qualitative level of analysis. Impacts associated with each interchange concept were compared relative to the other interchange concepts. The identification of a preferred alternative interchange concept for the 221st Avenue interchange was determined by the following transportation and environmental objectives: wetland impacts, right of way impacts, landfill impacts, and safety concerns associated with interchange ramp design (i.e., drivers being able to navigate loop ramps on a downgrade).

221st Avenue/future CR 121 Alignment

Before the Highway 169/221st Avenue interchange concepts could be evaluated, it was necessary to first determine whether it was more practical for 221st Avenue to bridge over Highway 169, or whether Highway 169 should bridge over a depressed 221st Avenue. Based on initial engineering work, it was determined to be more practical for Highway 169 to bridge over a depressed 221st Avenue. This was identified to avoid fill impacts to the landfill and wetlands east of Highway 169 if 221st Avenue were to bridge over Highway 169. In addition, the area surrounding 221st Avenue consists of active gravel mining operations, and future land uses for this area east of Highway 169 are identified for mineral excavation. Substantial amounts of fill would be necessary to bridge 221st Avenue over Highway 169 because of changes in topography associated with gravel mining activities.

It was also necessary to identify an alignment for the future 221st Avenue/CR 121 connection across Highway 169. The alignment of 221st Avenue/future CR 121 was determined by efforts to avoid/minimize impacts to Elk River Landfill and wetlands east of Highway 169 (see Figure 4C, Appendix A). There was no practicable alignment identified that would minimize impacts to the landfill as well as avoid wetland impacts east of Highway 169. Extending the existing 221st Avenue alignment directly east across Highway 169 would result in impacts to the landfill and impact wetlands east of Highway 169. Aligning 221st Avenue to the north of its existing alignment would result in substantial impacts to the landfill, but could minimize, and potentially avoid, wetland impacts to the east of Highway 169. Because it was important to minimize impacts to the both landfill and wetland areas, the 221st Avenue alignment would be shifted to the south of its existing alignment. This alignment minimizes impacts to the landfill while also minimizing impacts to wetland areas east of Highway 169.

The evaluation of 221st Avenue interchange alternatives is summarized in Table 6 and is described below.

Highway 169/221st Avenue Interchange Design Types Considered But Rejected

Standard Diamond Interchange: The standard diamond interchange concept would provide a single directional ramp for each entrance and exit movement to and from Highway 169 at 221st Avenue (see Figure C-8, Appendix C). The existing County Road 33 interchange to the south of 221st Avenue is a standard diamond interchange. A standard diamond interchange is the most common interchange type in rural areas.
The standard diamond interchange was estimated to result in the greatest impacts to the Elk River Landfill. The standard diamond interchange concept would also impact wetland areas in the northeast quadrant of the interchange (wetland W3-8, see Figure 4C, Appendix A). Because of these impacts, the standard diamond interchange concept was dismissed from further consideration.

Following the initial consideration of a standard diamond interchange, the other three interchange configurations were evaluated and found to avoid or minimize wetland impacts to varying degrees. These interchange concepts are discussed below.

Hybrid Tight Diamond Interchange: The hybrid tight diamond interchange concept would provide a single directional ramp for the entrance and exit movements to and from northbound Highway 169. The northbound Highway 169 entrance and exit ramps would be compressed towards the mainline (relative to the standard diamond concept). The southbound Highway 169 exit ramp would be folded to the south, providing a loop in the southwest quadrant of the interchange. A single directional ramp would provide for the entrance movement to southbound Highway 169. This concept was identified in an effort to avoid wetland impacts and minimize property impacts east of Highway 169.

The hybrid tight diamond concept would avoid impacts to the Elk River Landfill by folding the southbound exit ramp to the southwest quadrant of the interchange. However, compressing the northbound entrance and exit ramps closer to the mainline would still impact wetlands areas in the northeast quadrant of the interchange, and would impact property in the southeast and northeast quadrants of the interchange. For these reasons, the hybrid tight diamond concept was dismissed from further consideration.

TABLE 6
221ST AVENUE/CR 121 INTERCHANGE ALTERNATIVES

	Highway 169/221st Avenue Interchange Concepts				
Evaluation Criteria	**No Build Alternative**	**Standard Diamond**	**Hybrid Tight Diamond**	**Folded Diamond (To South)**	**Preferred Alternative (Button-Hook Concept)**
Other Transportation Goals and Objectives					
Engineering/safety concerns: vehicles being able to navigate loop exit on a downgrade	N/A	Interchange consists of single directional ramps only. No loop ramp on downgrade.	Safety concerns with loop ramp on downgrade in southwest quadrant of interchange	Safety concerns with loop ramp on downgrade in southwest quadrant of interchange	Buttonhook ramps in southwest quadrant of interchange. No loop ramp on downgrade.
Accommodates local roadway/frontage road system	N/A	Yes	Yes	Yes	Yes
Social, Economic and Environmental Considerations[(1)]					
Elk River Landfill impacts	Avoids landfill	Greater impacts	Avoids landfill	Avoids landfill	Avoids landfill
Wetland impacts (wetland areas east of Highway 169)	No impacts	Greater impacts	Greater impacts	Fewer impacts	Fewer impacts
Right of way impacts east of Highway 169 (residential and commercial land uses) (relative to other alternatives)	No impacts	Impacts to property in northeast and southeast quadrants	Impacts to property in northeast and southeast quadrants	Impacts to property in southeast quadrant	Impacts to property in southeast quadrant

[(1)]Relative qualitative impacts between interchange concepts.

Folded Diamond Interchange: The folded diamond interchange concept would provide a single directional ramp for the exit movement from northbound Highway 169 and a single directional ramp for the entrance movement to southbound Highway 169. The southbound exit ramp and northbound entrance ramp would be folded to the south of 221st Avenue, providing a loop ramp in the southwest and southeast quadrants of the interchange. Under this interchange concept, folding interchange ramps to the south would avoid impacts to the landfill in the northwest quadrant and avoid impacts to wetlands in the northeast quadrant of the interchange.

The folded diamond interchange concept would avoid impacts to the landfill by folding the southbound exit ramp to the southwest quadrant of the interchange. The folded diamond interchange concept would also minimize impacts to wetlands areas by folding the northbound entrance ramp to the southeast quadrant of the interchange. Transportation and engineering considerations, unique to the 221st Avenue interchange, were more important in dismissing the folded diamond concept from further consideration.

As previously noted, the Elk River Landfill is located in the northwest quadrant of the interchange and lands west of Highway 169 are actively mined. As such, there is a large percentage of heavy truck traffic associated with the landfill and gravel mining operations that would utilize the proposed 221st Avenue interchange. Because 221st would be depressed under Highway 169, the southbound exit loop in the southwest quadrant of the interchange would be on a downgrade. During the layout review process, Mn/DOT Geometrics staff raised concerns about vehicles, including heavy truck traffic, being able to safely navigate the southbound exit loop on a downgrade. A larger radius was considered for the southbound exit loop as well as a parallel deceleration lane along southbound Highway 169 to provide for slower speeds as vehicles approach and enter the loop ramp. However, these modifications did not adequately address all safety concerns associated with the loop ramp on a downgrade. Therefore, the folded diamond concept was dismissed from further consideration.

Highway 169/221st Avenue Build (Preferred) Alternative Interchange Type

Buttonhook Concept: The buttonhook concept was identified as the preferred interchange concept for the 221st Avenue interchange. The buttonhook concept was developed to avoid the landfill and wetlands north of the proposed 221st Avenue alignment, while also addressing safety concerns with a ramp on a downgrade in the southwest quadrant of the interchange. West of Highway 169, the southbound entrance and exit ramps would connect into the west frontage road south of 221st Avenue. East of Highway 169, the northbound entrance ramp would be folded to the south of 221st Avenue, providing a northbound entrance loop and a northbound exit ramp in the southeast quadrant of the interchange (see Figure 4C, Appendix A).

The buttonhook concept was identified as the Build (preferred) Alternative for the Highway 169/221st Avenue interchange for the following reasons:

- The buttonhook concept avoids the landfill in the northwest quadrant of the 221st Avenue interchange by folding the southbound exit ramp to the south of 221st Avenue.
- The buttonhook concept avoids wetland impacts in the northeast quadrant of the 221st interchange. While the buttonhook concept will impact wetland areas east of Highway 169, folding the northbound entrance ramp to the south of 221st Avenue avoids impacts associated with construction of a single directional ramp in the northeast quadrant of the interchange.
- The buttonhook concept addresses safety concerns raised by Mn/DOT Geometrics staff associated with vehicles, including heavy truck traffic, being able to safely navigate a southbound exit loop on a downgrade. The buttonhook concept takes the southbound exit ramp and intersects it with the west frontage road, eliminating the loop ramp in the southwest quadrant of the interchange.

<u>237th Avenue/239th Avenue (Livonia Township)</u>

237th Avenue (County Road 74) and 239th Avenue are local roads in Livonia Township that currently intersects with Highway 169, approximately ¾-mile south of the proposed CSAH 25/19 interchange. Several concepts were initially considered during the alternatives development process for 237th and 239th Avenues to provide connectivity across Highway 169.

These concepts included realigning 237th Avenue and 239th Avenue along with an over- or underpass of Highway 169. Based on input from Livonia Township and Sherburne County, these concepts were dismissed from further consideration. Under the Preferred Alternative, the existing 237th Avenue and 239th Avenue intersections with Highway 169 would be closed, and local traffic would be redirected to the CSAH 25/19 interchange via frontage roads along the east and west sides of Highway 169.

CSAH 25/19 Interchange

CSAH 25 and CSAH 19, located in Livonia Township, are classified as minor and major collector roadways, respectively. CSAH 25 and CSAH 19 currently intersect Highway 169 at two “T” at-grade intersections approximately 1,300 feet apart from one another.

Four interchange concepts were considered for the CSAH 25/19 interchange. All interchange types considered for CSAH 25/19 would realign CSAH 19 to the south, directly across from CSAH 25 to improve local roadway connectivity. These interchange type concepts are listed below.

1. Standard diamond interchange (Figure C-9, Appendix C)
2. Folded diamond interchange (ramps folded to the north) (Figure C-10, Appendix C)
3. Folded diamond interchange (ramps folded to the south) (Figure C-11, Appendix C)
4. Folded diamond interchange (ramps folded to the northwest and southeast quadrants) (Figure 4D, Appendix A)

A concept design for these configurations was identified during the project development process. The evaluation of these interchange types is summarized in Table 7. The analysis of CSAH 25/19 interchange-types was completed at a scoping, qualitative level of analysis. Some evaluation criteria were quantified to provide a relative comparison among alternatives. However, when evaluation criteria were quantified, a range was provided (e.g., 0 to 5 residential relocations, 5 to 10 residential relocations, 10 to 15 residential relocations, etc.) because of the lower degree of accuracy associated with the concept-level designs. The discussion of these alternatives is included in the following sections.

All of the interchange types considered for CSAH 25/19 would address the project transportation need by grade-separating Highway 169 from intersecting local roadways (see Section III.C). Other transportation, social and environmental considerations were identified and considered for each interchange type, although these criteria were identified to not differ substantially among the CSAH 25/19 interchange concepts identified above (see Table 7). The identification of a preferred alternative interchange type for the CSAH 25/19 interchange was determined by the following transportation and environmental objectives: accommodating frontage road connections, local road access spacing, right of way impacts, and potential residential relocations.

The evaluation of CSAH 25/19 interchange alternatives is summarized in Table 7 and is described below.

Highway 169/CSAH 25/19 Interchange Design Types Considered But Rejected

Standard Diamond: The standard diamond interchange concept would provide a single directional ramp for each entrance and exit movement to and from Highway 169 at CSAH 25/19 (see Figure C-9, Appendix C). As previously noted, a standard diamond interchange is the most common interchange type in rural areas.

While potential residential relocations associated with the standard diamond concept were similar to the folded diamond concept (NW and SE quadrants), the standard diamond interchange was anticipated to result in greater overall right of way impacts (relative to other interchange concepts). Under the standard diamond interchange alternative, the south frontage road west of Highway 169 is also least consistent with access spacing goals (i.e., 750 feet from interchange ramps to first local road intersection). Because of these impacts, the standard diamond interchange concept was rejected from further consideration.

Folded Diamond (Ramps Folded to the North): The folded diamond (ramps folded to the north) concept would provide a single directional ramp for the entrance movement to northbound Highway 169 and a single directional ramp for the exit movement from southbound Highway 169. The southbound entrance ramp and northbound exit ramp would be folded to the north of CSAH 25/19, providing a loop ramp in the northwest and northeast quadrants of the interchange (see Figure C-10, Appendix C). Under this interchange concept, folding interchange ramps to the north would limit property impacts south of CSAH 25/19.

Folding the interchange ramps to the north would avoid woodland areas in the southwest quadrant of the interchange; however, this would also result in impacts to agricultural land uses in the northwest quadrant of the interchange. The folded diamond concept (ramps folded to the north) was estimated to require 140 to 150 acres of right of way, and was estimated to result in 10 to 15 residential relocations. Because of these impacts, the folded diamond concept (ramps folded to the north) was rejected from further consideration.

Folded Diamond (Ramps Folded to the South): The folded diamond (ramps folded to the south) would provide a single directional ramp for the exit movement from northbound Highway 169 and a single directional ramp for the entrance movement to southbound Highway 169. The southbound exit ramp and northbound entrance ramp would be folded to the south of CSAH 25/19, providing a loop ramp in the southwest and southeast quadrants of the interchange (see Figure C-11, Appendix C). Under this interchange concept, folding interchange ramps to the south would limit property impacts north of CSAH 25/19.

The folded diamond concept (ramps folded to the south) was estimated to require 150 to 160 acres of right of way, and was estimated to result in 10 to 15 residential relocations. In addition, wetland areas to the west of the interchange prohibited frontage road connections in the southeast quadrant of the interchange. Because of these impacts, the folded diamond concept (ramps folded to the south) was rejected from further consideration.

TABLE 7
CSAH 25/19 INTERCHANGE ALTERNATIVES

Evaluation Criteria	Highway 169/CSAH 25/19 Interchange Alternatives				
	No Build Alternative	Standard Diamond	Folded Diamond (To North)	Folded Diamond (To South)	Preferred Alternative (Folded Diamond in NW and SE Quadrants)
Other Transportation Goals and Objectives					
Consistent with interchange spacing guidelines	N/A	Yes	Yes	Yes	Yes
Maintain/enhance roadway connectivity	CSAH 25 and CSAH 19 intersect Highway 169 at two "T" intersections 1,300 feet apart	Improves CSAH 25/19 connectivity	Improves CSAH 25/19 connectivity	Improves CSAH 25/19 connectivity	Improves CSAH 25/19 connectivity
Accommodating frontage road connections	N/A	Accommodates frontage road in northeast quadrant and local access in southeast quadrant	Accommodates frontage road connection in northeast and southwest quadrants	Does not accommodate frontage road connection to 239th overpass because of wetland areas west of interchange	Accommodates frontage road connection in northeast and southwest quadrants
Consistency with access spacing goals (750 feet from interchange ramps to first local road intersection)	N/A	Least Consistent Frontage road within 750 feet of ramp intersections west of interchange	More Consistent Private driveway within 750 feet of ramp intersections west of interchange	Consistent Distance to frontage roads and private driveways exceeds 750-foot local access spacing goal	More Consistent Private driveway within 750 feet of ramp intersections west of interchange

(1) Does not include potential wetland impacts associated with stormwater ponds.

TABLE 7 – continued
CSAH 25/19 INTERCHANGE ALTERNATIVES

	Highway 169/CSAH 25/19 Interchange Alternatives				
Evaluation Criteria	**No Build Alternative**	**Standard Diamond**	**Folded Diamond (To North)**	**Folded Diamond (To South)**	**Preferred Alternative (Folded Diamond in NW and SE Quadrants)**
Social, Economic and Environmental Considerations					
Wetland impacts (number of wetland areas affected) (1)	No wetland areas impacted	10 to 15 areas	10 to 15 areas	10 to 15 areas	15 to 20 areas
Wetland impacts (acres) (1)	0 acres	5 to 10 acres	5 to 10 acres	5 to 10 acres	5 to 10 acres
Vegetation impacts (woodland) (acres)	0 acres	Less than 10 acres	Less than 10 acres	10 to 20 acres	10 to 20 acres
Estimated amount of right of way (acres)(2)	0 acres	130 to 140 acres	140 to 150 acres	150 to 160 acres	100 to 110 acres
Potential residential relocation (relative to other alternatives)	No relocations	5 to 10	10 to 15	10 to 15	5 to 10
Commercial/business relocation (relative to other alternatives)	No relocations	Less than 5	Less than 5	Less than 5	Less than 5
Construction costs (million $)	$0	$10 to $15 million	$10 to $15 million	$10 to $15 million	$10 to $15 million

(2) Estimated right of way impacts based on concept designs considered during evaluation of interchange types. Following identification of the folded diamond interchange (NW and SE quadrants) as the preferred alternative interchange type, preliminary design and engineering was completed. This resulted in an increase in right of way impacts associated with the Build Alternative. If this same level of preliminary engineering and design were applied to other interchange concepts considered, it is reasonable to assume that right of way impacts would also increase in a similar magnitude as the preferred alternative. Therefore, although right of way impacts associated with the folded diamond interchange (NW and SE quadrants) have increased with the CSAH 25/19 preferred alternative, the CSAH 25/19 preferred alternative still minimizes impacts relative to other concepts considered.

Highway 169/CSAH 25/19 Build (Preferred) Alternative Interchange Type

Preferred Alternative (Folded Diamond Interchange – Ramps folded to the Northwest and Southeast): The folded diamond concept (ramps folded to the northwest and southeast) was identified as the preferred interchange concept for the CSAH 25/19 interchange. West of Highway 169, the southbound Highway 169 entrance ramp would be folded to the north of CSAH 25/19, providing a southbound entrance loop and southbound exit ramp in the northwest quadrant of the interchange. East of Highway 169, the northbound entrance ramp would be folded to the south of CSAH 25/19, providing a northbound entrance loop and a northbound exit ramp in the southeast quadrant of the interchange (see Figure 4D, Appendix A).

The folded diamond (ramps folded to the northwest and southeast) was identified as the Build (preferred) Alternative for the Highway 169/CSAH 25/19 interchange for the following reasons:

- Frontage road connectivity:
- Right of way impacts: The folded diamond concept (ramps folded to the northwest and southeast) was estimated to require 100 to 110 acres of new right of way, which was less than the other interchange concepts considered (see Table 7).
- Residential relocations: The folded diamond concept (ramps folded to the northwest and southeast) was estimated to result in 5 to 10 residential relocations. This is similar to the amount residential relocations estimated for the standard diamond concept, but fewer than the folded diamond (ramps folded to the north or south) concepts.

3. Segment Three: Zimmerman CSAH 4 Interchange

<u>Highway 169/CSAH 4 Interchange</u>

As part of the preliminary design and project development process for interchange access in Zimmerman, the Zimmerman Local Advisory Committee (LAC)[2] first considered general access locations within the City. This did not include the consideration of specific interchange types or configurations. The general access location concepts considered moving Highway 169 as well as the main Zimmerman access point. The following five options were considered for Highway 169 access in Zimmerman:

- **Option 1:** Highway 169 stays on existing alignment; Zimmerman access stays on existing CSAH 4 alignment.
- **Option 2:** Highway 169 stays on existing alignment; Zimmerman access is on a new roadway alignment shifted to the south in the area of 249th or 257th Avenue.
- **Option 3:** Highway 169 is on a new alignment shifted to the east, but west of Lake Fremont; Zimmerman access stays on existing CSAH 4 alignment.
- **Option 4:** Highway 169 is on a new alignment shifted east of Lake Fremont; Zimmerman access stays on existing CSAH 4 alignment.

[2] The Zimmerman Local Advisory Committee consisted of representatives from Mn/DOT, Sherburne County, Zimmerman, and Livonia Township (see Section VIII).

- **Option 5:** Highway 169 stays on existing alignment; Zimmerman access is on a new alignment shifted north of Lake Fremont.

Any of the access location concepts would be consistent with the purpose and need for the project by providing a grade-separated crossing that improves Highway 169 operations and eliminates mainline at-grade conflicts. A screening process was used to identify the preferred location for access concepts. This process considered the following transportation goals and objectives: consistency with regional and local transportation plans, consistency with local land use and development plans, locating access near heavy local economic activity (i.e., near key traffic origin/destinations), and maintaining a cohesive business district along Highway 169 and CSAH 4. Based on this screening process, three general location concepts were rejected from further consideration as described below.

- **Option 2** (move the primary Zimmerman access south of CSAH 4): This alternative does not enhance connectivity and continuity for CSAH 4 or the existing local roadway system, and does not place the interchange at an area of heavy local economic activity (i.e., near key traffic origins/destinations) desiring access to Highway 169.
- **Option 4** (move Highway 169 east of Lake Fremont): This alternative is inconsistent with the TH 169 Corridor Management Plan, which calls for improvements to Highway 169 largely on its existing alignment, and moves interchange access at least one mile east of the area of heavy local economic activity desiring access to Highway 169.
- **Option 5** (move Zimmerman access north of Lake Fremont): This alternative does not provide connectivity and continuity between key transportation corridors, particularly existing CSAH 4, and does not provide interchange access at an area of heavy local activity desiring access to Highway 169.

Option 1 (CSAH 4 interchange along existing Highway 169 alignment) and Option 3 (CSAH 4 interchange along shifted Highway 169 alignment) were retained for further consideration as part of the interchange-type evaluation. These two options were retained because they maintain connectivity and continuity with CSAH 4 through Zimmerman, are consistent with local and regional transportation plans, and because they locate the proposed interchange near the downtown Zimmerman business district (i.e. near key traffic origin/destination location). The two interchange types considered for CSAH 4 in Zimmerman are described below.

1. Compressed diamond interchange on the existing Highway 169 alignment.
2. Compressed diamond interchange with a loop in the southeast quadrant on a Highway 169 shifted alignment.

The two Highway 169/CSAH 4 interchange concepts are illustrated in Appendix C. Both alternatives would address transportation goals. Both alternatives maintain connectivity along CSAH 4, and ramp intersections under both alternatives would operate under or near capacity. With changes to local road connections, the compressed diamond interchange along a shifted Highway 169 alignment would be consistent with access spacing guidelines. The compressed diamond interchange along the existing Highway 169 alignment would be less consistent with access spacing guidelines, but this was considered not as important as other social, economic, and environmental considerations.

Social, economic, and environmental considerations were more important in identifying a preferred Highway 169/CSAH 4 interchange. The evaluation of the Highway 169/ CSAH 4 interchange alternatives is summarized in Table 8 and is described below.

Highway 169/CSAH 4 Interchange Design Type Considered But Rejected

Compressed Diamond Interchange on Existing Alignment: The compressed diamond interchange option would provide a single directional ramp for the entrance and exit movement to and from Highway 169. Highway 169 would bridge over CSAH 4. The distance between interchange ramps would be approximately 300 feet. To accommodate the reduced distance, the Highway 169/CSAH 4 interchange ramp intersections would operate as one intersection. These operations mean that traffic signals allow left turn movements to go one at a time from CSAH 4 onto the on ramps. The signals also release traffic on the interchange ramps separately (one ramp at a time) because there is no space to store vehicles on CSAH 4 between the interchange ramps.

The compressed diamond interchange configuration was identified to minimize right of way impacts to the residential area along the east side of Highway 169 between the highway and Lake Fremont. Compressing the interchange ramps in towards on another minimizes the amount of right of way necessary to accommodate an interchange.

The intersection spacing between the interchange ramps and the first local road intersection west of Highway 169 is 200 feet (3rd Street East). Because of this spacing, it was assumed that this intersection would be closed. As such, the next intersection to the west is 2nd Street East, approximately 600 feet from the interchange ramp intersections, which is more consistent with Mn/DOT access spacing goals.

The compressed diamond interchange alternative would likely impact fewer wetland areas and require less new right of way because Highway 169 remains along its existing alignment.[3] It was also estimated that the compressed diamond interchange alternative would require fewer residential relocations. However, the compressed diamond interchange alternative was estimated to result in up to 15 commercial/business relocations, and could result in an additional 5 to 10 commercial/business relocations depending upon design details. These commercial property impacts were primarily the result of expanding CSAH 4 through downtown. The compressed diamond interchange alternative would also divide the Zimmerman business district into east and west sides of Highway 169.

[3] Estimated wetland impacts did not include stormwater management considerations. Wetland impacts could increase with this alternative when stormwater management, depending upon stormwater design, because there are no infield areas within the interchange for stormwater treatment.

TABLE 8
CSAH 4 (ZIMMERMAN) INTERCHANGE ALTERNATIVES

Evaluation Criteria	Highway 169/CSAH 4 Interchange Alternatives		
	No-Build Alternative	**Compressed Diamond Interchange (existing Highway 169 alignment)**	**Preferred Alternative (Compressed Diamond/SE Loop Interchange along shifted Highway 169 alignment)**
Other Transportation Goal and Objectives			
Interchange ramp intersection spacing (feet)	N/A	300 feet	900 feet
Maintain/enhance roadway connectivity	Maintains east-west CSAH 4 connectivity	Maintains east-west CSAH 4 connectivity	Maintains east-west CSAH 4 connectivity
Consistency with access spacing goals (750 feet from interchange ramps to first local road intersection)	N/A	Less consistent First local road (3rd Street East) is located 200 feet from the nearest interchange ramp intersection. Next adjacent intersection to the west is 2nd Street East, which would be 600 feet from the interchange.	More consistent First local road anticipated (the west frontage road located on southbound lanes of the existing Hwy 169 alignment) is located 500 feet from the nearest interchange ramp intersection. If City elects to use 2nd Street East as the west frontage road, the Alternative meets the 750-foot access spacing goal.
Intersection operations (interchange ramp termini) (critical lane volumes over/at/under capacity)	Over Capacity	Under/At Capacity	Under/At Capacity
Social, Economic and Environmental (SEE) Considerations			
Wetland impacts (number of wetland areas affected) [(1)]	0 wetland areas	Less than 5 wetlands	5 to 10 wetlands
Wetland impacts (acres) [(1)]	0 acres	Less than 5 acres	5 to 10 acres
Estimated amount of right of way (acres)	0 acres	80 to 90 acres	140 to 150 acres
Amount of right of way available for redevelopment	None	None	30 acres

[(1)] Does not include potential wetland impacts associated with stormwater ponds or frontage roads. Potential wetland impacts associated with Highway 169 alignment and interchange configuration only.

TABLE 8 – continued
CSAH 4 (ZIMMERMAN) INTERCHANGE ALTERNATIVES

Evaluation Criteria	Highway 169/CSAH 4 Interchange Alternatives		
	No-Build Alternative	**Compressed Diamond Interchange (existing Highway 169 alignment)**	**Preferred Alternative (Compressed Diamond/SE Loop Interchange along shifted Highway 169 alignment)**
Social, Economic and Environmental (SEE) Considerations			
Residential relocation (total acquisition)	None	None Anticipated	15 to 20
Potential residential relocation (2)	None	None Anticipated	Less than 5
Commercial/business impacts (total relocation)	None	10 to 15	Less than 5
Potential commercial/ business impacts (2)	None	5 to 10	Less than 5
Maintain cohesive business district along Hwy 169 and CSAH 4	Maintains existing business district	Divides business district into east and west sides of Hwy 169	Creates cohesive business district on west side of Hwy 169 and accommodates redevelopment of existing Hwy 169 right of way
Constructability and impacts to local traffic circulation	N/A	Greater impacts because all construct would be completed along existing Highway 169 alignment	Fewer impacts because most construction would be completed off the existing Highway 169 alignment.
Construction costs (million $)	$0	$30 to $35 million	$20 to $25 million

(2)Potential residential relocation and potential commercial/business relocation. These residential and commercial properties would likely be impacted by the compressed diamond interchange or the compressed diamond (loop in SE quadrant) interchange. The need for total parcel acquisition and relocation would be determined by construction limits identified in detail design.

Construction staging for the compressed diamond alternative would be more complex, relative to the shifted alignment alternative, because the interchange would be constructed along the existing Highway 169 alignment. As a result, this would limit access to CSAH 4 and downtown Zimmerman during the construction period.

While the compressed diamond interchange was estimated to result in fewer wetland impacts and residential relocations, it was estimated to result in greater commercial/business relocations and impacts to the downtown business area as a result of widening CSAH 4. It also does not provide the opportunity to redevelop the existing Highway 169 right of way as part of a cohesive business district. Because of the commercial/business impacts, the compressed diamond interchange configuration was rejected from further consideration.

Highway 169/CSAH 4 Build (Preferred) Alternative Interchange Type

Preferred Alternative (Compressed Diamond Interchange with SE Loop on Shifted Alignment): A compressed diamond interchange with a loop in the southeast quadrant was identified as the preferred Highway 169/CSAH 4 interchange type. Under the preferred alternative, Highway 169 would be shifted approximately 700 feet to the east of its existing alignment at CSAH 4. This interchange would provide a single directional ramp for the entrance and exit movement to and from southbound Highway 169. A ramp would be provided for the exit movement from northbound Highway 169 to CSAH 4, and a loop in the southeast quadrant of the interchange would provide for the entrance movement from CSAH 4 to northbound Highway 169. CSAH 4 would bridge over Highway 169. The intersection spacing between interchange ramps would be 900 feet.

The compressed diamond interchange with a loop in the southeast quadrant was identified as the Build (preferred) Alternative for the Highway 169/CSAH 4 interchange for the following reasons:

- The compressed diamond (SE loop on shifted alignment) alternative was estimated to result in fewer impacts to commercial properties/businesses. Shifting Highway 169 and the proposed interchange to the east accommodates the expansion of CSAH 4 outside of the existing business district, allowing CSAH 4 to taper back down, requiring only partial right of way acquisitions from businesses along CSAH 4 west of Highway 169. The compressed diamond (SE loop on shifted alignment) would also maintain a cohesive business district west of Highway 169, whereas the existing Highway 169 alignment divides the business district.
- The compressed diamond (SE loop on shifted alignment) alternative would result in approximately 30 acres of existing highway right of way to be turned back for redevelopment following construction of the proposed Highway 169 realignment and interchange. Constructing an interchange along the existing Highway 169 alignment does not accommodate redevelopment opportunities.
- Construction of the compressed diamond (SE loop on shifted alignment) alternative would be less complex because the interchange would be constructed on a new

Highway 169 alignment. This would allow the use of existing Highway 169 and would maintain better access to downtown Zimmerman during construction.

- Construction cost estimates for the compressed diamond (SE loop on shifted alignment) alternative were estimated to be approximately \$5 to \$10 million less than the compressed diamond (existing highway alignment) alternative.
- The compressed diamond (SE loop on shifted alignment) alternative was estimated to require more right of way and result in more residential relocations because of the shift in the Highway 169 alignment to the east of its existing alignment. The compressed diamond (SE loop on shifted alignment) was estimated to result in greater impacts to wetlands, also because of the shift in the Highway 169 alignment and the placement of the interchange ramp and loop in the southeast quadrant of the interchange. There was no interchange type identified for the proposed Highway 169/CSAH 4 interchange that would avoid wetland impacts while also minimizing commercial and residential impacts. As such, greater impacts to wetland areas and residential properties represented a trade-off to minimizing impacts to commercial properties and businesses and other social and economic considerations.
- The grade-separation of CSAH 4 from Highway 169 will improve pedestrian and bicycle safety. The distance between interchange ramp intersections would be greater with the compressed diamond (SE loop on shifted alignment) alternative compared to the compressed diamond (existing Highway alignment) alternative. This increased distance makes it easier for pedestrians and bicyclists to navigate through the interchange area because conflicting turning movements at ramp intersections are spaced further apart.

APPENDIX C

Highway 169 Interchange Concept Drawings

A1

Legend
Mainline Highway (Reconstructed)
On/Off Ramps (Reconstructed)
Bridge (Existing or New)

Figure C-1

A2

Legend

- Mainline Highway (Reconstructed)
- On/Off Ramps (Reconstructed)
- Bridge (Existing or New)

Figure C-2

B1

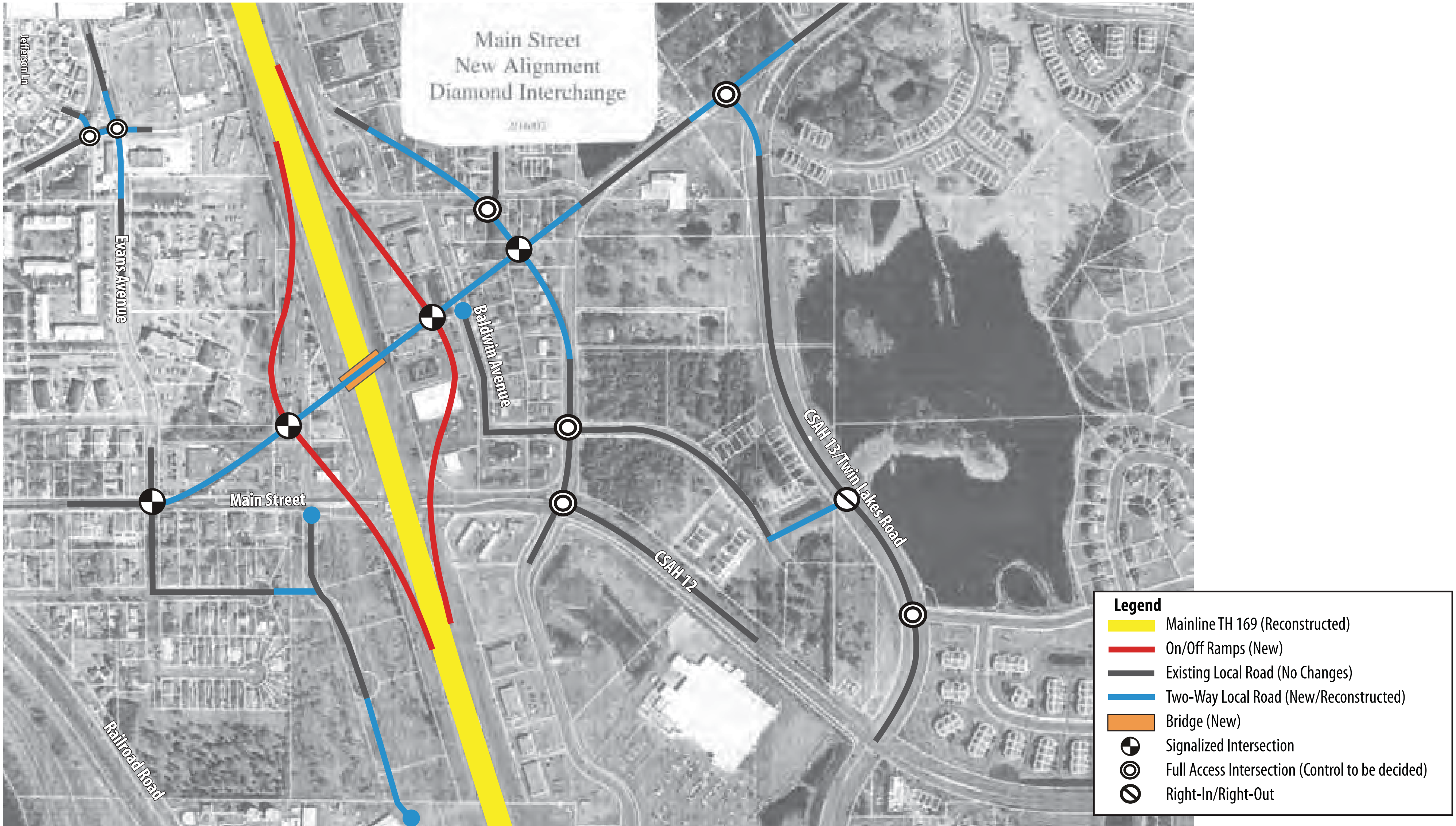

Main Street
New Alignment
Diamond Interchange
Jefferson Ln
Evans Avenue
Baldwin Avenue
Main Street
CSAH 13/Twin Lakes Road
CSAH 12
Railroad Road
Legend
Mainline TH 169 (Reconstructed)
On/Off Ramps (New)
Existing Local Road (No Changes)
Two-Way Local Road (New/Reconstructed)
Bridge (New)
Signalized Intersection
Full Access Intersection (Control to be decided)
Right-In/Right-Out

Figure C-3

B 1

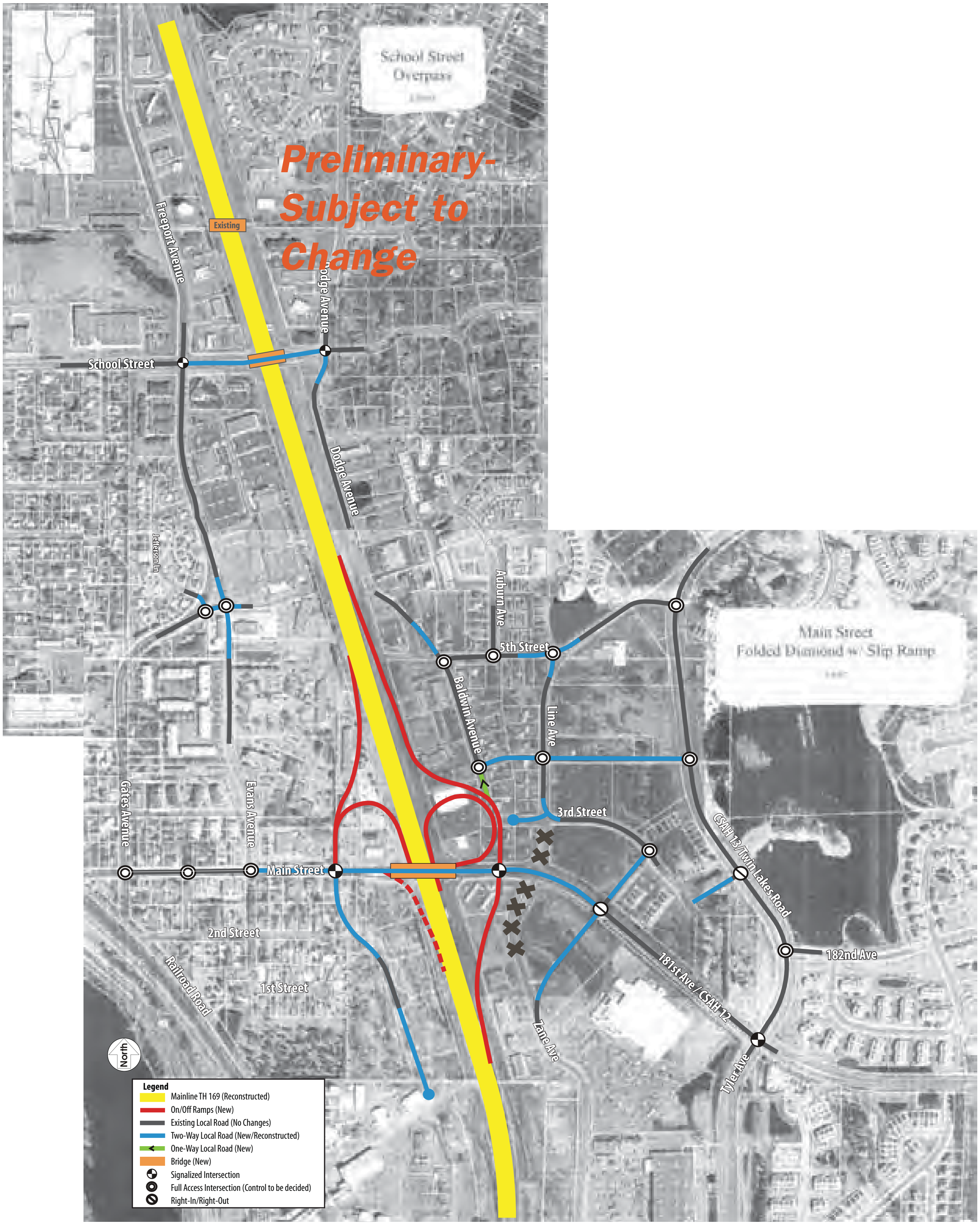
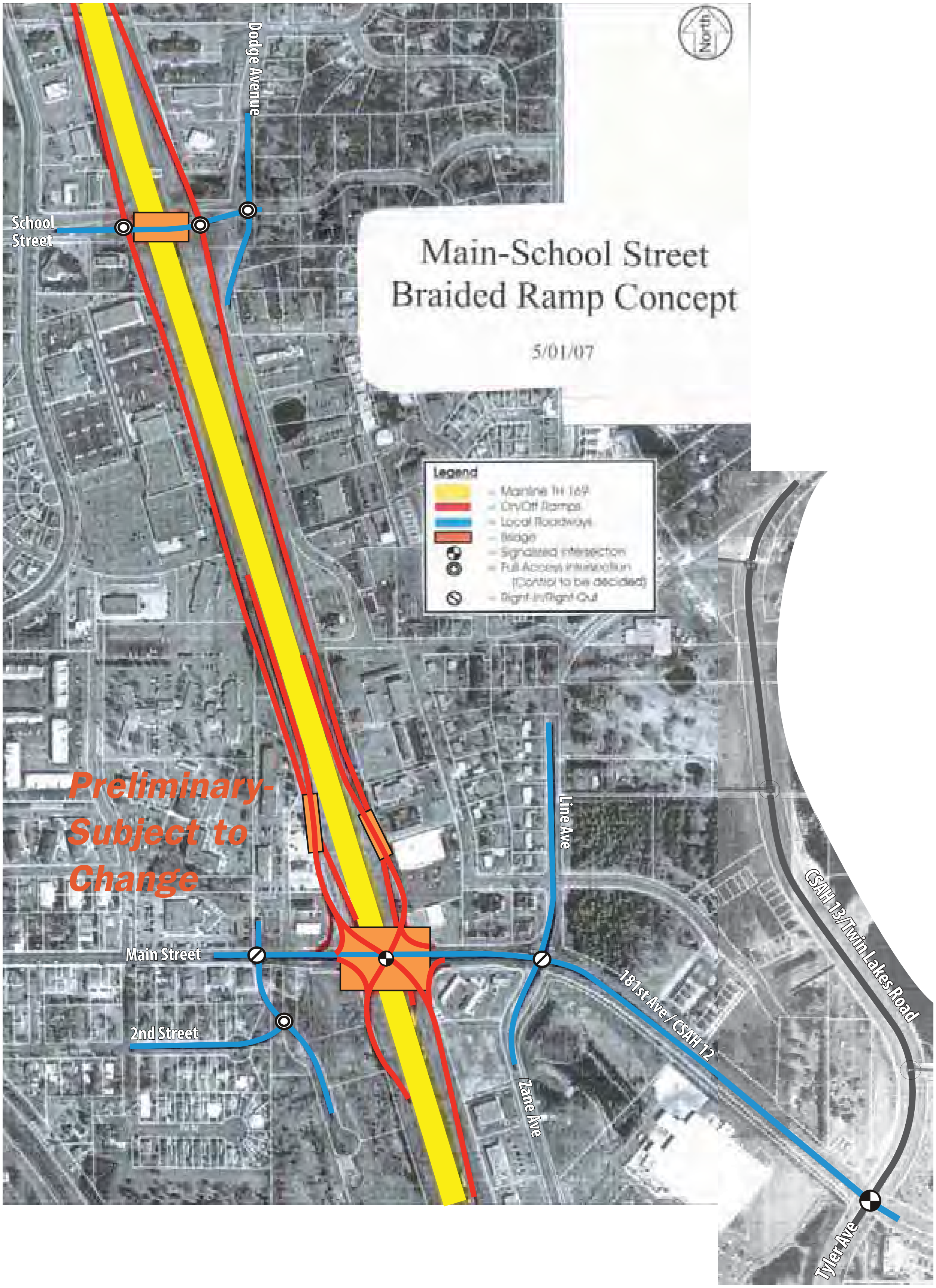

School Street Overpass
Preliminary-Subject to Change
Existing
Freeport Avenue
Dodge Avenue
School Street
Dodge Avenue
Jefferson Ln
Auburn Ave
Main Street Folded Diamond w/ Slip Ramp
5th Street
Baldwin Avenue
Line Ave
3rd Street
Gates Avenue
Evans Avenue
Main Street
CSAH 13/Twin Lakes Road
2nd Street
182nd Ave
Railroad Road
1st Street
181st Ave / CSAH 12
Zane Ave
Tyler Ave
North
Legend
Mainline TH 169 (Reconstructed)
On/Off Ramps (New)
Existing Local Road (No Changes)
Two-Way Local Road (New/Reconstructed)
One-Way Local Road (New)
Bridge (New)
Signalized Intersection
Full Access Intersection (Control to be decided)
Right-In/Right-Out

Figure C-4


North
Main-School Street
Collector-Distributor Road
Concept
5/01/07
Dodge Avenue
School Street
Preliminary-
Subject to
Change
Line Ave
Main Street
2nd Street
181st Ave / CSAH 12
Zane Ave
Legend
- Mainline TH 169
- On/Off Ramps
- Local Roadways
- Bridge
- Signalized Intersection
- Full Access Intersection
(Control to be decided)
- Right-in/Right-Out

Figure C-5



Main-School Street
Braided Ramp Concept
5/01/07
North
Legend
Mainline TH 169
On/Off Ramps
Local Roadways
Bridge
Signalized Intersection
Full Access Intersection
(Control to be decided)
Right-In/Right-Out
Dodge Avenue
School Street
Preliminary-
Subject to
Change
Main Street
2nd Street
Line Ave
Zane Ave
181st Ave/ CSAH 12
CSAH 13/Twin Lakes Road
Tyler Ave

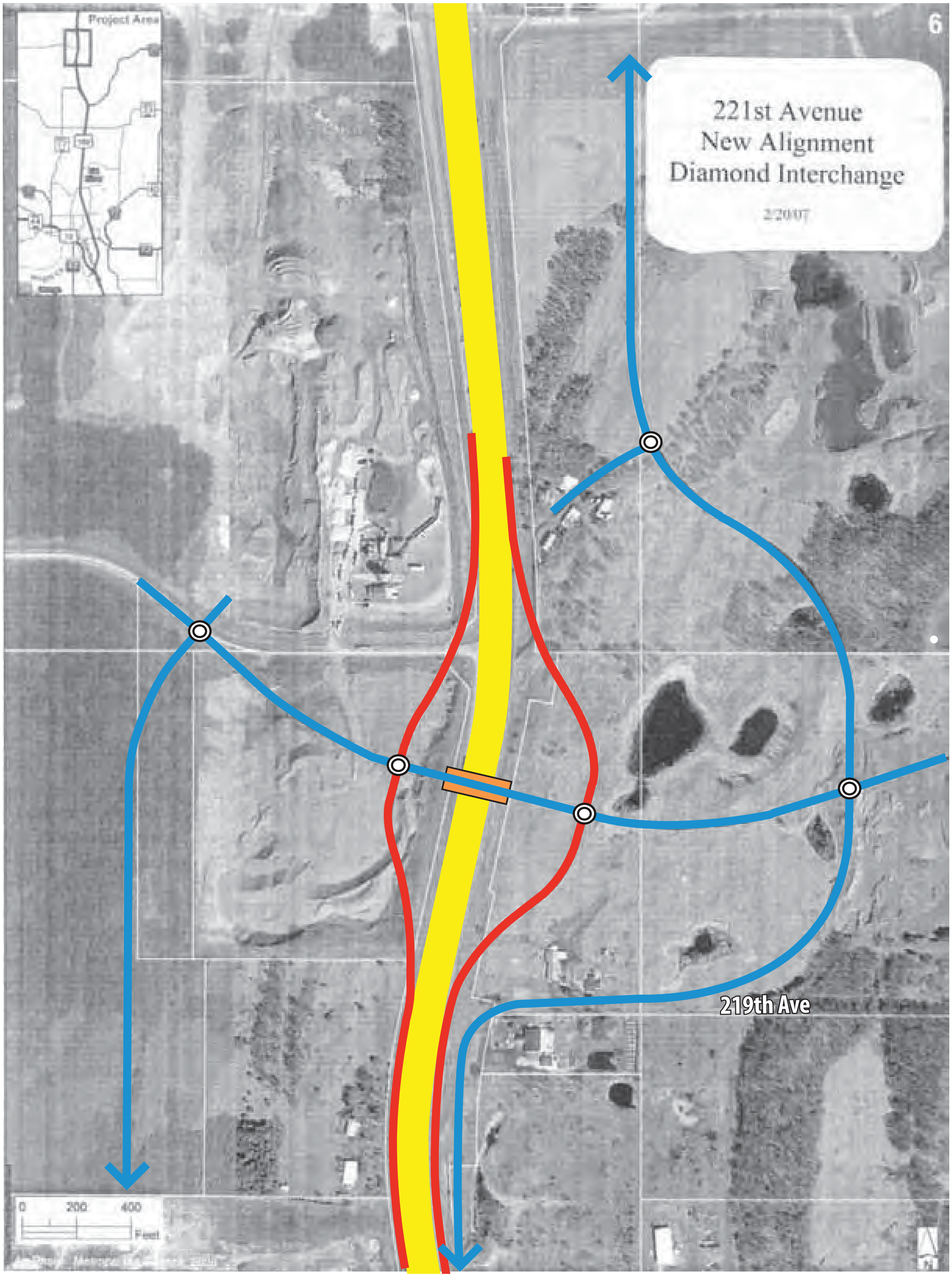
Figure C-6

D1


193rd Avenue and
197th Avenue
Split Diamond
Irving Street
197th Ave
Evans St
193rd Ave
Jackson Ave
Legend
Mainline TH 169 (Reconstructed)
On/Off Ramps (New)
Existing Local Road (No Changes)
Two-Way Local Road (New/Reconstructed)
One-Way Local Road (New)
Bridge (New)
Signalized Intersection
Full Access Intersection (Control to be decided)

Figure C-7

E1



Legend

- Mainline TH 169 (Reconstructed)
- On/Off Ramps (New)
- Two-Way Local Road (New/Reconstructed)
- Bridge (New)
- Full Access Intersection (Control to be decided)

Figure C-8

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C.S.A.H. 25/19 - STANDARD DIAMOND INTERCHANGE ALTERNATIVE

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Job #
12/14/2006

C.S.A.H. 25/19 - FOLDED DIAMOND INTERCHANGE (RAMPS FOLDED NORTH)

C-10

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Job #
12/14/2006

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C.S.A.H. 25/19 - FOLDED DIAMOND INTERCHANGE (RAMPS FOLDED SOUTH)

C-11

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Job #
12/14/2006

h:\projects\5669\HI-MU\Graphics\GRAPHICS LAYOUTS\CP710673_graphicsAll1B.dgn

CSAH 4 - COMPRESSED DIAMOND INTERCHANGE ON EXISTING ALIGNMENT

C-12

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Job #
12/14/2006

APPENDIX D

Agency Correspondence

U.S. Department of Homeland Security
United States Coast Guard

Commander
Eighth Coast Guard District

1222 Spruce Street
St. Louis, MO 63103-2832
Staff Symbol: dwb
Phone: (314)269-2380
Fax: (314)269-2737
Email: peter.j.sambor@uscg.mil

16591.3/Hwy 169
July 15, 2008

Mr. Craig Robinson
Minnesota Department of Transportation
District 3
3725 12th Street North
St. Cloud, MN 56303

Subj: TRUNK HIGHWAY 169 IMPROVEMENT PROJECT, WRIGHT COUNTY

Dear Mr. Robinson:

The waterways for the subject project conform to criteria for advance approval of bridges as set forth in Title 33, Code of Federal Regulations, Section 115.70, as amended. This regulation provides for the advance approval by the Commandant, U.S. Coast Guard, of the location and plans of bridges to be constructed across navigable waterways or waterways navigable-in-law but not actually navigated other than by logs, logs rafts, rowboats, canoes and small motorboats. Clearances provided for high water stages and drift will be considered adequate to meet the reasonable needs of navigation.

A Coast Guard Bridge Permit is not required. However, we will need as-built drawings of the replacement bridges, in 8 1/2 by 11 inch format, when the project is completed. The Coast Guard offers no objection to the project upon compliance with the laws and regulations listed below:

a. Executive Order 11990 - Protection of Wetlands.

b. Executive Order 11988 - Floodplain Management.

c. Section 106 of the National Historic Preservation Act (P. L. 89-665) and Executive Order 11593.

d. Section 401 of the Federal Water Pollution Control Act, as amended (P. L. 92-500).

e. Fish and Wildlife Coordination Act (P. L. 85-624).

f. Endangered Species Act (P. L. 93-205).

g. Section 309 of the Clean Air Act (P. L. 90-148).

h. Noise Control Act (P. L. 92-574).

i. Wild and Scenic Rivers Act of 1968, (P. L. 90-542).

j. Prime and Unique Farmlands (Council on Environmental Quality Policy dated January 16, 1980).

k. Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P. L. 91-646).

l. Environmental Justice, Executive Order 12898.

m. Taking of Private Property, Executive Order 12630.

n. Civil Justice Reform, Executive Order 12988.

o. Indian Tribal Governments, Executive Order 13175.

p. Energy Effects, Executive Order 13211.

q. Migratory Bird Act of 1018.

Sincerely,

ROGER K. WIEBUSCH
Bridge Administrator
By direction of the District Commander

Copy: USACE, St. Paul District

NRCS
Natural Resources Conservation Service
14855 Highway 10
Elk River, MN 55330-7606

Phone: (763) 241-1170
FAX: (763) 241-1161

February 14, 2008

Chad Holtmeyer
Environmental Planner
SRF Consulting Group, Inc.
One Carlson Parkway North, Suite 150
Minneapolis, MN 55447-4443

Dear Mr. Holtmeyer:

Subject: Zimmerman TH 169 Preliminary Design and Environmental Documentation - S.P. 7106-73, Sherburne Co., MN

This letter is in regards to your inquiry about the possible effect the proposed construction along the TH 169 corridor from 239th Avenue in Livonia Township to Elk River will have on prime farmland and farmland of statewide importance. NRCS has completed an analysis of the site and determined that approximately 7.5 acres of Statewide and Local Important Farmland is located within the proposed construction corridor. There was no Prime Farmland identified that was tilled or tillable in the future. The TH 169 corridor is predominately urban south of the junction of TH 169 and County Road 21.

It is the responsibility of the USDA, Natural Resources Conservation Service to monitor the effects of Federal programs or money on the conversion of farmland to non-agricultural uses through the Farmland Protection Policy Act (FPPA, Public Law 97-98, December 22, 1981). The land evaluation section of Form AD-1006 has been completed.

Enclosed are soils maps of the proposed construction area and a list of prime and important farmlands in Sherburne County. If NRCS can be of any further assistance please contact our office at (763) 241-1170 ex. 3.

Sincerely,

Jerry Anderson

Jerry Anderson
Soil Conservation Technician

Enclosures
Cc: Peter Weilke, Area Resource Soil Scientist, Brooklyn Center, MN

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 2/8/08
Name Of Project TH 169 Elk River to Zimmerman (SP 7106-73)	Federal Agency Involved Federal Highway Administration
Proposed Land Use Highway, Roadway	County And State Sherburne County, Minnesota
PART II *(To be completed by NRCS)*	Date Request Received By NRCS 2/11/08

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).*	Yes ☑	No ☐	Acres Irrigated	Average Farm Size 247
Major Crop(s) CORN, SOYBEANS, POTATOES	Farmable Land In Govt. Jurisdiction Acres: 214,780 % 77		Amount Of Farmland As Defined in FPPA Acres: 30360 % 14	
Name Of Land Evaluation System Used LE PART OF LESA	Name Of Local Site Assessment System N/A		Date Land Evaluation Returned By NRCS	

PART III *(To be completed by Federal Agency)*	Maximum Points	Alternative Site Rating Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly		35.0			
B. Total Acres To Be Converted Indirectly		0.0			
C. Total Acres In Site		35.0	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information					
A. Total Acres Prime And Unique Farmland		0			
B. Total Acres Statewide And Local Important Farmland		7.5			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted		0.025			
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value		0.0016			
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*		0 51.8	0	0	0
PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b))*	Maximum Points				
1. Area In Nonurban Use					
2. Perimeter In Nonurban Use					
3. Percent Of Site Being Farmed					
4. Protection Provided By State And Local Government					
5. Distance From Urban Builtup Area					
6. Distance To Urban Support Services					
7. Size Of Present Farm Unit Compared To Average					
8. Creation Of Nonfarmable Farmland					
9. Availability Of Farm Support Services					
10. On-Farm Investments					
11. Effects Of Conversion On Farm Support Services					
12. Compatibility With Existing Agricultural Use					
TOTAL SITE ASSESSMENT POINTS	160	0	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	0	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	0	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection

(See Instructions on reverse side) Form AD-1006 (10-83)

This form was electronically produced by National Production Services Staff

TH 169 - Vegetation/ Wetland

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
14855 Highway 10
Elk River, MN 55330-7606

*Helping People
Help the Land*

Phone: (763) 241-1170
FAX: (763) 241-1161

July 19, 2006

Lark Weller
Environmental Planner
SRF Consulting Group, Inc.
One Carlson Parkway North, Suite 150
Minneapolis, MN 55447-4443

Dear Lark Weller:

Subject: Zimmerman TH 169 Interchange Environmental Assessment (EA), SP#7106-73, Sherburne Co., MN

This letter is in regards to your inquiry about the possible effect the proposed construction at the intersection of TH 169 and CSAH 4 and future interchanges in the city of Zimmerman may have on prime farmland and farmland of statewide importance. NRCS has completed an analysis of the site and determined that approximately 5.7 acres of prime farmland is located within the proposed future interchange site (this figure is an estimate since the exact location of the interchanges has not been determined). There is no prime farmland located within the planned TH 169 and CSAH 4 interchange.

It is the responsibility of the USDA, Natural Resources Conservation Service to monitor the effects of Federal programs or money on the conversion of farmland to non-agricultural uses through the Farmland Protection Policy Act (FPPA, Public Law 97-98, December 22, 1981). The land evaluation section of the NRCS-CPA-106 has been completed.

Enclosed are soils maps of the proposed construction area and a list of prime and important farmlands in Sherburne County. If NRCS can be of any further assistance please contact our office at (763) 241-1170 ex. 3.

Sincerely,

Jerry Anderson

Jerry Anderson
Soil Conservation Technician

Enclosures
Cc: Peter Weilke, Area Resource Soil Scientist, Brooklyn Center, MN

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 7/3/06
Name Of Project Zimmerman TH 169 Interchange EA	Federal Agency Involved Federal Highway Administration
Proposed Land Use Roadway Interchange	County And State Sherburne County, Minnesota
PART II *(To be completed by NRCS)*	Date Request Received By NRCS

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).*	Yes ☒	No ☐	Acres Irrigated	Average Farm Size 247
Major Crop(s) CORN, SOYBEANS, POTATOES	Farmable Land In Govt. Jurisdiction Acres: 214,780 % 77		Amount Of Farmland As Defined in FPPA Acres: 30360 % 14	
Name Of Land Evaluation System Used LE PART OF LESA	Name Of Local Site Assessment System N/A		Date Land Evaluation Returned By NRCS 7/19/06	

PART III *(To be completed by Federal Agency)*		Alternative Site Rating			
		Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly		30.0			
B. Total Acres To Be Converted Indirectly		17.0			
C. Total Acres In Site		47.0	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information					
A. Total Acres Prime And Unique Farmland		5.7			
B. Total Acres Statewide And Local Important Farmland		0			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted		0.019			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		0.001			
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*		0 94.7	0	0	0
PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b))*	Maximum Points				
1. Area In Nonurban Use	15	4			
2. Perimeter In Nonurban Use	10	3			
3. Percent Of Site Being Farmed	20	2			
4. Protection Provided By State And Local Government	20	20			
5. Distance From Urban Builtup Area	15	0			
6. Distance To Urban Support Services	15	0			
7. Size Of Present Farm Unit Compared To Average	10	0			
8. Creation Of Nonfarmable Farmland	10	3			
9. Availability Of Farm Support Services	5	5			
10. On-Farm Investments	20	2			
11. Effects Of Conversion On Farm Support Services	10	0			
12. Compatibility With Existing Agricultural Use	10	5			
TOTAL SITE ASSESSMENT POINTS	160	44	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	0 94.7	0	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	44	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	44 [illegible]	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

(See Instructions on reverse side)

Form AD-1006 (10-83)

This form was electronically produced by National Production Services Staff

Minnesota Department of Natural Resources

Natural Heritage and Nongame Research Program, Box 25
500 Lafayette Road
St. Paul, Minnesota 55155-40

Phone: (651) 259-5109 Fax: (651) 296-1811 E-mail: lisa.joyal@dnr.state.mn.us

April 19, 2007

Mr. Lark Weller
SRF Consulting Group, Inc.
One Carlson Parkway North, Suite 150
Minneapolis, MN 55447-4443

Re: Request for Natural Heritage information for vicinity of proposed TH 169 Corridor Scoping Study, Sherburne and Wright Counties
NHNRP Contact #: ERDB 20070708

Dear Mr. Weller,

The Minnesota Natural Heritage database has been reviewed to determine if any rare plant or animal species or other significant natural features are known to occur within an approximate one-mile radius of the area indicated on the map enclosed with your information request. Based on this review, there are 56 known occurrences of rare species or native plant communities in the area searched. For details, please see the enclosed database printouts and the explanation of selected fields.

Current workloads prevent us from providing detailed comments at this time about which rare features may be impacted by your project. To avoid delaying your project planning and to assist you in evaluating whether your project might impact rare features, we are providing printouts of known locations of rare features in the vicinity of your project, and a fact sheet that provides guidance on determining whether your project might negatively affect one of these rare features. If you have specific questions regarding whether a particular activity might impact a rare feature, please contact me.

For your information, there are three other data sets available from the Natural Heritage Information System that you may find useful in your conservation planning efforts. These data sets, "Native Plant Community Polygons", "Sites of Biodiversity Significance", and "Railroad Rights-of-Way Prairies", are available via the internet at http://deli.dnr.state.mn.us.

The Natural Heritage database is maintained by the Natural Heritage and Nongame Research Program, a unit within the Division of Ecological Services, Department of Natural Resources. It is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. Its purpose is to foster better understanding and protection of these features.

Because our information is not based on a comprehensive inventory, there may be rare or otherwise significant natural features in the state that are not represented in the database. A county-by-county survey of rare natural features is now underway, and has been completed for Sherburne and Wright Counties. Our information about native plant communities is, therefore, quite thorough for these counties. However, because survey work for rare plants and animals is less exhaustive, and because there has not been an on-site survey of all areas of each county, ecologically significant features for which we have no records may exist on the project area.

The enclosed results of the database search are provided in two formats: short record report and long record report. To control the release of locational information, which might result in the damage or destruction of a rare element, both printout formats are copyrighted.

The short record report provides rare feature locations only to the nearest section, and may be reprinted, unaltered, in an Environmental Assessment Worksheet, municipal natural resource plan, or report compiled by your company for the project listed above. If you wish to reproduce the short record report for any other purpose, please contact me to request written permission. **The <u>long record report</u> includes more detailed locational information, and is for your personal use only. If you wish to reprint the long record report for any purpose, please contact me to request written permission.**

Please be aware that review by the Natural Heritage and Nongame Research Program focuses only on *rare natural features*. It does not constitute review or approval by the Department of Natural Resources as a whole. If you require further information on the environmental review process for other natural resource-related issues, you may contact your Regional Environmental Assessment Ecologist, Mike North, at (320) 255-4279.

An invoice in the amount of $138.21 will be mailed to you under separate cover within two weeks of the date of this letter. You are being billed for map and database search and staff scientist review. Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources.

Sincerely,

Lisa Joyal

Lisa A. Joyal
Endangered Species Environmental Review Coordinator

encl: Database search results
Rare Feature Database Print-Outs: An Explanation of Fields
Fact sheets: Blanding's Turtle, Bald Eagle, Environmental Review Guidance

Minnesota Natural Heritage & Nongame Research Program
Short Record Report of Element Occurrences within 1 mile radius of:
TH 169 Corridor Scoping Study
Multiple TRS
Sherburne & Wright Counties

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
Anoka, Dakota, Hennepin, Ramsey, Sherburne, Wright County, MN						
Ligumia recta (Black Sandshell) #337 Location Description: Legal description is too lengthy to fit in allotted space.		SPC	S3	G5	2004-08-19	30421
Isanti, Sherburne County, MN						
Emydoidea blandingii (Blanding's Turtle) #452 Location Description: T34N R25W S6, T34N R26W S10, T34N R26W S2, T34N R26W S11		THR	S2	G4	2003-10-10	10444
Mille Lacs County, MN						
Carex grayi (Gray's Sedge) #2 Location Description: T36N R26W S28, T36N R26W S33		NON	SNA	G4	1979-08-31	3987
Ligumia recta (Black Sandshell) #457 Location Description: T36N R26W S28, T36N R26W S33		SPC	S3	G5	2001-06-07	33907
Sherburne County, MN						
Antennaria parvifolia (Small-leaved Pussytoes) #17 Location Description: T34N R26W S5		SPC	S3	G5	1990-06-30	12002
Buteo lineatus (Red-shouldered Hawk) #199 Location Description: T33N R26W S22, T33N R26W S15		SPC	S3B,SNRN	G5	1995	21505
Dry Barrens Oak Savanna (Southern), Oak Subtype #18 Location Description: T34N R26W S8		N/A	S2	GNR	1989-07-14	10217
Dry Sand - Gravel Oak Savanna (Southern) Type #17 Location Description: T32N R26W S12, T32N R26W S1		N/A	S2	GNR	1989-07-12	10072
Emydoidea blandingii (Blanding's Turtle) #45 Location Description: T35N R26W S20, T35N R26W S30, T35N R26W S29		THR	S2	G4	1981-06-	1688
Emydoidea blandingii (Blanding's Turtle) #143 Location Description: T35N R26W S9		THR	S2	G4	1987-06-01	7800
Emydoidea blandingii (Blanding's Turtle) #235 Location Description: T35N R26W S9, T35N R26W S5, T35N R26W S4, T35N R26W S8		THR	S2	G4	1987-07-14	7403
Emydoidea blandingii (Blanding's Turtle) #236 Location Description: T35N R26W S22, T35N R26W S27		THR	S2	G4	1991-06-10	7404

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
Sherburne County, MN						
Emydoidea blandingii (Blanding's Turtle) #237 Location Description: T35N R26W S29, T35N R26W S30		THR	S2	G4	1987-07-17	7405
Emydoidea blandingii (Blanding's Turtle) #322 Location Description: T34N R26W S6, T35N R26W S31		THR	S2	G4	1988-06-18	9077
Emydoidea blandingii (Blanding's Turtle) #326 Location Description: T35N R26W S23, T35N R26W S15, T35N R26W S14, T35N R26W S22		THR	S2	G4	1999	9081
Emydoidea blandingii (Blanding's Turtle) #327 Location Description: T35N R26W S9, T35N R26W S17, T35N R26W S16, T35N R26W S8		THR	S2	G4	1988-07-08	9082
Emydoidea blandingii (Blanding's Turtle) #364 Location Description: T35N R26W S21		THR	S2	G4	1988-06-19	9016
Emydoidea blandingii (Blanding's Turtle) #365 Location Description: T35N R26W S28, T35N R26W S33		THR	S2	G4	1988-08-04	9017
Emydoidea blandingii (Blanding's Turtle) #366 Location Description: T34N R26W S18, T34N R26W S17		THR	S2	G4	1988-06-18	9018
Emydoidea blandingii (Blanding's Turtle) #494 Location Description: T33N R26W S33, T33N R26W S29, T33N R26W S28, T33N R26W S32		THR	S2	G4	1989-06-28	11220
Emydoidea blandingii (Blanding's Turtle) #568 Location Description: T35N R26W S35, T35N R26W S26		THR	S2	G4	1990-05-	12119
Emydoidea blandingii (Blanding's Turtle) #589 Location Description: T35N R26W S20, T35N R26W S29		THR	S2	G4	1990-07-21	12578
Emydoidea blandingii (Blanding's Turtle) #610 Location Description: T33N R26W S33		THR	S2	G4	1992-08-26	14384
Emydoidea blandingii (Blanding's Turtle) #611 Location Description: T33N R26W S33		THR	S2	G4	1992-08-26	14383
Emydoidea blandingii (Blanding's Turtle) #669 Location Description: T33N R26W S27, T33N R26W S28, T33N R26W S33		THR	S2	G4	1991-06-26	15848
Emydoidea blandingii (Blanding's Turtle) #790 Location Description: T34N R26W S35, T34N R26W S25, T34N R26W S36, T34N R26W S26		THR	S2	G4	1996-08-05	5888
Emydoidea blandingii (Blanding's Turtle) #840 Location Description: T33N R26W S15		THR	S2	G4	1996-06-24	23301

Minnesota Natural Heritage & Nongame Research Program
Short Record Report of Element Occurrences within 1 mile radius of:
TH 169 Corridor Scoping Study
Multiple TRS
Sherburne & Wright Counties

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
Sherburne County, MN						
Emydoidea blandingii (Blanding's Turtle) #1001 Location Description: T33N R26W S2, T33N R26W S11		THR	S2	G4	2002-06-12	29882
Emydoidea blandingii (Blanding's Turtle) #1051 Location Description: T33N R26W S23		THR	S2	G4	2004-06-13	31688
Haliaeetus leucocephalus (Bald Eagle) #2340 Location Description: T35N R26W S34	LT,PDL	SPC	S3B,S3N	G5	2005-04-19	31876
Hesperia uncas (Uncas Skipper) #2 Location Description: T33N R27W S24, T33N R26W S18, T33N R26W S21, T33N R27W S13, T33N R26W S20, T33N R26W S17, T33N R26W S19		END	S1	G5	1986-06-24	2469
Hieracium longipilum (Long-bearded Hawkweed) #43 Location Description: T34N R27W S12, T34N R26W S7		NON	SNA	G4G5	1989-07-14	10050
Hieracium longipilum (Long-bearded Hawkweed) #44 Location Description: T34N R26W S7, T34N R26W S6		NON	SNA	G4G5	1989-07-14	10051
Hieracium longipilum (Long-bearded Hawkweed) #45 Location Description: T34N R26W S8, T34N R26W S7		NON	SNA	G4G5	1989-07-14	10052
Hieracium longipilum (Long-bearded Hawkweed) #46 Location Description: T34N R26W S8		NON	SNA	G4G5	1989-09-25	10053
Hieracium longipilum (Long-bearded Hawkweed) #50 Location Description: T34N R26W S5		NON	SNA	G4G5	1990-06-30	12001
Linaria canadensis (Old Field Toadflax) #17 Location Description: T34N R26W S5		NON	SU	G5	1990-06-30	11999
Native Plant Community, Undetermined Class #482 Location Description: T33N R26W S4, T33N R26W S3		N/A	SNR	GNR	1973	1213
Native Plant Community, Undetermined Class #776 Location Description: T34N R26W S33, T34N R26W S32		N/A	SNR	GNR	1989-06-09	10219
Native Plant Community, Undetermined Class #1513 Location Description: T33N R26W S17, T33N R26W S16, T33N R26W S20, T33N R26W S21		N/A	SNR	GNR	1989-07-08	10212
Native Plant Community, Undetermined Class #1539 Location Description: T33N R26W S27, T33N R26W S26		N/A	SNR	GNR	1989-06-28	10222

Minnesota Natural Heritage & Nongame Research Program
Short Record Report of Element Occurrences within 1 mile radius of:
TH 169 Corridor Scoping Study
Multiple TRS
Sherburne & Wright Counties

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
Sherburne County, MN						
Native Plant Community, Undetermined Class #1560 Location Description: T33N R26W S17		N/A	SNR	GNR	1989-07-08	10224
Native Plant Community, Undetermined Class #1586 Location Description: T34N R26W S10, T34N R26W S3		N/A	SNR	GNR	1989-06-09	10221
Native Plant Community, Undetermined Class #1607 Location Description: T34N R26W S8, T34N R26W S7		N/A	SNR	GNR	1989-07-14	10066
Native Plant Community, Undetermined Class #1748 Location Description: T34N R26W S35, T34N R26W S25, T34N R26W S36, T34N R26W S26		N/A	SNR	GNR	1989-07-01	10225
Native Plant Community, Undetermined Class #1872 Location Description: T34N R26W S28, T34N R26W S33		N/A	SNR	GNR	1989-06-17	10223
Native Plant Community, Undetermined Class #1896 Location Description: T33N R26W S21, T33N R26W S20		N/A	SNR	GNR	1989-07-16	18916
Oak - (Red Maple) Woodland Type #1566 Location Description: T34N R26W S35, T34N R26W S25, T34N R26W S36, T34N R26W S26		N/A	S4	GNR	1989-09-05	10339
Pituophis catenifer (Gopher Snake) #48 Location Description: T34N R26W S9, T34N R26W S16		SPC	S3	G5	1990-06-19	12564
Platanthera flava var. herbiola (Tubercled Rein-orchid) #16 Location Description: T35N R26W S5		END	S1	G4T4Q	1996-07-05	6099
Tamarack Swamp (Southern) Type #92 Location Description: T33N R26W S8, T33N R26W S7		N/A	S3	GNR	1989-08-15	10062
Viola lanceolata (Lance-leaved Violet) #21 Location Description: T34N R26W S7		THR	S2	G5	1989-07-14	10060
Viola lanceolata (Lance-leaved Violet) #22 Location Description: T34N R26W S8		THR	S2	G5	1989-07-14	10061
Sherburne, Wright County, MN						
Native Plant Community, Undetermined Class #2145 Location Description: T33N R26W S33, T32N R26W S4, T121N R23W S15, T121N R23W S10		N/A	SNR	GNR	1979	24732
Wright County, MN						

Minnesota Natural Heritage & Nongame Research Program
Short Record Report of Element Occurrences within 1 mile radius of:
TH 169 Corridor Scoping Study
Multiple TRS
Sherburne & Wright Counties

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
Wright County, MN						
Haliaeetus leucocephalus (Bald Eagle) #2285 Location Description: T121N R23W S10, T121N R23W S15	LT,PDL	SPC	S3B,S3N	G5	2005-05-06	31248
Lanius ludovicianus (Loggerhead Shrike) #164 Location Description: T121N R23W S22	No Status	THR	S2B	G4	1996-05-23	20821

Records Printed = 56

Minnesota Department of Transportation

Office of Environmental Services
Mail Stop 620
395 John Ireland Boulevard
St. Paul, MN 55155

Office Tel: (651) 366-3614
Fax: (651) 366-3603

FEB 2009
Received
SRF, Inc

December 31, 2008

Dennis Gimmestad
State Historic Preservation Office
Minnesota History Center
345 Kellogg Blvd. West
St. Paul, MN 55102-1906

Regarding: S.P. 7106-71 & 7106-73 (TH 169, Sherburne County)
Grade-separated interchanges and overpasses at various locations
T. 32-34 N., R. 26 W., Zimmerman and Elk River

Dear Mr. Gimmestad:

We have reviewed the above-referenced undertaking pursuant to our FHWA-delegated responsibilities for compliance with Section 106 of the National Historic Preservation Act, as amended (36 CFR 800). The project involves grade-separated interchanges or overpasses and related road work at various locations along TH 169 in the cities of Zimmerman and Elk River.

Phase I and II archaeological, geomorphological, and architectural history surveys and evaluations were undertaken on this project. The results appear in five enclosed reports: *Architectural History Phase I Survey and Phase II Evaluations for the Trunk Highway 169 Preliminary Design and Environmental Documentation, Elk River, Sherburne County Minnesota* by Summit Envirosolutions (2008), *Architectural History Phase I Survey and Phase II Evaluation for the Trunk Highway 169 Preliminary Design, Zimmerman, Sherburne County Minnesota* by Summit Envirosolutions (2008), *Phase I Archaeological Survey for the Proposed TH 169/TH10 Grade-Separated Interchange Project, City of Elk River, Sherburne County, Minneosta* by HDR Engineering (2008), *Phase I Archaeological Survey for the Proposed TH 169/CSAH 4 Grade-Separated Interchange Project, City of Zimmerman, Sherburne County, Minneosta* by HDR Engineering (2008), and *Phase I Stratigraphic and Geoarchaeological Investigations at Proposed TH 169 Bridge Interchange Elk River, Minnesota* by Strata Morph Geoexploration (2008).

We concur with the report findings that there are three properties eligible for listing in the National Register of Histroic Places withion the area of potential effect (APE): the railroad roadway of St. Paul and Pacific (BNSF) Railroad Corridor District (SH-ERC-067), a portion of the Vernon Cemetery (SH-ERC-065), and the Farmers and Merchants Bank of Zimmerman (SH-ZMC-004). Although no eligible archaeological sites were found during the surveys, six parcels could not be surveyed in the Zimmerman area due to landowner refusal. These parcels will be survyed once the properties have been acquired. We are asking for your concurrence at this time. We will make a determination of effect at a later date.

Sincerely,

Craig Johnson
Cultural Resources Unit (CRU)

cc: Joe Hudak, Mn/DOT CRU
Jim Hallgren, Mn/DOT D3 (1 report)

Mn/DOT CRU/CO File
Legislative Library (1 report)

Minnesota
Historical Society

State Historic Preservation Office

February 5, 2009

Mr. Craig Johnson
Cultural Resources Unit
MN Dept. of Transportation
Transportation Building, MS 620
395 John Ireland Boulevard
St. Paul, MN 55155-1899

Re: S.P. 7106-71 & 7106-73, T.H. 169
Grade-separated interchanges & overpasses at various locations
Zimmerman & Elk River, Sherburne County
SHPO Number: 2009-0776

Dear Mr. Johnson:

Thank you for the opportunity to review and comment on the above project. It has been reviewed pursuant to the responsibilities given the State Historic Preservation Officer by the National Historic Preservation Act of 1966 and the Procedures of the Advisory Council on Historic Preservation (36CFR800), and to the responsibilities given the Minnesota Historical Society by the Minnesota Historic Sites Act and the Minnesota Field Archaeology Act.

Based on our review of the survey reports submitted, we have the following comments on this project at this time:

1. We concur with the determination that there are no National Register eligible archaeological properties on the parcels surveyed. We note that additional survey is yet to be completed.

2. We concur with the determination that the St. Paul and Pacific Railroad corridor District meets National Register criteria.

3. The submittal recommends that a portion of the Vernon Cemetery and the Farmers and Merchants Bank of Zimmerman both meet National Register criteria. We do not feel that there is adequate justification for the significance of either of these properties, and recommend that they are not eligible to the Register.

We look forward to working with you to complete this review after the remaining survey work has been completed. Contact us at 651-259-3456 with questions or concerns.

Sincerely,

Dennis A. Gimmestad
Government Programs & Compliance Officer

cc: Andrew Schmidt, Summit Envirosolutions
Michael Justin, HDR
Michael Kolb, Strata Morph
Tom Cinadr, SHPO

Minnesota Department of Transportation

Office of Environmental Services
Mail Stop 620
395 John Ireland Boulevard
St. Paul, MN 55155

Office Tel: (651) 366-3614
Fax: (651) 366-3603

May 20, 2009

Dennis Gimmestad
State Historic Preservation Office
Minnesota History Center
345 Kellogg Blvd. West
St. Paul, MN 55102-1906

Regarding: S.P. 7106-71 & 7106-73 (TH 169, Sherburne County)
Grade-separated interchanges or overpasses at various locations
T. 32-34 N., R. 26 W., Zimmerman and Elk River

Dear Mr. Gimmestad:

We have reviewed the above-referenced undertaking pursuant to our FHWA-delegated responsibilities for compliance with Section 106 of the National Historic Preservation Act, as amended (36 CFR 800). The project involves grade-separated interchanges or overpasses and related road work at various locations along TH 169 in the cities of Zimmerman and Elk River.

Your letter of 2/5/2009 concurs with our determination that the St. Paul and Pacific Railroad Corridor Historic District meets National Register criteria. In a meeting with you on 3/4/2009, we agreed that the railroad would be adversely affected since it would be relocated about 75 feet north of its present location at the TH 10/TH 169 intersection for a total distance of about one mile. The purpose of this letter is to request a written concurrence of our determination of adverse effect to the railroad.

We also understand that additional archaeological survey work needs to be completed.

Sincerely,

Craig Johnson
Cultural Resources Unit (CRU)

cc: Mn/DOT CRU/CO File
Jim Hallgren, Mn/DOT D3
Beth Bartz, SRF

Minnesota
Historical Society
STATE HISTORIC PRESERVATION OFFICE

June 19, 2009

Mr. Craig Johnson
Cultural Resources Unit
MN Dept. of Transportation
Transportation Building, Mail Stop 620
395 John Ireland Blvd.
St. Paul, MN 55155-1899

RE: S.P. 7106-71 & 7106-73, T.H. 169
Grade-separated interchanges and overpasses at various locations
Zimmerman & Elk River, Sherburne County
SHPO Number: 2009-0776

Dear Mr. Johnson:

Thank you for your letter regarding the above-referenced project.

We concur with your assessment that the project will have an adverse effect on the St. Paul and Pacific Railroad Historic District.

We note that your letter acknowledges that an archaeological survey of this project is yet to be completed. We will not be able to reach a determination of effect for the project as a whole until that survey is reviewed.

Contact us at (651) 259-3456 with questions or concerns.

Sincerely,

Dennis A. Gimmestad
Government Programs & Compliance Officer

APPENDIX E

Traffic Operations Technical Memoranda

TECHNICAL MEMORANDUM 2 – TRAFFIC OPERATIONS AND FORECASTS
FINAL MARCH 5, 2008

INTRODUCTION

The Trunk Highway 169 (TH 169) corridor is an important north-south principal arterial route in central Minnesota. In order for this corridor to continue to function efficiently in the future, a traffic operations analysis needs to be performed to determine the corridor changes that need to be made in the future. The limits of this analysis include TH 169 from Elk River to 239th Avenue NW and the study intersections are shown in Figure 1. The purpose of the study is to determine the impact to intersections along the TH 169 corridor due to the increase in travel demand in the year 2030 and to mitigate the impact of the additional future traffic. This traffic study includes a travel demand modeling process to determine the future traffic volume demand along TH 169 for the year 2030. Ultimately, TH 169 will close all at-grade intersections through Elk River and will become a freeway segment. Several concepts were developed for interchange alternatives at major cross streets along TH 169 through Elk River and the traffic forecasts were used to determine the interchange alternatives that best address future transportation needs of the corridor.

EXISTING CONDITIONS

Traffic operations were analyzed at the following key intersections:

- TH 169 and TH 169/10 South Ramps
- TH 169 and TH 169/10 North Ramps
- TH 169 and Great River Energy Entrance
- Main Street and Gates Street
- TH 169 and Main Street
- Main Street and Baldwin Avenue
- TH 169 and 5th Street
- School Street and Freeport Avenue
- TH 169 and School Street
- School Street and Dodge Avenue
- TH 169 and 191st Avenue
- Freeport Avenue and Jackson Street
- Jackson Street and Holt Street
- TH 169 and 193rd Avenue
- 193rd Avenue and Evans Street
- 197th Avenue and Irving Street
- TH 169 and 197th Avenue
- 197th Avenue and Evans Street
- 205th Avenue and TH 169 East Ramps
- TH 169 and 213th Avenue
- TH 169 and Elk River Bituminous Entrance
- TH 169 and 221st Avenue
- TH 169 and 225th Avenue
- TH 169 and Waste Management Entrance

Peak hour turning movement counts were collected at busier intersections and road tubes were placed at right-in/right-out access points and lower volume intersections (Figure 1). Road tubes were also used to determine the traffic volumes on ramps and mainline at the TH 169/10/101 interchange. Figures 2 and 3 reflect the existing a.m. and p.m. traffic volumes, geometrics, and traffic control at each intersection.

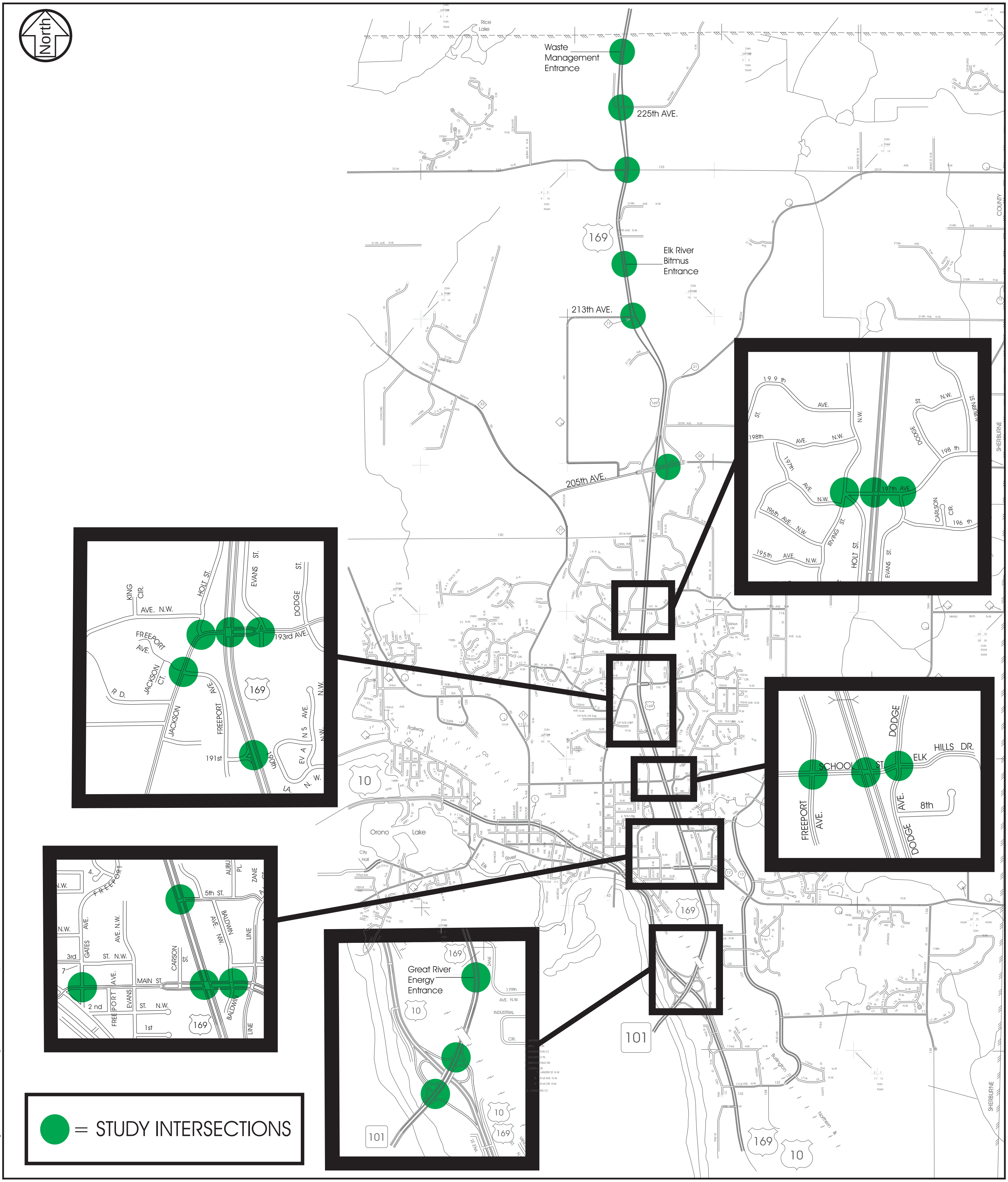
An operations analysis was conducted for the a.m. and p.m. peak hours at each of the respective peak hour key intersections to determine how traffic currently operates along the project segment. All signalized intersections were analyzed using the Synchro/SimTraffic software and unsignalized intersections were analyzed using the Highway Capacity Software. Capacity analysis results identify a Level of Service (LOS), which indicates how well an intersection is operating. The LOS results are based on average delay per vehicle. Intersections are given a ranking from LOS A through LOS F. LOS A indicates the best traffic operation and LOS F indicates an intersection where demand exceeds capacity. LOS A through D is generally considered acceptable by drivers (Table 1).

For the analysis of side-street stop controlled intersections, the operations can be described in two ways. First, the overall intersection level of service is documented, which provides the average delay per vehicle for all approaches. However, at an intersection with side-street stop control, the mainline does not stop. Therefore, the majority of delay is experienced by vehicles on the side street. In addition to providing an average delay for all approaches, it is important to indicate the level of service on the side-street approach. It is typical of intersections with higher mainline traffic volumes to experience high levels of delay (poor levels of service) on the side-street approaches, but an acceptable overall intersection level of service during the peak periods.

Table 1
Level of Service Criteria for Signalized and Unsignalized Intersections

Level of Service	Average Delay per Vehicle [seconds]	
	Signalized Intersections	Unsignalized Intersections(1)
A	< 10	< 10
B	10 – 20	10 – 15
C	20 – 35	15 – 25
D	35 – 55	25 – 35
E	55 – 80	35 – 50
F	> 80	> 50

(1) Stop-controlled intersection LOS criteria are the same for side-street and all-way stop controlled intersections



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Study Area Intersections

TH 169 in Elk River Traffic Study

City of Elk River

Figure 1

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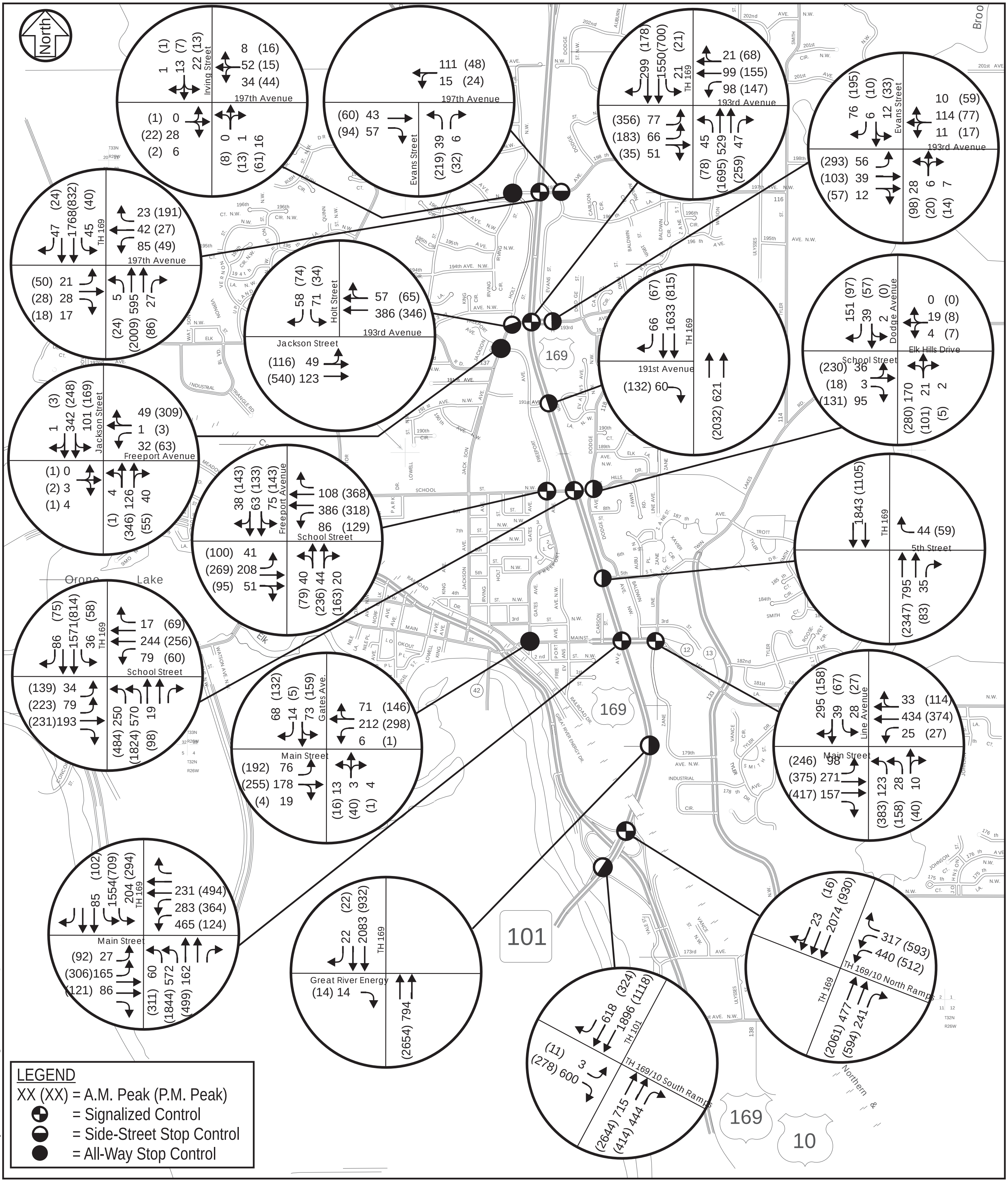

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Existing Conditions (1 of 2)

TH 169 in Elk River Traffic Study

City of Elk River

Figure 2

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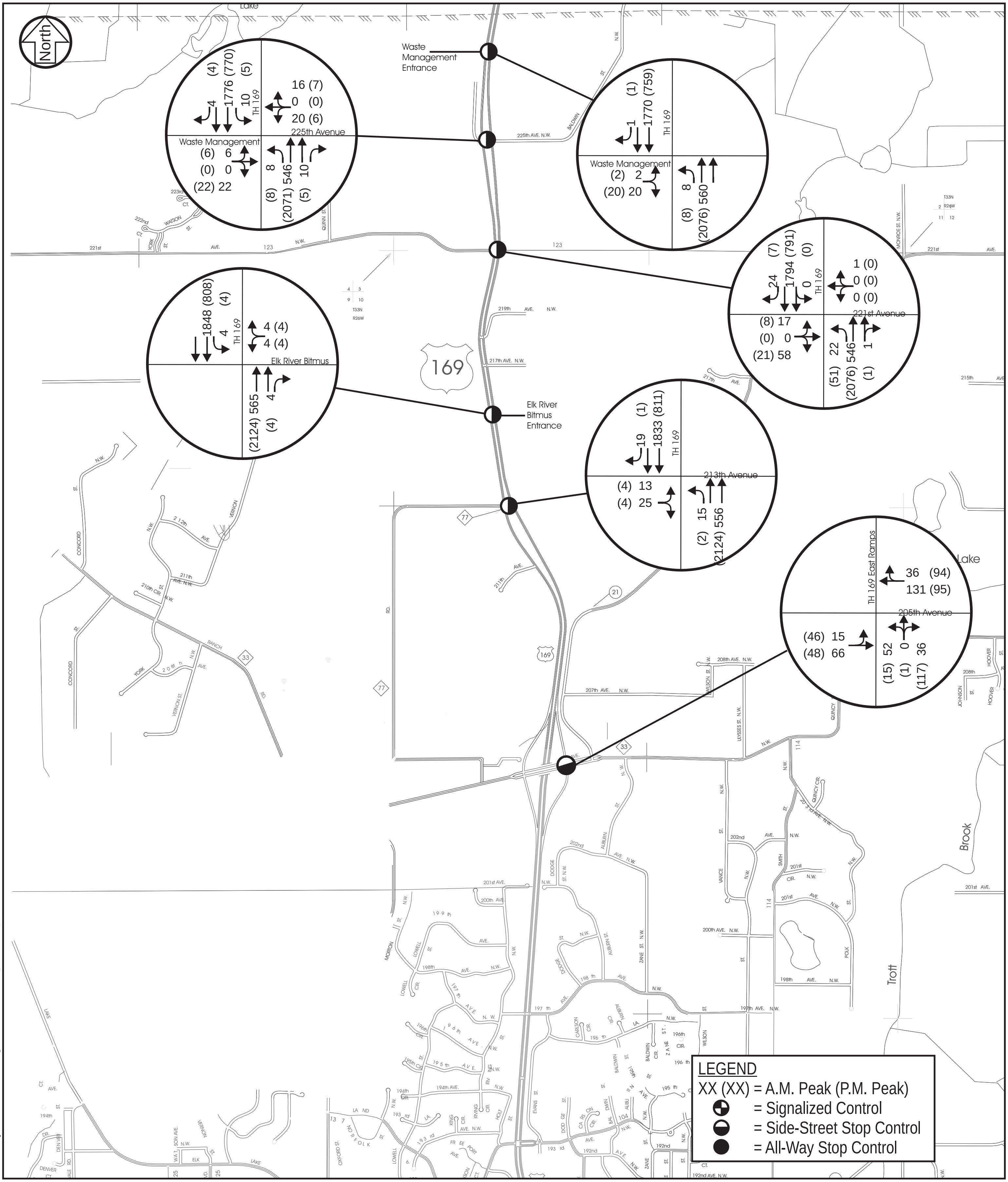

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Existing Conditions (2 of 2)

TH 169 in Elk River Traffic Study

City of Elk River

Figure 3

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Results of the existing analysis are shown in Table 2. The existing a.m. peak hour analysis shows that all key intersections operate at an acceptable overall LOS D or better with the exception of the TH 169/213th Avenue intersection. Several intersections experience unacceptable LOS E or F under existing p.m. peak hour conditions. These include TH 169/TH 10 South Ramps, TH 169/TH 10 North Ramps, TH 169/Great River Energy Entrance, Main Street/Gates Avenue, TH 169/Main Street, Main Street/Baldwin Avenue, TH 169/Elk River Bituminous Entrance and TH 169/225th Avenue intersections. It should be noted that in addition to the poor level of service at the TH 169/Main Street intersection during the p.m. peak, vehicles often wait several cycle lengths to clear the intersection. This causes long queues in the northbound direction in the p.m. peak hour resulting in high delays at the TH 169/TH 10 intersections as well as along Main Street.

Table 2
Existing Peak Hour Capacity Analysis
Level of Service Results

Intersection	Intersection Control	Level of Service Results	
		A.M. Peak Hour	P.M. Peak Hour
Elk River			
TH 169/TH 10 South Ramps	Side Street Stop	A/B	D/**F**
TH 169/TH 10 North Ramps	Signalized	B	**E**
TH 169/Great River Energy Entrance	Side Street Stop	A/A	D/**E**
Main Street/Gates Avenue	All Way Stop	B	**E**
TH 169/Main Street	Signalized	D	**F**
Main Street/Baldwin Avenue	Signalized	B	**E**
TH 169/5th Street	Side Street Stop	A/B	A/A
School Street/Freeport Avenue	Signalized	B	C
TH 169/School Street	Signalized	D	C
School Street/Dodge Avenue	Side Street Stop	A/A	A/B
TH 169/191st Avenue	Side Street Stop	A/A	A/A
Freeport Avenue/Jackson Street	All Way Stop	A	A
Jackson Street/Holt Street	Side Street Stop	A/B	A/B
TH 169/193rd Avenue	Signalized	C	C
193rd Avenue/Evans Street	Side Street Stop	A/A	A/A
197th Avenue/Irving Street	All Way Stop	A	A
TH 169/197th Avenue	Signalized	B	B
197th Avenue/Evans Street	Side Street Stop	A/A	A/A
TH 169 East Ramps/205th Avenue	Side Street Stop	A/A	A/A
TH 169/213th Avenue	Side Street Stop	A/**F**	A/D
TH 169/Elk River Bituminous Entrance	Side Street Stop	A/B	B/**F**
TH 169/221st Avenue	Side Street Stop	A/C	A/C
TH 169/225th Avenue	Side Street Stop	A/D	A/**F**
TH 169/Waste Management Entrance	Side Street Stop	A/C	A/A

Note: Levels of service (LOS) for unsignalized intersections are reported by an overall LOS followed by the worst approach LOS.

YEAR 2030 NO BUILD ANALYSIS

A 2030 No Build operations analysis was performed in order to determine what the impact that 2030 travel demand will have upon the existing TH 169 corridor. In order to develop 2030 Average Daily Traffic volumes, a travel demand modeling process was developed using assumptions derived from the 2006 Sherburne County Transportation Plan forecasting process. To see a detailed summary of the Travel Demand Modeling process, please see Appendix A.

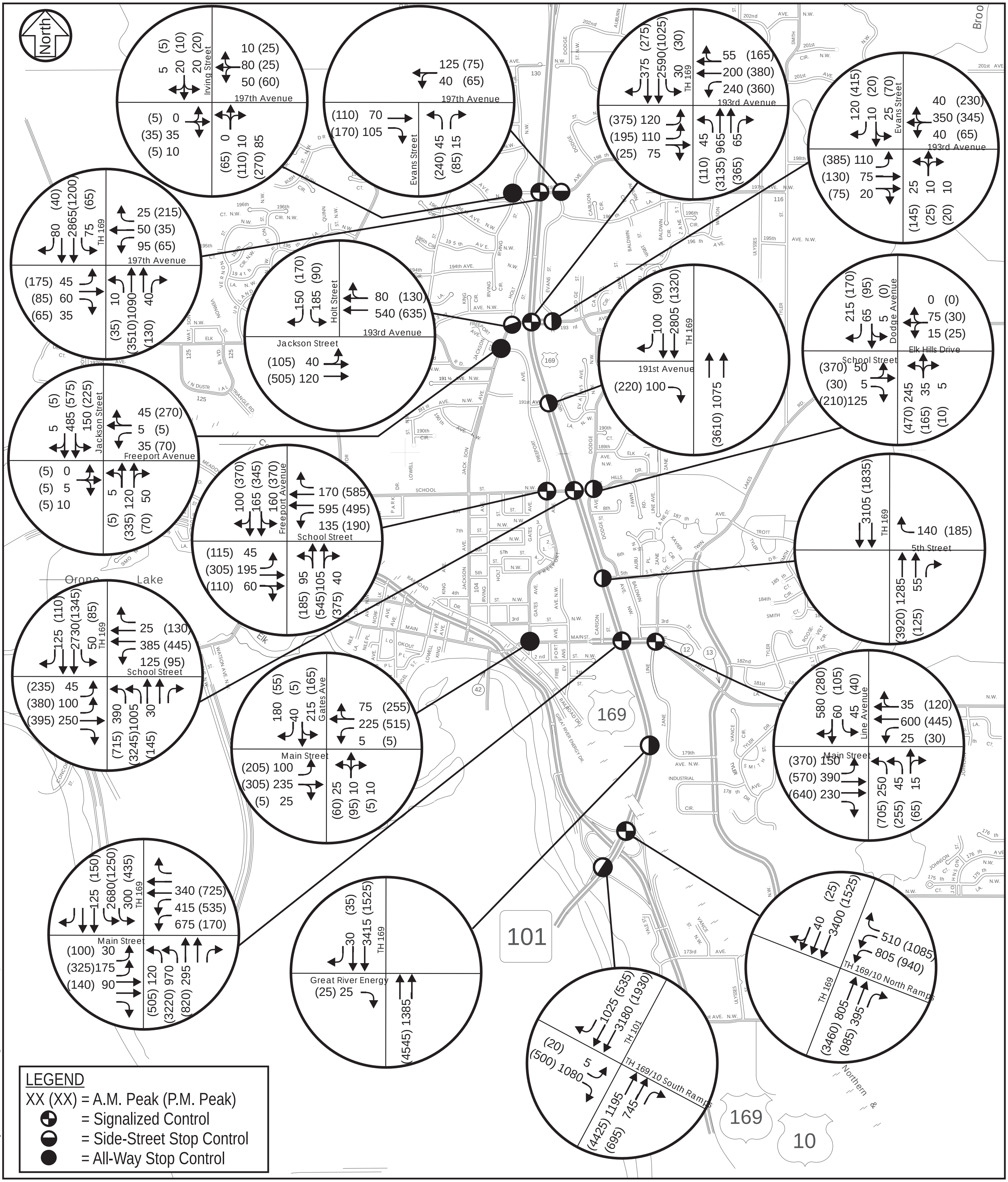
Once 2030 No Build Average Daily Traffic Volumes were developed from the Travel Demand Model, turning movements at each intersection could be produced using existing peak hour percentages and existing turning movement splits as an initial guideline. Volumes between adjacent intersections were then balanced. 2030 No Build turning movement volumes can be seen in Figures 4 and 5.

The results of the 2030 No-Build analysis are shown in Table 3. The results reveal that most intersections along the TH 169 corridor report high delays at unacceptable levels in both the a.m. and p.m. peak hour periods. This is primarily due to the expected growth in average daily traffic volumes within the TH 169 corridor without additional lane capacity.

Table 3
Year 2030 No Build Peak Hour Capacity Analysis
Level of Service Results

Intersection	Intersection Control	Level of Service Results	
		Peak Hour A.M.	Peak Hour P.M.
Elk River			
TH 169/TH 10 South Ramps	Side Street Stop	**F/F**	**E/F**
TH 169/TH 10 North Ramps	Signalized	**E**	**F**
TH 169/Great River Energy Entrance	Side Street Stop	A/A	D/**E**
Main Street/Gates Avenue	All Way Stop	C	**F**
TH 169/Main Street	Signalized	**F**	**F**
Main Street/Baldwin Avenue	Signalized	**E**	**F**
TH 169/5th Street	Side Street Stop	**F/F**	**F/F**
School Street/Freeport Avenue	Signalized	C	**F**
TH 169/School Street	Signalized	**F**	**E**
School Street/Dodge Avenue	Side Street Stop	**F/F**	**F/F**
TH 169/191st Avenue	Side Street Stop	**E/F**	B/B
Freeport Avenue/Jackson Street	All Way Stop	A	D
Jackson Street/Holt Street	Side Street Stop	C/**E**	**F/F**
TH 169/193rd Avenue	Signalized	**F**	**E**
193rd Avenue/Evans Street	Side Street Stop	D/**F**	**F/F**
197th Avenue/Irving Street	All Way Stop	A	**F**
TH 169/197th Avenue	Signalized	**F**	D
197th Avenue/Evans Street	Side Street Stop	A/C	A/B
TH 169 East Ramps/205th Avenue	Side Street Stop	A/A	A/A
TH 169/213th Avenue	Side Street Stop	**F/F**	**F/F**
TH 169/Elk River Bituminous Entrance	Side Street Stop	B/**F**	D/**F**
TH 169/221st Avenue	Side Street Stop	**F/F**	**F/F**
TH 169/225th Avenue	Side Street Stop	**E/F**	**E/F**
TH 169/Waste Management Entrance	Side Street Stop	D/**F**	C/**F**

Note: Levels of service (LOS) for unsignalized intersections are reported by an overall LOS followed by the worst approach LOS.



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Year 2030 No Build Conditions (1 of 2)

TH 169 in Elk River Traffic Study

City of Elk River

Figure 4

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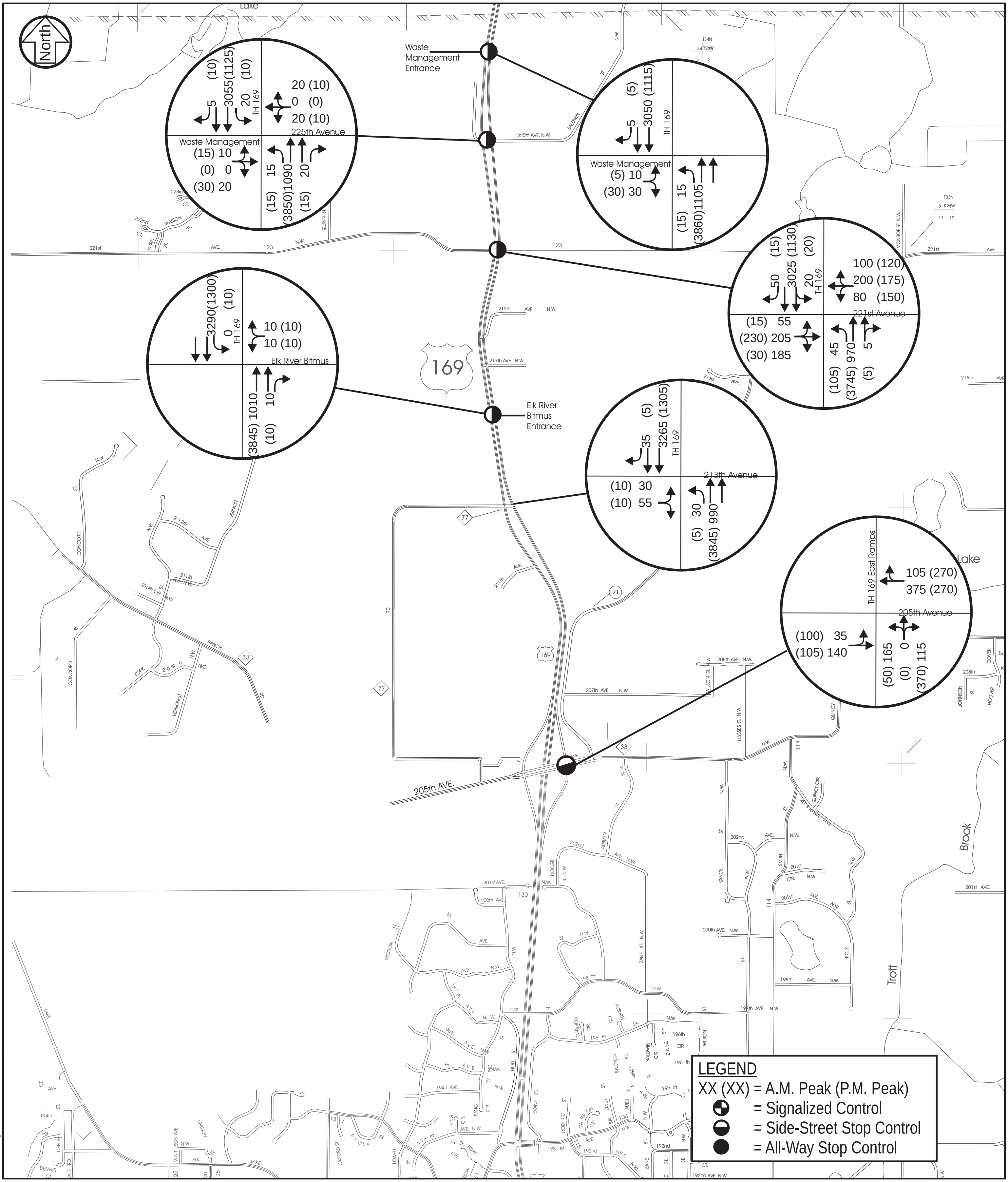

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Year 2030 No Build Conditions (2 of 2)

TH 169 in Elk River Traffic Study

City of Elk River

Figure 5

YEAR 2030 BUILD ANALYSIS

The year 2030 Build analysis was performed to determine if the proposed build concepts will mitigate the congestion issues the existing roadway geometrics and traffic control will experience under 2030 Build conditions.

Year 2030 Build volumes were developed using a similar process used in the development of the 2030 No-Build volumes. The primary difference is that under year 2030 Build conditions, several improvements to the TH 169 corridor will result in higher average daily traffic volumes than year 2030 No-Build conditions since the improved corridor attracts more trips.

There are several improvements that will be made along the TH 169 Corridor. The entire study segment from the TH 10/101/169 Interchange in Elk River through north of Fremont Avenue in Zimmerman will be converted into a freeway segment. This eliminates all at-grade intersections and will limit the access points to TH 169. Interchange alternatives were formed and preferred alternatives were chosen based on their location and environmental impact. Listed are the detailed changes to the TH 169 corridor:

TH 10/101/169 Interchange
The TH 10/101/169 Interchange will be converted into a full systems interchange. The systems interchange eliminates all full-access at-grade intersections of the existing interchange. The new interchange includes two loops and two flyover ramps. The interchange also includes a two-phase signal TH 10/169 EB on ramp from TH 101 NB and TH 169 SB. This signal will serve to meter the merge movements between the ramp and mainline.

Great River Energy Entrance
Great River Energy will no longer have a driveway access to TH 169 but will have a relocated entrance at an adjacent street

Main Street Interchange
The TH 169/Main Street Intersection will be converted into a single point interchange. The south ramps will tie directly to TH 169 while the north ramps will tie into a collector-distributor road between Main Street and School Street.

Main Street/School Street Collector-Distributor Road
School Street and Main Street are too close to have independent interchanges, therefore, a collector-distributor road is needed between the two cross streets. The collector-distributor road will eliminate weaving on the TH 169 mainline.

School Street Interchange
The TH 169/School Street intersection will be converted into a standard diamond interchange configuration.

School Street/193rd Avenue Collector-Distributor Road

School Street and 193rd Avenue are too close to have independent interchanges, therefore, a collector-distributor road is needed between the two cross streets. The collector-distributor road will eliminate weaving on the TH 169 mainline.

193rd Avenue Interchange

The TH 169/193rd Avenue intersection will be converted to a folded diamond configuration on the east and a standard diamond configuration on the west. The east ramps will tie in with the north approach of Evans Street.

197th Avenue Interchange

The TH 169/197th intersection will be converted to a half diamond interchange to the north. There will be no access to 197th Avenue from the TH 169 south approach.

221st Avenue Interchange

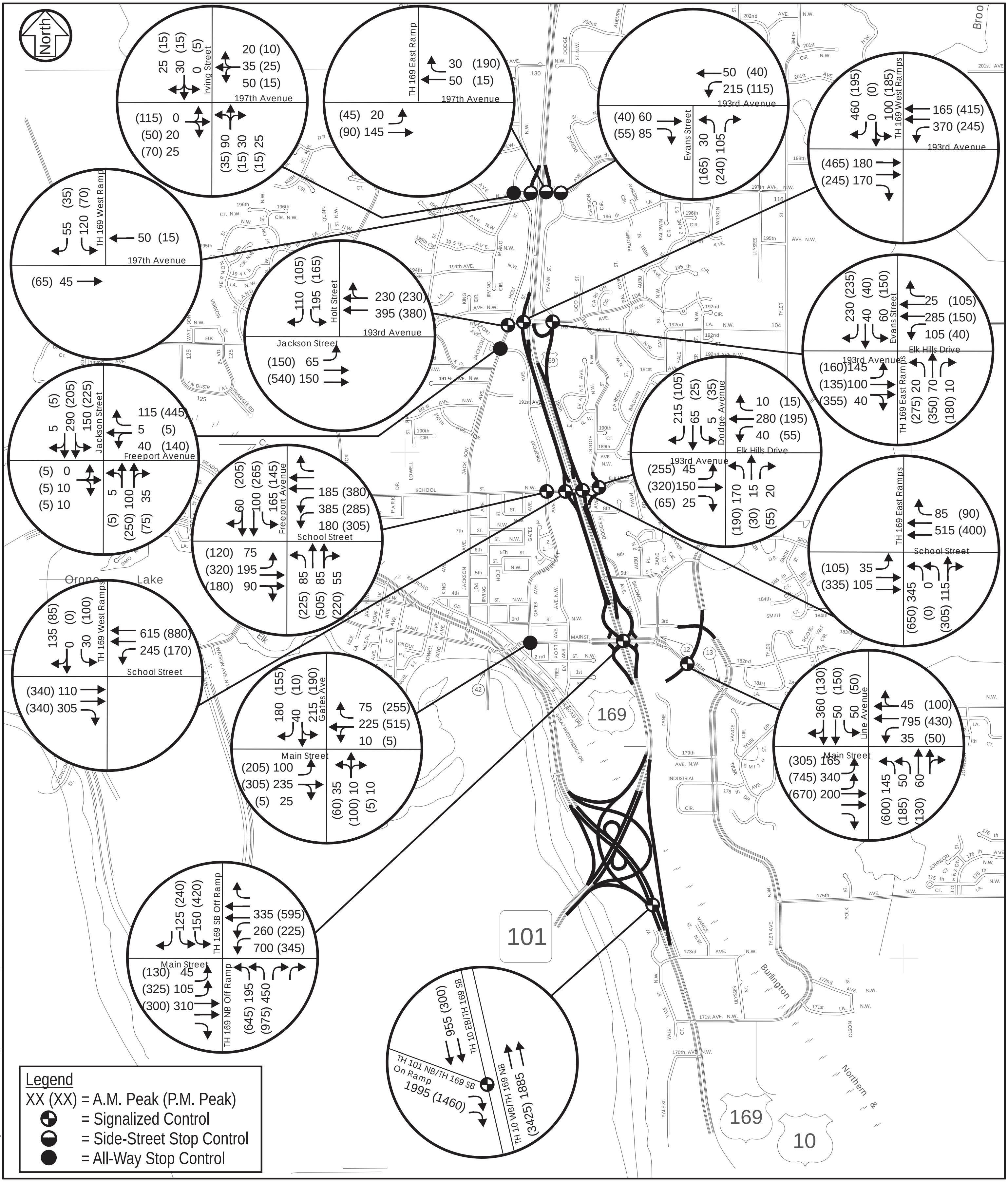
The 221st Avenue/TH 169 intersection will be converted to a folded diamond on the east and buttonhook ramps on the west.

239th Avenue Overpass

The 239th Avenue/TH 169 intersection will be converted into an overpass.

All of these geometric improvements along with the year 2030 build turning movement volumes are illustrated in Figures 6 and 7.

A traffic operations analysis was performed at select build geometrics to determine if the new geometrics can accommodate the year 2030 turning movement volumes. The locations where SimTraffic and the Highway Capacity Software were used were at the Main Street Interchange, School Street Interchange, and the 193rd and 197th interchanges. The results of this analysis can be viewed in Table 4.



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Year 2030 Build Conditions (1 of 2)

TH 169 in Elk River Traffic Study

City of Elk River

Figure 6

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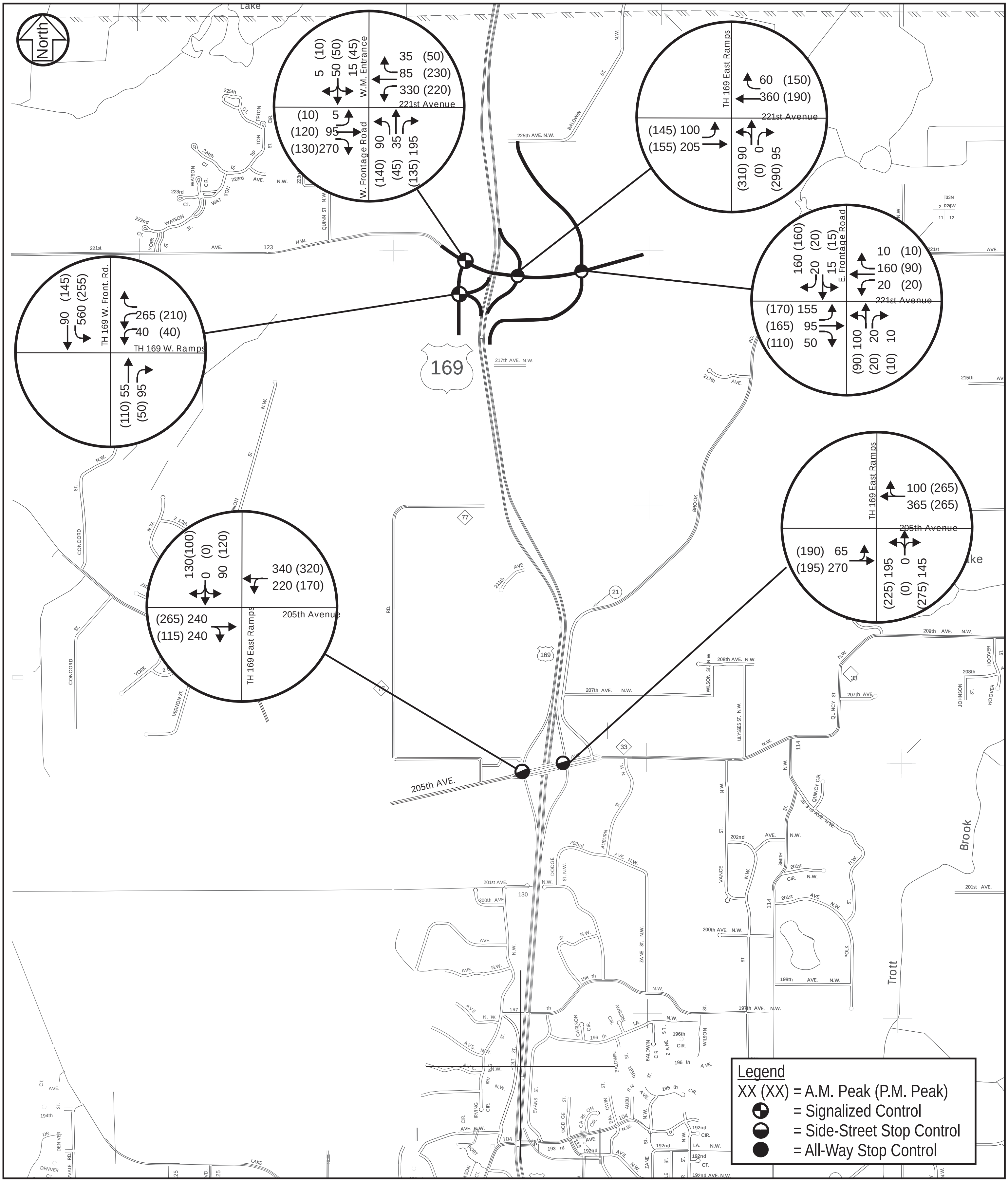

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Year 2030 Build Conditions (2 of 2)

TH 169 in Elk River Traffic Study

City of Elk River

Figure 7

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Year 2030 Build Peak Hour Capacity Analysis
Level of Service Results

Intersection	Intersection Control	Level of Service Results	
		Peak Hour A.M.	Peak Hour P.M.
Systems Interchange			
TH 10 EB/169 SB/On Ramp	Signalized	D	B
Main Street Interchange			
Main Street/Gates Avenue	All-Way Stop	C	B
Main Street/Carson Street	Side-Street Stop	A/B	A/A
Main Street/TH 169 SPIU	Signalized	B	C
Main Street/Line Avenue	Signalized	C	D
School Street Interchange			
School Street/Freeport Street	Signalized	C	C
School Street/West Ramps	Signalized	A	A
School Street/East Ramps	Signalized	B	C
School Street/Dodge Avenue	Signalized	C	C
193rd Avenue Interchange			
Jackson Avenue/Freeport Street	All-Way Stop	A	A
193rd Avenue/Holt Street	Signalized	B	B
193rd Avenue/West Ramps	Signalized	B	B
193rd Avenue/East Ramps/Evans Street	Signalized	B	B
197th Avenue Interchange			
197th Avenue/Holt Street/Irving Street	All-Way Stop	A	A
197th Avenue/West Ramp	Side Street Stop	A/A	A/A
197th Avenue/East Ramp	Side Street Stop	A/A	A/A
197th Avenue/Evans Street	Side Street Stop	A/A	A/A

Note: Levels of service (LOS) for unsignalized intersections are reported by an overall LOS followed by the worst approach LOS.

The analysis results from Table 4 indicate that all intersections in the a.m. and p.m. peak period for year 2030 build volumes operate at an acceptable LOS D or better.

Critical lane analysis was used to determine if the intersections at the interchange of TH 169/221st Avenue would perform under capacity given base geometrics. Year 2030 Build volumes were produced at these intersections by comparing 2030 ADTs at this location to existing ADTs and growing the existing turning movements accordingly. The thresholds of critical lane analysis are shown in Table 5 while the results of the critical lane analysis are shown in Table 6. The analysis results show that all four intersections operate well under capacity at base geometrics.

Table 5
Critical Lane Thresholds and Capacity Relationships

Signalized Intersections	
Sum of Critical Lane Volumes [vph]	**Relationship to Probable Capacity**
0 – 1,200	Under Capacity
1,201 – 1,400	At Capacity
≥ 1,400	Over Capacity

Table 6
Critical Lane Analysis Results

Intersection Description	Sum of Critical Lane Volumes [vph] A.M. Peak Hour	Sum of Critical Lane Volumes [vph] P.M. Peak Hour	Relationship to Probable Capacity
TH 169/221st Avenue East Ramps	590	740	Under Capacity
TH 169/221st Avenue West Ramps	685	460	Under Capacity
TH 169/221st Avenue East Frontage Rd	525	460	Under Capacity
TH 169/221st Avenue West Frontage Rd	520	540	Under Capacity

CONCLUSIONS AND RECOMMENDATIONS

The surrounding communities along the TH 169 corridor plan to have significant socio-economic growth through year 2030. Because of this growth, the travel demand along TH 169 will also significantly increase. Traffic operations analysis show that the existing TH 169 corridor will not be able to accommodate the anticipated year 2030 traffic volumes. The conversion of TH 169 to a four-lane freeway section from TH 10 in Elk River, along with the proposed interchanges at Main Street, School Street, 193rd Avenue, 197th Avenue, and 221st Avenue will enable the TH 169 corridor to accommodate the year 2030 traffic volumes.

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APPENDIX A:

TH 169 TRAVEL DEMAND MODELING DOCUMENTATION

SRF No. 0065875

MEMORANDUM

TO: John Hagen, P.E., Senior Associate

FROM: Jonathan Ehrlich, P.E., Senior Engineer

DATE: March 5, 2007

SUBJECT: TH 169 IN ELK RIVER TRAVEL DEMAND MODELING

This memorandum documents assumptions for the highway network and socioeconomic data to be used in the TH 169 interchange study in Elk River, as well as the forecast model process. These assumptions are all derived from the 2006 *Sherburne County Transportation Plan* forecasting process. The text of this memorandum is intended to be incorporated into a larger traffic report.

TRAVEL DEMAND MODELING PROCESS

Travel demand models estimate the amount of travel on transportation facilities given sets of development and transportation system development. The forecast provide basic descriptors of facility use (such as roadway volumes or transit ridership) and generalized travel impacts such as vehicle miles of travel and vehicle hours of travel.

Travel demand models are based on mathematical relationships and assumptions regarding future conditions. Models provide a representation of the future, but lack of certainty regarding future-year conditions dictates that model results should not be considered as having unwarranted precision. Their best use is as a comparison among alternatives for relative differences and impacts. Decision-makers and designers should be aware of the uncertainty in long-range forecasts and whether that uncertainty would affect outcomes related to forecast volumes.

Travel forecasts for TH 169 in Elk River were prepared using a modified version of the Collar County travel demand models developed by the Minnesota Department of Transportation and the Metropolitan Council. These models are computerized procedures for systematically predicting travel demand changes in response to development and transportation facility changes. They were completed in 2006 using data from an extensive regional Travel Behavior Inventory (TBI) conducted by the Metropolitan Council and Mn/DOT in 2001.

The procedure used to simulate and forecast travel patterns is a complex battery of input data and computer processes that transform data into representations of travel. The process uses the standard "four-step" approach to travel forecasting with sequential generation, distribution, mode choice, and assignment models. Detailed documentation of model process and parameters is available from Mn/DOT.

Zonal Data Representation

The Collar County models divide the nineteen-county region into 1,664 geographic transportation analysis zones (or TAZs). The zones serve as the beginning and end locations of travel in the region. The zonal system was determined primarily on the basis of physical boundaries and major roadways.

Collar County TAZs were subdivided in within Sherburne County to better characterize trip patterns. Zonal boundaries were drawn consistent with on the 2003 I-94/TH 10 Interregional Connection EIS and the 2001 Elk River Transportation Plan. The TAZ refinement process converted the 37 zones in Sherburne County to 156 zones.

Highway Network Representation

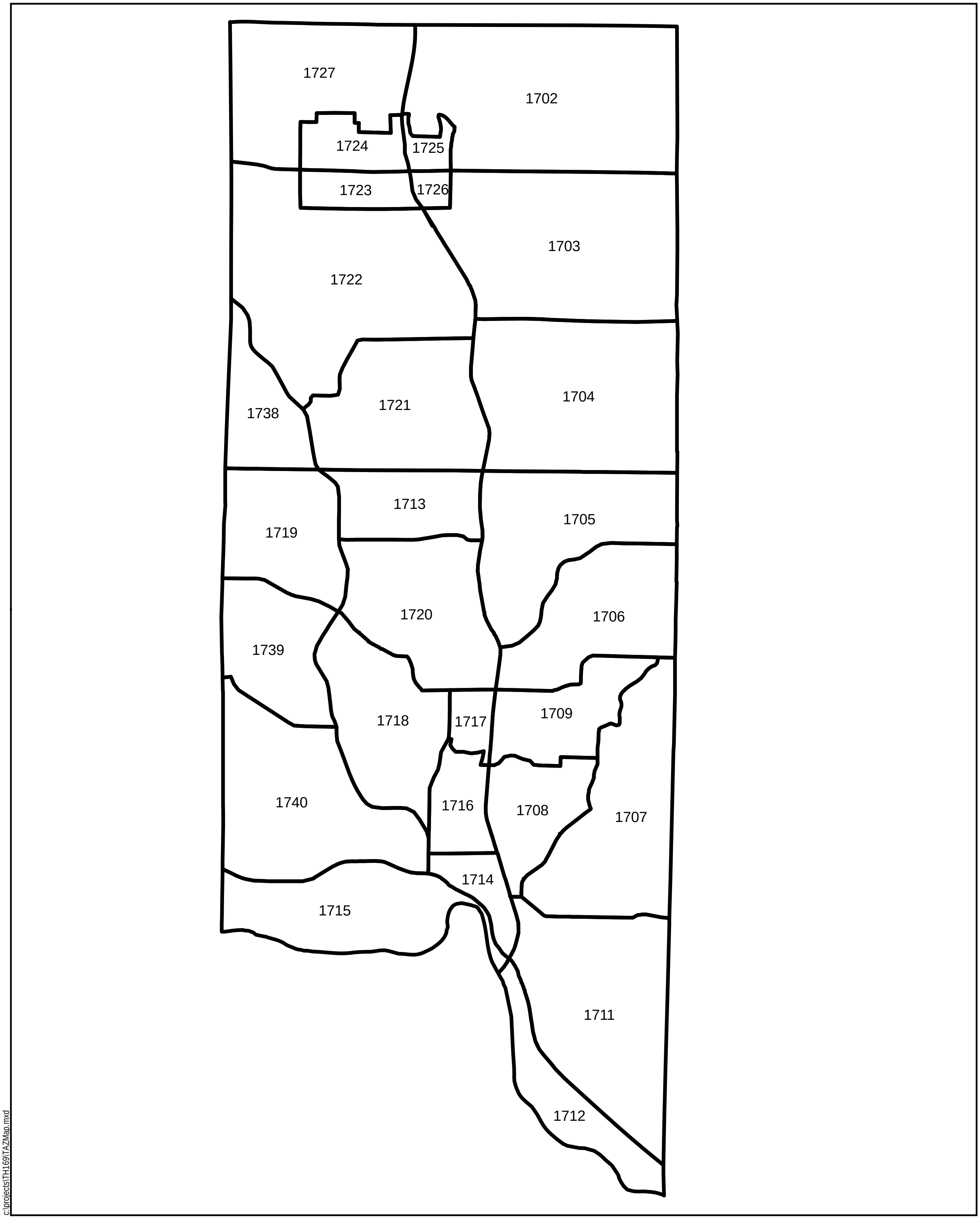
All of the freeways, expressways, and major arterial roadways in the region are compiled into a computer representation of the region's highway system. In addition, most minor arterials and many collector roads and other local streets are included. The attributes of the roadways are described in terms of area type, facility type, distance, free-flow speed, number of lanes, and capacity. The roadway network within Sherburne County was modified to include more detail: both as a result of the refinement of TAZs and the desire to include lower volume roadways in the model to better estimate travel patterns. All arterials in Sherburne County are included.

Trip Generation

Trip generation is the process by which the number of trips attributed to a zone is estimated based on the amount and type of activity in that zone. The end result of trip generation estimation is a total number of person-trips produced by and attracted to each zone. The trip generation phase of the forecasting process uses trip rates based on the 2001 regional TBI applied to each zone to calculate the number of person-trips taken, by purpose. The determinants of household trip production are household size, household income, the number of automobiles owned, and location. Several factors contribute to trip attractions, depending on the trip purpose. The main factors are retail employment, non-retail employment, and the amount of activity within a given proximity and area type.

Destination Choice

The destination choice process coverts the person-trips estimated in the generation step to movements between pairs of zones based on the amount of travel activity in a zone and the generalized travel time proximity of the producing zone to other zones. The resulting trip tables provide the number of trips between zones.



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Sherburne County Transportation Plan TAZs

Interchange Study - Elk River to Zimmerman

Minnesota Department of Transportation

Figure 1

Mode Choice

The mode choice phase of the regional model uses a nested discrete choice model to identify the number of person-trips between each pair of zones and determine whether the trips are made by single-occupant vehicles, carpools, or transit riders. The model is further used to determine if a trip is a candidate for a high-occupancy vehicle lane.

Temporal Distribution

The time-of-day or temporal distribution model takes the estimated daily vehicle trips and distributes them across periods of time in order to more accurately reflect peaking conditions on the roadway system. Four time periods representing the morning and afternoon peak periods, midday, and evening/night are differentiated.

Highway Assignment

The highway assignment model chooses the route between zones for any given trip. The process chooses routes based on travel times that reflect the appropriate traffic volume, roadway capacity, and speed relationship. It is an equilibrium model, which uses multiple iterations to balance demand with capacity, thereby reflecting capacity constraint.

Model Iterations

The regional model is run on an iterative process. Congested highway travel times are estimated by the highway assignment process, and then cycles back through the steps of the model. Congested travel times affect trip generation, destination choice, and mode choice. The end result is a set of travel demand forecasts that reflect the effects of congestion on travel choices. The model is run until sufficient convergence is reached, which for the purpose of this study, was four iterations.

FUTURE YEAR TRANSPORTATION FACILITY ASSUMPTIONS

- **TH 10 improvements included in 2030 base network**[1]
    - Big Lake bypass: 2024-2030 investment plan[2]
    - TH 10 / I-94 river crossing: 2015-2023 investment plan[3]
    - Freeway upgrades
        - TH 10 from Clear Lake to St Cloud
        - TH 10 from CSAH 15 east of Big Lake to CSAH 50 west of Big Lake
    - Additional interchanges
        - TH 10 and old TH 10 (Big Lake)
        - TH 10 and CSAH 16
        - TH 10 and CSAH 3
    - Additional overpasses
        - CSAH 65 N of Clear Lake

- **Other Regional Assumptions**
    - TH 101- Four Lane Freeway from I-94 to TH 10
    - I-94- Six lanes from TH 610 to TH 101, four lanes west TH 101

- **Local Elk River Improvements**
    - Connection of Sherburne CSAH 33 / Anoka CSAH 22
    - Connection of CSAH 12 with TH 101
    - Fillmore St NW extension south to TH 10(East of Elk River)
    - Realignment of CSAH 33 / CSAH 77 intersection

[1] Source planning documents included Highway 10/Highway 24 IRC plan, TH 10 Corridor Management Plan, District Three Long Range Plan
[2] District Three Long Range Plan
[3] District Three Long Range Plan

FUTURE YEAR (2030) SOCIOECONOMIC ASSUMPTIONS

Forecast of future year socioeconomic data (populations, household, retail and non-retail employment) for each zone in the model area is a primary determinant of the amount and characteristics of travel. Future year growth in population and employment was developed from a variety of sources

Past experience has shown that county-level population projections from the Minnesota State Demographic Center underestimate population growth in Sherburne County. The 2004 populations of Sherburne County (79,000) almost equal the 2010 projection of 86,400. Therefore, overall county population and employment totals were based on extrapolations of fifteen year trends. These population estimated represent a reasonable and conservative estimate of growth.

Projections for St. Cloud City and Haven Township were taken from the St. Cloud Area Planning Organization, which regularly prepares future year development projections.

City staff at every incorporated community in Sherburne County was contacted and their best assessments of growth patterns within their communities were requested and used wherever available. The City of Elk River provided their most recent transportation plan. County staff was consulted regarding growth patterns in townships.

Where local data were unavailable, future growth was allocated based on projections in the 2003 Mn/DOT I-94/TH 10 Interregional Connection EIS.

Table 1 and Table 2 display Sherburne County socio-economic data assumptions by community. Table 3 and Table 4 display TAZ level socio-economic data assumptions within the project study area. The TAZ system is shown in Figure 1.

TABLE 1
MUNICIPAL POPULATION/HOUSEHOLD TOTALS FOR SHERBURNE COUNTY

City/Township	2000		2030	
	Population	Households	Population	Households
City of Becker	1,741	567	5,050	2,020
City of Big Lake	3,235	1,177	6,321	2,132
City of Clear Lake	64	23	691	258
City of Elk River	16,144	5,587	43,069	13,765
City of Princeton (part)	7	1	550	220
City of St. Cloud (part)	3,440	1,262	4,387	1,448
City of Zimmerman	3,447	1,141	6,559	2,239
Baldwin Township	4,623	771	20,725	8,340
Becker Township	3,665	1,183	16,457	6,420
Big Lake Township	9,071	2,876	23,361	7,750
Blue Hill Township	811	135	1,267	369
Clear Lake Township	1,295	444	4,420	1,807
Haven Township	2,236	752	13,362	4,410
Livonia Township	2,613	842	17,755	6,233
Orrock Township	2,608	842	5,184	1,835
Palmer Township	2,186	760	4,155	1,562
Santiago Township	1,553	259	1,279	426
Total	58,738	18,620	174,595	61,234

TABLE 2
MUNICIPAL EMPLOYMENT TOTALS FOR SHERBURNE COUNTY

City/Township	2000 Employment			2030 Employment		
	Retail	Non-Retail	Total	Retail	Non-Retail	Total
City of Becker	55	752	807	335	879	1,214
City of Big Lake	75	975	1,050	118	2,426	2,544
City of Clear Lake	9	129	138	40	164	204
City of Elk River	1,628	4,547	6,175	1,631	16,250	17,881
City of Princeton (part)	0	670	670	0	2,819	2,819
City of St. Cloud (part)	24	161	185	330	177	507
City of Zimmerman	99	1,339	1,438	172	2,297	2,469
Baldwin Township	0	0	0	0	0	0
Becker Township	2	214	216	1,518	4,764	6,282
Big Lake Township	48	1,212	1,260	241	3,517	3,758
Blue Hill Township	0	0	0	0	0	0
Clear Lake Township	0	94	94	618	471	1,089
Haven Township	363	1,406	1,769	1,903	1,756	3,659
Livonia Township	0	82	82	457	1,419	1,876
Orrock Township	1	116	117	284	1,020	1,304
Palmer Township	0	0	0	236	1,352	1,588
Santiago Township	0	0	0	0	0	0
Total	2,303	11,696	13,999	7,882	39,311	47,193

TABLE 3
STUDY AREA TAZ-LEVEL POPULATION/HOUSEHOLD TOTALS

TAZ	2000 Population	2000 Households	2030 Population	2030 Households
1702	496	164	2,419	931
1703	496	164	2,017	776
1704	496	164	1,325	509
1705	89	28	808	259
1706	444	139	1,021	327
1707	315	90	9,437	3,091
1708	1,462	451	2,594	821
1709	825	255	1,530	484
1711	379	127	5,420	1,512
1712	198	42	1,547	523
1713	46	15	859	258
1714	3,223	1,229	2,949	1,050
1715	3,573	1,114	6,162	1,777
1716	1,322	504	1,857	661
1717	166	63	110	39
1718	991	378	2,184	778
1719	134	41	1,233	369
1720	333	104	1,644	493
1721	296	92	1,333	446
1722	444	138	5,936	1,988
1723	551	182	9,572	3,061
1724	2,137	707	24,364	7,786
1725	724	240	8,265	2,639
1726	35	12	869	279
1727	330	103	4,604	1,542
1738	57	18	121	40
1739	248	94	655	233
1740	2,396	913	3,058	1,089

TABLE 4
STUDY AREA TAZ-LEVEL EMPLOYMENT TOTALS

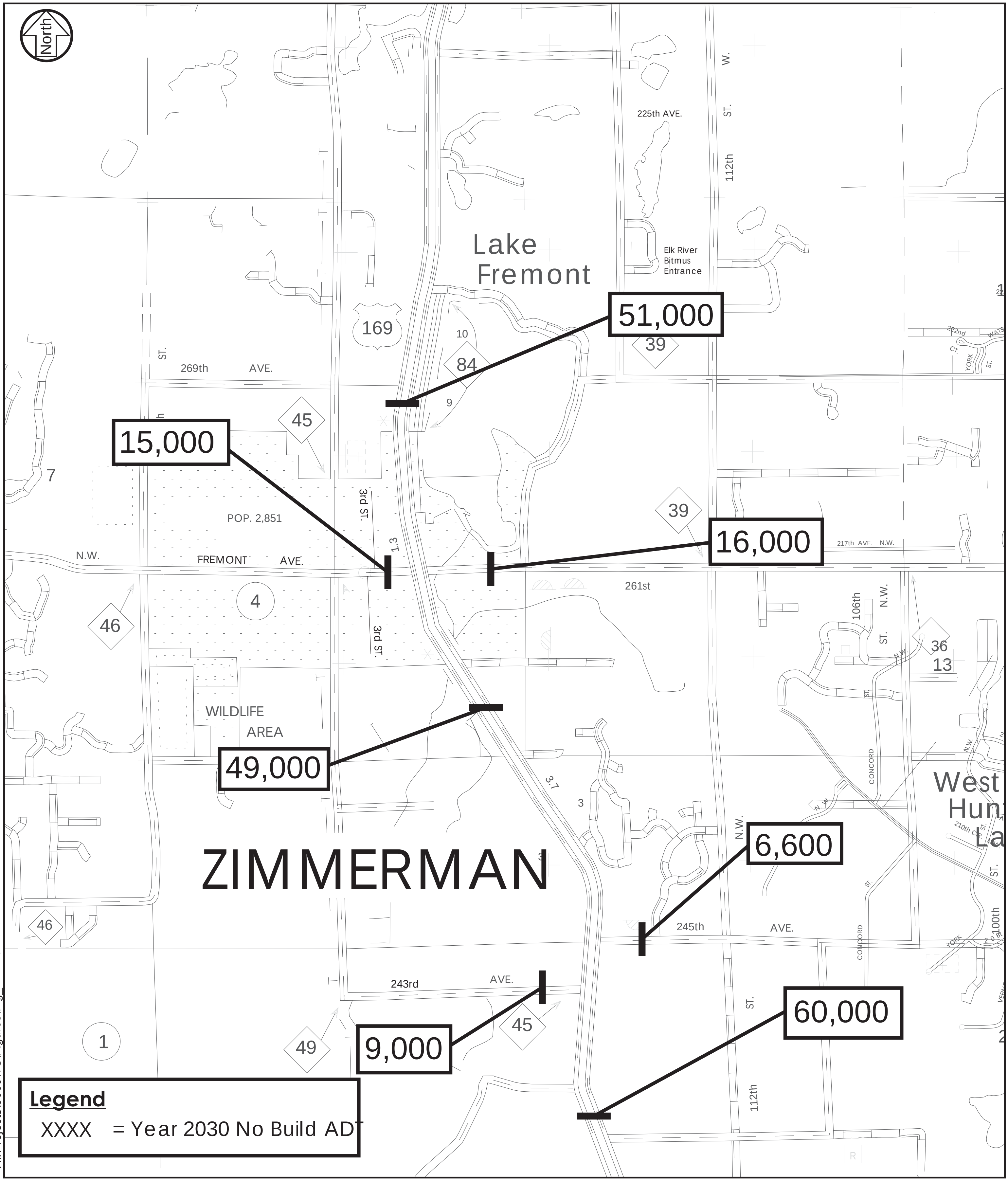
City/Township	2000 Employment			2030 Employment		
	Retail	Non-Retail	Total	Retail	Non-Retail	Total
1702	0	14	14	149	30	179
1703	0	14	14	31	116	147
1704	0	14	14	0	20	20
1705	0	5	5	0	4	4
1706	0	16	18	0	191	193
1707	0	43	50	0	45	46
1708	212	240	396	206	196	384
1709	58	48	88	56	39	91
1711	231	542	757	364	6,209	6,597
1712	95	180	261	50	59	104
1713	0	13	15	0	10	10
1714	783	1,016	1,614	649	999	1,597
1715	170	924	1,165	231	4,761	5,015
1716	8	339	397	7	370	379
1717	0	0	0	0	0	0
1718	0	121	140	0	149	150
1719	0	17	20	0	20	20
1720	20	101	128	19	977	1,003
1721	0	10	10	22	401	423
1722	0	16	16	100	602	701
1723	33	446	479	616	5,362	5,960
1724	33	446	479	673	5,362	6,004
1725	33	446	479	322	5,362	5,736
1726	0	0	0	19	163	181
1727	0	11	11	150	226	376
1738	0	3	3	6	25	31
1739	0	97	112	0	111	112
1740	50	847	1,009	50	2,109	2,174

2030 FORECASTS

2030 No Build and Build forecast results are shown in Figures 2 and 3.

While the collar county model is validated to base year (2000-2002) counts, there is always a certain base-year discrepancy in each link. To account for this discrepancy, forecast year volumes were adjusted on a link-by-link basis. Volume adjustments were be applied consistent with the methods described in *NCHRP 255 (Highway Traffic Data for Urbanized Area Project Planning and Design),* chapter four. This method averages adjustments derived from the ratio and the arithmetic difference of base year ground counts to assigned volumes.

A blind application of this technique is inappropriate under the Build condition, where TH 169 is experiencing a major change in capacity. Therefore, a staged approach was followed. For each arterial link, the model difference between the Build and No Build alternative was calculated. The future year percentage adjustment from the No Build volumes was applied to the difference, and then added to the No Build volume to produce a Build volume. The volume on TH 169 under the Build alternative was calculated by adding up forecast diversions (adjusted difference between No Build and Build) on parallel arterials.



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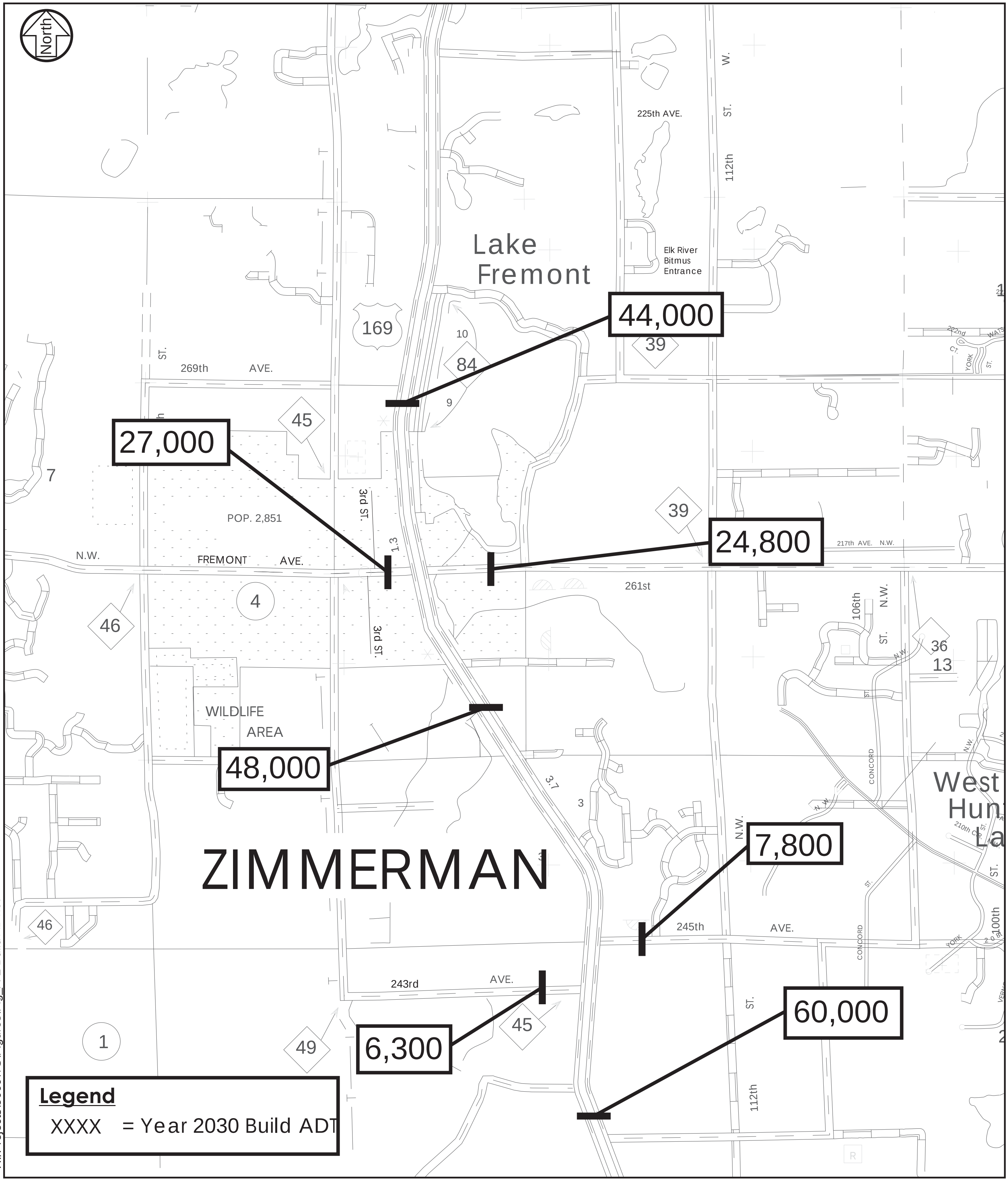
Year 2030 No Build Average Daily Traffic Forecasts

TH 169 in Zimmerman Traffic Study

City of Zimmerman

Figure A-2

5669
February 2008



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Year 2030 Build Average Daily Traffic Forecasts

TH 169 in Zimmerman Traffic Study

City of Zimmerman

Figure A-3

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February 2008

TECHNICAL MEMORANDUM 2 –
TRAFFIC OPERATIONS AND FORECASTS
FINAL MARCH 5, 2008

INTRODUCTION

The Trunk Highway 169 (TH 169) corridor is an important north-south principal arterial route in central Minnesota. In order for this corridor to continue to function efficiently in the future, a traffic operations analysis needs to be performed to determine the corridor changes that need to be made in the future. The limits of this analysis include TH 169 from 243rd Avenue NW south of Zimmerman to CSAH 4 in Zimmerman and the study intersections can be viewed in Figure 1. The purpose of the study is to determine the impact to intersections along the TH 169 corridor due to the increase in travel demand in the year 2030 and to mitigate the impact of the additional future traffic. This traffic study includes a travel demand modeling process to determine the future traffic volume demand along TH 169 for the year 2030. Ultimately, at-grade intersections along TH 169 through Zimmerman will be closed and TH 169 will become a freeway segment. Concepts were developed for interchange alternatives at major cross streets along TH 169 through Zimmerman and the traffic forecasts were used to determine the interchange alternatives that best address future transportation needs of the corridor.

EXISTING CONDITIONS

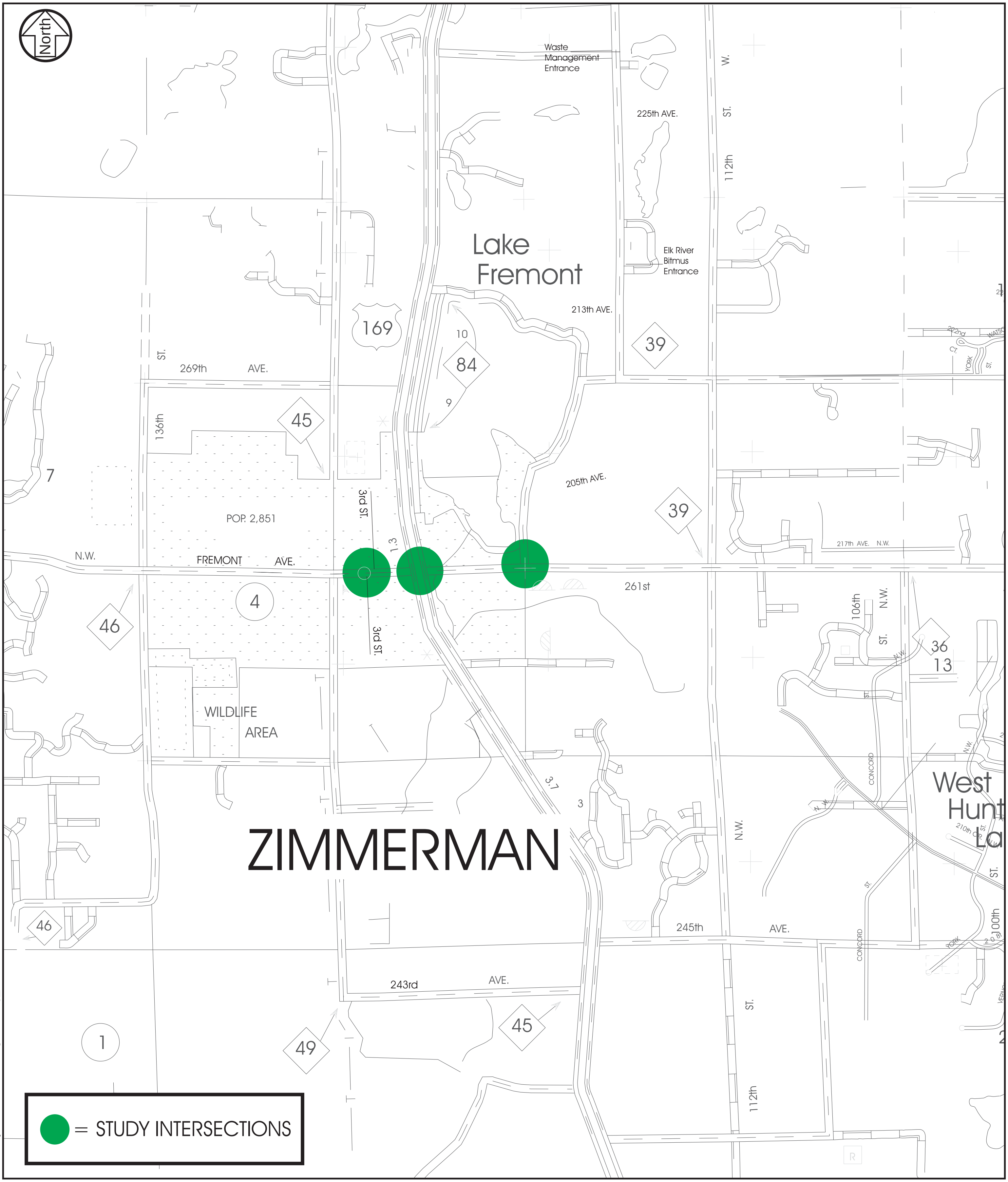
Traffic operations were analyzed at the following key intersections:

- Fremont Avenue (CSAH 4) and TH 169
- Fremont Avenue (CSAH 4) and Fremont Drive
- Fremont Avenue (CSAH 4) and 3rd Street (south leg)
- Fremont Avenue (CSAH 4) and 3rd Street (north leg)

SRF collected a.m. and p.m. peak hour counts at these key intersections. Figure 2 reflects the existing a.m. and p.m. traffic volumes, geometrics, and traffic control at each intersection.

An operations analysis was conducted for the a.m. and p.m. peak hours at each of the respective peak hour key intersections to determine how traffic currently operates. The signalized intersections were analyzed using the Synchro/SimTraffic software and unsignalized intersections were analyzed using the Highway Capacity Software. Capacity analysis results identify a Level of Service (LOS), which indicates how well an intersection is operating. The LOS results are based on average delay per vehicle. Intersections are given a ranking from LOS A through LOS F. LOS A indicates the best traffic operation and LOS F indicates an intersection where demand exceeds capacity. LOS A through D is generally considered acceptable by drivers (see Table 1).

For the analysis of side-street stop controlled intersections, the operations can be described in two ways. First, the overall intersection level of service is documented, which provides the average delay per vehicle for all approaches. However, at an intersection with side-street stop control, the mainline does not stop. Therefore, the majority of delay is experienced by vehicles on the side street. In addition to providing an average delay for all approaches, it is important to



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Study Area Intersections

TH 169 in Zimmerman Traffic Study

City of Zimmerman

Figure 1

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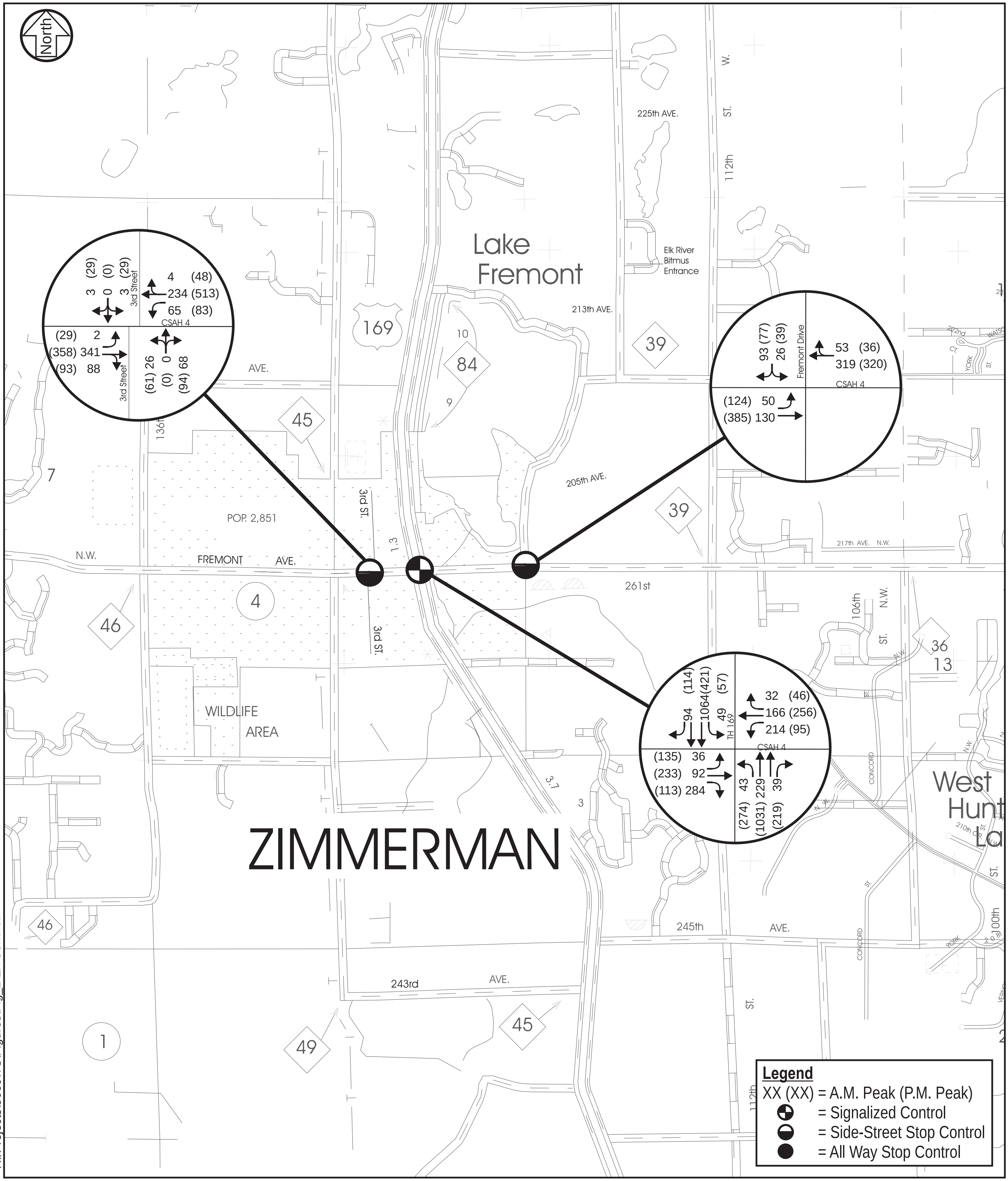
January 2008



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Existing Conditions

TH 169 in Zimmerman Traffic Study

City of Zimmerman

Figure 2

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March 2008

indicate the level of service on the side-street approach. It is typical of intersections with higher mainline traffic volumes to experience high levels of delay (poor levels of service) on the side-street approaches, but an acceptable overall intersection level of service during the peak periods.

Table 1
Level of Service Criteria for Signalized and Unsignalized Intersections

Level of Service	Average Delay per Vehicle [seconds]	
	Signalized Intersections	Unsignalized Intersections(1)
A	< 10	< 10
B	10 – 20	10 – 15
C	20 – 35	15 – 25
D	35 – 55	25 – 35
E	55 – 80	35 – 50
F	> 80	> 50

(1) Stop-controlled intersection LOS criteria are the same for side-street and all-way stop controlled intersections

Results of the existing analysis are shown in Table 2. The existing a.m. peak hour analysis shows that all key intersections operate at an acceptable overall LOS D. The CSAH 4/Fremont Drive intersection shows high delay on the side-street approach during the a.m. peak hour which results in poor side-street levels of service. During the existing p.m. peak hour, the analysis shows that all of the key intersections experience operational problems with either an overall intersection or a side-street level of service at unacceptable levels (LOS E or F). This is a direct result of long queues and high delays on CSAH 4 from the TH 169/CSAH 4 intersection.

Table 2
Existing Peak Hour Capacity Analysis
Level of Service Results

Intersection	Intersection Control	Level of Service Results	
		A.M. Peak Hour	P.M. Peak Hour
Fremont Avenue (CSAH 4) / TH 169	Signalized	D	**E**
Fremont Avenue (CSAH 4) / Fremont Drive	Side-Street Stop	C/**E**	**E/F**
Fremont Avenue (CSAH 4) / 3rd Street (South Leg)	Side-Street Stop	A/A	**F/F**
Fremont Avenue (CSAH 4) / 3rd Street (North Leg)	Side-Street Stop	A/A	C/**F**

Note: Levels of service for unsignalized intersections are reported by an overall intersection LOS followed by the worst approach LOS.

YEAR 2030 NO-BUILD ANALYSIS

A 2030 No-Build operations analysis was performed in order to determine what the impact that 2030 travel demand will have upon the existing TH 169 corridor. In order to develop 2030 Average Daily Traffic volumes, a travel demand modeling process was developed using assumptions derived from the 2006 Sherburne County Transportation Plan forecasting process. To see a detailed summary of the Travel Demand Modeling process, please see Appendix A.

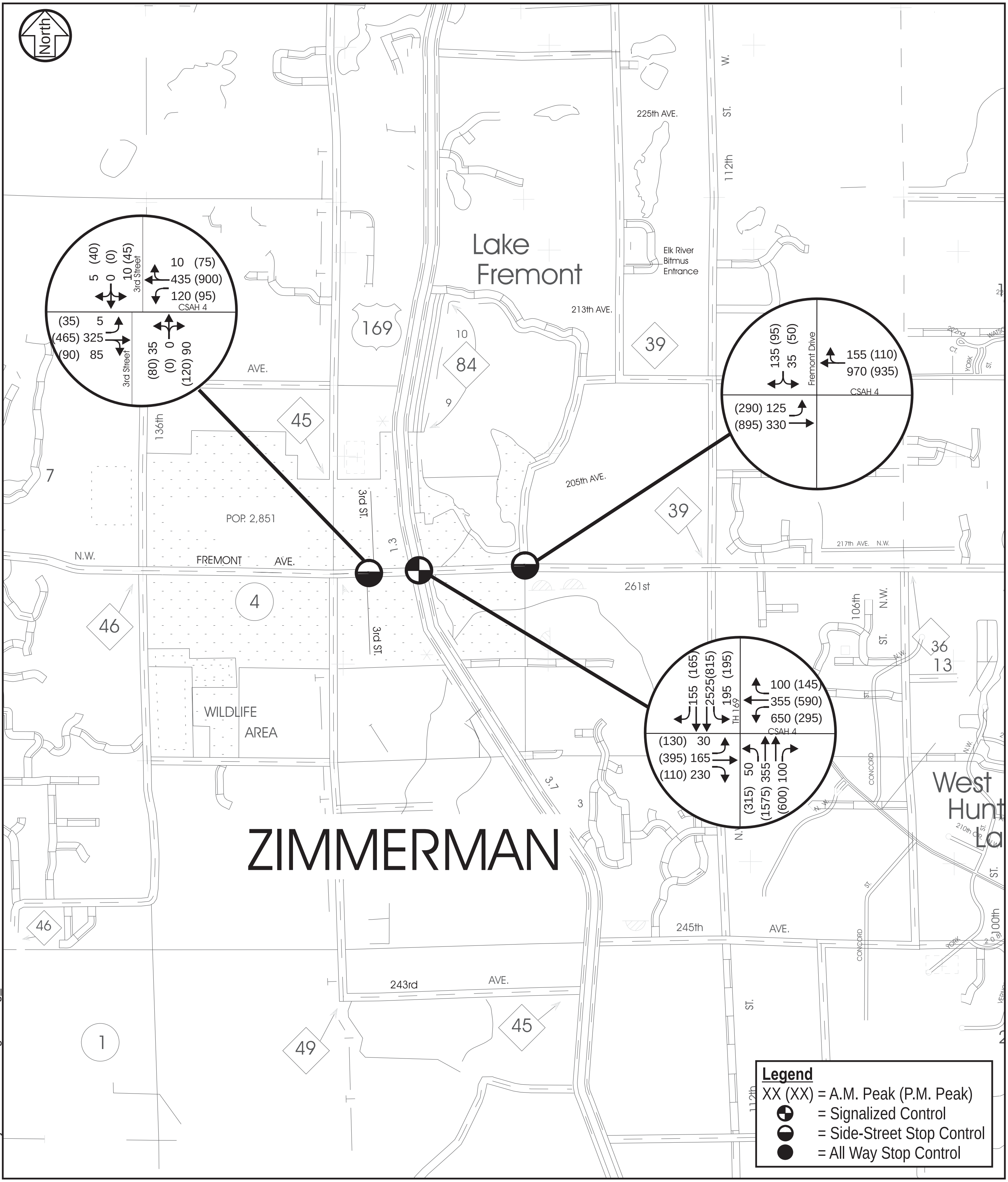
Once 2030 No-Build Average Daily Traffic Volumes were developed from the Travel Demand Model, turning movements at each intersection were produced using existing peak hour percentages and existing turning movement splits as an initial guide. Volumes between adjacent intersections were then balanced. 2030 No-Build turning movement volumes are shown in Figure 3.

The results of the 2030 No-Build operations analysis are shown in Table 3. The results reveal that most intersections along the TH 169 corridor report high delays at unacceptable levels in both the a.m. and p.m. peak hour periods. This is primarily due to the expected growth in traffic volumes along the TH 169 corridor without additional lane capacity.

Table 3
Year 2030 No-Build Peak Hour Capacity Analysis
Level of Service Results

Intersection	Intersection Control	Level of Service Results	
		A.M. Peak Hour	P.M. Peak Hour
Fremont Avenue (CSAH 4) / TH 169	Signalized	**F**	**F**
Fremont Avenue (CSAH 4) / Fremont Drive	Side Street Stop	**F/F**	**F/F**
Fremont Avenue (CSAH 4) / 3rd Street (South Leg)	Side Street Stop	A/**F**	**F/F**
Fremont Avenue (CSAH 4) / 3rd Street (North Leg)	Side Street Stop	**F/F**	**F/F**

Note: Levels of service for unsignalized intersections are reported by an overall intersection LOS followed by the worst approach LOS.



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Year 2030 No Build Conditions

Figure 3

TH 169 in Zimmerman Traffic Study

City of Zimmerman

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March 2008

YEAR 2030 BUILD ANALYSIS

The year 2030 Build analysis was performed to determine if the proposed build alternatives will mitigate the congestion issues that the existing roadway geometrics and traffic control will experience under the year 2030 Build conditions.

Year 2030 Build volumes were developed using a similar process used in the development of the year 2030 No-Build volumes. The primary difference is that under year 2030 Build conditions, several improvements to the TH 169 corridor will result in higher average daily traffic volumes than year 2030 No-Build conditions since the improved corridor attracts more trips.

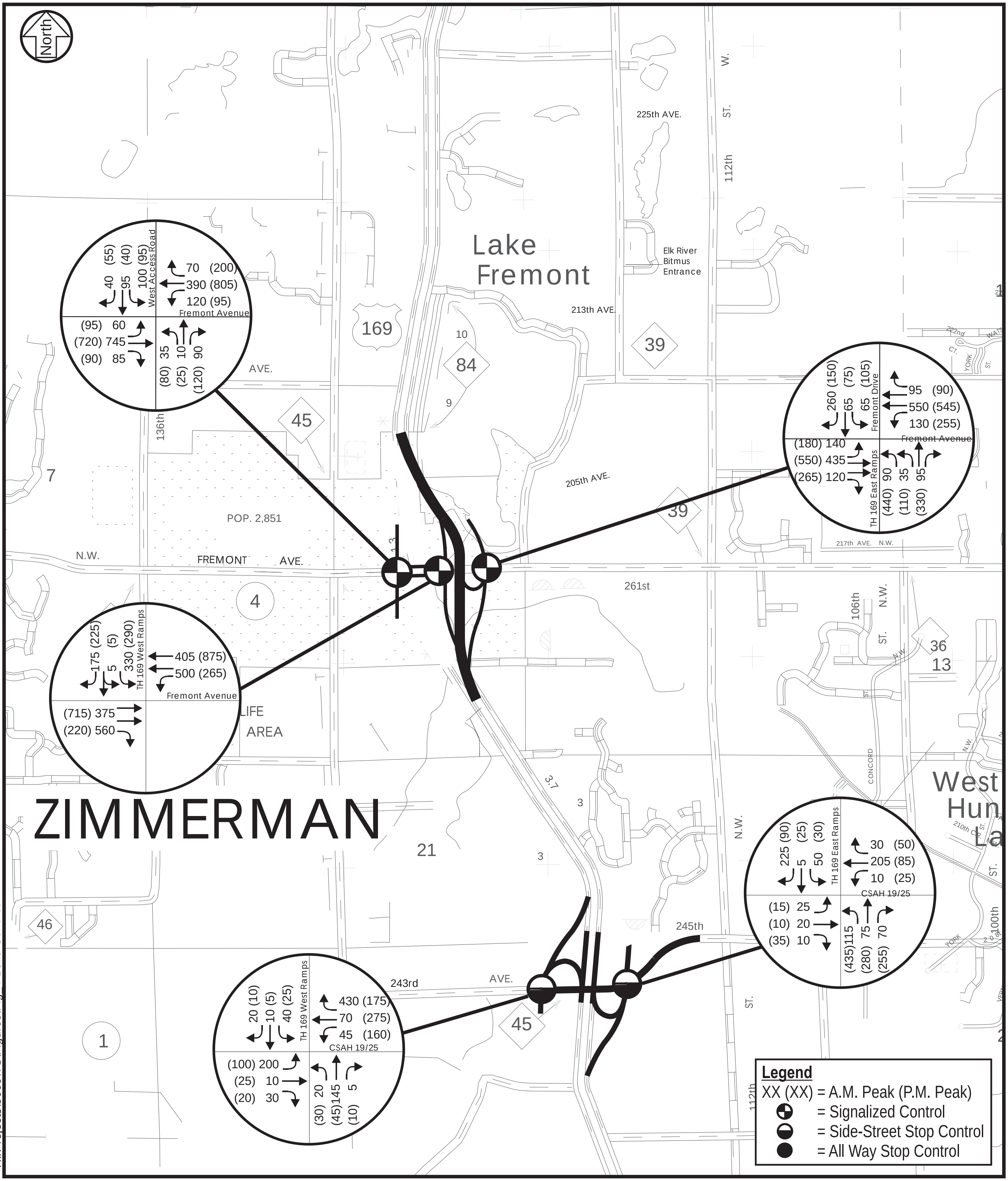
The improvements along the TH 169 Corridor include the conversion of TH 169 to a freeway segment. This will eliminate all at-grade intersections and will limit the access points to TH 169. Interchange alternatives were developed and preferred alternatives were chosen based on their location and overall impacts. The detailed changes to the TH 169 corridor in Zimmerman are listed below:

Fremont Avenue (CSAH 4) Interchange
The Fremont Avenue (CSAH 4)/TH 169 intersection will be converted into an interchange with a folded diamond configuration to the east and a standard diamond configuration to the west. The east ramps tie in with the north approach of Fremont Drive.

CSAH 19/25 Interchange
The intersections of TH 169/243rd Avenue NW and TH 169/245th Avenue will be converted into a folded diamond interchange with the west route becoming CSAH 19 and the east route becoming CSAH 25. While the CSAH 4 interchange is proposed to address both existing and year 2030 No-Build operational concerns, the CSAH 19/25 interchange is being proposed to provide a grade-separated alternative to the existing off-set, at-grade intersections of 243rd and 245th Avenues.

All of these geometric improvements along with the year 2030 build turning movement volumes are illustrated in Figures 6 and 7.

A traffic operations analysis was performed (using either SimTraffic and the Highway Capacity Software, or a critical lane analysis) at select build geometrics to determine if the new geometrics can accommodate the year 2030 turning movement volumes. SimTraffic and the Highway Capacity Software were used were at the Fremont Avenue (CSAH 4) Interchange intersections in Zimmerman. A critical lane analysis was used to determine if the intersections at the interchange of TH 169/CSAH 19/CSAH 25 would perform under capacity given base geometrics. The results of this 2030 Build analysis are described in the following sections.



Year 2030 Build Conditions

TH 169 in Zimmerman Traffic Study

City of Zimmerman

Figure 4

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March 2008

Fremont Avenue (CSAH 4) Interchange

The results of the 2030 Build analysis at the Fremont Avenue (CSAH 4) interchange are shown in Table 4.

Table 4
Year 2030 Build A.M. and P.M. Peak Hour Capacity Analysis
Level of Service Results

Intersection	Intersection Control	Level of Service Results A.M. Peak Hour	Level of Service Results P.M. Peak Hour
Fremont Avenue (CSAH 4) Interchange			
Fremont Avenue (CSAH 4) / West Access Road	Signalized	D	C
Fremont Avenue (CSAH 4) / West Ramps	Signalized	C	C
Fremont Avenue (CSAH 4) / East Ramps/Fremont Drive	Signalized	D	D

The analysis results from Table 4 indicate that all intersections operate at an acceptable LOS D or better under year 2030 peak hour Build conditions given the proposed lane designations and traffic control shown in Figure 4.

CSAH 19/25 Interchange

Year 2030 Build volumes were produced at these intersections by comparing year 2030 Build daily traffic volumes at this location to existing average daily traffic volumes. The thresholds of critical lane analysis at the CSAH 19/25 Interchange are shown in Table 5 while the results of the critical lane analysis are shown in Table 6. The analysis results show that both intersections will operate well under capacity under year 2030 conditions given the lane designations shown in Figure 4.

Table 5
Critical Lane Thresholds and Capacity Relationships

Signalized Intersections	
Sum of Critical Lane Volumes [vph]	**Relationship to Probable Capacity**
0 – 1,200	Under Capacity
1,201 – 1,400	At Capacity
≥ 1,400	Over Capacity

Table 6
Year 2030 Build Peak Hour
Critical Lane Analysis Results

Intersection	Sum of Critical Lane Volumes [vph]		Relationship to Probable Capacity
	A.M. Peak Hour	P.M. Peak Hour	
TH 169/CSAH 19/25 East Ramps	635	790	Under Capacity
TH 169/CSAH 19/25 West Ramps	940	655	Under Capacity

CONCLUSIONS AND RECOMMENDATIONS

The surrounding communities along the TH 169 corridor plan to have significant socio-economic growth through year 2030. As a result of this growth, the travel demand along the TH 169 corridor will also significantly increase. Traffic operations analysis show that the existing TH 169 corridor will not be able to accommodate the year 2030 No-Build traffic volumes. The conversion of TH 169 to a four-lane freeway from 243rd Avenue NW through CSAH 4 in Zimmerman, along with the proposed interchanges at CSAH 4 and the future CSAH 19/25 will enable the TH 169 corridor to accommodate year 2030 traffic volumes.

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APPENDIX A:

TH 169 TRAVEL DEMAND MODELING DOCUMENTATION

Refer to the travel demand modeling memorandum included with the traffic operations memorandum for Highway 169 in Elk River (*TH 169 in Elk River Travel Demand Modeling* dated March 7, 2007). This memorandum includes travel demand modeling results for the entire length of the project corridor from Highway 10 in Elk River to CSAH 4 in Zimmerman.

APPENDIX F

Floodplain Assessment (Mississippi River)

Appendix F – Floodplain Assessment

The Highway 169 improvements between Elk River and Zimmerman will cause an encroachment upon the Mississippi River. The encroachment is created by the proposed mainline Highway 169 bridge and associated Highway 169 bypass lane bridge that allows traffic to merge on to southbound or northbound Highway 10. The proposed bridges span most of the floodplain and corresponding floodway; however, encroachments will occur with the proposed bridge abutments, approaches and piers. The following National Flood Insurance Program Flood Insurance Rate Map listed in Table F-1 were examined for determination of floodplain impacts.

TABLE F-1
FLOOD INSURANCE RATE MAPS

Map Name	Map Number	Communities Contained
Sherburne County, MN and Incorporated Areas	27141C0395E	Elk River
City of Otsego, MN Wright County	2707470002A	Otsego

The project will create a transverse encroachment within the floodplain of the Mississippi River of 620 feet. Transverse encroachments represent crossings of streams, rivers, lakes, etc. at angles greater than or equal to 30 degrees. Figure 7A, Appendix A displays the area of the transverse and longitudinal impact.

Analysis of the floodplain impacts that would potentially occur from the Highway 169 improvements was performed in accordance with Presidential Executive Order – 11988, addressing the following four areas:

- **Area 1: No significant potential for interruption of a transportation facility which is needed for emergency vehicles or provides a community's only evacuation route.**

  The proposed Highway 169 bridge crossing over the Mississippi River and corresponding approaches will be designed to provide 100-year flood protection. Within the vicinity of the proposed river crossing, the 100-year flood elevation is approximately 863 feet. The minimum elevation of the proposed Highway 169 roadway profile located within the delineated floodplain is approximately 875 feet which is a difference of approximately 12 feet.

- **Area 2: There is no significant impact on natural and beneficial floodplain values.**

  Floodplain impacts, both beneficial and adverse, will occur to the Mississippi River as a result of the proposed project.

  A. No fisheries impacts are anticipated.

B. The new bridge structures will not increase the flow velocities in the river. Therefore, fish movements should not be affected.

C. The bridge will be designed to accommodate canoe and recreation boat traffic during periods of normal river flows.

D. Wetlands will be impacted by the Highway 169 bypass lane bridge.

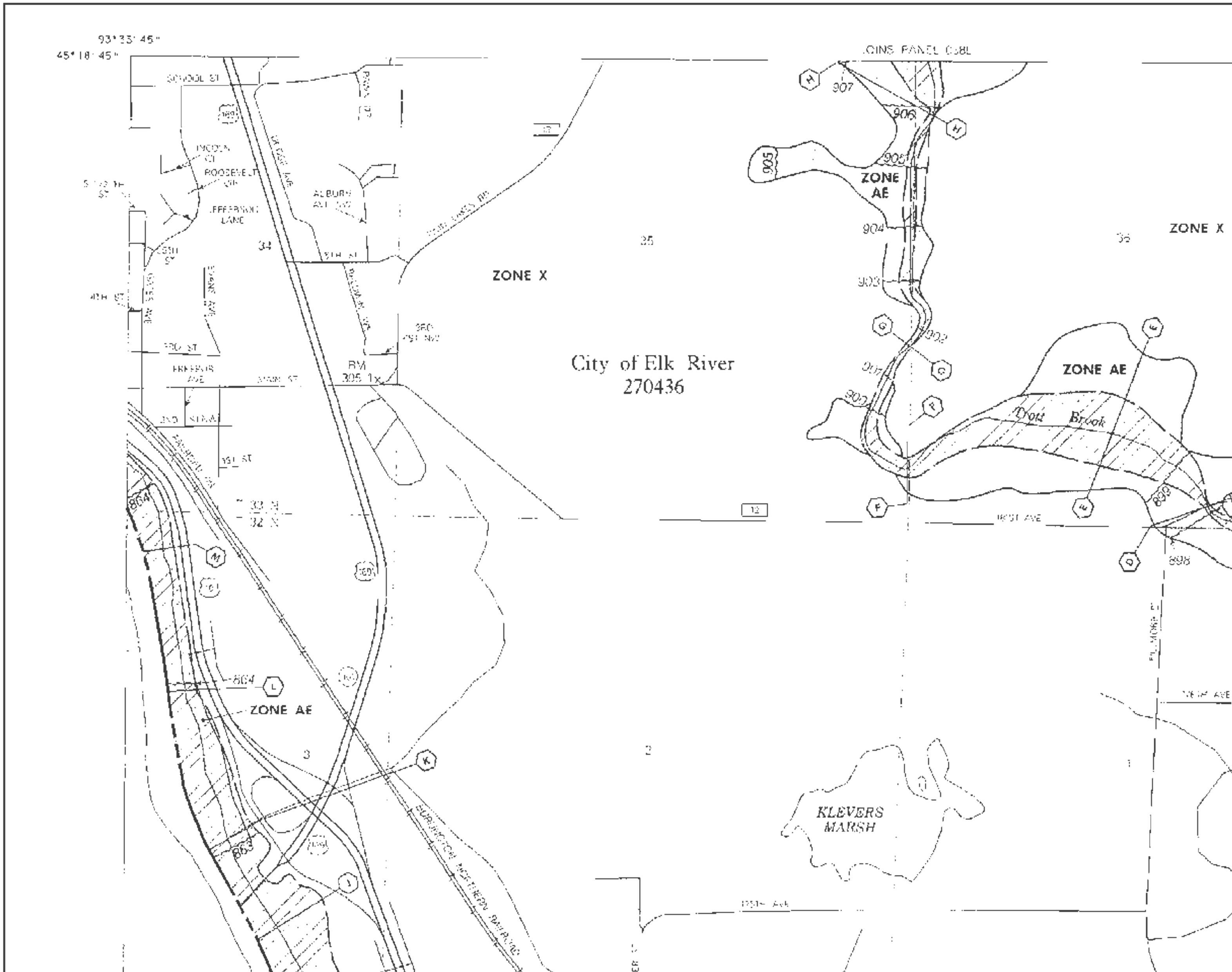
E. Appropriate turf establishment and erosion control measures will be used.

- **Area 3: There is no significant increased risk of flooding.**

  There will be no increased risk of flooding as a result of the proposed project. Design of the proposed bridge crossing the Mississippi River will be done such that the existing water surface profile is maintained. During final design of the proposed bridge, a detailed hydraulic analysis, hydraulic memorandum and risk assessment will be completed.

- **Area 4: The project will not support and/or result in incompatible floodplain development.**

  No incompatible floodplain development will result from the proposed project, as the project does not provide additional access to the floodplain areas. Sherburne County and Cities of Elk River and Otsego are members of the National Flood Insurance Program and have floodplain ordinances that restrict development within designated floodplains. Each ordinance is in compliance with the MnDNR floodplain management guidelines.



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP
SHERBURNE COUNTY,
MINNESOTA
AND INCORPORATED AREAS

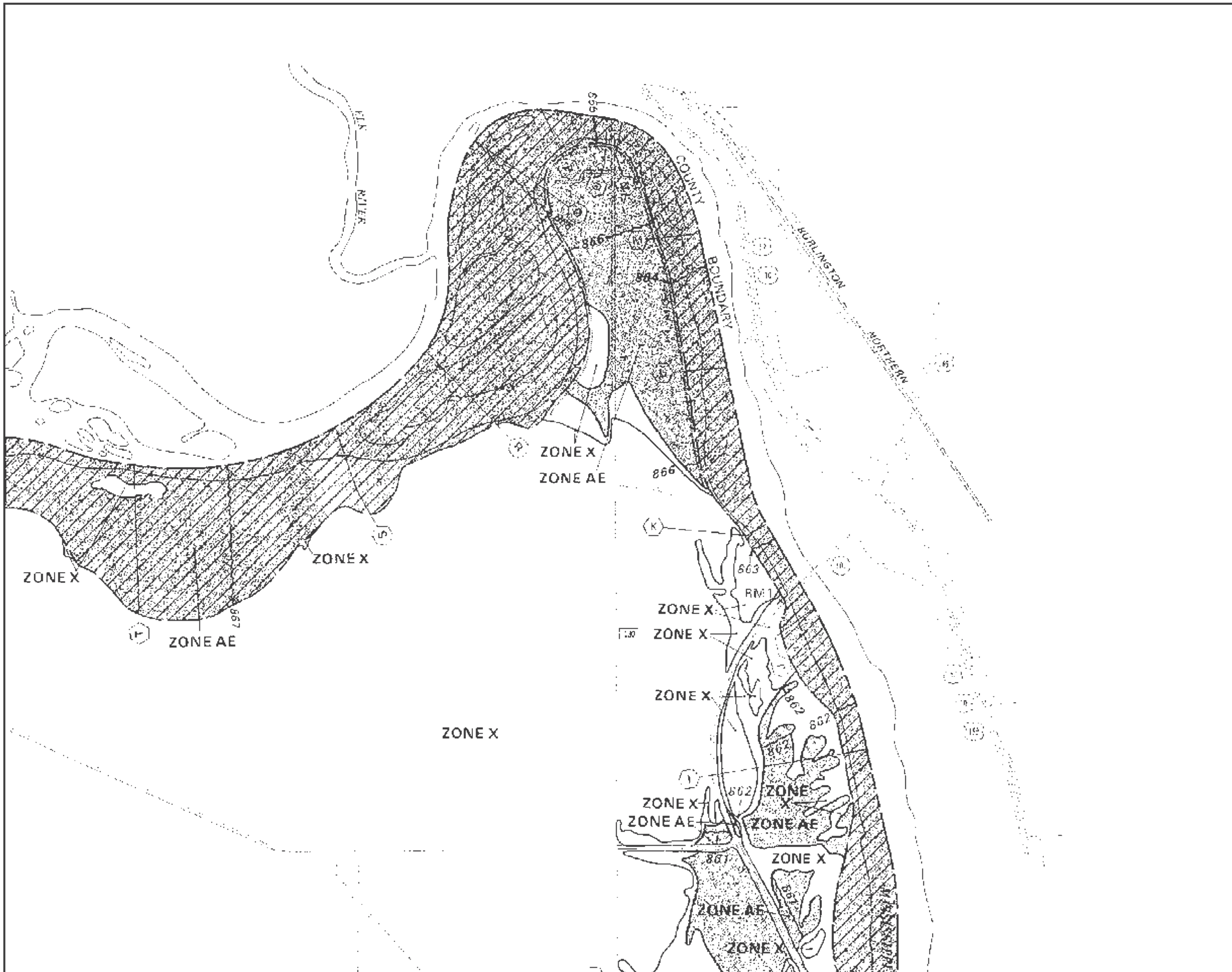
PANEL 395 OF 410

MAP NUMBER
27141C0395 E

EFFECTIVE DATE:
MAY 4, 2000

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CITY OF
OTSEGO,
MINNESOTA
WRIGHT COUNTY

PANEL 2 OF 4

COMMUNITY-PANEL NUMBER:
270747 0002 A

MAP REVISED:
SEPTEMBER 30, 1992

Federal Emergency Management Agency

APPENDIX G

Traffic Noise Analysis

HIGHWAY 169 TRAFFIC NOISE ANALYSIS

The purpose of this analysis is to evaluate and document the potential traffic noise impacts from the proposed Highway 169 project in Elk River and Zimmerman, Minnesota. This analysis includes modeled traffic noise levels for existing (year 2007) and future (year 2030) No-Build and Build conditions. This report is organized into the following sections:

- Introduction (Background Information)
- Analysis Methodology
- Modeling Results
- Noise Mitigation
- Noise Barrier Evaluation
- Conclusions

Introduction

Noise is defined as any unwanted sound. Sound travels in a wave motion and produces a sound pressure level. This sound pressure level is commonly measured in decibels. Decibels (dB) represent the logarithm of the ratio of a sound energy relative to a reference sound energy. For highway traffic noise, an adjustment, or weighting, of the high- and low- pitched sound is made to approximate the way that an average person hears sound. The adjusted sound levels are stated in units of "A-weighted decibels" (dBA). A sound increase of 3 dBA is barely perceptible by the human ear, a 5 dBA increase is clearly noticeable, and a 10 dBA increase is heard as twice as loud. For example, if the sound energy is doubled (i.e., the amount of traffic doubles), there is a 3 dBA increase in noise, which is just barely noticeable to most people. On the other hand, if traffic increases by a factor of ten times, the resulting sound level will increase by about 10 dBA and be heard to be twice as loud.

In Minnesota, traffic noise impacts are evaluated by measuring and/or modeling the traffic noise levels that are exceeded 10 percent and 50 percent of the time during the hours of the day and/or night that have the loudest traffic scenario. These numbers are identified as the L_{10} and L_{50} levels, respectively. The L_{10} value is the noise level that is exceeded for a total of 10 percent, or 6 minutes, of an hour. The L_{50} value is the noise level that is exceeded for a total of 50 percent, or 30 minutes, of an hour.

The following chart provides a rough comparison of the noise levels of some common noise sources.

Sound Pressure Level (dBA)	Noise Source
140----------------------------	Jet Engine (at 75 feet)
130---------------------------	Jet Aircraft (at 300 feet)
120----------------------------	Rock and Roll Concert
110----------------------------	Pneumatic Chipper
100----------------------------	Jointer/Planer
90 ----------------------------	Chainsaw
80 ----------------------------	Heavy Truck Traffic
70 ---------------------------	Business Office
60 ----------------------------	Conversational Speech
50 ----------------------------	Library
40 ----------------------------	Bedroom
30 ----------------------------	Secluded Woods
20 ----------------------------	Whisper

Source: "A Guide to Noise Control in Minnesota," Minnesota Pollution Control Agency, http://www.pca.state.mn.us/programs/pubs/noise.pdf and "Highway Traffic Noise," FHWA, http://www.fhwa.dot.gov/environment/htnoise.htm.

Along with the volume of traffic and other factors (e.g., topography of the area and vehicle speed) that contribute to the loudness of traffic noise, the distance of a receptor from a sound's source is also an important factor. Sound level decreases as distance from a source increases. A rule of thumb regarding sound level decrease due to increasing distance from a line source (roadway) that is commonly used is: beyond approximately 50 feet from the sound source, each doubling of distance from the line source over hard ground (such as pavement or water) will reduce the sound level by 3 dBA, whereas each doubling of distance over soft ground (such as vegetated or grassy ground) results in a sound level decrease of 4.5 dBA.

Minnesota state noise standards have been established for daytime and nighttime periods. For residential land uses (identified as Noise Area Classification 1 or NAC-1), the Minnesota State standards for L_{10} are 65 dBA for daytime and 55 dBA for nighttime; the standards for L_{50} are 60 dBA for daytime and 50 dBA for nighttime. The MPCA defines daytime as 7:00 a.m. to 10:00 p.m. and nighttime from 10:00 p.m. to 7:00 a.m. State noise standards are depicted in Table G-1. Minnesota State noise standards apply to the outdoor atmosphere (i.e., exterior noise levels).

TABLE G-1
MINNESOTA STATE NOISE STANDARDS

MPCA State Noise Standards					
Land Use	**Code**	**Daytime (7 a.m. – 10 p.m.) dBA**		**Nighttime (10 p.m. – 7 a.m.) dBA**	
Residential	**NAC-1**	L_{10} of 65	L_{50} of 60	L_{10} of 55	L_{50} of 50
Commercial	**NAC-2**	L_{10} of 70	L_{50} of 65	L_{10} of 70	L_{50} of 65
Industrial	**NAC-3**	L_{10} of 80	L_{50} of 75	L_{10} of 80	L_{50} of 75

For residential and parkland uses (Federal Land Use Category B), the Federal L_{10} noise abatement criteria is 70 dBA for both daytime and nighttime. Locations where noise levels are "approaching" or exceeding the criterion level must be evaluated for noise abatement reasonableness. Mn/DOT defines a level as "approaching" the criterion level when it is 1 dBA or less below the criterion level (e.g., 69 dBA is defined as "approaching" the Federal noise abatement criterion for residential land uses). Federal Noise Abatement Criteria (NAC) are shown in Table G-2.

TABLE G-2
FEDERAL NOISE ABATEMENT CRITERIA

FHWA Noise Abatement Criteria		
Category	**L_{10} dBA**	**Land Use**
A	**60**	Special areas requiring serenity
B	**70**	Residential and recreational areas
C	**75**	Commercial and industrial areas
D	**NA**	Undeveloped areas
E	**55***	Residential, hospitals, libraries, etc.

* Applies to interior noise levels. All other land uses are exterior levels.

In addition to the identified noise criteria, the FHWA also defines a noise impact as a "substantial increase" in the future noise levels over the existing noise levels. Mn/DOT considers an increase of 5 dBA or greater a substantial noise level increase.

The State noise standards apply to Highway 169 and Highway 10. Exemptions to state noise standards are found in Minnesota Statutes 2000, Section 116.07 subd. (2a). There is stated the conditions and roadway types that are exempt from the state noise standards. Because Federal funds may be used as part of this project, the Federal noise abatement criteria apply to all roads.

Methodology

Affected Environment

The purpose of this noise analysis is to determine the effect on impacts of the proposed project on traffic-generated noise levels. It is also important to note that the project setting includes other noise sources in the area that may have some affect on ambient noise levels.

The Highway 169 project corridor is located in an urban/suburban area in Elk River from the Mississippi River to 197th Avenue and transitions from this urban/suburban environment to a rural environment as motorists travel north through Livonia Township to the City of Zimmerman. Traffic noise is generated by vehicles traveling on Highway 169 as well as intersecting County and local roadways. Other sources include noise generated by freight trains traveling on the BNSF Railway mainline, which crosses Highway 169 just north of the Highway 10/101/169 system interchange. The BNSF mainline line carries approximately 46 trains per day at 60 miles per hour (mph), as well as additional traffic from the Northstar Commuter Rail service (additional 12 trains per day).[1] In addition to train noise, other location-specific sources include noise generated by operations of the Great River Energy facility at the Highway 10/101/169 interchange, and noise generated by gravel mining operations in the rural portion of Elk River.

Noise Monitoring

Noise level monitoring is commonly performed during a noise study to document existing noise levels. Existing noise levels were monitored at six sites adjacent to proposed construction areas and where chosen to represent areas of outdoor human activity (i.e., residential land uses). Noise monitoring locations are described below.

- Monitoring site 1 (receptor 7) is located along the east side of Highway 169 in Elk River between Main Street and School Street at Baldwin Park (see Figure G-1).
- Monitoring site 2 (receptor 21) is located along the east side of Highway 169 in Elk River between School Street and 193rd Avenue (see Figure G-2).
- Monitoring site 3 (receptor 61) is located along the east side of Highway 169 in Livonia Township south of the existing CSAH 25 alignment (northeast quadrant of the proposed Highway 169/CSAH 19/25 interchange) (see Figure G-4).
- Monitoring site 4 (receptor 76) is located along the east side of Highway 169 north of CSAH 4 in Zimmerman. Monitoring site 4 is located in a residential area along existing Fremont Drive that would be acquired for right of way with the proposed shifted alignment of Highway 169 (see Figure G-5).

[1] Minnesota Department of Transportation. 2008. The Minnesota Department of Transportation website (online). Mn/DOT Metro Railroads Train Volumes and Speeds Map accessed 02-10-2008 at http://www.dot.state.mn.us/ofrw/freightData.html

- Monitoring site 5 (receptor 80) is located east of Highway 169 and north of CSAH 4 along Fremont Lane. Monitoring site 5 represents residences located along the southeast shore of Lake Fremont (see Figure G-5).
- Monitoring site 6 (receptor 84-2) is located east of Highway 169 and north of CSAH 4 along Pine Street and Terrace Drive. Monitoring site 6 is located between the proposed Freemont Drive alignment and Lake Fremont (see Figure G-5).

Daytime noise levels were monitored during daytime hours (from 9:00 a.m. to noon and from 1:00 p.m. to 4:00 p.m.) on August 14, 2007. A trained noise monitoring technician was present at each session for the entire monitoring session to ensure correct operation of the instrumentation.

Daytime noise monitoring results ranged from 50.0 dBA (L_{10}) to 70.0 dBA (L_{10}). Noise monitoring results are presented in Tables G-3A through G-3C along with the results of computer modeling for existing daytime conditions.

Noise Modeling

Traffic noise impacts were assessed by modeling noise levels at receptor sites likely to be affected by the construction of the proposed project. Noise levels were modeled at 92 representative receptor sites along the project corridor. Of the 92 noise model receptor locations, 64 receptor locations represented residential land uses. Other receptor locations represented institutional (church), park, commercial/business, or industrial land uses. The land use at each receptor location is indicated in Tables G-3A through G-3C and G-4A through G-4C. The locations of the model receptor sites are shown in Figures G-1 through G-5. Traffic noise impacts for the proposed project were evaluated based on the three segments (urban Elk River; rural Elk River and Livonia Township; Zimmerman) described in Section III.A of the EA/EAW.

Noise modeling was done using the noise prediction program "MINNOISE," a version of the FHWA "STAMINA" model adapted by Mn/DOT. This model uses traffic volumes, speed, class of vehicle, and the typical characteristics (e.g., roadway horizontal and vertical alignment) of the roadway being analyzed. Noise model input files were developed based on the following assumptions:

- Traffic data input into the MINNOISE model included existing (year 2007)[2] and future (year 2030 No Build and Build conditions) forecasted traffic volumes. Year 2030 was identified as the future year for analysis because this is the design year used for the traffic operations analysis and design of the proposed improvements.
- The peak p.m. hour (4:30 p.m. to 5:30 p.m.) was identified to be the loudest hour during the daytime period. The peak a.m. hour (6:00-7:00 a.m.) during the morning rush hour period was identified to be the loudest hour during the nighttime period.

[2] Traffic data input for existing conditions model input files in Segment 1 (urban Elk River) and Segment 2 (rural Elk River and Livonia Township) are based on year 2007 traffic volumes. Traffic data input for existing conditions model input files in Segment 3 (Zimmerman) are based on year 2006 traffic volumes. Discussions of modeled traffic noise levels under existing conditions will refer to year 2007 for all locations throughout the project area.

- In urban Elk River (Segment One) and rural Elk River (southern half of Segment Two), the peak daytime hour was identified as eight percent of ADT. The peak nighttime hour (6:00 - 7:00 a.m.) was identified as seven percent of ADT. In Livonia Township and Zimmerman (northern half of Segment Two and Segment Three), including the proposed CSAH 25/19 interchange, the peak daytime hour was identified as 12 percent of ADT. The nighttime hour (6:00 – 7:00 am) was identified as nine percent of ADT.
- In urban Elk River (Segment One) and rural Elk River (southern half of Segment Two), the directional split on the directional split on Highway 169 during the daytime peak hour was identified as 70 percent northbound and 30 percent southbound. The directional split during the nighttime hour (6:00 – 7:00 a.m.) was identified as 30 percent northbound and 70 percent southbound.
- In Livonia Township (northern half of Segment Two) and Zimmerman (Segment Three) the directional split on Highway 169 during the daytime peak hour was identified as 70 percent northbound and 30 percent southbound. The directional split during the nighttime hour was identified as 30 percent northbound and 70 percent southbound.
- Existing and No-Build noise model input files assumed that vehicles were traveling through Highway 169 at-grade intersections in Elk River, Livonia Township, and Zimmerman at constant operating speeds as a worst-case scenario.

Peak noise levels also do not always correspond to peak traffic hours. This is the case when increased congestion during the morning and afternoon peak hours causes reduced speeds. To account for this phenomenon, default traffic volumes were used in the noise model input files when traffic models indicated that operational level of service (LOS) on a particular roadway was LOS D or worse. An operational LOS C is considered free-flow conditions for purposes of traffic noise models.

Intersection operations analyses were used as a proxy to determine the LOS on Highway 169 in the urban area of Elk River where existing at-grade intersections are more closely spaced together (i.e., Main Street to 197th Avenue), relative to other locations along the Highway 169 project corridor. Where adjacent at-grade intersections operate at LOS D or worse, traffic queues may prevent vehicles from reaching free-flow speeds between the intersections. In this case, a default volume of 900 vehicles per lane per hour was used in the urban area in Elk River with existing and future No Build conditions.

Intersection operations analyses were also used as a proxy to determine the operational level of service at CSAH 4 in Zimmerman. Under future No Build conditions, the existing Highway 169/CSAH 4 intersection is predicted to operate at LOS F. Under future No Build conditions, projected traffic volumes on Highway 169 in Zimmerman are anticipated to exceed the capacity of the existing expressway facility. As such, traffic queues may prevent vehicles from reaching free-flow speeds on Highway 169 through Zimmerman. In this case, a default volume of 1,200 vehicles per lane per hour was used for Highway 169 through the City of Zimmerman.

Modeling Results

Noise monitoring and modeling results are tabulated in Tables G-3A through G-3C and G-4A through G-4C. Noise modeling results are summarized in Table G-5. Modeling receptor locations are illustrated in Figures G-1 through G-5. While both the L_{10} and L_{50} descriptors are shown in the tables, the discussions of modeling results presented below only reference the L_{10} values, because the L_{10} descriptor is used to define both the State and Federal noise level regulatory thresholds.

Segment One: Urban Elk River

As tabulated in Table G-3A, existing daytime noise levels range from 57.6 dBA to 71.7 dBA, whereas existing nighttime noise levels range from 55.8 dBA to 69.6 dBA. In general, existing nighttime noise levels are approximately 1 dBA to 2 dBA lower than existing daytime levels at modeled receptor locations. Fourteen modeled receptor locations with existing conditions exceed State daytime standards. Twenty-six modeled receptor locations with existing conditions exceed State nighttime standards.

Noise levels for future (year 2030) No-Build conditions generally increase by 1 dBA to 2 dBA over existing conditions for both daytime and nighttime conditions. Future No-Build daytime noise levels are predicted to range from 59.3 dBA to 72.2 dBA, whereas future No-Build nighttime noise levels are predicted to range from 59.6 dBA to 73.6 dBA. Fifteen modeled receptor locations are predicted to exceed State daytime standards with future No-Build conditions. Thirty modeled residential receptor locations are predicted to exceed State nighttime standards with future No-Build conditions (see Table G-3A and Table G-4A).

Construction of the Build Alternative is predicted to increase daytime noise levels approximately 0.7 dBA to 7.4 dBA compared to existing conditions at most modeled locations within Elk River from the Highway 10/101/169 interchange to 197th Avenue. One modeled receptor location east of Highway 169 (receptor 2-1) is predicted to increase by 10.2 dBA. This increase is due in part to the shift in the Highway 169 alignment to the east at this location. In general, noise level increases are predicted because of increases in traffic volumes over time, changes in alignments (vertical and horizontal) of local roadways, and construction of interchanges and interchange ramps.

Some modeled receptor locations are predicted to experience a reduction in daytime noise levels with construction of the Build Alternative in the urban Elk River Segment. In general, these modeled receptor locations are located adjacent to interchange areas where the Highway 169 vertical profile is depressed and retaining walls are proposed with Build conditions.

Segment Two: Rural Elk River and Livonia Township

Existing daytime noise levels range from 52.4 dBA to 73.8 dBA, whereas existing nighttime noise levels range from 51.5 dBA to 72.0 dBA (see Table G-3B). In general, existing nighttime noise levels are up to 2 dBA lower than existing daytime levels at modeled receptor locations. Thirteen modeled residential receptor locations with existing conditions exceed State daytime standards. Twenty-two modeled receptor locations with existing conditions exceed State nighttime standards.

Noise levels for future (year 2030) No-Build conditions generally increase by 1 dBA to 2 dBA over existing conditions for both daytime and nighttime conditions. Future No-Build daytime noise levels are predicted to range from 53.2 dBA to 73.3 dBA, whereas future No-Build nighttime noise levels are predicted to range from 53.7 dBA to 74.2 dBA. Fifteen modeled residential receptor locations are predicted to exceed State daytime standards under future No-Build conditions. Twenty-three modeled residential receptor locations are predicted to exceed State nighttime standards under future No-Build conditions (see Table G-3B and Table G-4B).

Construction of the Build Alternative is predicted to increase daytime noise levels approximately 1 dBA to 3 dBA at most modeled locations within rural Elk River and Livonia Township. Daytime noise levels are predicted to increase 7.6 dBA and 11.5 dBA at rural receptor locations where local road alignments or frontage road alignments are located adjacent to modeled receptor locations.

Segment Three: Zimmerman

As tabulated in Table G-3C, existing daytime noise levels range from 52.4 dBA to 72.4 dBA, whereas existing nighttime noise levels range from 51.4 dBA to 70.8 dBA. In general, existing nighttime noise levels are approximately 2 dBA lower than daytime levels at modeled receptor locations. Nine modeled residential receptor locations with existing conditions exceed State daytime standards. Fifteen modeled residential receptor locations with existing conditions exceed State nighttime standards.

Noise levels for the future (year 2030) No-Build conditions generally increase by approximately 1 dBA to 2 dBA over existing noise levels for both daytime and nighttime conditions. Future No-Build daytime noise levels are predicted to range from 54.5 dBA to 74.4 dBA, whereas future No-Build nighttime noise levels are predicted to range from 53.9 dBA to 73.2 dBA. Nine modeled residential receptor locations are predicted to exceed State daytime standards under future (year 2030) No-Build. Nineteen modeled residential receptor locations are predicted to exceed State nighttime standards under future No-Build conditions (see Tables G-3C and G-4C).

Construction of the Build Alternative is predicted to decrease noise levels in Zimmerman west of Highway 169 where the highway alignment is shifted to the east. Noise levels are predicted to increase 5.9 dBA to 15.0 dBA over existing conditions at areas east of Highway 169 along Lake Fremont. In general, noise level increases are predicted because of changes in the horizontal alignment of Highway 169 (i.e., shifting the Highway 169 horizontal alignment to accommodate the Highway 169/CSAH 4 interchange under future (year 2030) Build conditions).

TABLE G-3A
HIGHWAY 169 NOISE MONITORING AND MODELING RESULTS – DAYTIME
SEGMENT ONE: URBAN ELK RIVER

Receptor*	Monitored		Existing (2007)		No-Build (2030)		Difference Between Existing (2007) and No-Build (2030)		Build (2030)		Difference Between Existing (2007) and Build (2030)	
	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}
1-1 (P) (1)			**70.6**	**66.5**	**72.1**	**68.4**	1.5	1.9	**70.0**	**67.4**	-0.6	0.9
1-2 (C) (1)			66.6	63.8	68.0	65.6	1.4	1.8	67.3	64.8	0.7	1.0
1-3 (R/C) (2)			**70.2**	**66.7**	**72.0**	**69.1**	1.8	2.4	**71.4**	**67.5**	1.2	0.8
2-1 (C) (1)			65.3	62.0	66.0	63.2	0.7	1.2	**75.5**	**72.2**	10.2	10.2
3-1 (R) (4)			60.5	58.0	61.5	59.2	1.0	1.2	64.2	**61.9**	3.7	3.9
4-1 (R) (3)			61.4	58.8	62.4	60.0	1.0	1.2	**66.1**	**62.9**	4.7	4.1
5 (C) (4)			68.7	64.4	69.8	65.8	1.1	1.4	NA	NA	NA	NA
6 (R) (3)			**69.5**	**65.0**	**70.0**	**65.9**	0.5	0.9	**69.3**	**66.2**	-0.2	1.2
7 (P) (1)	**67.0**	**63.0**	**69.1**	**64.7**	**69.7**	**65.6**	0.6	0.9	**68.2**	**65.4**	-0.9	0.7
8-1 (R) (6)			**67.8**	**63.6**	**68.9**	**65.0**	1.1	1.4	**69.3**	**66.1**	1.5	2.5
9 (R) (1)			**71.7**	**66.6**	**72.2**	**67.5**	0.5	0.9	**72.9**	**69.1**	1.2	2.5
10 (C) (3)			67.9	63.9	68.6	65.0	0.7	1.1	67.6	63.6	-0.3	-0.3
11 (C) (1)			69.8	**65.3**	**70.7**	**66.5**	0.9	1.2	67.4	61.5	-2.4	-3.8
12 (R) (4)			61.2	58.4	62.1	59.6	0.9	1.2	60.3	58.1	-0.9	-0.3
13 (C) (2)			67.6	63.5	68.8	65.0	1.2	1.5	69.8	**66.2**	2.2	2.7
14 (C) (1)			69.5	64.9	70.8	66.7	1.3	1.8	66.3	63.8	-3.2	-1.1
15 (R) (1)			60.7	58.0	61.8	59.4	1.1	1.4	62.1	59.7	1.4	1.7
16 (R) (4)			**65.1**	**60.6**	**66.9**	**63.0**	1.8	2.4	**65.9**	**61.6**	0.8	1.0
17 (C) (4)			68.1	63.6	69.8	**65.7**	1.7	2.1	68.1	**65.3**	0.0	1.7
18 (C) (3)			64.9	61.5	66.7	63.2	1.8	1.7	66.3	64.0	1.4	2.5
19 (R) (3)			60.3	57.7	61.9	59.3	1.6	1.6	62.6	**60.6**	2.3	2.9
State Standards(1)	**65**	**60**	**65**	**60**	**65**	**60**	-	-	**65**	**60**	-	-
State Standards(2)	**70**	**65**	**70**	**65**	**70**	**65**	-	-	**70**	**65**	-	-

Bold numbers are above State standards.
(R) – Residential; (C) – Commercial; (I) – Industrial; (Ch) – Church; (P) – Park
(1) State daytime standards for residential land uses (NAC-1).
(2) State daytime standards for commercial land uses (NAC-2).
* – Number in parentheses in this column is the number of receptors and/or commercial buildings represented by each receptor.
N/A = not applicable. These receptors would be acquired as part of the project.

TABLE G-3A continued
HIGHWAY 169 NOISE MONITORING AND MODELING RESULTS – DAYTIME
SEGMENT ONE: URBAN ELK RIVER

Receptor*	Monitored		Existing (2007)		No-Build (2030)		Difference Between Existing (2007) and No-Build (2030)		Build (2030)		Difference Between Existing (2007) and Build (2030)	
	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}
20-1 (R) (4)			**68.2**	**64.0**	**70.1**	**65.7**	1.9	1.7	**75.4**	**72.0**	7.2	8.0
21 (R) (4)	**70.0**	**65.5**	**69.5**	**64.9**	**71.4**	**66.6**	1.9	1.7	**76.9**	**73.4**	7.4	8.5
22 (C) (4)			68.3	63.7	70.0	**65.8**	1.7	2.1	**73.9**	**70.5**	5.6	6.8
23 (R) (1)			62.2	59.2	64.0	**61.0**	1.8	1.8	**68.9**	**66.7**	6.7	7.5
24 (R) (4)			57.6	55.4	59.3	57.1	1.7	1.7	64.2	**62.5**	6.6	7.1
25 (R) (3)			59.9	55.2	62.3	57.7	2.4	2.5	64.4	**61.1**	4.5	5.9
26 (R) (2)			61.4	57.0	63.6	59.2	2.2	2.2	64.7	**61.9**	3.3	4.9
27 (C) (3)			65.8	62.1	67.2	63.9	1.4	1.8	69.7	**66.7**	3.9	4.6
28 (R) (1)			61.7	58.0	62.8	59.5	1.1	1.5	63.1	**60.7**	1.4	2.7
29 (C) (1)			68.8	64.3	69.9	**65.6**	1.1	1.3	69.6	**66.2**	0.8	1.9
30 (R) (2)			63.0	59.7	63.8	**60.9**	0.8	1.2	**65.4**	**61.3**	2.4	1.6
31-1 (R) (2)			**66.5**	**62.5**	**67.3**	**63.5**	0.8	1.0	**68.9**	**64.6**	2.4	2.1
32 (C) (1)			67.6	63.6	67.9	64.1	0.3	0.5	65.4	62.0	-2.2	-1.6
33 (R) (3)			59.5	56.7	60.1	57.5	0.6	0.8	64.7	58.9	5.2	2.2
34 (R) (3)			**65.4**	**61.7**	**66.1**	**62.6**	0.7	0.9	**67.0**	**64.3**	1.6	2.6
35 (R) (2)			**70.5**	**65.8**	**70.9**	**66.5**	0.4	0.7	**73.0**	**69.3**	2.5	3.5
36-1 (R) (2)			**66.2**	**61.1**	**66.7**	**61.8**	0.5	0.7	**72.1**	**68.5**	5.9	7.4
37-1 (R) (2)			**67.5**	**62.7**	**68.3**	**63.7**	0.8	1.0	**72.7**	**69.5**	5.2	6.8
State Standards[(1)]	**65**	**60**	**65**	**60**	**65**	**60**	**-**	**-**	**65**	**60**	**-**	**-**
State Standards[(2)]	**70**	**65**	**70**	**65**	**70**	**65**	**-**	**-**	**70**	**65**	**-**	**-**

Bold numbers are above State standards.
(R) – Residential; (C) – Commercial; (I) – Industrial; (Ch) – Church; (P) – Park
[(1)] State daytime standards for residential land uses (NAC-1).
[(2)] State daytime standards for commercial land uses (NAC-2).
* – Number in parentheses in this column is the number of receptors and/or commercial buildings represented by each receptor.
N/A = not applicable. These receptors would be acquired as part of the project.

TABLE G-3B
HIGHWAY 169 NOISE MONITORING AND MODELING RESULTS – DAYTIME
SEGMENT TWO: RURAL ELK RIVER AND SOUTHERN LIVONIA TOWNSHIP

Receptor*	Monitored		Existing (2007)		No-Build (2030)		Difference Between Existing (2007) and No-Build (2030)		Build (2030)		Difference Between Existing (2007) and Build (2030)	
	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}
38 (R) (1)			55.9	52.4	57.9	51.6	2.0	-0.8	58.3	56.1	2.4	3.7
39 (R) (3)			**65.8**	**62.1**	**66.5**	**63.2**	0.7	1.1	**68.5**	**65.9**	2.7	3.8
40 (R) (1)			63.1	59.9	63.8	**60.9**	0.7	1.0	**65.8**	**63.5**	2.7	3.6
41 (R) (1)			58.6	56.0	59.3	57.0	0.7	1.0	61.3	59.5	2.7	3.5
42 (R) (2)			**67.8**	**63.5**	**68.9**	**64.9**	1.1	1.4	**70.3**	**67.2**	2.5	3.7
43 (R) (1)			**69.3**	**64.2**	**70.6**	**65.8**	1.3	1.6	**71.9**	**68.1**	2.6	3.9
44 (I) (1)			66.8	63.1	67.8	64.4	1.0	1.3	69.5	66.9	2.7	3.8
45 (R) (2)			**69.3**	**65.2**	**70.0**	**66.2**	0.7	1.0	**72.3**	**69.3**	3.0	4.1
46 (R) (1)			**71.1**	**66.4**	**72.2**	**67.8**	1.1	1.4	**73.9**	**70.4**	2.8	4
47 (I) (1)			65.4	62.1	66.1	63.1	0.7	1.0	68.3	66.0	2.9	3.9
48 (R) (2)			**71.2**	**66.2**	**72.4**	**67.7**	1.2	1.5	N/A	N/A	N/A	N/A
49 (C) (1)			60.4	57.9	61.2	59.0	0.8	1.1	63.5	**61.9**	3.1	4
50 (R) (1)			52.4	50.6	53.2	51.7	0.8	1.1	63.9	56.9	11.5	6.3
51 (R) (1)			**72.7**	**67.6**	**73.3**	**68.7**	0.6	1.1	**75.4**	**71.5**	2.7	3.9
52 (R) (1)			**67.0**	**62.9**	**67.6**	**63.9**	0.6	1.0	**69.5**	**66.6**	2.5	3.7
53 (I) (1)			69.1	63.9	70.2	65.4	1.1	1.5	71.7	67.7	2.6	3.8
54 (R) (1)			60.4	50.8	63.1	54.2	2.7	3.4	60.8	56.6	0.4	5.8
55 (R) (1)			64.5	**61.4**	**66.0**	**63.4**	1.5	2.0	**67.3**	**65.0**	2.8	3.6
56 (R) (1)			**72.9**	**67.8**	**74.9**	**70.5**	2.0	2.7	**75.0**	**70.4**	2.1	2.6
57 (R) (1)			**73.8**	**68.4**	**75.9**	**71.2**	2.1	2.8	**76.9**	**72.7**	3.1	4.3
58 (R) (3)			**67.9**	**64.2**	**69.3**	**66.2**	1.4	2.0	**71.1**	**68.2**	3.2	4.0
59 (R) (1)			64.0	**61.0**	**65.7**	**63.3**	1.7	2.3	**67.7**	**65.4**	3.7	4.4
60 (C) (1)			**70.8**	**66.4**	**72.7**	**69.0**	1.9	2.6	**73.6**	**70.2**	2.8	3.8
61 (R) (1)	66.0	61.0	**68.4**	**64.6**	**69.8**	**66.7**	1.4	2.1	**71.4**	**68.6**	3.0	4.0
62 (R) (1)			56.4	54.1	58.7	56.7	2.3	2.6	64.0	59.4	7.6	5.3
63 (R) (1)			62.3	59.4	64.4	**61.9**	2.1	2.5	**65.8**	**63.3**	3.5	3.9
64 (R) (1)			**66.6**	**63.1**	**68.3**	**65.5**	1.7	2.4	**69.5**	**66.9**	2.9	3.8
65 (R) (1)			62.7	59.5	64.2	**61.6**	1.5	2.1	**65.8**	**63.5**	3.1	4.0
State Standards[1]	**65**	**60**	**65**	**60**	**65**	**60**	**-**	**-**	**65**	**60**	**-**	**-**
State Standards[2]	**70**	**65**	**70**	**65**	**70**	**65**	**-**	**-**	**70**	**65**	**-**	**-**

Bold numbers are above State standards.
(R) – Residential; (C) – Commercial; (I) – Industrial; (Ch) – Church; (P) – Park
(1) State daytime standards for residential land uses (NAC-1).
(2) State daytime standards for commercial land uses (NAC-2).
* – Number in parentheses in this column is the number of receptors and/or commercial buildings represented by each receptor.
N/A = not applicable. These receptors would be acquired as part of the project.

TABLE G-3C
HIGHWAY 169 NOISE MONITORING AND MODELING RESULTS – DAYTIME
SEGMENT THREE: ZIMMERMAN AND NORTHERN LIVONIA TOWNSHIP

Receptor*	Monitored		Existing (2007)		No-Build (2030)		Difference Between Existing (2007) and No-Build (2030)		Build (2030)		Difference Between Existing (2007) and Build (2030)	
	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}
66 (Ch) (1)			**68.4**	**63.7**	**70.4**	**66.5**	2.0	2.8	**71.9**	**68.2**	3.5	4.5
67 (C) (5)			69.5	64.4	**71.6**	**67.3**	2.1	2.9	65.4	63.1	-4.1	-1.3
68 (C) (1)			68.0	63.4	70.0	**66.2**	2.0	2.8	63.3	61.4	-4.7	-2.0
69 (C) (2)			70.0	64.9	**72.1**	**67.9**	2.1	3.0	64.0	62.1	-6.0	-2.8
70 (C)(1)			63.3	60.0	65.1	62.5	1.8	2.5	62.9	60.2	-0.4	0.2
71 (Ch) (1)			63.7	59.9	**65.4**	**62.3**	1.7	2.4	63.8	60.3	0.1	0.4
72 (C) (3)			**70.2**	64.8	**72.3**	**67.8**	2.1	3.0	64.0	62.1	-6.2	-2.7
73 (C) (4)			63.6	59.9	65.5	62.5	1.9	2.6	61.7	60.0	-1.9	0.1
74 (R) (17)			58.4	55.4	60.3	57.9	1.9	2.5	61.4	59.5	3.0	4.1
75 (C) (6)			**72.4**	**66.3**	**74.4**	**69.2**	2.0	2.9	67.4	65.1	-5.0	-1.2
76 (R) (4)	**67.0**	60.0	**69.4**	**64.4**	**71.3**	**67.1**	1.9	2.7	**73.8**	**69.9**	4.4	5.5
77-1 (R) (2)			57.4	54.3	59.2	56.8	1.8	2.5	**70.5**	**67.4**	13.1	13.1
77-2 (R) (2)			56.1	53.3	58.0	55.8	1.9	2.5	**68.1**	**65.4**	12.0	12.1
77-3 (R) (2)			54.6	52.0	56.5	54.5	1.9	2.5	**65.5**	**63.2**	10.9	11.2
77-4 (R) (3)			53.4	51.1	55.4	53.6	2.0	2.5	63.6	**61.5**	10.2	10.4
78-1 (R) (1)			57.0	54.1	58.8	56.6	1.8	2.5	**72.0**	**68.6**	15.0	14.5
78-2 (R) (2)			55.7	53.0	57.6	55.5	1.9	2.5	**68.5**	**65.8**	12.8	12.8
79 (R) (4)			54.0	51.6	56.0	54.1	2.0	2.5	**65.0**	**62.8**	11.0	11.2
80 (R) (8)	50.0	47.0	52.4	50.3	54.5	53.0	2.1	2.7	62.7	**60.8**	10.3	10.5
81 (R) (1)			52.8	50.7	55.1	53.5	2.3	2.8	63.4	**61.4**	10.6	10.7
82 (R) (8)			53.0	50.4	55.8	53.8	2.8	3.4	60.7	59.1	7.7	8.7
83 (R) (6)			59.2	55.8	61.0	58.3	1.8	2.5	**71.6**	**68.3**	12.4	12.5
State Standards(1)	**65**	**60**	**65**	**60**	**65**	**60**	**-**	**-**	**65**	**60**	**-**	**-**
State Standards(2)	**70**	**65**	**70**	**65**	**70**	**65**	**-**	**-**	**70**	**65**	**-**	**-**

Bold numbers are above State standards.
(R) – Residential; (C) – Commercial; (I) – Industrial; (Ch) – Church; (P) – Park
(1) State daytime standards for residential land uses (NAC-1).
(2) State daytime standards for commercial land uses (NAC-2).
* – Number in parentheses in this column is the number of receptors and/or commercial buildings represented by each receptor.
N/A = not applicable. These receptors would be acquired as part of the project.

TABLE G-3C continued
HIGHWAY 169 NOISE MONITORING AND MODELING RESULTS – DAYTIME
SEGMENT THREE: ZIMMERMAN AND NORTHERN LIVONIA TOWNSHIP

Receptor*	**Monitored**		**Existing (2007)**		**No-Build (2030)**		**Difference Between Existing (2007) and No-Build (2030)**		**Build (2030)**		**Difference Between Existing (2007) and Build (2030)**	
	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}
84-1 (R) (2)			59.4	56.0	61.2	58.5	1.8	2.5	**69.3**	**66.5**	9.9	10.5
84-2 (R) (1)	57.0	52.5	60.4	56.8	62.2	59.3	1.8	2.5	**69.6**	**66.8**	9.2	10.0
85 (R) (3)			**67.3**	**62.7**	**69.1**	**65.4**	1.8	2.7	**73.2**	**69.5**	5.9	6.8
86 (R) (1)			**68.5**	**63.5**	**70.4**	**66.2**	1.9	2.7	**72.6**	**68.7**	4.1	5.2
87 (R) (3)			**68.0**	**63.2**	**69.8**	**65.9**	1.8	2.7	**71.5**	**68.2**	3.5	5.0
88 (R) (3)			**69.6**	**63.9**	**71.6**	**66.8**	2.0	2.9	**72.4**	**68.1**	2.8	4.2
89 (R) (3)			**68.5**	**63.5**	**70.4**	**66.3**	1.9	2.8	**71.1**	**67.7**	2.6	4.2
90 (R) (3)			**68.3**	**63.4**	**70.2**	**66.1**	1.9	2.7	**71.1**	**67.9**	2.8	4.5
91 (R) (3)			**67.7**	**63.0**	**69.5**	**65.7**	1.8	2.7	**70.9**	**67.8**	3.2	4.8
92 (R) (3)			**69.3**	**64.0**	**71.2**	**66.8**	1.9	2.8	**73.0**	**69.1**	3.7	5.1
State Standards(1)	**65**	**60**	**65**	**60**	**65**	**60**	**-**	**-**	**65**	**60**	**-**	**-**
State Standards(2)	**70**	**65**	**70**	**65**	**70**	**65**	**-**	**-**	**70**	**65**	**-**	**-**

Bold numbers are above State standards.
(R) – Residential; (C) – Commercial; (I) – Industrial; (Ch) – Church; (P) – Park
(1) State daytime standards for residential land uses (NAC-1).
(2) State daytime standards for commercial land uses (NAC-2).
* – Number in parentheses in this column is the number of receptors and/or commercial buildings represented by each receptor.
N/A = not applicable. These receptors would be acquired as part of the project.

TABLE G-4A
HIGHWAY 169 NOISE MONITORING AND MODELING RESULTS – NIGHTTIME
SEGMENT ONE: URBAN ELK RIVER

Receptor*	**Existing (2007)**		**2030 No-Build**		**Difference Between Existing (2007) and 2030 No-Build**		**2030 Build**		**Difference Between Existing (2007) and 2030 Build**	
	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}
1-1 (P) (1)	**69.6**	**65.7**	**73.6**	**69.8**	4.0	4.1	**69.8**	**66.4**	0.2	0.7
1-2 (C) (1)	66.5	63.4	68.1	65.7	1.6	2.3	67.3	64.4	0.8	1.0
1-3 (R/C) (2)	**68.7**	**65.2**	**71.5**	**68.6**	2.8	3.4	**69.9**	**65.6**	1.2	0.4
2-1 (C) (1)	64.6	61.1	65.8	62.8	1.2	1.7	**72.4**	**68.4**	7.8	7.3
3-1 (R) (4)	**60.4**	**57.6**	**61.5**	**59.2**	1.1	1.6	**63.0**	**60.2**	2.6	2.6
4-1 (R) (3)	**60.7**	**57.9**	**62.4**	**60.0**	1.7	2.1	**64.3**	**60.8**	3.6	2.9
5 (C) (4)	68.8	64.1	69.8	65.8	1.0	1.7	NA	NA	NA	NA
6 (R) (3)	**67.5**	**63.4**	**70.0**	**65.9**	2.5	2.5	**68.5**	**65.0**	1.0	1.6
7 (P) (1)	**67.1**	**63.0**	**69.7**	**65.6**	2.6	2.6	**67.8**	**64.4**	0.7	1.4
8-1 (R) (6)	**67.9**	**63.3**	**68.9**	**65.0**	1.0	1.7	**69.7**	**65.4**	1.8	2.1
9 (R) (1)	**69.4**	**64.7**	**72.2**	**67.5**	2.8	2.8	**71.1**	**67.1**	1.7	2.4
10 (C) (3)	66.0	62.2	67.8	64.0	1.8	1.8	66.5	62.7	0.5	0.5
11 (C) (1)	67.1	62.4	**70.5**	**66.7**	3.4	4.3	64.4	57.3	-2.7	-5.1
12 (R) (4)	**58.8**	**56.2**	**62.5**	**60.2**	3.7	4.0	**58.3**	**55.3**	-0.5	-0.9
13 (C) (2)	66.0	62.1	69.8	**66.3**	3.8	4.2	67.0	62.1	1.0	0.0
14 (C) (1)	68.2	63.8	71.9	67.9	3.7	4.1	63.3	59.5	-4.9	-4.3
15 (R) (1)	**58.4**	**55.8**	**62.1**	**59.8**	3.7	4.0	**59.6**	**56.4**	1.2	0.6
16 (R) (4)	**63.4**	**57.9**	**65.6**	**61.6**	2.2	3.7	**63.9**	**58.2**	0.5	0.3
17 (C) (4)	67.1	62.7	**70.9**	**66.9**	3.8	4.2	64.0	59.3	-3.1	-3.4
18 (C) (3)	62.9	59.3	66.8	63.6	3.9	4.3	62.7	59.1	-0.2	-0.2
19 (R) (3)	**58.4**	**55.7**	**62.2**	**59.8**	3.8	4.1	**59.2**	**56.4**	0.8	0.7
State Standards(1)	**55**	**50**	**55**	**50**	-	-	**55**	**50**	-	-
State Standards(2)	**70**	**65**	**70**	**65**	-	-	**70**	**65**	-	-

Bold numbers are above State standards.
(R) – Residential; (C) – Commercial; (I) – Industrial; (Ch) – Church; (P) – Park
(1) State nighttime standards for residential land uses (NAC-1).
(2) State nighttime standards for commercial land uses (NAC-2).
* – Number in parentheses in this column is the number of receptors and/or commercial buildings represented by each receptor.
N/A = not applicable. These receptors would be acquired as part of the proposed project.

TABLE G-4A continued
HIGHWAY 169 NOISE MONITORING AND MODELING RESULTS – NIGHTTIME
SEGMENT ONE: URBAN ELK RIVER

Receptor*	Existing (2007)		2030 No-Build		Difference Between Existing (2007) and 2030 No-Build		2030 Build		Difference Between Existing (2007) and 2030 Build	
	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}
20-1 (R) (4)	**66.0**	**61.5**	**69.9**	**65.9**	3.9	4.4	**70.6**	**65.5**	4.6	4.0
21 (R) (4)	**67.2**	**62.3**	**71.1**	**66.7**	3.9	4.4	**72.0**	**66.7**	4.8	4.4
22 (C) (4)	67.4	62.8	**71.2**	**67.1**	3.8	4.3	**70.4**	65.0	3.0	2.2
23 (R) (1)	**60.4**	**57.2**	**64.2**	**61.4**	3.8	4.2	**64.7**	**61.2**	4.3	4.0
24 (R) (4)	**55.8**	**53.5**	**59.6**	**57.6**	3.8	4.1	**60.3**	**57.8**	4.5	4.3
25 (R) (3)	**58.1**	**52.5**	**61.7**	**57.6**	3.6	5.1	**62.3**	**57.5**	4.2	5.0
26 (R) (2)	**59.5**	**54.2**	**63.0**	**59.1**	3.5	4.9	**62.6**	**58.6**	3.1	4.4
27 (C) (3)	64.3	60.5	67.7	64.4	3.4	3.9	66.3	61.9	2.0	1.4
28 (R) (1)	**60.0**	**55.8**	**62.5**	**59.5**	2.5	3.7	**60.5**	**56.8**	0.5	1.0
29 (C) (1)	67.7	63.3	**71.4**	**67.3**	3.7	4.0	68.8	64.2	1.1	0.9
30 (R) (2)	**61.4**	**58.2**	**65.0**	**62.2**	3.6	4.0	**64.3**	**59.3**	2.9	1.1
31-1 (R) (2)	**65.1**	**61.2**	**68.8**	**65.3**	3.7	4.1	**67.0**	**61.3**	1.9	0.1
32 (C) (1)	64.5	60.6	68.3	64.9	3.8	4.3	64.0	60.3	-0.5	-0.3
33 (R) (3)	**57.5**	**54.8**	**61.2**	**58.8**	3.7	4.0	**62.5**	**55.6**	5.0	0.8
34 (R) (3)	**63.6**	**59.8**	**67.3**	**63.9**	3.7	4.1	**64.7**	**61.6**	1.1	1.8
35 (R) (2)	**66.6**	**62.1**	**70.4**	**66.4**	3.8	4.3	**70.2**	**66.5**	3.6	4.4
36-1 (R) (2)	**62.5**	**57.5**	**66.3**	**61.9**	3.8	4.4	**69.8**	**65.9**	7.3	8.4
37-1 (R) (2)	**65.8**	**61.0**	**69.6**	**65.3**	3.8	4.3	**71.8**	**67.9**	6.0	6.9
State Standards(1)	**55**	**50**	**55**	**50**	**-**	**-**	**55**	**50**	**-**	**-**
State Standards(2)	**70**	**65**	**70**	**65**	**-**	**-**	**70**	**65**	**-**	**-**

Bold numbers are above State standards.
(R) – Residential; (C) – Commercial; (I) – Industrial; (Ch) – Church; (P) – Park
(1) State nighttime standards for residential land uses (NAC-1).
(2) State nighttime standards for commercial land uses (NAC-2).
* – Number in parentheses in this column is the number of receptors and/or commercial buildings represented by each receptor.
N/A = not applicable. These receptors would be acquired as part of the proposed project.

TABLE G-4B
HIGHWAY 169 NOISE MONITORING AND MODELING RESULTS – NIGHTTIME
SEGMENT TWO: RURAL ELK RIVER AND SOUTHERN LIVONIA TOWNSHIP

Receptor*	**Existing (2007)**		**2030 No-Build**		**Difference Between Existing (2007) and 2030 No-Build**		**2030 Build**		**Difference Between Existing (2007) and 2030 Build**	
	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}
38 (R) (1)	**56.9**	48.0	**59.9**	**51.8**	3.0	3.8	**56.7**	**53.4**	-0.2	5.4
39 (R) (3)	**64.4**	**60.5**	**66.4**	**63.4**	2.0	2.9	**66.0**	**62.8**	1.6	2.3
40 (R) (1)	**62.3**	**58.4**	**64.5**	**61.3**	2.2	2.9	**63.4**	**60.6**	1.1	2.2
41 (R) (1)	**57.7**	**54.8**	**59.9**	**57.5**	2.2	2.7	**59.1**	**56.8**	1.4	2
42 (R) (2)	**68.9**	**64.3**	**71.0**	**67.3**	2.1	3.0	**70.5**	**66.7**	1.6	2.4
43 (R) (1)	**70.7**	**65.5**	**72.9**	**68.7**	2.2	3.2	**72.4**	**67.9**	1.7	2.4
44 (I) (1)	67.1	62.9	69.2	65.9	2.1	3.0	68.8	65.4	1.7	2.5
45 (R) (2)	**67.4**	**63.1**	**69.5**	**66.1**	2.1	3.0	**69.5**	**66.0**	2.1	2.9
46 (R) (1)	**71.6**	**66.4**	**73.8**	**69.6**	2.2	3.2	**73.5**	**69.1**	1.9	2.7
47 (I) (1)	64.1	60.6	66.2	63.4	2.1	2.8	66.1	63.3	2.0	2.7
48 (R) (2)	**72.0**	**66.6**	**74.2**	**69.8**	2.2	3.2	**74.1**	**69.7**	2.1	3.1
49 (C) (1)	59.3	56.7	61.5	59.4	2.2	2.7	61.5	59.5	2.2	2.8
50 (R) (1)	51.5	49.6	53.7	**52.2**	2.2	2.6	**63.3**	**55.9**	11.8	6.3
51 (R) (1)	**70.4**	**65.2**	**72.7**	**68.4**	2.3	3.2	**72.1**	**67.5**	1.7	2.3
52 (R) (1)	**65.4**	**60.1**	**67.4**	**63.3**	2.0	3.2	**66.1**	**62.7**	0.7	2.6
53 (I) (1)	70.5	65.2	72.6	68.2	2.1	3.0	71.9	67.3	1.4	2.1
54 (R) (1)	**58.5**	48.3	**61.7**	**52.7**	3.2	4.4	**57.3**	**54.8**	-1.2	6.5
55 (R) (1)	**62.8**	**59.3**	**65.2**	**62.6**	2.4	3.3	**65.2**	**62.5**	2.4	3.2
56 (R) (1)	**72.4**	**66.6**	**75.0**	**70.4**	2.6	3.8	**74.1**	**68.9**	1.7	2.3
57 (R) (1)	**73.4**	**67.3**	**76.0**	**71.1**	2.6	3.8	**76.0**	**71.2**	2.6	3.9
58 (R) (3)	**66.0**	**61.9**	**68.5**	**65.3**	2.5	3.4	**68.6**	**65.3**	2.6	3.4
59 (R) (1)	**63.0**	**59.5**	**65.4**	**62.8**	2.4	3.3	**65.8**	**63.2**	2.8	3.7
60 (C) (1)	**70.1**	65.0	**72.6**	**68.7**	2.5	3.7	**72.3**	**68.2**	2.2	3.2
61 (R) (1)	**66.5**	**62.2**	**69.0**	**65.7**	2.5	3.5	**69.0**	**65.9**	2.5	3.7
62 (R) (1)	55.0	**52.2**	**57.9**	**55.8**	2.9	3.6	**60.4**	**56.3**	5.4	4.1
63 (R) (1)	**60.7**	**57.4**	**63.6**	**61.0**	2.9	3.6	**63.2**	**60.7**	2.5	3.3
64 (R) (1)	**65.7**	**61.7**	**68.1**	**65.1**	2.4	3.4	**68.1**	**65.1**	2.4	3.4
65 (R) (1)	**61.1**	**57.4**	**63.5**	**60.7**	2.4	3.3	**63.6**	**60.9**	2.5	3.5
State Standards(1)	**55**	**50**	**55**	**50**	**-**	**-**	**55**	**50**	**-**	**-**
State Standards(2)	**70**	**65**	**70**	**65**	**-**	**-**	**70**	**65**	**-**	**-**

Bold numbers are above State standards.
(R) – Residential; (C) – Commercial; (I) – Industrial; (Ch) – Church; (P) – Park
(1) State nighttime standards for residential land uses (NAC-1).
(2) State nighttime standards for commercial land uses (NAC-2).
* – Number in parentheses in this column is the number of receptors and/or commercial buildings represented by each receptor.
N/A = not applicable. These receptors would be acquired as part of the proposed project.

TABLE G-4C
HIGHWAY 169 NOISE MONITORING AND MODELING RESULTS – NIGHTTIME
SEGMENT THREE: ZIMMERMAN AND NORTHERN LIVONIA TOWNSHIP

Receptor*	Existing (2007)		No-Build (2030)		Difference Between Existing (2007) and No-Build (2030)		Build (2030)		Difference Between Existing (2007) and Build (2030)	
	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}
66 (Ch) (1)	**69.0**	**63.9**	**70.6**	**66.3**	1.6	2.4	**72.2**	**68.2**	3.2	4.3
67 (C) (5)	**70.4**	64.9	**72.0**	**67.3**	1.6	2.4	64.7	62.1	-5.7	-2.8
68 (C) (1)	68.6	63.6	70.3	66.1	1.7	2.5	62.6	60.5	-6.0	-3.1
69 (C) (2)	**70.8**	**65.3**	**72.6**	**68.0**	1.8	2.7	63.8	61.7	-7.0	-3.6
70 (C)(1)	62.9	59.3	64.7	61.8	1.8	2.5	63.2	60.2	0.3	0.9
71 (Ch) (1)	62.8	58.9	64.7	**61.5**	1.9	2.6	64.3	**60.5**	1.5	1.6
72 (C) (3)	**70.7**	64.8	**73.2**	**68.4**	2.5	3.6	63.8	61.7	-6.9	-3.1
73 (C) (4)	63.4	59.3	65.8	62.6	2.4	3.3	61.2	59.2	-2.2	-0.1
74 (R) (17)	**58.1**	**54.8**	**60.5**	**57.9**	2.4	3.1	**61.0**	**58.8**	2.9	4.0
75 (C) (6)	**70.3**	63.8	**72.9**	**67.5**	2.6	3.7	67.0	64.3	-3.3	0.5
76 (R) (4)	**67.6**	**62.3**	**70.0**	**65.8**	2.4	3.5	**74.0**	**69.7**	6.4	7.4
77-1 (R) (2)	**56.2**	**53.0**	**58.6**	**56.1**	2.4	3.1	**69.1**	**65.9**	12.9	12.9
77-2 (R) (2)	55.0	**52.0**	**57.3**	**55.1**	2.3	3.1	**66.8**	**64.0**	11.8	12.0
77-3 (R) (2)	53.6	**50.8**	**55.9**	**53.9**	2.3	3.1	**64.3**	**61.9**	10.7	11.1
77-4 (R) (3)	52.5	49.9	54.8	**52.9**	2.3	3.0	**62.5**	**60.3**	10.0	10.4
78-1 (R) (1)	**55.9**	**52.8**	**58.2**	**55.9**	2.3	3.1	**70.6**	**67.0**	14.7	14.2
78-2 (R) (2)	54.6	**51.8**	**57.0**	**54.8**	2.4	3.0	**67.2**	**64.3**	12.6	12.5
79 (R) (4)	53.0	**50.4**	**55.4**	**53.4**	2.4	3.0	**63.9**	**61.5**	10.9	11.1
80 (R) (8)	51.4	49.1	53.9	**52.2**	2.5	3.1	**61.7**	**59.6**	10.3	10.5
81 (R) (1)	51.8	49.5	54.4	**52.7**	2.6	3.2	**62.4**	**60.3**	10.6	10.8
82 (R) (8)	51.9	49.0	54.9	**52.7**	3.0	3.7	**60.0**	**58.4**	8.1	9.4
83 (R) (6)	**57.9**	**54.4**	**60.2**	**57.5**	2.3	3.1	**70.2**	**66.8**	12.3	12.4
State Standards(1)	**55**	**50**	**55**	**50**	-	-	**55**	**50**	-	-
State Standards(2)	**70**	**65**	**70**	**65**	-	-	**70**	**65**	-	-

Bold numbers are above State standards.
(R) – Residential; (C) – Commercial; (I) – Industrial; (Ch) – Church; (P) – Park
(1) State nighttime standards for residential land uses (NAC-1).
(2) State nighttime standards for commercial land uses (NAC-2).
* – Number in parentheses in this column is the number of receptors and/or commercial buildings represented by each receptor.
N/A = not applicable. These receptors would be acquired as part of the proposed project.

TABLE G-4C
HIGHWAY 169 NOISE MONITORING AND MODELING RESULTS – NIGHTTIME
SEGMENT THREE: ZIMMERMAN AND NORTHERN LIVONIA TOWNSHIP

Receptor*	Existing (2007)		No-Build (2030)		Difference Between Existing (2007) and No-Build (2030)		Build (2030)		Difference Between Existing (2007) and Build (2030)	
	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}
84-1 (R) (2)	**58.2**	**54.5**	**60.5**	**57.7**	2.3	3.2	**68.1**	**65.2**	9.9	10.7
84-2 (R) (1)	**59.1**	**55.3**	**61.4**	**58.5**	2.3	3.2	**68.4**	**65.4**	9.3	10.1
85 (R) (3)	**65.6**	**60.9**	**68.0**	**64.3**	2.4	3.4	**71.9**	**68.1**	6.3	7.2
86 (R) (1)	**66.8**	**61.5**	**69.3**	**65.0**	2.5	3.5	**71.3**	**67.2**	4.5	5.7
87 (R) (3)	**66.3**	**61.3**	**68.7**	**64.7**	2.4	3.4	**70.4**	**66.9**	4.1	5.6
88 (R) (3)	**67.9**	**61.8**	**70.5**	**65.4**	2.6	3.6	**71.8**	**66.8**	3.9	5.0
89 (R) (3)	**66.9**	**61.6**	**69.3**	**65.2**	2.4	3.6	**70.2**	**66.5**	3.3	4.9
90 (R) (3)	**66.7**	**61.5**	**69.1**	**65.0**	2.4	3.5	**70.2**	**66.7**	3.5	5.2
91 (R) (3)	**66.1**	**61.2**	**68.4**	**64.7**	2.3	3.5	**69.9**	**66.6**	3.8	5.4
92 (R) (3)	**67.6**	**61.9**	**70.1**	**65.5**	2.5	3.6	**72.1**	**67.7**	4.5	5.8
State Standards(1)	**55**	**50**	**55**	**50**	**-**	**-**	**55**	**50**	**-**	**-**
State Standards(2)	**70**	**65**	**70**	**65**	**-**	**-**	**70**	**65**	**-**	**-**

Bold numbers are above State standards.
(R) – Residential; (C) – Commercial; (I) – Industrial; (Ch) – Church; (P) – Park
(1) State nighttime standards for residential land uses (NAC-1).
(2) State nighttime standards for commercial land uses (NAC-2).
* – Number in parentheses in this column is the number of receptors and/or commercial buildings represented by each receptor.
N/A = not applicable. These receptors would be acquired as part of the proposed project.

TABLE G-5
HIGHWAY 169: TRAFFIC NOISE IMPACT SUMMARY

Type of Impact	Segment 1 Urban Elk River (37 Modeled Receptor Locations)			Segment 2 Rural Elk River and Livonia Township (28 Modeled Receptor Locations)			Segment 3 Zimmerman (27 Modeled Receptor Locations)		
	Existing (Year 2007)	**No-Build (Year 2030)**	**Build (Year 2030)**	**Existing (Year 2007)**	**No-Build (Year 2030)**	**Build (Year 2030)**	**Existing (Year 2007)**	**No-Build (Year 2030)**	**Build (Year 2030)**
Modeled Receptors Over State Daytime Standards (L_{10})	14	15	19	14	15	18	12	16	14
Modeled Receptors Over State Nighttime Standards (L_{10})	26	30	28	21	24	25	21	23	21
Modeled Receptors Approaching/ Exceeding Federal Abatement Criteria (69 dBA) [(1)]	6	8	10	7	9	12	3	11	14
Substantial increase from existing (≥5 dBA) to future Build conditions noise levels	N/A	N/A	9	N/A	N/A	2	N/A	N/A	9

N/A = not applicable.
[(1)] For residential and parkland uses (Federal land use category B). Approaching Federal noise abatement criteria for commercial/industrial receptors (Federal land use category) is defined as 74 dBA (L_{10}).

Noise Mitigation

The future Highway 169 Project in Elk River and Zimmerman is considered a Type I project for purposes of noise mitigation analysis. A Type I project is the construction of a new highway on a new alignment or the physical alteration of an existing highway (e.g., change in horizontal or vertical alignment; increase in number of through lanes). 23 CFR 772.13(c) describes noise abatement measures that are to be considered when a noise impact has been identified with a Type I highway project. These noise abatement measures include:

- Traffic management measures (e.g., traffic control devices and signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, modified speed limits, and exclusive land designations);
- Alteration of horizontal and vertical alignments;
- Acquisition of property rights (either in fee or lesser interest) for construction of noise barriers;
- Construction of noise barriers (including landscaping for aesthetic purposes) whether within or outside the highway right-of-way;
- Acquisition of real property or interests therein (predominately unimproved property) to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise; and
- Noise insulation of noise sensitive public use or nonprofit institutional structures.

Noise Barrier Evaluation

Noise barrier construction decisions are based on a study of feasibility and reasonableness. Feasibility is determined by physical and/or engineering constraints (i.e., whether a noise barrier could feasibly be constructed on the site). Reasonableness is a more subjective criterion and is based on a number of factors. Economic reasonableness is determined by consideration of Mn/DOT's cost-effectiveness index in concert with Mn/DOT's noise barrier acoustical effectiveness limits (i.e., noise level reduction capability). If noise mitigation is found to be cost-effective, additional reasonableness factors such as aesthetics and the desires of affected property owners are considered.

The feasibility of noise barrier construction is sometimes dependent on design details that are not known until the final design phase of the project. The following analysis assumes that noise walls could be feasibly constructed up to 20 feet high throughout the project corridor.

For a noise barrier to be considered acoustically effective, it must achieve a noise reduction of 5 dBA or more. To be considered cost-effective, the cost per dBA of reduction per residence should be equal to, or less than $3,250 (in 1997 dollars). The following formula can be used to determine the cost-effectiveness of the barrier:

The cost-effectiveness index is equal to the cost of the noise barrier[1] divided by the product of the average noise level reduction based on those residences that had noise level reductions of 5 dBA or more and the number of residences that had noise level reductions of 5 dBA or more.

[1]The cost of a noise wall is calculated using $15 per square foot of wall, except on structures, where the cost is $18 per square foot.

Only residences that experience a five or greater decibel reduction in noise following construction of a noise barrier are considered in this analysis. The result of the above formula is a cost per decibel per residence. This overall approach is outlined in Mn/DOT Noise Policy for Type I and Type II Federal-Aid Projects as per 23 CFR 772.

There are several steps to assessing the cost-effectiveness of noise barriers. First, the cost-effective noise wall height is determined for each segment of the project area. For this study, three heights of potential noise barriers were analyzed: 20, 15 and 10 feet (except as described under Area 1, below). If a 20-foot noise barrier meets the reasonableness criteria and is feasible, it would be proposed for construction. If the 20-foot barrier does not meet the criteria, a 15-foot barrier is evaluated. Likewise, if a 15-foot barrier does not meet the criteria, a 10-foot barrier is studied. If a 10-foot noise barrier meets the reasonableness criteria and is feasible, it would then be proposed for construction.

State daytime and nighttime noise standards were predicted to be exceeded at modeled receptor locations throughout the project area. As such, noise barriers were evaluated at modeled receptor locations where State standards are predicted to be exceeded with future (2030) Build conditions. The locations of modeled noise walls are shown in Figures G-1 through G-5. Additional model receptor locations were added where necessary for purposes of calculating barrier cost-effectiveness.

Daytime noise barrier cost-effectiveness results are tabulated in Tables G-6 through G-8 (see pages 37 through 48 at the end of this document).

Segment One: Urban Elk River

Area A (Receptors 1-1, 3-1, 3-2, 4-1, 4-2)

Area A is located along the west side of Highway 169 from the Highway 10/101/169 interchange to the Main Street interchange. Area A is bisected by the BNSF Railway mainline. Industrial land uses are located in the northwest quadrant of the Highway 10/101/169 interchange. This is the site of a Great River Energy (GRE) power plant. Operations of this facility are a dominant source of noise at this site. Commercial land uses are located in the southwest quadrant of the Main Street interchange (receptor 3-2). Residential land uses are located to the west along Main Avenue (receptors 3-1 and 4-1). Commercial and residential land uses in the southeast quadrant of the Main Street interchange are predicted to exceed State noise standards with future Build conditions.

Receptor 1-1 represents open space in the southwest quadrant of the Highway 10/101/169 interchange. This is the site of a highway rest area (Babcock Memorial Rest Area) that is currently used as a public water access site. This site is operated and maintained under a limited use permit between the DNR and Mn/DOT. The site is located within the highway right of way. According to the limited use permits, use of the highway rest area in no way establishes a permanent park or recreation area. As such, no noise mitigation was considered at this location.

An approximately 1,160-foot long noise wall was modeled in the southwest quadrant of the Main Street interchange. This modeled wall would shield commercial land uses in the southwest quadrant of the interchange (represented by receptor 3-2). This modeled barrier extends from Main Street to a point located approximately 1,160 feet south of Main Street. This modeled wall was located on a proposed retaining wall in the southwest quadrant of the Main Street interchange.

The 1,160-foot long, 10-foot modeled barrier provides a reduction that varies from 0.2 dBA to 3.6 dBA. The 1,160-foot long, 15-foot high modeled barrier results in reductions that vary from 0.3 dBA to 5.0 dBA in modeled noise levels. The cost-effectiveness for the 15-foot high wall is $25,425/dBA/receptor. The 1,160-foot long, 20-foot high modeled barrier results in reductions that vary from 0.4 dBA to 5.7 dBA in modeled noise levels. The cost-effectiveness for the 20-foot high wall is $29,605/dBA/receptor.

The 10-foot high modeled barrier does not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 15-foot high and 20-foot high modeled barriers do not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

Area B (Receptors 1-2, 1-3, 2-1, 2-2, 2-3)

Area B is located along the east side of Highway 169 from the Highway 10/101/169 interchange to the Main Street interchange. Area B is bisected by the BNSF Railway mainline. Land use in the southeast and northeast quadrants of the Highway 10/101/169 interchange is commercial. Land uses in Area B between the BNSF Railway and the Main Street interchange are commercial. Commercial land uses in Area B between the BNSF Railway and Main Street (receptors 2-1, 2-2, 2-3) are predicted to exceed State standards with future Build conditions.

Three noise walls were evaluated for Area B between along the east side of Highway 169 between the Highway 10/101/169 interchange and Main Street. An approximately 550-foot long wall was modeled in the northeast quadrant of the Highway 10/101/169 interchange (Wall B1). An approximately 700-foot long wall was modeled along the east side of Highway 169 north of the BNSF Railway (Wall B2). An approximately 1,700-foot long wall was modeled in the southeast quadrant of the Main Street interchange (Wall B3). The results of the Area B evaluation are summarized below.

- <u>Wall B1 (receptor 1-2)</u>: An approximately 550-foot long noise barrier was modeled in the northeast quadrant of the Highway 10/101/169 interchange along a retaining wall east of the eastbound Highway 10 to northbound Highway 169 ramp. This modeled barrier would shield commercial land uses in the northeast quadrant of the Highway 169 interchange.

The 10-foot and 15-foot high modeled barriers do not meet the minimum 5 dBA reduction threshold to be considered acoustically effective. The 550-foot long, 20-foot high modeled noise barrier results in a 5.1 dBA reduction in modeled noise levels. The cost-effectiveness for the 20-foot high wall is $15,147/dBA/receptor. This modeled wall does not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

- Wall B2 (receptor 2-1): An approximately 700-foot long noise barrier was modeled along the east side of Highway 169, north of the BNSF Railway. This modeled barrier would shield commercial land uses represented by receptor 2-1. The 700-foot long, 10-foot high modeled barrier provides a reduction of 4.0 dBA. The 700-foot long, 15-foot high modeled noise barrier results in a 6.7 dBA reduction in modeled noise levels. The cost-effectiveness for the 15-foot high wall is $22,500/dBA/receptor. The 700-foot long, 20-foot high modeled noise barrier results in a 9.1 dBA reduction in modeled noise levels. The cost-effectiveness for the 20-foot high wall is $22,088/dBA/receptor.

  The 10-foot high modeled barrier does not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 15-foot high and 20-foot high modeled barriers do not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

- Wall B3 (receptors 2-2 and 2-3): An approximately 1,700-foot long noise barrier was modeled in the southeast quadrant of the Main Street interchange. This modeled barrier would shield commercial land uses represented by receptors 2-2 and 2-3. This modeled barrier extends from a point located approximately 1,400 feet south of Main Street to Line Avenue, east of Highway 169. This modeled wall was located on top of a proposed retaining wall in the southeast quadrant of the Main Street interchange.

  The 1,700-foot long, 10-foot high modeled barrier provides a reduction that varies from 2.2 dBA to 3.2 dBA. The 1,700-foot long, 15-foot high modeled noise barrier results in reductions that vary from 4.2 dBA to 5.9 dBA in modeled noise levels. The cost-effectiveness for the 15-foot high wall is $63,686/dBA/receptor. The 1,700-foot long, 20-foot high modeled noise barrier results in reductions that vary from 6.6 dBA to 8.1 dBA in modeled noise levels. The cost-effectiveness for the 20-foot high wall is $12,153/dBA/receptor.

  The 10-foot high modeled barrier does not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 15-foot high and 20-foot high modeled barriers do not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

Area C (Receptors 5, 8-1, 8-2, 13, 14, 16)

Area C is located along the west side of Highway 169 between Main Street and School Street. Area C consists of primarily commercial land uses (receptors 5, 13, 14). Residential land uses are located along Highway 169 north of the Main Street interchange area (receptors 8-1 and 8-2) and west of the School Street interchange along the south side of School Street (receptor 16).

Commercial land uses in Area C (receptors 13 and 14) along Highway 169 are predicted to be below State standards with future Build conditions. Residential land uses in Area C (receptors 8-1 and 16) are predicted to exceed State daytime and nighttime standards with future Build conditions.

Receptor 5 represents commercial land uses in the northwest quadrant of the Main Street interchange. A proposed stormwater pond is located at these commercial sites. The commercial sites represented by receptor 5 would be relocated with the project (see Section VII.B).

Receptor 16 is predicted to exceed State daytime and nighttime standards with future Build conditions. Receptor 16 is located approximately 650 feet west of Highway 169 in the southwest quadrant of the School Street/Freeport Street intersection. School Street is a high-volume, locally-owned east-west roadway that functions as the east frontage road between School Street and 193rd Avenue. Freeport Street is a high-volume, locally-owned north-south roadway that functions at the west frontage road between Main Street and School Street. School Street and Freeport Street are the dominant sources of traffic noise for residences represented by receptor 16. As such, there are no reasonable or feasible mitigation measures that could be implemented along Highway 169 that would result in a substantial reduction in noise levels at this location.

An approximately 1,280-foot noise wall was modeled in the northwest quadrant of the Main Street interchange. This modeled wall would shield residential land uses (Guardian Angels) represented by Receptors 8-1 and 8-2. This modeled barrier extends from a point located approximately 200 feet north of Main Street to a point located approximately 1,280 feet north of Main Street. This modeled wall was located on a proposed retaining wall north of the southbound exit ramp to Main Street. In the northwest quadrant of the interchange, the modeled wall was located between a proposed stormwater pond and the southbound exit ramp.

The 1,280-foot long, 10-foot modeled barrier provides a reduction that varies from 1.7 dBA to 4.7 dBA. The 1,280-foot long, 15-foot high modeled noise barrier results in reductions that vary from 2.2 dBA to 6.6 dBA in modeled noise levels. The cost-effectiveness for the 15-foot high wall is $7,102/dBA/receptor. The 1,280-foot long, 20-foot high modeled noise barrier results in reductions that vary from 2.5 dBA to 7.8 dBA in modeled noise levels. The cost-effectiveness for the 20-foot high wall is $7,981/dBA/receptor.

The 10-foot high modeled barrier does not meet Mn/DOT’s minimum 5 dBA reduction threshold to be considered acoustically effective. The 15-foot high and 20-foot high modeled barriers do not meet Mn/DOT’s minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

Area D (Receptors 6, 7, 9, 10, 11, 12-1, 12-2, 15)

Area D is located along the east side of Highway 169 from the Main Street interchange to the School Street interchange. Area D consists of a mix of commercial and residential land uses. Commercial and residential land uses (receptors 6, 7 and 9) are located in the northeast quadrant of the Main Street interchange. Commercial land uses (receptors 10 and 11) are located between Main and School Streets and in the southeast quadrant of the School Street interchange. Residential land uses (receptors 12-1, 12-2 and 15) are located to the south of School Street east of the relocated Dodge Street.

Residential land uses in the northeast quadrant of the Main Street interchange are predicted to exceed State daytime and nighttime standards with future Build conditions. Modeled receptor locations representing commercial land uses between Main Street and School Street are predicted to be below State standards with future Build conditions. Residential land uses south of School Street at Dodge Street are predicted to exceed State nighttime standards with future Build conditions.

Three noise walls were evaluated for Area D along the east side of Highway 169 between Main Street and School Street. An approximately 910-foot wall was modeled in the northeast quadrant of the Main Street interchange (Wall D1). An approximately 620-foot wall was modeled in the southeast quadrant of the School Street interchange (Wall D2). An alternative 480-foot wall was modeled in the southeast quadrant of the School Street interchange east of relocated Dodge Street (Wall D3). The results of the Area D evaluation are summarized below.

- Wall D1 (receptors 6, 7, 9): An approximately 910-foot noise wall was modeled in the northeast quadrant of the Main Street interchange. This modeled barrier extends from a point located approximately 500 feet north of Main Street to 5th Street (approximately 1,400 feet north of Main Street). This modeled wall does not shield commercial land uses in the northeast quadrant of the Main Street interchange, and does not shield commercial land uses along Dodge Avenue north of 5th Street.

  The 910-foot long, 10-foot high modeled barrier provides a reduction that varies from 2.5 dBA to 3.8 dBA. The 910-foot long, 15-foot high modeled provided a 3.2 dBA to 5.1 dBA reduction in modeled noise levels. The cost-effectiveness for the 15-foot high wall is $4,853/dBA/receptor. The 910-foot long, 20-foot high modeled provided a 3.6 dBA to 5.6 dBA reduction in modeled noise levels. The cost-effectiveness for the 20-foot high wall is $5,859/dBA/receptor.

  The 10-foot high modeled barrier does not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 15-foot high and 20-foot high modeled barriers do not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

  Receptor 7 represents Baldwin Park, a City of Elk River park located along Highway 169 in the northeast quadrant of the Main Street interchange. Modeled noise levels at receptor 7 with future Build conditions are predicted to be 66.0 dBA (L_{10}). Parks are considered special use areas. It is Mn/DOT policy to provide noise mitigation at special use areas such that modeled noise levels with future Build conditions are below State daytime noise standards.

Baldwin Park would be shielded by 910-foot long noise wall described above. As tabulated in Tables G-6, G-7, and G-8, the 10-foot high, 15-foot high, and 20-foot high modeled barriers did not achieve a substantial reduction (≥ 5 dBA) in noise levels at receptor 7. The City of Elk River has indicated that if redevelopment of this area occurs, Baldwin Park amenities would be relocated. As such, no noise mitigation is proposed at this location.

- <u>Wall D2 (receptors 12-1, 12-2, 15)</u>: An approximately 620-foot long noise wall was modeled in the southeast quadrant of the School Street interchange. This modeled barrier follows the relocated Dodge Street alignment in the southeast quadrant of the School Street interchange. This modeled barrier extends from the retaining wall between the northbound exit ramp to School Street and Dodge Street to the School Street/Dodge Street intersection. This modeled wall does not shield commercial land uses along Dodge Street south of the School Street interchange.

  The 10-foot, 15-foot, and 20-foot high modeled barriers do not meet the minimum 5 dBA reduction threshold to be considered acoustically effective. Therefore, none of the analyzed barriers are proposed.

- <u>Wall D3 (receptors 12-1, 12-2, 15)</u>: An approximately 480-foot long noise wall was modeled in the southeast quadrant of the School Street interchange east of relocated Dodge Street. This modeled barrier would require the acquisition of additional right of way east of Dodge Street. This modeled wall does not shield commercial land uses along Dodge Street south of the School Street interchange.

  The 10-foot, 15-foot, and 20-foot high modeled barriers do not meet the minimum 5 dBA reduction threshold to be considered acoustically effective. Therefore, none of the analyzed barriers are proposed.

Area E (Receptors 17, 22, 27)

Area E is located along the west side of Highway 169 from the School Street interchange to the 193rd Avenue interchange. Area E consists of commercial land uses (receptors 17, 22, 27). Commercial land uses (receptor 17) in the northwest quadrant of the School Street interchange are predicted to be below State noise standards with future Build conditions. Commercial land uses (receptor 27) in the southwest quadrant of the 193rd Avenue interchange are also predicted to be below State noise standards with future Build conditions.

Commercial land uses in between Freeport Avenue and Highway 169 (receptor 22) are predicted to exceed State noise standard with future Build conditions. An approximately 1,490-foot noise barrier was modeled along the west side of Highway 169 from a point located approximately 950 feet north of School Street (site of municipal water tower) to a point located approximately 1,150 feet south of Jackson Avenue.

The 10-foot modeled barrier provides a reduction that varies from 0 dBA to 3.7 dBA. One commercial receptor (receptor 22) is predicted to achieve a 7.2 dBA reduction with the 15-foot high modeled wall. The cost-effectiveness for the 15-foot wall is $11,406/dBA/receptor. One commercial receptor (receptor 22) is predicted to achieve a 9.9 dBA reduction with the 20-foot high modeled wall. The cost-effectiveness for the 20-foot high wall is $11,203/dBA/receptor.

The 10-foot high modeled barrier does not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 15-foot high and 20-foot high modeled barriers do not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

Area F (Receptors 19, 20-1, 20-2, 20-3, 20-4, 20-5, 21, 23, 24, 25)

Area F is located along the east side of Highway 169 from the proposed School Street interchange to the proposed 193rd Avenue interchange. Area F consists of commercial land uses in the northeast quadrant of the School Street interchange and in the southeast quadrant of the 193rd Avenue interchange. Single-family residential land uses are located along the east side of Highway 169 between the proposed interchanges (receptors 20-1, 21 and 23). Residential land uses (receptors 24 and 25) are also located to the east of an open water wetland in the southeast quadrant of the 193rd Avenue interchange.

Commercial land uses in the northeast quadrant of the School Street interchange are predicted to be below State standards with future Build conditions. Commercial property in the southeast quadrant of the 193rd Avenue interchange would be acquired as right of way to accommodate the proposed interchange. Residential land uses in Area F are predicted to exceed State daytime and nighttime standards with future Build conditions.

Receptor 19 is predicted to exceed State nighttime standards with future Build conditions. Receptor 19 is located approximately 500 feet east of Highway 169 along Dodge Street. Dodge Street is a locally-owned roadway. The segment of Dodge Street north of School Street at receptor 19 is characterized by private driveway connections providing access for adjacent residences. The distance between driveways and intersecting local roadways ranges from approximately 50 feet to 100 feet. Gaps in a noise barrier at this location would limit its acoustical effectiveness. As such, there is no feasible mitigation measure that could be implemented along this segment of Dodge Street.

An approximately 1,105-foot long noise barrier was modeled along the east side of Highway 169 near the southeast quadrant of the 193rd Avenue interchange. This modeled barrier extends from a point located approximately 1,000 feet north of School Street to a point located approximately 1,350 feet south of 193rd Avenue. The northern terminus of this wall is located at an open water wetland in the southeast quadrant of the 193rd Avenue interchange. It is not feasible to extend the noise wall beyond this point because of additional fill impacts to this open water wetland. As such, this modeled barrier would not shield residences represented by receptors 24 and 25. The 1,105-foot long noise barrier would effectively shield 19 residences along the east side of Highway 169.

The 1,105-foot long, 20-foot tall modeled barrier at this location results in reductions that vary from 2.6 dBA to 13.3 dBA in modeled noise levels with the. The cost-effectiveness of the 20-foot high wall is $2,153/dBA/receptor (see Table G-8). This 20-foot high wall meets Mn/DOT's cost-effectiveness criteria and is proposed. Traffic noise impacts and mitigation will be re-assessed at the time of project implementation based on conditions in place at that time. Final mitigation decisions will be based on the results of this re-assessment, input from affected residents, community input, and final design considerations.

Area G (Receptors 29, 30, 31-1, 31-2, 31-3, 33)

Area G is located along the west side of Highway 169 between the 193rd Avenue interchange and the 197th Avenue interchange. Land uses in the northwest quadrant of the 193rd Avenue interchange are commercial (receptor 29). Residential land uses are located along Holt Street and Irving Street (receptors 30, 31-2, 31-3, 33), west of the highway. Modeled noise levels for commercial land uses in the northwest quadrant of the 193rd Avenue interchange are predicted to be below State daytime and nighttime standards with future Build conditions. Modeled noise levels for residential land uses are predicted to exceed State daytime and nighttime standards with future Build conditions.

An approximately 2,190-foot noise barrier was modeled along the west side of Highway 169 between 193rd Avenue and 197th Avenue. This modeled barrier extends from a point located approximately 1,000 feet north of 193rd Avenue to 197th Avenue, and is located between the highway right of way limits and proposed retaining walls along the west side of Highway 169. This modeled barrier does not shield commercial land uses in the northwest quadrant of the 193rd Avenue interchange. The 10-foot, 15-foot, and 20-foot high modeled barriers do not meet the minimum 5 dBA reduction threshold to be considered acoustically effective. Therefore, none of the analyzed barriers are proposed.

The modeled barrier was located within Mn/DOT Highway 169 right of way. 197th Avenue, Irving Street, and Holt Street, which are located to the west of Highway 169 and the modeled barrier, contribute to the sound environment for residences in Area G. As such, there are no feasible mitigation measures that could be implemented along Highway 169 that would result in a substantial reduction in noise levels at modeled receptor locations in Area G.

Area H (Receptor 32)

Area H is located along the east side of Highway 169 between the 193rd Avenue interchange and the 197th Avenue interchange. Area H consists of commercial land uses. Modeled noise levels for commercial land uses between 193rd Avenue and 197th Avenue are projected to be below State daytime and nighttime standards with future Build conditions.

Area I (Receptors 34, 37-1, 37-2)

Area I is located along the west side of Highway 169 north of the 197th Avenue interchange. Area I consists of residential land uses (single-family residences). Modeled receptor locations in

Area I are predicted to exceed State daytime and nighttime standards with future Build conditions.

An approximately 2,610-foot noise barrier was modeled along the west side of Highway 169 north of 197th Avenue. This noise barrier was located on a proposed retaining wall in the northwest quadrant of the 197th Avenue interchange. The approximately 2,610-foot long, 10-foot high modeled barrier provides a reduction that varies from 0.1 dBA to 3.7 dBA. The approximately 2,610-foot long, 15-foot high modeled provides a reduction that varies from 1.0 dBA to 4.8 dBA. The 20-foot high, 2,610-foot long modeled barrier results in reductions that vary from 3.1 dBA to 5.8 dBA in modeled noise levels. The cost-effectiveness for the 20-foot high wall is $44,397/dBA/receptor.

The 10-foot high and 15-foot high modeled barriers do not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 20-foot high modeled barrier does not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

Area J (Receptors 35, 36-1, 36-2, 36-3, 36-4, 36-5)

Area J is located along the east side of Highway 169 north of the 197th Avenue interchange. Area J consists of residential land uses (single-family residences). Modeled receptor locations in Area J are predicted to exceed State daytime and nighttime standards with future Build conditions.

An approximately 2,500-foot noise barrier was modeled along the east side of Highway 169 north of 197th Avenue. This modeled noise barrier was located on proposed retaining wall in the northeast quadrant of the 197th Avenue interchange. The 10-foot high, 2,500-foot long modeled barrier results in reductions that vary from 0.7 dBA to 5.5 dBA in modeled noise levels. The cost-effectiveness for the 10-foot high wall is $67,636/dBA/receptor. The 15-foot high, 2,500-foot long modeled noise barrier results in reductions that vary from 1.9 dBA to 8.0 dBA in modeled noise levels. The cost-effectiveness for the 15-foot wall is $21,458/dBA/receptor. The 20-foot high, 2,500-foot long modeled noise barrier results in reductions that vary from 2.6 dBA to 9.8 dBA in modeled noise levels. The cost-effectiveness for the 20-foot wall is $14,194/dBA/receptor.

The 10-foot, 15-foot and 20-foot high modeled barriers do not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

Segment Two: Rural Elk River and Livonia Township

Area K (Receptors 42, 43, 44, 46, 48)

Area K represents rural residential and industrial land uses along the west side of Highway 169 from south of County Road 77 to the 221st Avenue interchange. Industrial land uses from County Road 77 to 221st Avenue are predicted to be below State standards with future Build conditions. Rural residential uses adjacent to County Road 77 are predicted to exceed State daytime and nighttime standards with future Build conditions.

Two separate noise wall were modeled in Area K adjacent to the existing County Road 77 intersection with Highway 169. The evaluation of these walls is described below.

- Wall K1 (receptor 42): An approximately 895-foot wall was modeled along the west side of Highway 169 south of County Road 77. The approximately 895-foot long, 10-foot high modeled barrier provides a reduction of 2.4 dBA. The approximately 895-foot long, 15-foot high modeled provides a reduction of 4.5 dBA. The 895-foot long, 20-foot high modeled wall results in a reduction of 6.6 dBA in modeled noise levels with future Build conditions. The cost effectiveness of the 20-foot high wall is $19,545/dBA/receptor.

  The 10-foot high and 15-foot high modeled barriers do not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 20-foot high modeled barrier does not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

- Wall K2 (receptor 43): An approximately 790-foot wall was modeled along the west side of Highway 169 at the existing Highway 169/County Road 77 intersection. The approximately 790-foot long, 10-foot high modeled barrier provides a reduction of 1.3 dBA. The approximately 790-foot long, 15-foot high modeled provides a reduction of 3.4 dBA. The 790-foot long, 20-foot high modeled wall results in a reduction of 6.7 dBA in modeled noise levels with future Build conditions. The cost effectiveness of the 20-foot high wall is $33,806/dBA/receptor.

  The 10-foot high and 15-foot high modeled barriers do not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 20-foot high modeled barrier does not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

Area L (Receptors 38, 39, 40, 41, 45, 47, 49)

Area L represents rural residential and commercial/industrial land uses along the east side of Highway 169 from Brook Drive to the proposed 221st Avenue interchange. The proposed east frontage road intersects Brook Drive east of Highway 169. Commercial and industrial land uses in the southeast quadrant of the 221st Avenue interchange are predicted to be below State standards with future Build conditions. In general, rural residential uses to the south of the 221st Avenue interchange are predicted to exceed State daytime and nighttime standards with future Build conditions.

Two separate noise walls were modeled in Area L along the east side of Highway 169 south of the 221st Avenue interchange. The evaluation of these walls is described below.

- Wall L1 (receptors 38, 39, 40, 41): An approximately 3,400-foot noise wall was modeled along the east side of Highway 169 at Brook Drive. The traffic noise reduction provided by the 10-foot and 15-foot high modeled barriers is predicted to be less than the 5 dBA reduction threshold to be considered acoustically effective. The approximately 3,400-foot long, 10-foot high modeled barrier provides a reduction that varies from 0.5 dBA to 1.1 dBA. The approximately 3,400-foot long, 15-foot high modeled provides a reduction that varies from 1.5 dBA to 3.4 dBA. The 3,400-foot long, 20-foot high modeled wall results in reductions that vary from 3.0 dBA to 6.7 dBA in modeled noise levels with future Build conditions. The cost effectiveness of the 20-foot high wall is $50,224/dBA/receptor.

The 10-foot high and 15-foot high modeled barriers do not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 20-foot high modeled barrier does not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

- Wall L2 (receptor 45): An approximately 1,390-foot noise wall was modeled adjacent to the southeast quadrant of the 221st Avenue interchange. The traffic noise reduction provided by the 10-foot, 15-foot, and 20-foot high modeled barriers is predicted to be less than the 5 dBA reduction threshold to be considered acoustically effective. Therefore, none of the analyzed barriers are proposed.

Area M (Receptors 53, 56, 57, 59, 60)

Area M represents industrial and rural residential land uses along the west side of Highway 169 from the proposed 221st Avenue interchange to the CSAH 25/19 interchange. Industrial land uses in the northwest quadrant of the 221st Avenue interchange (receptor 53) are predicted to be below State standards with future Build conditions. Modeled noise levels at rural residential uses in the southwest quadrant of the CSAH 25/19 interchange are predicted to exceed State daytime and nighttime standards with future Build conditions.

Two separate noise walls were modeled in Area M adjacent to the CSAH 25/19 interchange. The evaluation of these walls is described below.

- Wall M1 (receptor 56): An approximately 995-foot noise wall was modeled along the west side of Highway 169 south of 237th Avenue. The noise wall analysis assumes that the existing access to Highway 169 would be closed at this location, and that an alternate access would be provided to the frontage road system with future Build conditions.

  The 995-foot long, 10-foot high modeled noise wall results in a reduction of 6.4 dBA in modeled noise levels with future Build conditions. The cost-effectiveness of the 10-foot high wall is $22,852/dBA/receptor. The 995-foot long, 15-foot high modeled wall results in a reduction of 10.2 dBA in modeled noise levels with future Build conditions. The cost-effectiveness of the 15-foot high wall is $21,287/dBA/receptor. The 995-foot long, 20-foot high modeled wall results in a reduction of 13.9 dBA in modeled noise levels with future Build conditions. The cost effectiveness of the 20-foot high wall is $20,827/dBA/receptor.

  The 10-foot, 15-foot and 20-foot high modeled barriers do not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

- Wall M2 (receptors 57, 59, 60): An approximately 2,770-foot noise wall was modeled in the southwest quadrant of the Highway 169/CSAH 25/19 interchange from CSAH 25 south to 237th Avenue. The approximately 2,770-foot long, 10-foot high modeled barrier provides a reduction that varies from 1.2 dBA to 4.1 dBA. The 2,770-foot long, 15-foot high modeled wall results in reductions that vary from 2.1 dBA to 7.6 dBA in modeled noise levels with future Build conditions. The cost-effectiveness for the 15-foot wall is $44,036/dBA/receptor. The 2,770-foot long, 20-foot high modeled wall results in reductions that vary from 3.6 dBA to 10.6 dBA in modeled noise levels with future Build conditions. The cost-effectiveness for the 20-foot high wall is $43,492/dBA/receptor.

  The 10-foot high modeled barrier does not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 15-foot high and 20-foot high modeled barriers do not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

Area N (Receptors 51, 52, 54, 55, 58)

Area N represents rural residential land uses along the east side of Highway 169 from the proposed 221st Avenue interchange to the CSAH 25/19 interchange. In general, modeled noise levels are predicted to exceed State daytime and nighttime standards at this location with future Build conditions.

Four separate noise walls were modeled in Area N. Wall N1 is located in the northeast quadrant of the 221st Avenue interchange. Wall N2 is located to the north of the 221st Avenue interchange along the east side of Highway 169. Walls N3 and N4 are located adjacent to the CSAH 25/19 interchange. The evaluation of these walls is described below.

- Wall N1 (receptor 51): An approximately 830-foot long noise wall was modeled in the northeast quadrant of the 221st Avenue interchange. This modeled barrier shields one rural residence that currently has direct access to Highway 169. The approximately 830-foot long, 10-foot high modeled barrier provides a reduction of 4.4 dBA. The 830-foot long, 15-foot high modeled wall results in a reduction of 8.3 dBA in modeled noise levels with future Build conditions. The cost-effectiveness for the 15-foot wall is $21,687/dBA/receptor. The 830-foot long, 20-foot high modeled wall results in a reduction of 10.9 dBA in modeled noise levels with future Build conditions. The cost-effectiveness for the 20-foot high wall is $21,881/dBA/receptor.

  The 10-foot high modeled barrier does not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 15-foot high and 20-foot high modeled barriers do not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

- Wall N2 (receptor 52): An approximately 1,600 foot long noise wall was modeled north of the 221st Avenue interchange along the east side of Highway 169. This modeled barrier shields one rural residence that currently has access to Highway 169 via 225th Avenue. The

10-foot high and 15-foot high modeled barriers do not meet the minimum 5 dBA reduction threshold to be considered acoustically effective. The approximately 1,600-foot long, 10-foot high modeled barrier provides a reduction of 1.0 dBA. The approximately 1,600-foot long, 15-foot high modeled barrier provides a reduction of 3.1 dBA. The 1,600-foot long, 20-foot high modeled wall results in a reduction of 5.8 dBA in modeled noise levels with future Build conditions. The cost-effectiveness for the 20-foot high wall is $80,948/dBA/receptor.

The 10-foot high and 15-foot high modeled barriers do not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 20-foot high modeled barrier does not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

- <u>Wall N3 (receptors 54 and 55)</u>: An approximately 2,250-foot noise wall was modeled along the east side of Highway 169 at 237th Avenue. This modeled barrier would shield two rural residences along the east side of Highway 169, south of the CSAH 25/19 interchange. The approximately 2,250-foot long, 10-foot high modeled barrier provides a reduction that varies from 2.1 dBA to 2.7 dBA. The approximately 2,250-foot long, 15-foot high modeled barrier provides a reduction that varies from 3.6 dBA to 3.7 dBA. The approximately 2,250-foot long, 20-foot high modeled wall results in reductions that vary from 4.8 dBA to 7.2 dBA in modeled noise levels with future Build conditions. The cost effectiveness of the 20-foot high wall is $92,500/dBA/receptor.

  The 10-foot high and 15-foot high modeled barriers do not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 20-foot high modeled barrier does not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

- <u>Wall N4 (receptor 58)</u>: An approximately 2,880-foot noise wall was modeled in the southeast quadrant of the Highway 169/ CSAH 25/19 interchange, between the highway and the proposed frontage road. The approximately 2,880-foot long, 10-foot high modeled barrier provides a reduction of 3.3 dBA. The approximately 2,880-foot long, 15-foot high modeled wall results in a reduction of 5.4 dBA in modeled noise levels with future Build conditions. The cost-effectiveness for the 15-foot wall is $29,688/dBA/receptor. The approximately 2,880-foot long, 20-foot high modeled wall results in a reduction of 6.8 dBA in modeled noise levels with future Build conditions. The cost-effectiveness for the 20-foot high wall is $31,434/dBA/receptor.

  The 10-foot high modeled barrier does not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 15-foot high and 20-foot high modeled barriers do not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

Area O, Wall O1 (Receptor64)

Area O (receptor 64) represents a single residential property along the west side of Highway 169, north of the proposed CSAH 25/19 interchange. This residence is located approximately 500 feet west of the southbound travel lanes. Modeled noise levels at Receptor R64 are predicted to exceed State daytime and nighttime noise standards with future Build conditions.

An approximately 4,000-foot noise wall (Wall O1) was modeled along the west side of Highway 169 at Receptor R64, north of the proposed CSAH 25/19 interchange. The traffic noise reduction provided by the 10-foot, 15-foot, and 20-foot modeled barriers is predicted to be less than the 5 dBA reduction threshold to be considered acoustically effective. Therefore, none of the analyzed barriers are proposed.

Area P (Receptors 61, 62, 63, 65)

Area P represents rural residential land uses along the east side of Highway 169, north of realigned CSAH 19 and the CSAH 25/19 interchange. In general, modeled noise levels are predicted to exceed State daytime and nighttime standards at this location with future Build conditions.

Three separate noise walls were modeled within Area P. The evaluation of these walls is described below.

- <u>Wall P1 (receptor 61)</u>: An approximately 1,270-foot long noise wall was modeled in the northeast quadrant of the Highway 169/CSAH 25/19 interchange, from realigned CSAH 19 to the existing CSAH 19 alignment. The approximately 1,270-foot long, 10-foot high modeled barrier provides a reduction of 2.0 dBA. The approximately 1,270-foot long, 15-foot high modeled barrier provides a reduction of 4.0 dBA. The approximately 1,270-foot long, 20-foot high modeled wall results in a reduction of 6.4 dBA in modeled noise levels with future Build conditions. The cost-effectiveness for the 20-foot wall is $14,531/dBA/receptor.

  The 10-foot high and 15-foot high modeled barriers do not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 20-foot high modeled barrier does not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

- <u>Wall P2 (receptors 63 and 65)</u>: An approximately 2,570-foot long noise wall was modeled along the east side of Highway 169, north of the existing CSAH 19 alignment. This modeled wall would shield residences represented by receptors 63 and 65; these receptors are located approximately 500 feet to 700 feet east of Highway 169. The traffic noise reduction provided by the 10-foot, 15-foot, and 20-foot high modeled barriers is predicted to be less than the 5 dBA reduction threshold to be considered acoustically effective. Therefore, none of the analyzed barriers are proposed.

- <u>Wall P3 (receptor 62)</u>: Receptor 62 is located north of relocated CSAH 25, approximately 1,400 feet east of Highway 169. CSAH 25 is a Sherburne County-owned east-west roadway that provides connectivity to Anoka County to the east. An approximately 1,210-foot long noise wall was modeled adjacent to receptor 62 along the north side of realigned CSAH 25. The approximately 1,210-foot long, 10-foot high modeled barrier provides a reduction of 4.1 dBA. The approximately 1,210-foot long, 15-foot high modeled wall results in a reduction of 5.3 dBA in modeled noise levels with future Build conditions. The cost-effectiveness for the 15-foot high wall is $50,094/dBA/residence. The approximately 1,210-foot long, 20-foot high modeled wall results in a reduction of 7.1 dBA in modeled noise levels with future Build conditions. The cost-effectiveness for the 20-foot wall is $49,859/dBA/receptor.

The 10-foot high modeled barrier does not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 15-foot high and 20-foot high modeled barriers do not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

Segment Three: Zimmerman

Area O, Wall O2 (Receptor 66)

Area O (receptor 66) represents a church along the west side of Highway 169, south of the proposed Highway 169/CSAH 4 interchange. This church is located adjacent to the point where the proposed realignment of Highway 169 matches the existing alignment south of CSAH 4. Modeled noise levels at receptor 66 are predicted to exceed State daytime and nighttime noise standards with future Build conditions.

An approximately 1,535-foot long noise wall (Wall O2) was modeled along the west side of Highway 169 at receptor 66, south of the proposed 257th Avenue overpass. The approximately 1,535-foot long, 10-foot high modeled barrier provides a reduction of 3.8 dBA. The 1,535-foot long, 15-foot high modeled wall results in a reduction of 6.6 dBA in modeled noise levels with future Build conditions. The cost-effectiveness for the 15-foot wall is $51,307/dBA/receptor. The 1,535-foot long, 20-foot high modeled wall results in a reduction of 9.1 dBA in modeled noise levels with future Build conditions. The cost-effectiveness for the 20-foot wall is $49,451/dBA/receptor.

The 10-foot high modeled barrier does not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 15-foot high and 20-foot high modeled barriers do not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

Area Q (Receptor 74)

Area Q consists of commercial and residential land uses in the northwest quadrant of the Highway 169/CSAH 4 interchange. Modeled noise levels for commercial receptors are predicted to be below State standards for commercial land uses under future Build conditions (see Tables G-3C and G-4C). Receptor 74 represents 17 first-row residences west of Highway 169. These receptors are located more than 500 feet west of Highway 169. Commercial land uses are planned along Highway 169 between the highway and the modeled receptor location. Modeled noise levels at this receptor are predicted to be below State daytime noise standards under future Build conditions, but are predicted to exceed State nighttime noise standards.

An approximately 2,990-foot noise wall was modeled along the west side of Highway 169 at receptor 74. The traffic noise reduction provided by the 10-foot, 15-foot, and 20-foot high modeled barriers is predicted to be less than 5 dBA reduction threshold to be considered acoustically effective. Therefore, none of the analyzed barriers are proposed

Area R (Receptors 77-1, 77-2, 77-3, 77-4, 78-1, 78-2, 79, 80, 81, 82, 83, 84-1, 84-2, 85, 86, 87, 88, 89, 90, 91, 92)

Area R consists of residential land uses in the northeast quadrant of the Highway 169/CSAH 4 interchange. Modeled receptor locations represent 56 residences along Fremont Drive and Fremont Lane adjacent to Lake Fremont. Modeled noise levels at residential receptors in Area R are predicted to exceed State daytime and nighttime standards (see Tables G-3C and G-4C).

An approximately 4,780-foot noise wall was modeled along the east side of the proposed Highway 169 alignment from the northeast quadrant of the Highway 169/CSAH 4 interchange to a point west of Lake Fremont. The approximately 4,780-foot long, 10-foot high modeled barrier provides a reduction that varies from 0.4 dBA to 4.1 dBA. The 4,780-foot long, 15-foot high modeled wall results in reductions that vary from 0.9 dBA to 6.3 dBA in modeled noise levels with future Build conditions. The cost-effectiveness for the 15-foot wall is $10,509/dBA/receptor. The 4,780-foot long, 20-foot high modeled wall results in reductions that vary from 1.6 dBA to 8.3 dBA in modeled noise levels with future Build conditions. The cost-effectiveness for the 20-foot wall is $5,765/dBA/receptor.

The 10-foot high modeled barrier does not meet Mn/DOT's minimum 5 dBA reduction threshold to be considered acoustically effective. The 15-foot high and 20-foot high modeled barriers do not meet Mn/DOT's minimum $3,250 cost-effectiveness criteria. Therefore, none of the analyzed barriers are proposed.

Alternative Noise Abatement

Noise abatement measures other than noise barriers were considered for the proposed project. These measures are identified in 23 CRF 772.13c and are listed above. The following describes the evaluation of alternative noise abatement measures.

Traffic Management Measures

Measures such as signing for prohibition of certain vehicle types, time-use restriction for certain vehicle types, and modified speed limits would not be feasible or practicable for this project. To limit the vehicle types, time of use, and vehicle speeds on Highway 169 in Elk River, Livonia Township and Zimmerman would not be consistent with the function of Highway 169 a as principal arterial roadway and a high priority IRC.

Alteration of Horizontal and Vertical Alignments

The proposed Highway 169 freeway design the urban Elk River segment (Main Street to 197th Avenue) includes depressing the mainline (i.e., roadway elevation lower than the surrounding environment. The proposed design includes retaining walls at select locations along the project corridor to minimize right of way impacts to adjacent properties. Highway 169 is depressed up to 20 feet in some locations through the urban Elk River segment. The extent that the freeway section can be depressed is limited by the groundwater elevation. The Highway 169 profiles were designed to maintain seven feet of clearance between the finished centerline elevation and the seasonal high groundwater elevation in order to maintain adequate groundwater separation in the roadside ditches. Depression of the Highway 169 profile provides noise attenuation relative to a profile that is at-grade with the surrounding environment.

The proposed Highway 169 freeway design is located on the current roadway alignment in urban and rural Elk River and Livonia Township. In Zimmerman, the Highway 169 horizontal alignment is shifted to the east of its existing alignment. This alignment shift, along with increases in traffic volumes over time, contribute to the noise increases predicted at modeled receptor locations east of Highway 169 along Lake Fremont. An alternative interchange concept was evaluated in Zimmerman that utilized existing Highway 169 alignment. This alternative was dismissed from consideration because of commercial/business relocations and impacts to the downtown business area as a result of widening CSAH 4. This alternative would also not provide the opportunity to redevelop the existing Highway 169 right of way as part of a cohesive business district.

Land Use Planning and Exclusive Land Use Designations

Land east and west of Highway 169 in rural Elk River, Livonia Township, and Zimmerman is currently undeveloped. A noise analysis was completed to identify future noise levels at representative receptor locations within these undeveloped areas that can be used as a guide for planning by local officials responsible for land use controls to help prevent future traffic noise impacts on currently undeveloped lands within the project area.

For this analysis, the noise model input files assumed no structures or other intervening barriers between the receptor locations and the roadway, and that noise model input files assumed an acoustically soft ground cover between the roadway and modeled receiver locations. These distances should only be used as a reference guide in community planning to help minimize future noise impacts, given the assumptions and traffic volumes that were used to generate the noise model input files and the model output, and do not represent traffic noise levels or distances where State standards or Federal noise abatement criteria for residential and commercial land uses would be exceeded in the future.

Representative daytime traffic noise levels was predicted at representative distances (50 feet, 100 feet, 200 feet, 300 feet, 400 feet and 500 feet) east or west of Highway 169. This analysis was completed at three locations within the project area, chosen to represent areas of planned growth:

- Rural Elk River along the east side of Highway 169 north of the proposed 221st Street interchange.
- Livonia Township along the east side of Highway 169 north of the proposed CSAH 25/19 interchange.
- City of Zimmerman along the west side of Highway 169 north of CSAH 4 and the proposed CSAH 4 interchange.

Daytime and nighttime model results for each of the three locations listed above are tabulated in Table G-9. Distances are measured from Highway 169 right of way limits.

Examples of site plan elements that could reduce noise on residential developments include: berms, fencing, and increased setbacks. Vegetation is only effective if it is at least 100 feet deep, tall enough to block views of the roadway, and dense enough so that the roadway can not been seen through the vegetation (e.g., branches down to ground level with trees/shrubs planted very close together so there are no gaps in the vegetation). As such, the depth, height, and density of vegetation needed make vegetative screening not practical as an element to reduce noise levels. Vegetative screening is more effective in providing aesthetic benefits and acting as a visual barrier. Commercial buildings directly adjoining the roadway would also block some traffic noise for residential receptors, as well as increasing the distance between the roadway and residences, resulting in noise levels potentially meeting State Standards at residential areas closer to the roadway.

Conclusions

In general, construction of the project will result in increases in traffic noise due to increased traffic and changes in the vertical and horizontal alignment of project-area roadways. Some locations are predicted to experience decreases in traffic noise largely due to depression of the Highway 169 roadway through the urban Elk River area. Cost-effectiveness of noise barriers was calculated; one 20-foot high wall located along the east side of Highway 169 near the southeast quadrant of the Highway 169/193rd Avenue interchange that achieved a 5 dBA reduction was found to be cost-effective and is proposed.

Traffic noise impacts and mitigation will be re-assessed in the future at the time of project implementation, based on regulations, conditions and land uses in place at that time. Decisions on noise mitigation to be included in the project will be based on the results of the future noise impact reassessment. Final mitigation decisions will be subject to community input, input from affected property owners, and final design considerations.

TABLE G-6
NOISE MITIGATION COST EFFECTIVENESS RESULTS (DAYTIME)
10-foot Modeled Walls

Receptors	Daytime L_{10} Noise (dBA) Pref. Alt. year 2030 (no wall)	Pref. Alt. year 2030 (10 ft wall)	Reduction (in dBA) with 10 ft noise wall	Number of residences	Number of affected residences	Length of wall (feet)	Wall surface area (sq ft) (1)	Total cost of wall ($15/sq ft)	Cost/dBA/ receptor
Area A (southwest quadrant of Main Street interchange)									
3-1	64.2	63.3	0.9	4	0	1,160	11,400	$171,000	N/A
3-2	69.4	65.8	3.6	2	0				
4-1	**66.1**	**65.9**	0.2	3	0				
4-2	**66.0**	**65.5**	0.5	2	0				
Area B, Wall B1 (northeast quadrant of Hwy 10/101/169 interchange)									
1-2	**71.4**	**69.6**	1.8	2	0	550	5,300	$79,500	N/A
Area B, Wall B2 (east of Hwy 169 north of BNSF Railway mainline)									
2-1	**75.5**	**71.5**	4.0	1	0	700	6,800	$102,000	N/A
Area B, Wall B3 (southeast quadrant of Main Street interchange)									
2-2	**71.3**	69.1	2.2	5	0	1,700	16,800	$252,000	N/A
2-3	69.3	66.1	3.2	1	0				
Area C (northwest quadrant of Main Street interchange)									
8-1	**69.3**	64.6	4.7	6	0	1,280	12,600	$189,000	N/A
8-2	62.7	61.0	1.7	10	0				
Area D, Wall D1 (northeast quadrant of Main Street interchange)									
6	**67.0**	64.5	2.5	6	0	910	8,900	$133,500	N/A
7	**66.0**	63.3	2.7	1	0				
9	**70.0**	**66.2**	3.8	8	0				
Area D, Wall D2 (southeast quadrant of School Street interchange)									
12-1	60.3	60.3	0.0	4	0	620	6,000	$90,000	N/A
12-2	61.4	61.0	0.4	1	0				
15	62.1	61.6	0.5	1	0				
Area D, Wall D3 (south of School Street, east of Dodge Street) (2)									
12-1	60.3	60.2	0.1	4	0	480	4,600	$69,000	N/A
12-2	61.4	61.3	0.1	1	0				
15	62.1	61.4	0.7	1	0				

Bold numbers exceed State daytime noise standards.
N/A = not applicable because all receptors adjacent to the modeled wall did not meet the minimum 5 dBA threshold to be considered acoustically effective.
(1) Surface area includes wall taper at each end.
(2) Wall located outside of proposed right of way. Right of way costs not included with total cost of wall.

TABLE G-6 continued
NOISE MITIGATION COST EFFECTIVENESS RESULTS (DAYTIME)
10-foot Modeled Walls

Receptors	Daytime L_{10} Noise (dBA) Pref. Alt. year 2030 (no wall)	Pref. Alt. year 2030 (10 ft wall)	Reduction (in dBA) with 10 ft noise wall	Number of residences	Number of affected residences	Length of wall (feet)	Wall surface area (sq ft) (1)	Total cost of wall ($15/sq ft)	Cost/dBA/ receptor
Area E (west of Hwy 169, between School Street and 193rd Avenue interchanges)									
17	68.1	68.1	0.0	4	0	1,490	14,700	$220,500	N/A
22	**73.9**	**70.2**	3.7	4	0				
27	69.7	69.6	0.1	3	0				
Area F (east of Hwy 169, south of Hwy 169/193rd Avenue interchange)									
20-1	**75.4**	**71.0**	4.4	3	0	1,105	10,850	$162,750	$5,200
20-2	**70.0**	**67.4**	2.6	2	0				
20-3	**77.2**	**70.9**	6.3	3	3				
20-4	**71.0**	**67.5**	3.5	5	0				
20-5	**66.5**	64.7	1.8	4	0				
21	**76.9**	**70.7**	6.2	2	2				
23	**68.9**	**67.3**	1.6	1	0				
Area G (west of Hwy 169, between 193rd Avenue and 197th Avenue interchanges)									
29	69.6	69.5	0.1	1	0	2,190	21,700	$325,500	N/A
30	**65.4**	65.0	0.4	2	0				
31-1	**68.9**	**67.7**	1.2	2	0				
31-2	61.2	59.9	1.3	4	0				
31-3	61.6	60.1	1.5	2	0				
33	64.7	64.1	0.6	3	0				
Area I (west of Hwy 169, north of 197th Avenue interchange)									
34	**67.0**	63.3	3.7	3	0	2,610	25,900	$388,500	N/A
37-1	**72.7**	**70.9**	1.8	2	0				
37-2	**72.0**	**71.9**	0.1	4	0				

Bold numbers exceed State daytime noise standards.
N/A = not applicable because all receptors adjacent to the modeled wall did not meet the minimum 5 dBA threshold to be considered acoustically effective.
(1) Surface area includes wall taper at each end.

TABLE G-6 continued
NOISE MITIGATION COST EFFECTIVENESS RESULTS (DAYTIME)
10-foot Modeled Walls

Receptors	Daytime L_{10} Noise (dBA)		Reduction (in dBA) with 10 ft noise wall	Number of residences	Number of affected residences	Length of wall (feet)	Wall surface area (sq ft) [1]	Total cost of wall ($15/sq ft)	Cost/dBA/ receptor
	Pref. Alt. year 2030 (no wall)	Pref. Alt. year 2030 (10 ft wall)							
Area J (east of Hwy 169, north of 197th Avenue interchange)									
35 [2]	**73.0**	**67.5**	5.5	1	1	2,500	24,800	$372,000	$67,636
36-1	**72.1**	**68.9**	3.2	2	0				
36-2	**68.7**	**68.0**	0.7	3	0				
36-3	**76.3**	**72.6**	3.7	1	0				
36-4	**70.9**	**69.9**	1.0	1	0				
Area K, Wall K1 (west of Hwy 169, south of County Road 77)									
42	**70.1**	**67.7**	2.4	2	0	895	8,750	$131,250	N/A
Area K, Wall K2 (west of Hwy 169 at County Road 77)									
43	**71.9**	**70.6**	1.3	1	0	790	7,700	$115,500	N/A
Area L, Wall L1 (east of Hwy 169 at Brook Drive)									
38	58.3	57.8	0.5	1	0	3,400	33,800	$507,000	N/A
39	**68.5**	**67.4**	1.1	3	0				
40	**65.8**	65.0	0.8	1	0				
41	61.3	60.8	0.5	1	0				
Area L, Wall L2 (east of Hwy 169 south of 221st Avenue interchange)									
45	**72.3**	**71.5**	0.8	1	0	1,390	13,700	$205,500	N/A
Area M, Wall M1 (west of Hwy 169, south of 237th Avenue)									
56	**75.0**	**68.6**	6.4	1	1	995	9,750	$146,250	$22,852
Area M, Wall M2 (southwest quadrant of Hwy 169/CSAH 25/19 interchange)									
57	**76.9**	**72.8**	4.1	1	0	2,770	27,500	$412,500	N/A
59	**67.7**	**66.5**	1.2	2	0				
60	**73.6**	**69.9**	3.7	1	0				
Area N, Wall N1 (northeast quadrant of Hwy 169/221st Avenue interchange)									
51	**75.4**	**71.0**	4.4	1	0	830	8,100	$121,500	N/A

Bold numbers exceed State daytime noise standards.

N/A = not applicable because all receptors adjacent to the modeled wall did not meet the minimum 5 dBA threshold to be considered acoustically effective.

(1) Surface area includes wall taper at each end.

(2) Barrier cost-effectiveness for Area J calculated based on Receptor R35 representing one residence because of right of way impacts and residential relocations associated with the proposed 197th Avenue interchange (see Figure 9B in Appendix A and right of way impact tables in Appendix I.)

TABLE G-6 continued
NOISE MITIGATION COST EFFECTIVENESS RESULTS (DAYTIME)
10-foot Modeled Walls

Receptors	Daytime L_{10} Noise (dBA) Pref. Alt. year 2030 (no wall)	Pref. Alt. year 2030 (10 ft wall)	Reduction (in dBA) with 10 ft noise wall	Number of residences	Number of affected residences	Length of wall (feet)	Wall surface area (sq ft) [1]	Total cost of wall ($15/sq ft)	Cost/dBA/ receptor
Area N, Wall N2 (east of Hwy 169, north of Hwy 169/221st Avenue interchange)									
52	**69.4**	**68.4**	1.0	1	0	1,600	15,800	$237,000	N/A
Area N, Wall N3 (east of Hwy 169, south of 237th Avenue)									
54	60.8	58.1	2.7	1	0	2,250	22,300	$334,500	N/A
55	**67.3**	**65.2**	2.1	1	0				
Area N, Wall N4 (southeast quadrant of Hwy 169/CSAH 25/19 interchange)									
58	**71.1**	**67.8**	3.3	4	0	2,880	28,600	$429,000	N/A
Area O, Wall O1 (northwest quadrant of Hwy 169/CSAH 25/19 interchange)									
64	**69.5**	**68.6**	0.9	1	0	4,000	39,800	$597,000	N/A
Area O, Wall O2 (west of Hwy 169, south of CSAH 4 – Zimmerman)									
66	**71.9**	**68.1**	3.8	1	0	1,535	15,150	$227,250	N/A
Area P, Wall P1 (northeast quadrant of Hwy 169/CSAH 25/19 interchange)									
61	**71.4**	**69.4**	2.0	4	0	1,270	12,500	$187,500	N/A
Area P, Wall P2 (east of Hwy 169, north of existing CSAH 19 intersection with Hwy 169)									
63	**65.8**	64.5	1.3	3	0	2,570	25,500	$382,500	N/A
65	**65.8**	**64.8**	1.0	2	0				
Area P, Wall P3 (east of Hwy 169, north of realigned CSAH 25)									
62	64.0	59.9	4.1	1	0	1,210	11,900	$178,500	N/A
Area Q (west of Hwy 169, north of CSAH 4 – Zimmerman)									
74	61.4	61.2	0.2	17	0	2,290	22,700	$340,500	N/A

Bold numbers exceed State daytime noise standards.
N/A = not applicable because all receptors adjacent to the modeled wall did not meet the minimum 5 dBA threshold to be considered acoustically effective.
[1] Surface area includes wall taper at each end.

TABLE G-6 continued
NOISE MITIGATION COST EFFECTIVENESS RESULTS (DAYTIME)
10-foot Modeled Walls

Receptors	Daytime L_{10} Noise (dBA) Pref. Alt. year 2030 (no wall)	Pref. Alt. year 2030 (10 ft wall)	Reduction (in dBA) with 10 ft noise wall	Number of residences	Number of affected residences	Length of wall (feet)	Wall surface area (sq ft) [1]	Total cost of wall ($15/sq ft)	Cost/dBA/ receptor
Area R (northeast quadrant Hwy 169/CSAH 4 interchange – Zimmerman)									
77-1	**70.5**	**68.2**	2.3	2	0	4,780	47,600	$714,000	N/A
77-2	**68.1**	**65.9**	2.2	2	0				
77-3	**65.5**	64.0	1.5	2	0				
77-4	63.6	62.4	1.2	3	0				
78-1	**72.0**	**69.8**	2.2	1	0				
78-2	**68.5**	**67.0**	1.5	2	0				
79	65.0	63.7	1.3	4	0				
80	62.7	61.9	0.8	8	0				
81	63.4	62.6	0.8	1	0				
82	60.7	60.3	0.4	8	0				
83	**71.6**	**69.2**	2.4	6	0				
84-1	**69.3**	**66.7**	2.6	2	0				
84-2	**69.6**	**66.4**	3.2	1	0				
85	**73.2**	**69.8**	3.4	3	0				
86	**72.6**	**68.5**	4.1	3	0				
87	**71.5**	**68.5**	3.0	3	0				
88	**72.4**	**70.1**	2.3	2	0				
89	**71.1**	**68.5**	2.6	3	0				
90	**71.1**	**68.4**	2.7	3	0				
91	**70.9**	**68.2**	2.7	3	0				
92	**73.0**	**70.6**	2.4	3	0				

Bold numbers exceed State daytime noise standards.
N/A = not applicable because all receptors adjacent to the modeled wall did not meet the minimum 5 dBA threshold to be considered acoustically effective.
(1) Surface area includes wall taper at each end.

TABLE G-7
NOISE MITIGATION COST EFFECTIVENESS RESULTS (DAYTIME)
15-foot Modeled Walls

Receptors	Daytime L_{10} Noise (dBA) Pref. Alt. year 2030 (no wall)	Daytime L_{10} Noise (dBA) Pref. Alt. year 2030 (15 ft wall)	Reduction (in dBA) with 15 ft noise wall	Number of residences	Number of affected residences	Length of wall (feet)	Wall surface area (sq ft) [1]	Total cost of wall ($15/sq ft)	Cost/dBA/ receptor
Area A (southwest quadrant of Main Street interchange)									
3-1	64.2	62.9	1.3	4	0	1,160	16,950	$254,250	$25,425
3-2	69.4	64.4	5.0	2	2				
4-1	**66.1**	**65.8**	0.3	3	0				
4-2	**66.0**	**65.3**	0.7	2	0				
Area B, Wall B1 (northeast quadrant of Hwy 10/101/169 interchange)									
1-2	**71.4**	**67.5**	3.9	2	0	550	7,800	$117,000	N/A
Area B, Wall B2 (east of Hwy 169 north of BNSF Railway mainline)									
2-1	**75.5**	68.8	6.7	1	1	700	10,050	$150,750	$22,500
Area B, Wall B3 (southeast quadrant of Main Street interchange)									
2-2	**71.3**	67.1	4.2	5	0	1,700	25,050	$375,750	$63,686
2-3	69.3	63.4	5.9	1	1				
Area C (northwest quadrant of Main Street interchange)									
8-1	**69.3**	62.7	6.6	6	6	1,280	18,750	$281,250	$7,102
8-2	62.7	60.5	2.2	10	0				
Area D, Wall D1 (northeast quadrant of Main Street interchange)									
6	**67.0**	63.8	3.2	6	0	910	13,200	$198,000	$4,853
7	**66.0**	62.3	3.7	1	0				
9	**70.0**	64.9	5.1	8	8				
Area D, Wall D2 (southeast quadrant of School Street interchange)									
12-1	60.3	60.2	0.1	4	0	620	8,850	$132,750	N/A
12-2	61.4	60.7	0.7	1	0				
15	62.1	61.3	0.8	1	0				
Area D, Wall D3 (south of School Street, east of Dodge Street) [2]									
12-1	60.3	60.1	0.2	4	0	480	6,750	$101,250	N/A
12-2	61.4	60.9	0.5	1	0				
15	62.1	61.0	1.1	1	0				

Bold numbers exceed State daytime noise standards.
N/A = not applicable because all receptors adjacent to the modeled wall did not meet the minimum 5 dBA threshold to be considered acoustically effective.
(1) Surface area includes wall taper at each end.
(2) Wall located outside of proposed right of way. Right of way costs not included with total cost of wall.

TABLE G-7 continued
NOISE MITIGATION COST EFFECTIVENESS RESULTS (DAYTIME)
15-foot Modeled Walls

Receptors	Daytime L_{10} Noise (dBA)		Reduction (in dBA) with 15 ft noise wall	Number of residences	Number of affected residences	Length of wall (feet)	Wall surface area (sq ft) (1)	Total cost of wall ($15/sq ft)	Cost/dBA/ receptor
	Pref. Alt. year 2030 (no wall)	Pref. Alt. year 2030 (15 ft wall)							
Area E (west of Hwy 169, between School Street and 193rd Avenue interchanges)									
17	68.1	68.1	0.0	4	0	1,490	21,900	$328,500	$11,406
22	**73.9**	66.7	7.2	4	4				
27	69.7	69.5	0.2	3	0				
Area F (east of Hwy 169, southeast quadrant of Hwy 169/193rd Avenue interchange)									
20-1	**75.4**	**67.2**	8.2	3	3	1,105	16,125	$241,875	$2,098
20-2	**70.0**	**65.1**	4.9	2	2				
20-3	**77.2**	**66.7**	10.5	3	3				
20-4	**71.0**	**65.2**	5.8	5	5				
20-5	**66.5**	64.2	2.3	4	0				
21	**76.9**	**66.7**	10.2	2	2				
23	**68.9**	**66.6**	2.3	1	0				
Area G (west of Hwy 169, between 193rd Avenue and 197th Avenue interchanges)									
29	69.6	69.5	0.1	1	0	2,190	32,400	$486,000	N/A
30	**65.4**	64.8	0.6	2	0				
31-1	**68.9**	**66.8**	2.1	2	0				
31-2	61.2	59.3	1.9	4	0				
31-3	61.6	59.1	2.5	2	0				
33	64.7	63.6	1.1	3	0				
Area I (west of Hwy 169, north of 197th Avenue interchange)									
34	**67.0**	62.2	4.8	3	0	2,610	38,700	$580,500	N/A
37-1	**72.7**	**70.0**	2.7	2	0				
37-2	**72.0**	**71.0**	1.0	4	0				

Bold numbers exceed State daytime noise standards.
N/A = not applicable because all receptors adjacent to the modeled wall did not meet the minimum 5 dBA threshold to be considered acoustically effective.
(1) Surface area includes wall taper at each end.

TABLE G-7 continued
NOISE MITIGATION COST EFFECTIVENESS RESULTS (DAYTIME)
15-foot Modeled Walls

Receptors	Daytime L_{10} Noise (dBA) Pref. Alt. year 2030 (no wall)	Pref. Alt. year 2030 (15 ft wall)	Reduction (in dBA) with 15 ft noise wall	Number of residences	Number of affected residences	Length of wall (feet)	Wall surface area (sq ft) (1)	Total cost of wall ($15/sq ft)	Cost/dBA/ receptor
Area J (east of Hwy 169, north of 197th Avenue interchange)									
35 (2)	**73.0**	65.0	8.0	1	1	2,500	37,050	$555,750	$21,458
36-1	**72.1**	**66.7**	5.4	2	2				
36-2	**68.7**	**66.3**	2.4	3	0				
36-3	**76.3**	**69.2**	7.1	1	1				
36-4	**70.9**	**69.0**	1.9	1	0				
Area K, Wall K1 (west of Hwy 169, south of County Road 77)									
42	**70.1**	**65.6**	4.5	2	0	895	12,975	$194,625	N/A
Area K, Wall K2 (west of Hwy 169 at County Road 77)									
43	**71.9**	**68.5**	3.4	1	0	790	11,400	$171,000	N/A
Area L, Wall L1 (east of Hwy 169 at Brook Drive)									
38	58.3	56.8	1.5	1	0	3,400	50,550	$758,250	N/A
39	**68.5**	**65.1**	3.4	3	0				
40	**65.8**	63.5	2.3	1	0				
41	61.3	59.6	1.7	1	0				
Area L, Wall L2 (east of Hwy 169 south of 221st Avenue interchange)									
45	**72.3**	**69.9**	2.4	1	0	1,390	20,400	$306,000	N/A
Area M, Wall M1 (west of Hwy 169, south of 237th Avenue)									
56	**75.0**	64.8	10.2	1	1	995	14,475	$217,125	$21,287
Area M, Wall M2 (southwest quadrant of Hwy 169/CSAH 25/19 interchange)									
57	**76.9**	**69.3**	7.6	1	1	2,770	41,100	$616,500	$44,036
59	**67.7**	**65.6**	2.1	2	0				
60	**73.6**	**67.2**	6.4	1	1				
Area N, Wall N1 (northeast quadrant of Hwy 169/221st Avenue interchange)									
51	**75.4**	**67.1**	8.3	1	1	830	12,000	$180,000	$21,687

Bold numbers exceed State daytime noise standards.
N/A = not applicable because all receptors adjacent to the modeled wall did not meet the minimum 5 dBA threshold to be considered acoustically effective.
(1) Surface area includes wall taper at each end.
(2) Barrier cost-effectiveness for Area J calculated based on Receptor R35 representing one residence because of right of way impacts and residential relocations associated with the proposed 197th Avenue interchange (see Figure 9B in Appendix A and right of way impact tables in Appendix I.)

TABLE G-7 continued
NOISE MITIGATION COST EFFECTIVENESS RESULTS (DAYTIME)
15-foot Modeled Walls

Receptors	Daytime L_{10} Noise (dBA) Pref. Alt. year 2030 (no wall)	Pref. Alt. year 2030 (15 ft wall)	Reduction (in dBA) with 15 ft noise wall	Number of residences	Number of affected residences	Length of wall (feet)	Wall surface area (sq ft) (1)	Total cost of wall ($15/sq ft)	Cost/dBA/ receptor
Area N, Wall N2 (east of Hwy 169, north of Hwy 169/221st Avenue interchange)									
52	**69.4**	**66.3**	3.1	1	0	1,600	23,550	$353,250	N/A
Area N, Wall N3 (east of Hwy 169, south of 237th Avenue)									
54	60.8	57.2	3.6	1	0	2,250	33,300	$499,500	N/A
55	**67.3**	63.6	3.7	1	0				
Area N, Wall N4 (southeast quadrant of Hwy 169/CSAH 25/19 interchange)									
58	**71.1**	**65.7**	5.4	4	4	2,880	42,750	$641,250	$29,688
Area O, Wall O1 (northwest quadrant of Hwy 169/CSAH 25/19 interchange)									
64	**69.5**	**67.3**	2.2	1	0	4,000	59,550	$893,250	N/A
Area O, Wall O2 (west of Hwy 169, south of CSAH 4 – Zimmerman)									
66	**71.9**	**65.3**	6.6	1	1	1,535	22,575	$338,625	$51,307
Area P, Wall P1 (northeast quadrant of Hwy 169/CSAH 25/19 interchange)									
61	**71.4**	**67.4**	4.0	4	0	1,270	18,600	$279,000	N/A
Area P, Wall P2 (east of Hwy 169, north of existing CSAH 19 intersection with Hwy 169)									
63	**65.8**	64.0	1.8	3	0	2,570	38,100	$571,500	N/A
65	**65.8**	63.7	2.1	2	0				
Area P, Wall P3 (east of Hwy 169, north of realigned CSAH 25)									
62	64.0	58.7	5.3	1	1	1,210	17,700	$265,500	$50,094
Area Q (west of Hwy 169, north of CSAH 4 – Zimmerman)									
74	61.4	60.4	1.0	17	0	2,290	33,900	$508,500	N/A

Bold numbers exceed State daytime noise standards.
N/A = not applicable because all receptors adjacent to the modeled wall did not meet the minimum 5 dBA threshold to be considered acoustically effective.
(1) Surface area includes wall taper at each end.

TABLE G-7 continued
NOISE MITIGATION COST EFFECTIVENESS RESULTS (DAYTIME)
15-foot Modeled Walls

Receptors	Daytime L_{10} Noise (dBA) Pref. Alt. year 2030 (no wall)	Daytime L_{10} Noise (dBA) Pref. Alt. year 2030 (15 ft wall)	Reduction (in dBA) with 15 ft noise wall	Number of residences	Number of affected residences	Length of wall (feet)	Wall surface area (sq ft) (1)	Total cost of wall ($15/sq ft)	Cost/dBA/ receptor
Area R (northeast quadrant Hwy 169/CSAH 4 interchange – Zimmerman)									
77-1	**70.5**	**65.6**	4.9	2	0	4,780	71,250	$1,068,750	$10,509
77-2	**68.1**	63.4	4.7	2	0				
77-3	**65.5**	61.8	3.7	2	0				
77-4	63.6	60.4	3.2	3	0				
78-1	**72.0**	**67.4**	4.6	1	0				
78-2	**68.5**	**65.0**	3.5	2	0				
79	65.0	61.6	3.4	4	0				
80	62.7	60.5	2.2	8	0				
81	63.4	61.4	2.0	1	0				
82	60.7	59.8	0.9	8	0				
83	**71.6**	**66.4**	5.2	6	6				
84-1	**69.3**	63.7	5.6	2	2				
84-2	**69.6**	63.3	6.3	1	1				
85	**73.2**	**67.1**	6.1	3	3				
86	**72.6**	**67.1**	5.5	3	3				
87	**71.5**	**66.6**	4.9	3	0				
88	**72.4**	**68.5**	3.9	2	0				
89	**71.1**	**66.9**	4.2	3	0				
90	**71.1**	**66.7**	4.4	3	0				
91	**70.9**	**66.3**	4.6	3	0				
92	**73.0**	**69.4**	3.6	3	0				

Bold numbers exceed State daytime noise standards.
N/A = not applicable because all receptors adjacent to the modeled wall did not meet the minimum 5 dBA threshold to be considered acoustically effective.
(1) Surface area includes wall taper at each end.

TABLE G-8
NOISE MITIGATION COST EFFECTIVENESS RESULTS (DAYTIME)
20-foot Modeled Walls

Receptors	Daytime L_{10} Noise (dBA) Pref. Alt. year 2030 (no wall)	Pref. Alt. year 2030 (20 ft wall)	Reduction (in dBA) with 20 ft noise wall	Number of residences	Number of affected residences	Length of wall (feet)	Wall surface area (sq ft) [1]	Total cost of wall ($15/sq ft)	Cost/dBA/ receptor
Area A (southwest quadrant of Main Street interchange)									
3-1	64.2	62.6	1.6	4	0	1,160	22,500	$337,500	$29,605
3-2	69.4	63.7	5.7	2	2				
4-1	**66.1**	**65.7**	0.4	3	0				
4-2	**66.0**	**65.1**	0.9	2	0				
Area B, Wall B1 (northeast quadrant of Hwy 10/101/169 interchange)									
1-2	71.4	66.3	5.1	2	2	550	10,300	$154,500	$15,147
Area B, Wall B2 (east of Hwy 169 north of BNSF Railway mainline)									
2-1	**75.5**	66.4	9.1	1	1	700	13,400	$201,000	$22,088
Area B, Wall B3 (southeast quadrant of Main Street interchange)									
2-2	**71.3**	64.7	6.6	5	5	1,700	33,300	$499,500	$12,153
2-3	69.3	61.2	8.1	1	1				
Area C (northwest quadrant of Main Street interchange)									
8-1	**69.3**	61.5	7.8	6	6	1,280	24,900	$373,500	$7,981
8-2	62.7	60.2	2.5	10	0				
Area D, Wall D1 (northeast quadrant of Main Street interchange)									
6	**67.0**	63.4	3.6	6	0	910	17,500	$262,500	$5,859
7	**66.0**	61.8	4.2	1	0				
9	**70.0**	64.4	5.6	8	8				
Area D, Wall D2 (southeast quadrant of School Street interchange)									
12-1	60.3	60.1	0.2	4	0	620	11,700	$175,500	N/A
12-2	61.4	60.4	1.0	1	0				
15	62.1	61.1	1.0	1	0				
Area D, Wall D3 (south of School Street, east of Dodge Street) [2]									
12-1	60.3	60.0	0.3	4	0	480	8,900	$133,500	N/A
12-2	61.4	60.5	0.9	1	0				
15	62.1	60.7	1.4	1	0				

Bold numbers exceed State daytime noise standards.
N/A = not applicable because all receptors adjacent to the modeled wall did not meet the minimum 5 dBA threshold to be considered acoustically effective.
[1] Surface area includes wall taper at each end.
[2] Wall located outside of proposed right of way. Right of way costs not included with total cost of wall.

TABLE G-8 continued
NOISE MITIGATION COST EFFECTIVENESS RESULTS (DAYTIME)
20-foot Modeled Walls

Receptors	Daytime L_{10} Noise (dBA) Pref. Alt. year 2030 (no wall)	Daytime L_{10} Noise (dBA) Pref. Alt. year 2030 (20 ft wall)	Reduction (in dBA) with 20 ft noise wall	Number of residences	Number of affected residences	Length of wall (feet)	Wall surface area (sq ft) [1]	Total cost of wall ($15/sq ft)	Cost/dBA/ receptor
Area E (west of Hwy 169, between School Street and 193rd Avenue interchanges)									
17	68.1	68.1	0.0	4	0	1,490	29,100	$436,500	$11,023
22	**73.9**	64.0	9.9	4	4				
27	69.7	69.4	0.3	3	0				
Area F (east of Hwy 169, southeast quadrant of Hwy 169/193rd Avenue interchange)									
20-1	**75.4**	64.5	10.9	3	3	1,105	21,400	$321,000	$2,153
20-2	**70.0**	63.5	6.5	2	2				
20-3	**77.2**	63.9	13.3	3	3				
20-4	**71.0**	63.5	7.5	5	5				
20-5	**66.5**	63.9	2.6	4	0				
21	**76.9**	63.9	13.0	2	2				
23	**68.9**	**66.3**	2.6	1	0				
Area G (west of Hwy 169, between 193rd Avenue and 197th Avenue interchanges)									
29	69.6	69.5	0.1	1	0	2,190	43,100	$646,500	N/A
30	**65.4**	64.7	0.7	2	0				
31-1	**68.9**	**66.1**	2.8	2	0				
31-2	61.2	58.9	2.3	4	0				
31-3	61.6	58.4	3.2	2	0				
33	64.7	63.4	1.3	3	0				
Area I (west of Hwy 169, north of 197th Avenue interchange)									
34	**67.0**	61.2	5.8	3	3	2,610	51,500	$772,500	$44,397
37-1	**72.7**	**69.3**	3.4	2	0				
37-2	**72.0**	**68.9**	3.1	4	0				

Bold numbers exceed State daytime noise standards.
N/A = not applicable because all receptors adjacent to the modeled wall did not meet the minimum 5 dBA threshold to be considered acoustically effective.
(1) Surface area includes wall taper at each end.

TABLE G-8 continued
NOISE MITIGATION COST EFFECTIVENESS RESULTS (DAYTIME)
20-foot Modeled Walls

Receptors	Daytime L_{10} Noise (dBA)		Reduction (in dBA) with 20 ft noise wall	Number of residences	Number of affected residences	Length of wall (feet)	Wall surface area (sq ft) [(1)]	Total cost of wall ($15/sq ft)	Cost/dBA/ receptor
	Pref. Alt. year 2030 (no wall)	Pref. Alt. year 2030 (20 ft wall)							
Area J (east of Hwy 169, north of 197th Avenue interchange)									
35 [(2)]	**73.0**	63.4	9.6	1	1	2,500	49,300	$739,500	$14,194
36-1	**72.1**	64.0	8.1	2	2				
36-2	**68.7**	63.2	5.5	3	3				
36-3	**76.3**	**66.5**	9.8	1	1				
36-4	**70.9**	**68.3**	2.6	1	0				
Area K, Wall K1 (west of Hwy 169, south of County Road 77)									
42	**70.1**	63.5	6.6	2	2	895	17,200	$258,000	$19,545
Area K, Wall K2 (west of Hwy 169 at County Road 77)									
43	**71.9**	**65.2**	6.7	1	1	790	15,100	$226,500	$33,806
Area L, Wall L1 (east of Hwy 169 at Brook Drive)									
38	58.3	55.3	3.0	1	0	3,400	67,300	$1,009,500	$50,224
39	**68.5**	61.8	6.7	3	3				
40	**65.8**	60.9	4.9	1	0				
41	61.3	57.3	4.0	1	0				
Area L, Wall L2 (east of Hwy 169 south of 221st Avenue interchange)									
45	**72.3**	**67.8**	4.5	1	0	1,390	27,100	$406,500	N/A
Area M, Wall M1 (west of Hwy 169, south of 237th Avenue)									
56	**75.0**	**61.1**	13.9	1	1	995	19,300	$289,500	$20,827
Area M, Wall M2 (southwest quadrant of Hwy 169/CSAH 25/19 interchange)									
57	**76.9**	66.3	10.6	1	0	2,770	54,800	$822,000	$43,492
59	**67.7**	64.1	3.6	2	0				
60	**73.6**	**65.3**	8.3	1	0				
Area N, Wall N1 (northeast quadrant of Hwy 169/221st Avenue interchange)									
51	**75.4**	64.5	10.9	1	1	830	15,900	$238,500	$21,881

Bold numbers exceed State daytime noise standards.
N/A = not applicable because all receptors adjacent to the modeled wall did not meet the minimum 5 dBA threshold to be considered acoustically effective.
(1) Surface area includes wall taper at each end.
(2) Barrier cost-effectiveness for Area J calculated based on Receptor R35 representing one residence because of right of way impacts and residential relocations associated with the proposed 197th Avenue interchange (see Figure 9B in Appendix A and right of way impact tables in Appendix I.)

TABLE G-8 continued
NOISE MITIGATION COST EFFECTIVENESS RESULTS (DAYTIME)
20-foot Modeled Walls

Receptors	Daytime L_{10} Noise (dBA): Pref. Alt. year 2030 (no wall)	Daytime L_{10} Noise (dBA): Pref. Alt. year 2030 (20 ft wall)	Reduction (in dBA) with 20 ft noise wall	Number of residences	Number of affected residences	Length of wall (feet)	Wall surface area (sq ft) (1)	Total cost of wall ($15/sq ft)	Cost/dBA/ receptor
Area N, Wall N2 (east of Hwy 169, north of Hwy 169/221st Avenue interchange)									
52	**69.4**	63.6	5.8	1	1	1,600	31,300	$469,500	$80,948
Area N, Wall N1 (east of Hwy 169, south of 237th Avenue)									
54	60.8	56.0	4.8	1	0	2,250	44,400	$666,000	$92,500
55	**67.3**	60.1	7.2	1	0				
Area N, Wall N2 (southeast quadrant of Hwy 169/CSAH 25/19 interchange)									
58	**71.1**	64.3	6.8	4	0	2,880	57,000	$855,000	$31,434
Area O, Wall O1 (northwest quadrant of Hwy 169/CSAH 25/19 interchange)									
64	**69.5**	64.7	4.8	1	0	4,000	79,400	$1,191,000	N/A
Area O, Wall O2 (west of Hwy 169, south of CSAH 4 – Zimmerman)									
66	**71.9**	62.8	9.1	1	1	1,535	30,000	$450,000	$49,451
Area P, Wall P1 (northeast quadrant of Hwy 169/CSAH 25/19 interchange)									
61	**71.4**	65.0	6.4	4	0	1,270	24,800	$372,000	$14,531
Area P, Wall P2 (east of Hwy 169, north of existing CSAH 19 intersection with Hwy 169)									
63	**65.8**	62.9	2.9	3	0	2,570	50,800	$762,000	N/A
65	**65.8**	61.5	4.3	2	0				
Area P, Wall P3 (east of Hwy 169, north of realigned CSAH 25)									
62	64.0	56.9	7.1	1	1	1,210	23,600	$354,000	$49,859
Area Q (west of Hwy 169, north of CSAH 4 – Zimmerman)									
74	61.4	58.9	2.5	17	0	2,290	45,100	$676,500	N/A

Bold numbers exceed State daytime noise standards.
N/A = not applicable because all receptors adjacent to the modeled wall did not meet the minimum 5 dBA threshold to be considered acoustically effective.
(1) Surface area includes wall taper at each end.

TABLE G-8 continued
NOISE MITIGATION COST EFFECTIVENESS RESULTS (DAYTIME)
20-foot Modeled Walls

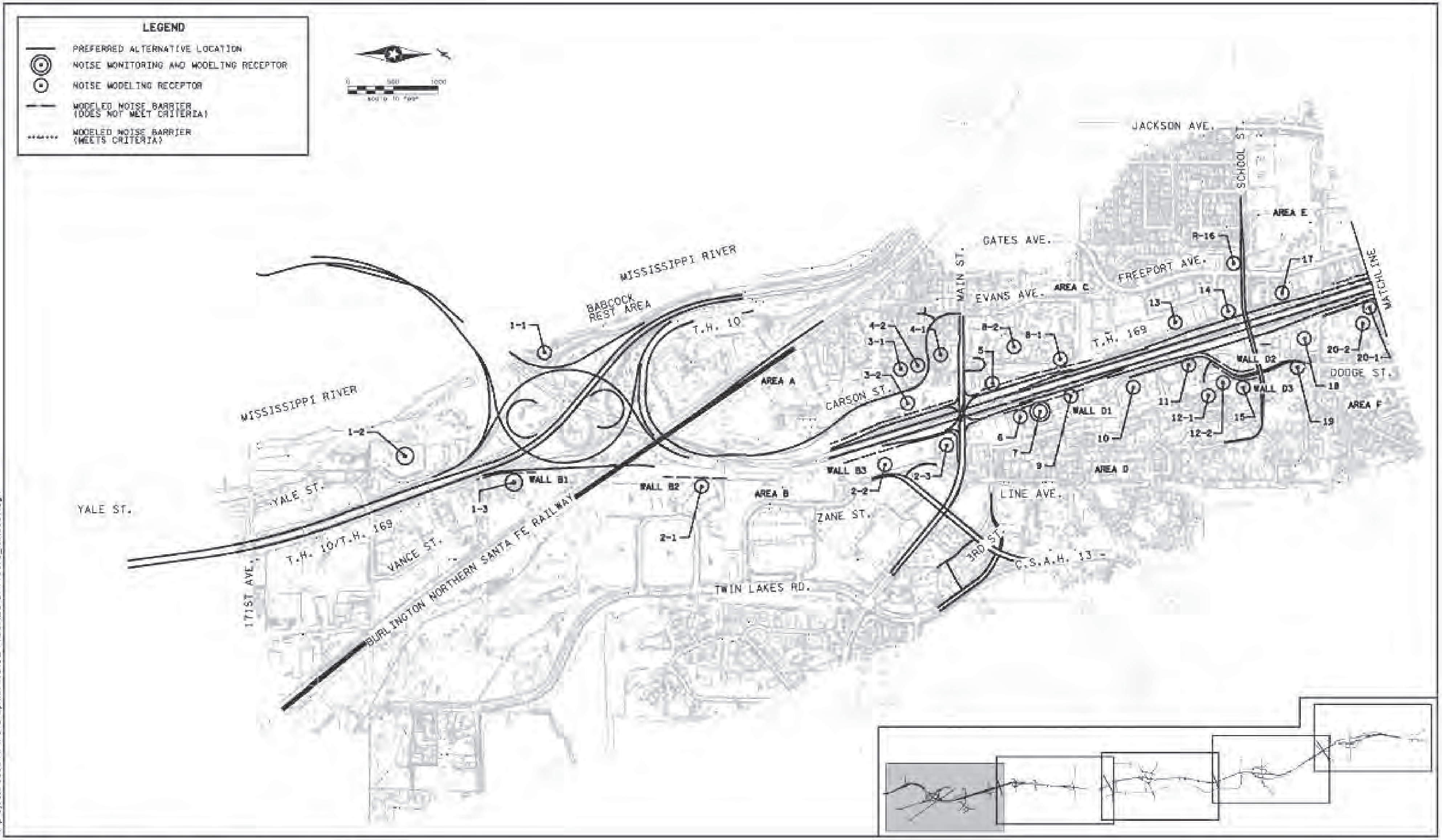
Receptors	Daytime L_{10} Noise (dBA) Pref. Alt. year 2030 (no wall)	Pref. Alt. year 2030 (20 ft wall)	Reduction (in dBA) with 20 ft noise wall	Number of residences	Number of affected residences	Length of wall (feet)	Wall surface area (sq ft) [(1)]	Total cost of wall ($15/sq ft)	Cost/dBA/ receptor
Area R (northeast quadrant Hwy 169/CSAH 4 interchange – Zimmerman)									
7-1	**70.5**	63.3	7.2	2	2	4,780	94,900	$1,423,500	$5,765
77-2	**68.1**	61.2	6.9	2	2				
77-3	**65.5**	59.8	5.7	2	2				
77-4	63.6	58.7	4.9	3	0				
78-1	**72.0**	**65.5**	6.5	1	1				
78-2	**68.5**	63.0	5.5	2	2				
79	65.0	59.7	5.3	4	4				
80	62.7	59.2	3.5	8	0				
81	63.4	60.2	3.2	1	0				
82	60.7	59.1	1.6	8	0				
83	**71.6**	64.2	7.4	6	6				
84-1	**69.3**	61.5	7.8	2	2				
84-2	**69.6**	61.3	8.3	1	1				
85	**73.2**	**65.6**	7.6	3	3				
86	**72.6**	**66.1**	6.5	3	3				
87	**71.5**	**65.4**	6.1	3	3				
88	**72.4**	**67.7**	4.7	2	0				
89	**71.1**	**65.9**	5.2	3	3				
90	**71.1**	**65.8**	5.3	3	3				
91	**70.9**	**65.4**	5.5	3	3				
92	**73.0**	**68.8**	4.2	3	0				

Bold numbers exceed State daytime noise standards.
N/A = not applicable because all receptors adjacent to the modeled wall did not meet the minimum 5 dBA threshold to be considered acoustically effective.
[(1)] Surface area includes wall taper at each end.

TABLE G-9
HIGHWAY 169 NOISE MODELING RESULTS
DISTANCE FROM ROADWAY (daytime and nighttime)

Distance from Hwy 169 Right of Way Limits [1]	Future Build Conditions Rural Elk River North of 221st St East of Hwy 169				Future Build Conditions Livonia Township North of CSAH 25/19 West of Hwy 169 [3]				Future Build Conditions Zimmerman North of CSAH 4 West of Hwy 169			
	Daytime (2030)		**Nighttime (2030)**		**Daytime (2030)**		**Nighttime (2030)**		**Daytime (2030)**		**Nighttime (2030)**	
	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}	L_{10}	L_{50}
50 feet	75.6	71.8	72.3	67.8	76.5	72.4	74.2	69.6	75.3	70.9	75.8	71.1
100 feet	73.4	70.0	70.4	66.5	74.1	70.6	72.0	68.1	73.2	69.4	73.4	69.3
200 feet	70.4	67.6	67.7	64.4	70.9	68.1	69.1	65.9	70.2	67.1	70.3	66.8
300 feet	68.2	65.7	65.8	62.8	68.8	66.4	67.1	64.4	68.1	65.3	68.0	64.9
400 feet	66.5	64.3	64.2	61.6	67.5	65.2	66.0	63.2	66.4	63.9	66.2	63.4
500 feet	65.1	63.1	62.9	60.5	69.2	63.4	67.7	61.0	65.1	62.7	64.8	62.2
State Standards[1]	**65**	**60**	**55**	**50**	**65**	**60**	**55**	**50**	**65**	**60**	**55**	**50**
State Standards[2]	**70**	**65**	**70**	**65**	**70**	**65**	**70**	**65**	**70**	**65**	**70**	**65**

(1) State daytime and nighttime standards for residential land uses (NAC-1).
(2) State daytime and nighttime standards for commercial land uses (NAC-2).
(3) Modeled noise levels in the northeast quadrant of the CSAH 25/19 interchange are predicted to increase from 400 feet to 500 feet from the Highway 169 right of way limits because the point located 500 feet from Highway 169 approaches a local frontage road. Final locations for local frontage roads will be determined in the future with development of adjacent lands.



NOISE RECEPTOR AND MODELED BARRIER LOCATIONS

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure G 1

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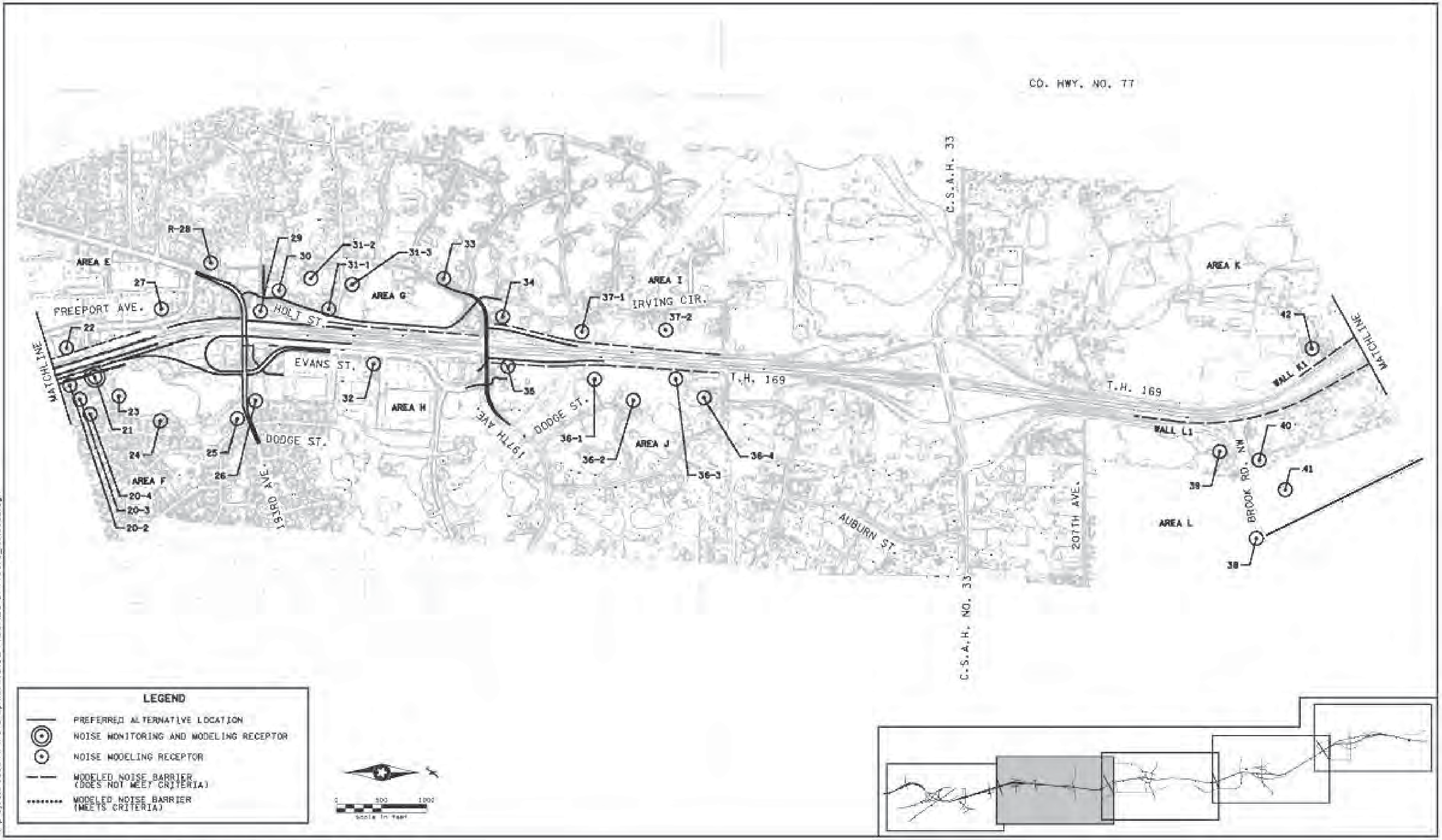

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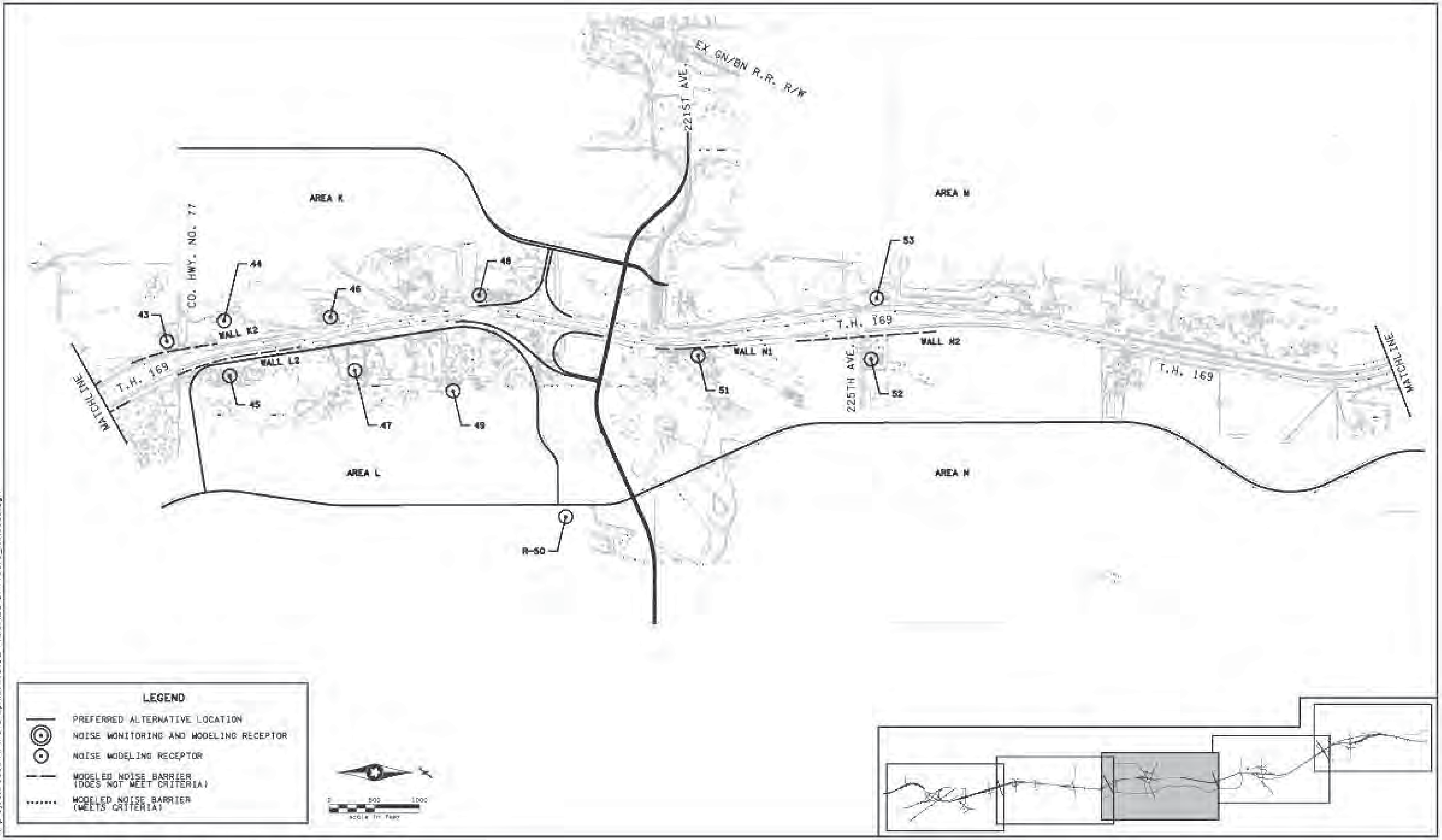
NOISE RECEPTOR AND MODELED BARRIER LOCATIONS

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure G2



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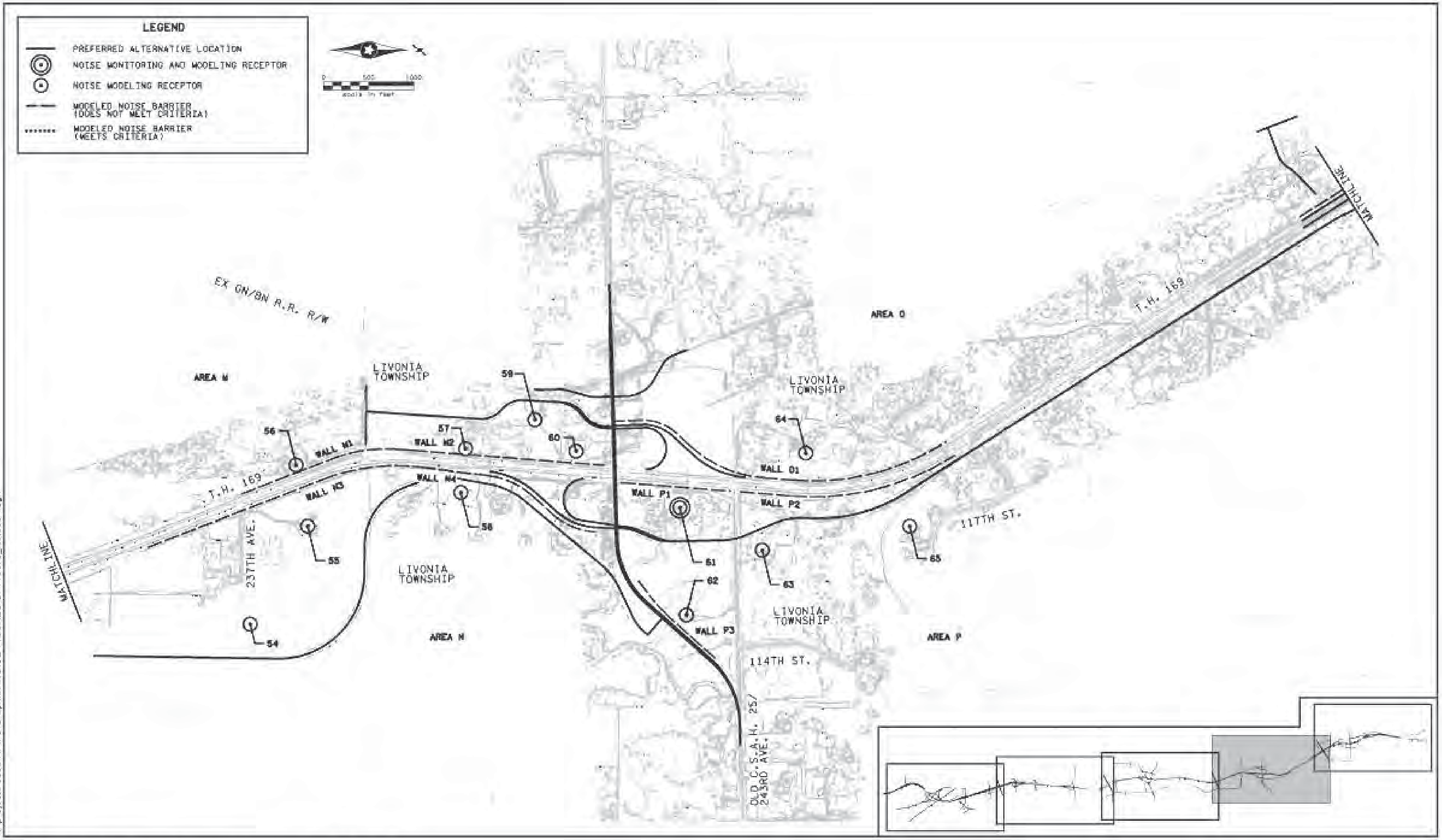
NOISE RECEPTOR AND MODELED BARRIER LOCATIONS

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure G 3

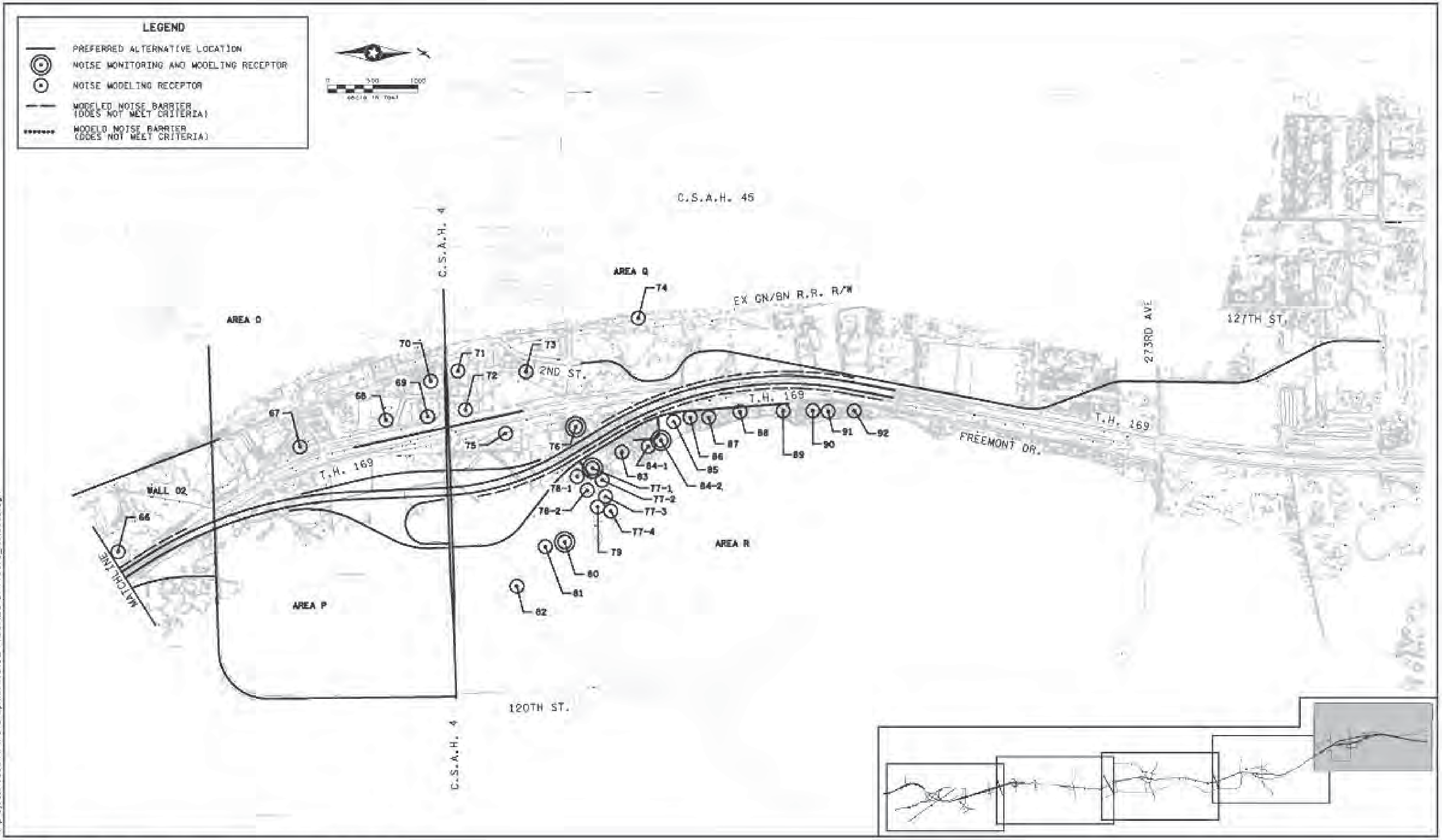


NOISE RECEPTOR AND MODELED BARRIER LOCATIONS

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure G4



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NOISE RECEPTOR AND MODELED BARRIER LOCATIONS

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure G5

APPENDIX H

Memorandum of Agreement

U.S. Department of Transportation
Federal Highway Administration

Minnesota Division

380 Jackson Street
Galtier Plaza, Suite 500
St. Paul, MN 55101-4802
651.291.6100
Fax 651.291.6000
www.fhwa.dot.gov/mndiv

October 28, 2009

Mr. Don Kilma
Director
Office of Federal Agency Programs
Advisory Council on Historic Preservation
Old Post Office Building
1100 Pennsylvania Avenue, NW Suite 809
Washington, D.C. 20004

Re: Section 106 Memorandum of Agreement
SP 7106-71 & 7106-73, TH-169 Freeway Conversion Project City of Otsego, Wright County & Cities of Elk River & Zimmerman & Livonia Township, Sherburne County, Minnesota

Dear Mr. Klima:

We have consulted with the Minnesota State Historic Preservation Officer and the Minnesota Department of Transportation, and we have agreed on measures to mitigate the effects on the historic property for the above referenced project; as documented in the enclosed executed Memorandum of Agreement (MOA). By copy of this letter, a copy of the fully executed MOA is being provided to all the signatories of the MOA.

If you have any questions about the project or the enclosed MOA, please contact me at (651) 291-6126.

Sincerely yours,

Timothy J. Anderson, PE
Highway Engineer

Enclosure

TJA/jer

cc: 1 Mn/DOT – Craig Johnson, MS 620
1 SHPO – Dennis Gimmestad
1 RF
1 Anderson

SECTION 106 MEMORANDUM OF AGREEMENT
BETWEEN
THE FEDERAL HIGHWAY ADMINISTRATION (FHWA)
AND THE
MINNESOTA STATE HISTORIC PRESERVATION OFFICE (SHPO)
PURSUANT TO 36 CFR 800.6 (B) (IV)
REGARDING THE TRUNK HIGHWAY 169 FREEWAY CONVERSION PROJECT
(S.P. 7106-71 AND S.P. 7106-73)
IN
OTSEGO, WRIGHT COUNTY, MINNESOTA
ELK RIVER, SHERBURNE COUNTY, MINNESOTA
LIVONIA TOWNSHIP, SHERBURNE COUNTY, MINNESOTA
ZIMMERMAN, SHERBURNE COUNTY, MINNESOTA

WHEREAS, the Minnesota Department of Transportation (Mn/DOT) plans to reconstruct Trunk Highway (TH) 169 as a freeway facility from the TH 10/101/169 system interchange in Elk River to County State Aid Highway (CSAH) 4 in Zimmerman. The project also includes reconstruction of TH 101 from the CSAH 39 interchange in Otsego to the TH 10/101/169 system interchange, including reconstruction of the TH 101 bridge over the Mississippi River; and

WHEREAS, the Federal Highway Administration (FHWA) is providing Federal-Aid highway funds to Mn/DOT for preliminary engineering and design for interchange construction at CSAH 4 and TH 169 in the City of Zimmerman (S.P. 7106-71); and

WHEREAS, the Project is not funded for construction within the 2009-2028 planning period for Mn/DOT District 3. The TH 169 freeway conversion from TH 10 in Elk River to Zimmerman is identified in the *Draft District 3 Highway Investment Plan 2009-2028* (February 2009) as an unfunded high priority need; and

WHEREAS, the FHWA, in consultation with the Minnesota State Historic Preservation Office (SHPO) identified the St. Paul and Pacific (BNSF) Railroad Corridor Historic District as a historic property eligible for the National Register of Historic Places; and

WHEREAS, the FHWA, in consultation with the SHPO, has determined that reconstruction an approximately one-mile long segment of the St. Paul and Pacific (BNSF) Railroad Corridor Historic District on a new alignment located approximately 75 feet to the north of the existing alignment will have adverse effects to the property under Section 106 of the National Historic Preservation Act and its implementing regulations (36 CFR 800); and

WHEREAS, the FHWA has consulted with the SHPO and the Minnesota Department of Transportation (Mn/DOT) pursuant to 36 CFR 800.6(b)(1) to resolve the adverse effects of the undertaking on historic properties; and

WHEREAS, the FHWA has notified the Advisory Council on Historic Preservation (ACHP) of its finding of adverse effect in accordance with 36 CFR 800.6(a)(1), and has provided the documentation specified in 36 CFR 800.11(e) and the ACHP has declined to participate in the consultation;

WHEREAS, the FHWA, in consultation with the SHPO, has invited Mn/DOT to sign this MOA as an invited signatory in accordance with 36 CFR 800 (c) (4); and

WHEREAS, since this project has the same adverse effect on the St. Paul and Pacific (BNSF) Railroad Corridor Historic District as the TH 10 freeway facility project in Elk River (S.P. 7102-123), the mitigation to resolve the adverse effect is the same for both projects and require separate MOA's; and

NOW, THEREFORE, the FHWA, the SHPO, and Mn/DOT agree that upon the FHWA's approval of the undertaking, the FHWA will ensure that the following stipulations shall be implemented in order to take into account the effect of the undertaking on historic properties.

STIPULATIONS

The FHWA will ensure that the following measures are carried out:

STIPULATION I. INTERPRETIVE DISPLAY

A. The Mn/DOT will develop an interpretive display (e.g., kiosk) for the St. Paul and Pacific (BNSF) Railroad Corridor Historic District. This interpretive display will focus on the role of the St. Paul and Pacific (BNSF) Railroad Corridor Historic District in the development of the Elk River area and the importance of the railroad corridor in providing railroad access to communities along the Mississippi River. The interpretive display will be placed on Mn/DOT-owned property at the Elk River Northstar Commuter Rail Park and Ride facility (north of the St. Paul and Pacific [BNSF] Railroad Corridor). The placement of the interpretive display on Mn/DOT property at the Northstar Commuter Rail Park and Ride facility will be coordinated with the SHPO.

B. Mn/DOT will submit a draft of the interpretive display content and draft design of the interpretive display, including how it relates to the Park and Ride facility and Northstar Commuter rail station to the SHPO for review and concurrence.

C. Mn/DOT will construct and install the interpretive display at the Elk River Northstar Commuter Rail Park and Ride facility within one (1) year of project letting .

STIPULATION II. AMENDMENTS

Any signatory to this Memorandum of Agreement (MOA) may request in writing to the FHWA that it be amended, whereupon the parties shall consult to consider the proposed amendment. The regulations at 36 CFR 800 shall govern the execution of any such amendment.

STIPULATION IIII. DISPUTE RESOLUTION

Disputes regarding the completion of the terms of this agreement shall be resolved by the signatories. If the signatories cannot agree, any one of the signatories may request the participation of the ACHP to assist in resolving the dispute.

STIPULATION IV. TERMINATION

Any signatory to this MOA may terminate the agreement by providing thirty (30) days' written notice to the other signatories, provided the signatories consult during the period prior to termination to agree on amendments or other actions that would avoid termination.

STIPULATION V. DURATION

If the terms of this agreement have not been completed within two (2) years from the date the project is let, this agreement will be considered null and void. If the FHWA anticipates that the agreement will not be implemented within this timeframe, it will notify the signatories in writing at least thirty (30) days prior to the agreement becoming invalid. The agreement may be extended by the written concurrence of the signatories. If the agreement becomes invalid and the FHWA elects to continue with the undertaking, the FHWA will reinitiate review of the undertaking in accordance with 36 CFR 800.

Execution of this MOA by the FHWA and the SHPO and implementation of its terms evidence that the FHWA has taken into account the effects of its undertaking on historic properties and has afforded the ACHP opportunity to comment.

FEDERAL HIGHWAY ADMINISTRATION (FHWA)

By: Cheryl B. Martin 10/22/09

for Derrell Turner, Division Administrator Date

MINNESOTA STATE HISTORIC PRESERVATION OFFICE (SHPO)

By: Britta L. Bloomberg 9/28/09

Nina Archibal, State Historic Preservation Officer Date

Britta L. Bloomberg, Deputy SHPO

Invited Signatories:

MINNESOTA DEPARTMENT OF TRANSPORTATION (Mn/DOT)

By: Thomas K. Sorel 9/30/09

Thomas K. Sorel, Commissioner Date

APPENDIX I

Draft Section 4(f) Evaluation

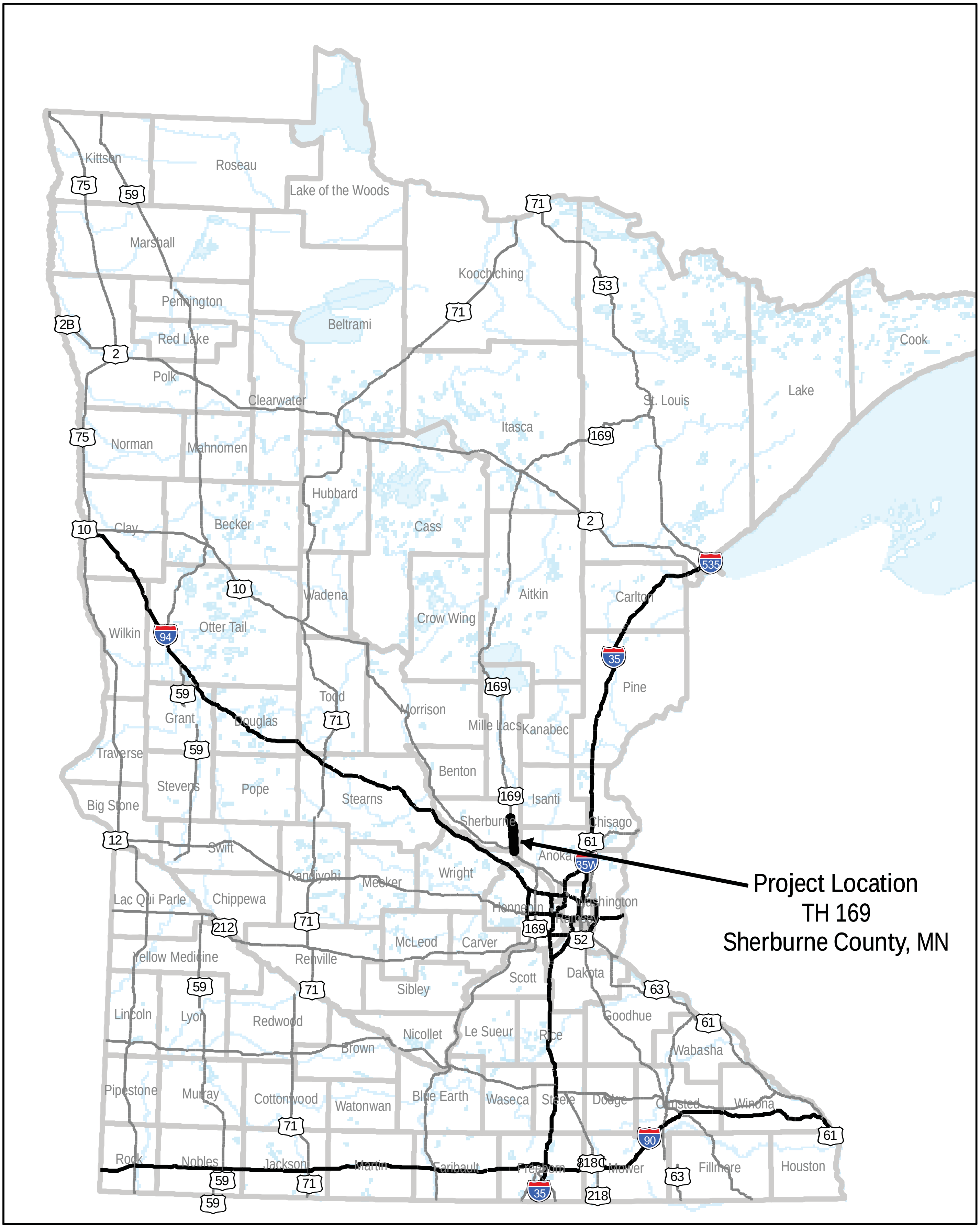
Draft
Section 4(f) Evaluation

Trunk Highway 169
Elk River to Zimmerman

State Project: 7106-73 (Elk River); 7106-71 (Zimmerman)
Minnesota Project: To Be Assigned

From: Trunk Highway 101/County State Aid Highway 39 interchange
To: 277th Avenue
in
Cities: Otsego, Elk River, and Zimmerman
Township: Livonia
Counties: Wright and Sherburne
Section(s), Township(s), Range(s):
Sections: 3-5, 8-10, 15-17, 27-29, 32-34; T35N; R26W
3-5, 8-10, 15-17, 20-22, 27-29, 32-34; T34N; R26W
2-4, 9-11, 14-16, 21-23, 26-28, 33-35; T33N; R26W
3, 10, 11; T32N; R26W

Conversion of Trunk Highway (TH) 169 from an expressway facility to a freeway facility from Elk River through Zimmerman, including TH 101 lane addition in Otsego from County State Aid Highway (CSAH) 39 to the TH 10/101/169 system interchange and expansion of the TH 101 Mississippi River crossing between Otsego and Elk River.



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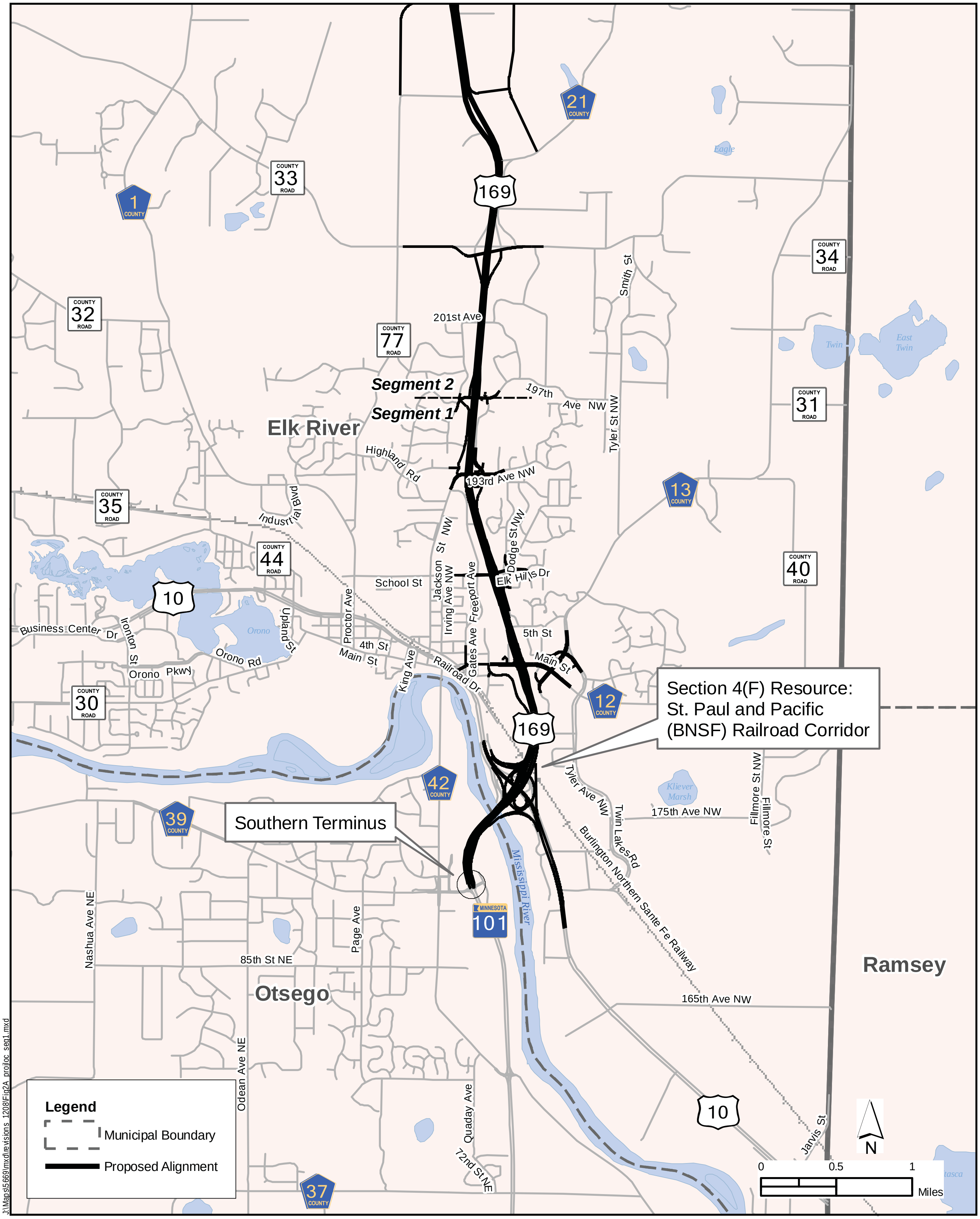
STATE LOCATION MAP

Figure 1

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71



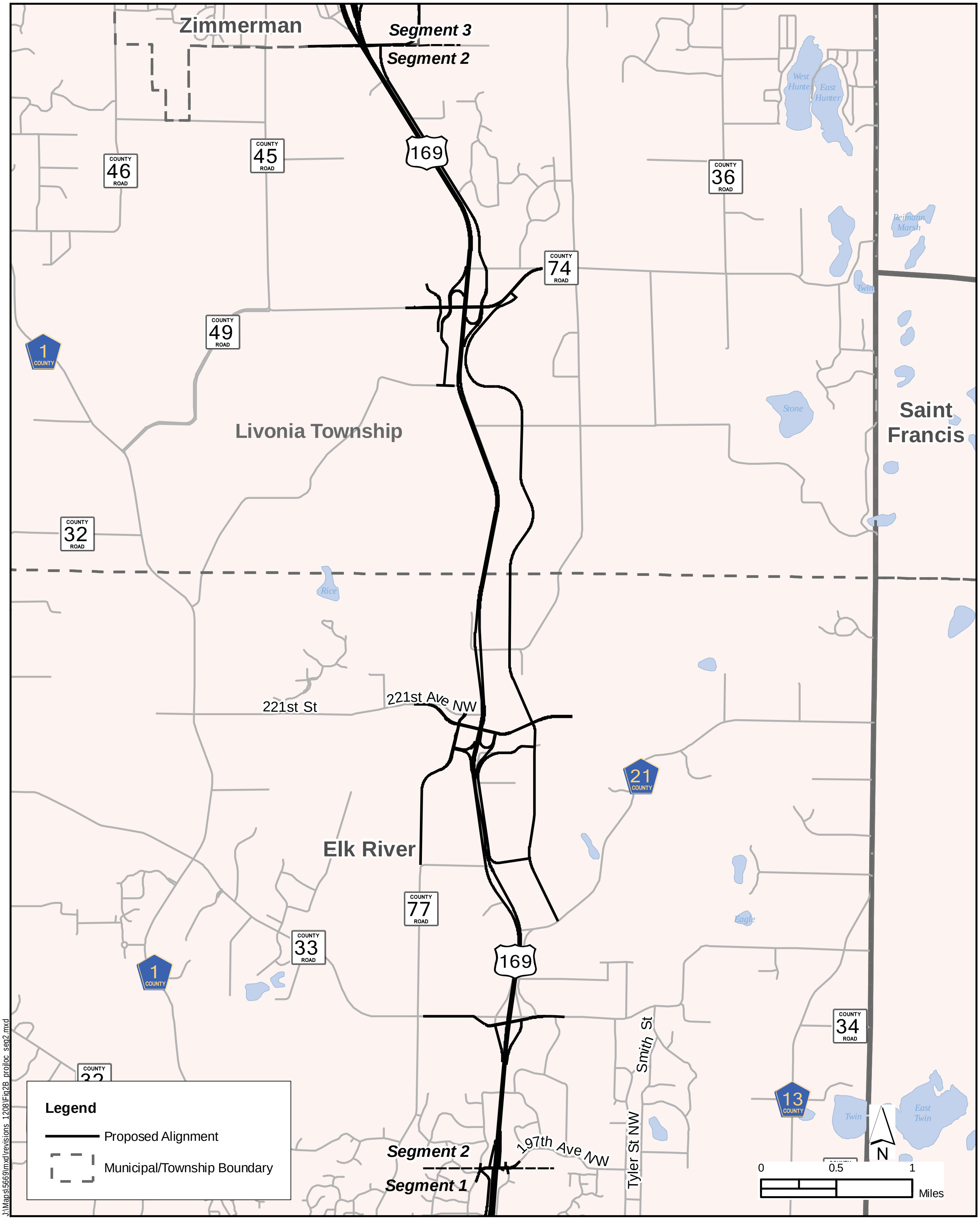
PROJECT LOCATION: SEGMENT ONE - URBAN ELK RIVER

Figure 2A

Segment One: CSAH 39 to197th Avenue NW

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71



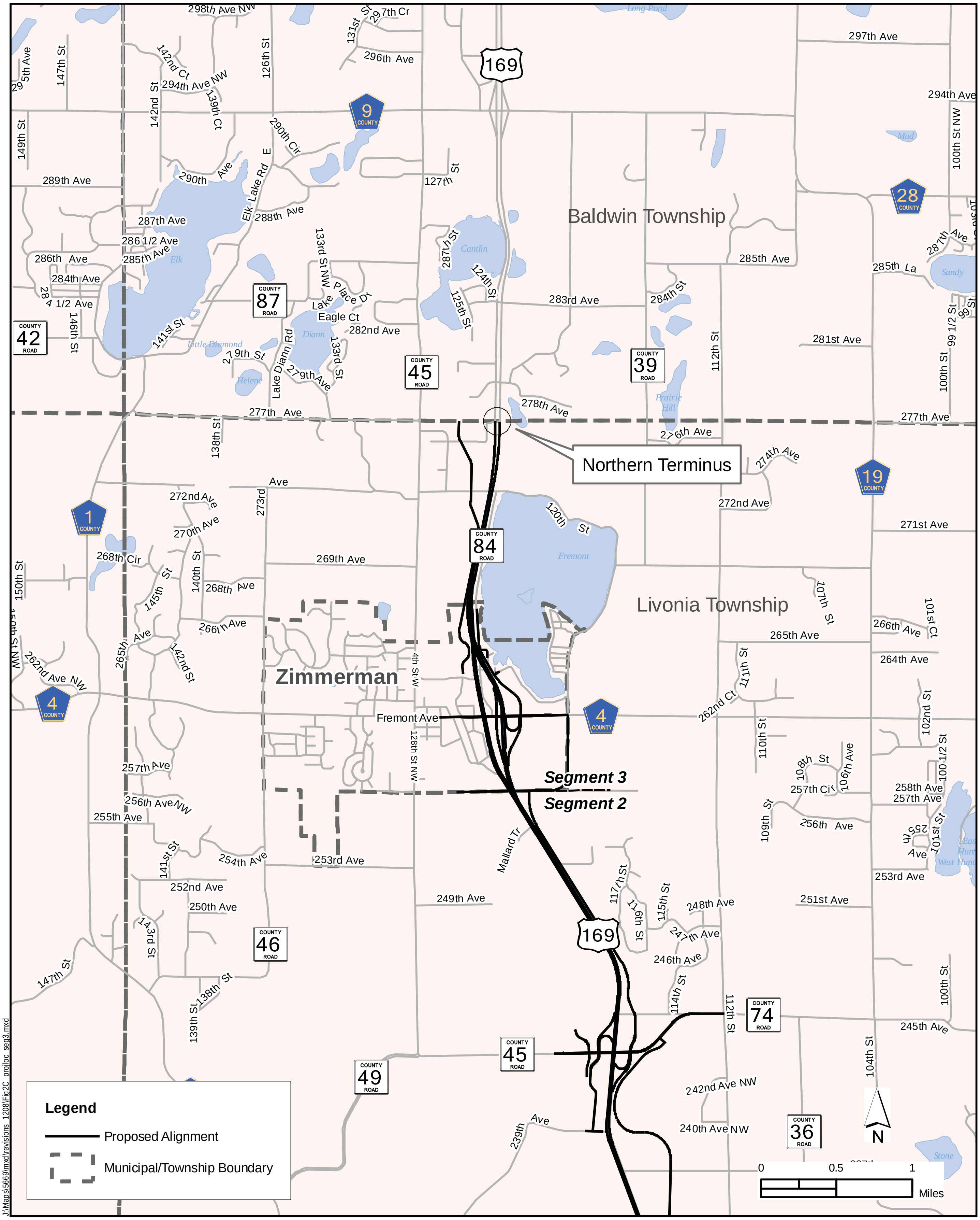
PROJECT LOCATION: SEGMENT TWO - RURAL ELK RIVER & S. LIVONIA TOWNSHIP

Figure 2B

Segment Two: 197th Avenue NW to Livonia Township/City of Zimmerman Boundary

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71



PROJECT LOCATION: SEGMENT THREE - ZIMMERMAN & N. LIVONIA TOWNSHIP

Figure 2C

Segment Three: City of Zimmerman municipal boundary to 277th Avenue in Livonia Township

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

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I. INTRODUCTION

The Section 4(f) legislation as established under the Department of Transportation Act of 1966 (49 USC 303, 23 USC 138) and as revised in 2005 by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) (which included moving the Section 4(f) regulations to 23 CFR 774) provides protection for publicly owned parks, recreation areas, historic sites, wildlife and/or waterfowl refuges from conversion to a transportation use. The Federal Highway Administration (FHWA) may not approve the use of land from a significant publicly owned park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless a determination is made that:

- There is no feasible and prudent alternative to the use of land from the property; and
- The action includes all possible planning to minimize harm to the property resulting from such use (23 CFR774.17).

Additional protection is provided for outdoor recreational lands under the Section 6(f) legislation (16 USC 4602-8(f) (3)) where Land and Water Conservation (LAWCON) funds were used for the planning, acquisition or development of the property. These properties may be converted to a non-outdoor recreational use only if replacement land of at least the same fair market value and reasonably equivalent usefulness and location is assured.

The purpose of this Section 4(f) Evaluation is to provide the information required by the Secretary of Transportation to make the decision regarding the use of properties protected by Section 4(f) and/or Section 6(f) legislation under the preferred alternative selected in the Trunk Highway (TH) 169 Elk River to Zimmerman Environmental Assessment/Environmental Assessment Worksheet (EA/EAW).

This Section 4(f) Evaluation describes all identified Section 4(f) and/or Section 6(f) properties proposed to be "used" under the preferred alternative, potential impacts on those properties, and possible mitigation measures to minimize impacts. A "use" occurs (1) when land from a Section 4(f) site is acquired for a transportation project, (2) when there is an occupancy of land that is adverse in terms of the statute's preservationist purposes, or (3) when the proximity impacts of the transportation project on the Section 4(f) sites, without acquisition of land, are so great that the purposes for which the Section 4(f) site exists are substantially impaired (normally referred to as a constructive use).

The Section 4(f) process requires that any impacts from use of a park, recreation area, historic site, wildlife or waterfowl refuge for highway purposes be evaluated in context with the proposed highway construction/reconstruction activity. An inventory of these types of properties was completed for the TH 169 (Elk River to Zimmerman) project area. Based on this inventory, a review of the proposed design, and assessment of the project's impacts, the realignment of the St. Paul and Pacific (BNSF) Railroad Corridor constitutes a Section 4(f) use. The St. Paul and Pacific (BNSF) Railroad Corridor was determined eligible for the National Register of Historic Places as an historic rail corridor. The Measures to Minimize Harm section (Section VI) below describes efforts made to avoid and minimize use of the Section 4(f) resource.

The TH 169 (Elk River to Zimmerman) Project has been reviewed for potential Section 6(f) involvement. No Section 6(f) involvement exists on this project.

II. PROPOSED ACTION

A description of the proposed project, and an explanation of the purpose and need for the project, are in the Environmental Assessment/Environmental Assessment Worksheet document. Please refer to the Alternatives section of that document for a description of the proposed action (Section IV.B.2 of the EA/EAW), and the Purpose and Need section of that document (Section III) for the purpose and need of the project.

III. SECTION 4(f) PROPERTY

Map of Section 4(f) Property/Location

The project map on page ii (Figure 2A) illustrates the location of the Section 4(f) resource (St. Paul and Pacific Railroad Corridor) relative to the project area.

Description of St. Paul and Pacific (BNSF) Railroad Corridor

The St. Paul and Pacific (BNSF) Railroad Corridor runs in a northwesterly direction parallel to Highway 10. The St. Paul and Pacific (BNSF) Railroad Corridor crosses Highway 169 just north of the Highway 10/101/169 interchange, runs through downtown Elk River, and separates from the Highway 10 corridor as the Highway turns to the west. The railroad corridor is double tracked. The railroad corridor bridges over Highway 169, and is at-grade with local street crossings in downtown Elk River and to the east of Highway 169. The railroad right of way is generally 100 feet wide, but expands to approximatey 200 feet in downtown Elk River, in the area that historically accommodated the Elk River Station.

A Phase I Architectural History Survey and Phase II Architectural History Evaluation conducted for this project determined that the former St. Paul and Pacific Railroad Corridor constitutes a railroad corridor historic district. The St. Paul and Pacific (BNSF) Railroad Corridor District is eligible for listing in the National Register of Historic Places (NRHP). Contributing elements to the railroad corridor historic district are the double-tracked railroad corridor and associated ditches within the right of way.

The corridor is significant for its association with the St. Paul and Pacific railroad, which built the first railroad in Minnesota in 1862 between St. Paul and St. Anthony Falls. The corridor through Elk River was built in 1864 and reached the Sauk Rapids area by 1867. Portions of the railroad corridor's setting have been redeveloped with modern buildings and other transportation infrastructure, such as the Highway 10/101/169 interchange, and other portions retain the general historic characteristics.

The railroad crosses over Highway 169 to the north of the existing Highway 10/101/169 interchange. The railroad bridge is a steel deck girder bridge (four spans) constructed in 1961. Because the railroad bridge post-dates the period of significance described above, it is not a contributing element to the railroad corridor historic district.

Ownership of Section 4(f) property

The St. Paul and Pacific Railroad Corridor is owned and operated by the BNSF Railway Corporation.

Function of Section 4(f) property

<u>Historic Function</u>

The historical function of the corridor, as described in the Phase I Architectural History Survey and Phase II Architectural History Evaluation is summarized below.

> The St. Paul and Pacific Railroad built the first railroad in Minnesota in 1862 between St. Paul and St. Anthony Falls. The corridor through Elk River was built in 1864 and reached the Sauk Rapids area by 1867. The railroad was an important early transportation corridor, providing the first railroad access to the communities and sawmills along the Mississippi River north of Minneapolis. The corridor also served the Northern Pacific, the St. Paul Minneapolis and Manitoba (Manitoba) and the Great Northern Railroads. The corridor provided the Northern Pacific with its only northwest route into and out of Minneapolis from 1870, when it gained control of the St. Paul and Pacific, through the end of the historic period… For the Manitoba/Great Northern, the corridor was also critical from 1879, when the Manitoba gained control of the St. Paul and Pacific and gained access to Duluth, albeit in a roundabout fashion, until 1898, when the Great Northern built the Coon Creek cutoff south of Anoka.

The St. Paul and Pacific Railroad Corridor historic district was previously determined eligible for listing in the NRHP. Prior to the Phase I and Phase II cultural resource studies completed for the proposed TH 10 Project, the segment within Elk River had not been previously surveyed. The St. Paul and Pacific Railroad Corridor within Elk River constitutes a railroad corridor historic district, is significant for its association with the St. Paul and Pacific Railroad, and is eligible for listing in the NRHP.

Current Function

The BNSF Railway Corporation currently operates the St. Paul and Pacific (BNSF) Railroad Corridor as a rail transportation facility. BNSF Railway refers to this rail line as the Staples Subdivision, which extends from Moorhead, Minnesota to Minneapolis, Minnesota.

Description and location of all existing and planned facilities

Historic Context (Railroads and Agricultural Development)

As described above, St. Paul and Pacific Railroad Corridor within Elk River constitutes a railroad corridor historic district and is significant for its association with the St. Paul and Pacific Railroad. The railroad was an important early transportation corridor, providing the first railroad access to the communities and sawmills along the Mississippi River north of Minneapolis. Within the context of agricultural development, railroad corridors, including the St. Paul and Pacific, hauled crops and animal products from farm to market facilitating a transition to diversified agriculture by connecting commodity producers with processors, as well as facilitating industrial crop production, large-scale milling, and mass marketing of food products.

Current Railroad Operations

The existing railroad corridor is described in the Description section above. According to information from BNSF Railway, more than 40 freight trains travel on this rail line through Elk River each day.

In addition to freight services, the Northstar Commuter Rail operates on the St. Paul and Pacific (BNSF) Railroad Corridor from Big Lake, Minnesota to downtown Minneapolis, Minnesota. A park-and-ride facility and rail station is located along the St. Paul and Pacific (BNSF) railroad corridor in Elk River, east of the TH 169 (Elk River to Zimmerman) project area at 171st Street and Twin Lakes Road.

Future Railroad Expansion

The addition of a third track by BNSF Railway parallel to the existing tracks is planned for the future.

Access

The St. Paul and Pacific (BNSF) railroad corridor is owned by a private company. BNSF Railway maintains access roads parallel to the railroad tracks for maintenance activities. There are several at-grade crossings to the west of Highway 169 (Proctor Avenue, Jackson Street, Main Street) and to the east of Highway 169 in Elk River.

Relationship to other similarly used lands in the vicinity

Not applicable to this railroad corridor historic district.

Applicable clauses affecting the ownership

None. This property is owned by BNSF Railway and is used for transportation purposes.

Unusual characteristics reducing or enhancing the value of the property

None.

IV. IMPACTS ON THE SECTION 4(f) PROPERTY

The proposed project would include realigning the St. Paul and Pacific (BNSF) Railroad Corridor to the north of its existing alignment from west of 171st Avenue to a point located approximately 2,500 feet west of Highway 169. The existing railroad bridge over Highway 169 will be removed and replaced with a new structure over the highway. As noted above in Section III, the existing railroad bridge over Highway 169 is not a contributing element to the historic railroad corridor. This new strucutre would be located to the east of the existing bridge because the proposed Highway 169 alignment would be located to the east of the existing highway alignment at the crossing of the St. Paul and Pacific (BNSF) Railroad Corridor. New structures would also be constructed along the St. Paul and Pacific (BNSF) Railroad to accommodate interchange ramps from westbound Highway 10 to northbound Highway 169, and southbound Highway 169 to westbound Highway 10. The proposed railroad grade would be constructed approximately one to two feet higher than the existing railroad corridor grade.

Total length of the St. Paul and Pacific (BNSF) Railroad Corridor reconstruction is approximately 6,000 feet. The centerline of the proposed double track alignment is located approximately 70 feet to the north of the existing centerline alignment. The proposed railroad right of way width in the realigned section is approximately 100 feet. The proposed alignment would accommodate construction of a future third track by BNSF Railway at a later time.

Realignment and impacts to the St. Paul and Pacific (BNSF) Railroad Corridor and are necessary as part of the TH 169 (Elk River to Zimmerman) Project for the following reasons:

- Construction Staging: The St. Paul and Pacific (BNSF) Railroad Corridor is part of the BNSF Staples Subdivision between the Twin Cities region and Fargo/Moorhead region. This BNSF Railway line currently carries approximately 46 freight trains per day. The St. Paul and Pacific (BNSF) Railroad Corridor also carries the Northstar Commuter Rail between Big Lake and Minneapolis (additional 12 trains per day).

Because of the importantce of this corridor for freight movement and commuter rail, maintaining operations on this railroad line during project construction was a key consideration during project development..

It is not feasible to construct the proposed Highway 169 capacity improvements (see discussion below, "Highway 169 Capacity") and Highway 10/101/169 system interchange improvements (see discussion below, "Highway 10/101/169 Interchange") across the existing St. Paul and Pacific (BNSF) Railroad Corridor alignment and maintain rail operations at the same time. Realignment of the railroad corridor would allow rail operations to continue on the existing tracks during railroad grade separation and highway construction. After the new railroad tracks and grade separations are constructed and in place, train traffic would shift to the new tracks and the existing tracks and bridge over Highway 169 would be removed.

- Flood Elevation, Railroad Profile and Clearance Requirements: The Mississippi River is located immediately to the south of the Highway 10/101/169 system interchange and the St. Paul and Pacific (BNSF) Railroad Corridor. Highway 10 currently runs east-west through the interchange; Highway 101/169 crosses over Highway 10. The flood elevation of the Mississippi River is approximately 863 feet. Highway 10 must be reconstructed through the system interchange such that it is located above the flood elevation. This design requirement increases the proposed profile elevation of Highway 169 through the Highway 10/101/169 system interchange to the St. Paul and Pacific (BNSF) Railroad alignment. In order to meet minimum clearance requirements between the Highway 169 roadway profile and the bottom of the proposed BNSF Railway bridge over Highway 169, the railroad grade must be raised by approximately one foot relative to existing conditions. Realignment of the railroad corridor would allow for rail operations to continue on the existing tracks while the new railroad corridor is constructed

- Highway 169 Capacity: As discussed in the project need, forecast traffic volumes on Highway 169 are projected to exceed the capacity of the existing facility, resulting in poor operations and delays. In order for Highway 169 to provide adequate capacity and levels of service for forecast traffic volumes, it must be expanded to a six-lane facility (three lanes in both the north- and southbound directions). The existing BNSF Railway bridge over Highway 169 is a four-span bridge, with bridge piers located along the outside shoulders of the north- and southbound travel lanes, and a pier located between the travel lanes in the center median. The existing bridge openings are not wide enough to accommodate the three through travel lanes in both the north- and southbound directions that is needed to provide adequate capacity for projected traffic volumes.

- Highway 10/101/169 Interchange: As discussed in the project need, the Highway 10/101/169 interchange currently operates at unacceptable levels during the p.m. peak hour, and is projected to operate at unacceptable levels of service in the future (year 2030 conditions) during the a.m. and p.m. peak hours as well. One of the goals of the project is to provide for acceptable traffic operations, consistent with current engineering standards. Reconstruction of the Highway 10/101/169 system interchange to accommodate free-flow for all interchange movements between Highway 10, 101, and 169 are necessary to address mobility and traffic operations needs, and are consistent with conversion of Highway 169 to a freeway facility.

The distance between the north ramps of the existing interchange and the St. Paul and Pacific (BNSF) Railroad Corridor is approximately 550 feet. The Mississippi River is located immediately to the south of the Highway 10/101/169 interchange, and is a barrier to any alignment locations to the south (discussed in greater detail below, "Build on Alternative Alignment Location"). Because of this distance between the railroad and the interchange, and the Mississsppi River to the south, proposed interchange ramps from westbound Highway 10 to northbound Highway 169, and southbound Highway 169 to westbound Highway 10, would merge to/from Highway 169 north of the St. Paul and Pacific (BNSF) Railroad Corridor. As such, new structures are needed along the St. Paul and Pacific (BNSF) Railroad Corridor to grade-separate these interchange movements from the railroad.

V. AVOIDANCE ALTERNATIVES

No Build/Do Nothing Alternative

The No Build Alternative would avoid any impacts to the BNSF Railway. However, the No Build Alterantive would not adequately address safety concerns related to the existing at-grade access along the Highway 169 corridor. The No Build Alternative does not correct the capacity and operational deficiencies associated with the existing Highway 169 corridor and the Highway 10/101/169 system interchange. The No Build Alternative does not meet the Purpose and Need for the project; therefore, it is not a feasible and prudent alternative.

Slight Alignment Changes

Slight alignment changes in Highway 169 were considered. Highway 169 runs perpendicular to the St. Paul and Pacific (BNSF) Railroad Corridor. Because of the north-south alignment of Highway 169, and the east-west alignment of the St. Paul and Pacific (BNSF) Railroad Corridor, any Highway 169 alignment change will affect the St. Paul and Pacific (BNSF) Railroad Corridor. The proposed Highway 169 alignment is located approximately 300 feet east of the existing Highway 169 crossing under the St. Paul and Pacific (BNSF) Railroad Corridor. Moreover, slight alignment changes to the west of the existing Highway 169 alignment are not feasible because of impacts to the Great River Energy site and power plant (refuse-derived fuel power plant). Slight alignment changes to the east or west of the existing Highway 169 alignment would require a new grade-separation between Highway 169 and the railroad corridor, requiring construction of a new railroad alignment to maintain railroad operations during construction.

Build on Alternative Alignment Location

Reconstructing the Highway 10/101/169 interchange on an alternative alignment location to the south to permit the existing St. Paul and Pacific (BNSF) Railroad Corridor to remain was considered; however this alternative was not considered feasible because of physical constraints surrounding the interchange area (e.g., the Mississippi River is located directly south of the Highway 10/101/169 interchange). The avoidance alignment concept was developed maintaining the St. Paul and Pacific (BNSF) Railroad Corridor along its existing alignment, while also utilizing the existing the Highway 169 alignment under the railroad. The avoidance alignment location incorporated the same roadway geometrics and relationship between interchange components (e.g., distance between interchange ramps) as the Preferred Alternative design to provide the traffic operations and capacity necessary to address the purpose and need for the project. This avoidance alignment also assumed that is feasible to design a six-lane freeway section (three lanes in both the north- and southbound directions) on Highway 169 under the existing four-span railroad bridge over the highway.

Maintaining the existing St. Paul and Pacific (BNSF) Railroad Corridor and existing rail crossing location under Highway 169 under this scenario would allow for rail operations to be maintained on the existing rail line during project construction. The avoidance alignment concept is illustrated in the attached Figure 3. Impacts as a result of this avoidance alignment concept are summarized below.

- <u>Highway 10/ 101/169 Interchange</u>: Build on an alternative alignment location to permit the the existing St. Paul and Pacific (BNSF) Railroad Corridor to remain places the Highway 10/ 101/169 system interchange on a new location to the southwest of the existing interchange. As previously noted, a system interchange to accommodate free-flow for all interchange movements between Highways 10, 101, and 169 are necessary to address mobility and traffic operations needs of the proposed project, and are consistent with conversion of Highway 169 to a freeway facility. Transportation improvements in this area are constrained by the Mississippi River to the south, the St. Paul and Pacific (BNSF) Railroad Corridor to the north, and the Great River Energy (GRE) Site (refuse-derived powerplant) to the northwest. The Mississippi River is a state-designated Wild and Scenic River. The segment of the Mississippi River within the project area is designated by the Minnesota Department of Natural Resources (DNR) as "recreational."

  Maintaining the existing St. Paul and Pacific (BNSF) Railroad Corridor and existing railroad crossing location over Highway 169 would result in substantial shift in the interchange location. This is because of roadway geometrics and relationships between interchange features. In order for the proposed Highway 169 travel lanes to utilize the existing rail line crossing location, the interchange ramp from westbound Highway 10 to northbound Highway 169 must merge with Highway 169 south of the St. Paul and Pacific (BNSF) Railroad Corridor. In addition, the ramps west- and eastbound Highway 10 must also exit from southbound Highway 169 south of the St.

Paul and Pacific (BNSF) Railroad Corridor. Locating the entrance and exit points for these interchange ramps south of the St. Paul and Pacific (BNSF) Railroad Corridor to utilize the existing crossing under the rail line forces the location of the system interchange to the southwest.

The existing Highway 169 alignment is on a tangent section under the the St. Paul and Pacific (BNSF) Railroad Corridor. The proposed Highway 169 alignment is on a curve under the St. Paul and Pacific (BNSF) Railroad Corridor alignment. The proposed highway alignment transitions to a tangent section north of the St. Paul and Pacific (BNSF) Railroad Corridor. Maintaining the existing rail line alignment and utilizing the existing rail crossing over Highway 169 requires that the proposed roadway tangent section north of the rail line match the existing roadway tangent section under the St. Paul and Pacific (BNSF) Railroad Corridor. As a result, this constraint would also force the location of the system interchange to the southwest.

Shifting the Highway 10/101/169 interchange to the southwest to permit the the existing St. Paul and Pacific (BNSF) Railroad Corridor and existing railroad crossing location over Highway 169 to remainwould place the system interchange within the Mississippi River, resulting in extensive impacts to the Mississippi River and surrounding environment.

- Highway 10 : It is not feasible to relocate Highway 10 on a new alignment to accommodate the Highway 10/101/169 system interchange location describe above. Locating the system interchange to the south would place Highway 10 on a new alignment within the Mississippi River.
- Highway 101: It is not feasible to maintain the existing Highway 101 alignment to accommodate the Highway 10/101/169 system interchange location described above. Locating the Highway 10/101/169 system interchange to the southwest of its existing location would require substantial realignment and reconstruction of Highway 101 to the south of the Mississippi River in Otsego, resulting in extensive impacts to the surrounding community.

Conclusion

Because none of the avoidance alternatives were found to be feasible and prudent, the only remaining alternative was the preferred alternative.

VI. MEASURES TO MINIMIZE HARM

To mitigate the unavoidable impacts to the Section 4(f) resource – St. Paul and Pacific (BNSF) Railroad Corridor – resulting from the preferred alternative, measures to minimize harm/mitigate were jointly developed between the Mn/DOT CRU, Mn/DOT District 3, SHPO and FHWA. The MOA in the Attachments describes the agreement reached among these parties.

As previously described, St. Paul and Pacific (BNSF) Railroad Corridor is also used as a commuter rail facility. A park-and-ride facility and commuter rail station (under construction) is located to the east of Highway 169 at 171st Avenue and Twin Lakes Road. Mitigation for impacts to the St. Paul and Pacific Railroad Corridor includes future construction of an interpretive display on Mn/DOT property at the park and ride facility. The details of this interpretive display, such as content and design, will be subject to SHPO review prior to design and construction.

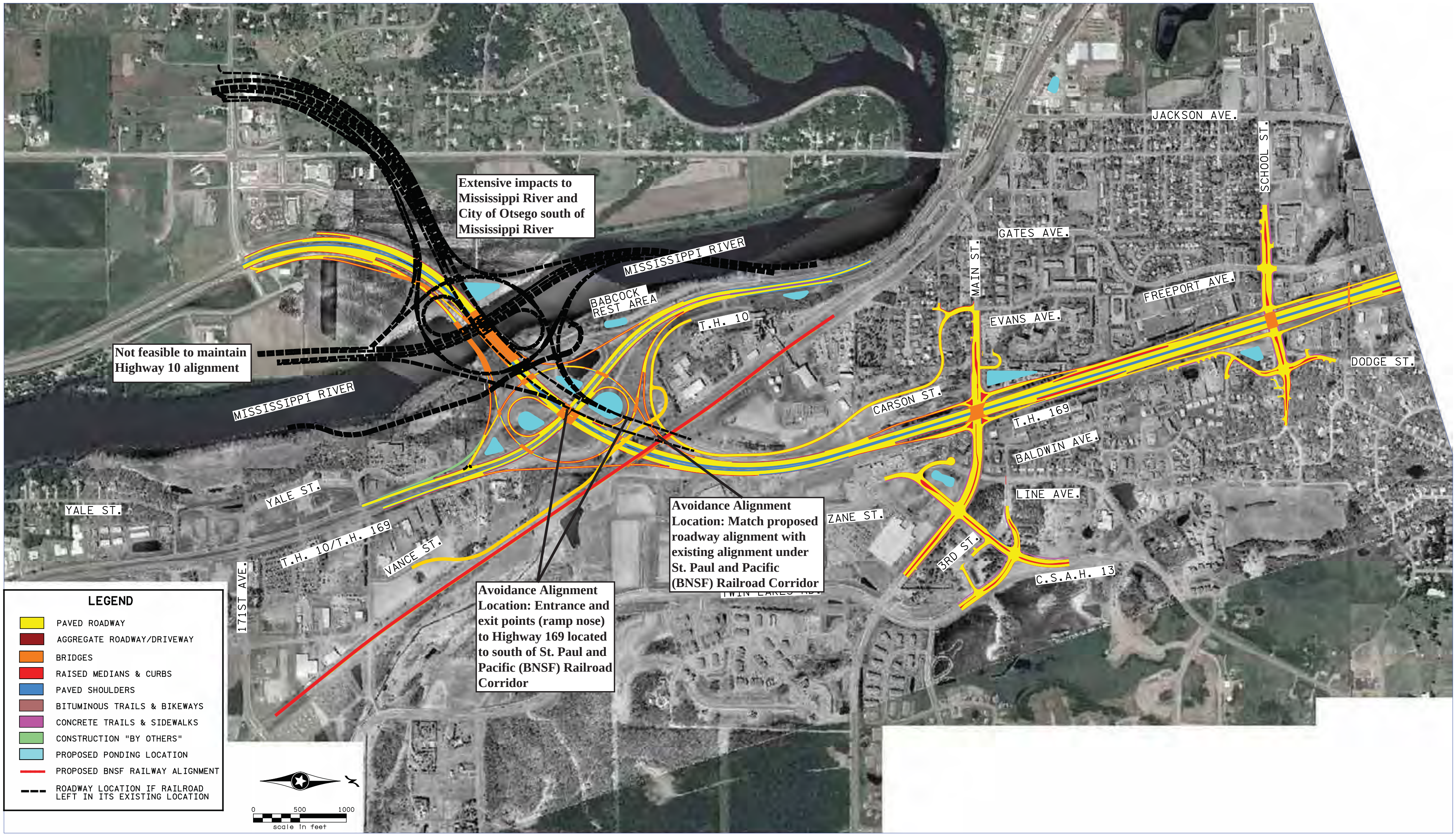
The proposed project is not funded for construction. Timing of implementation of this mitigation measure will be dependent upon project construction funding. Implementation of mitigation will occur in the future concurrent with project implementation.

VII. COORDINATION

The development process for this project included coordination between the Minnesota Department of Transportation (Mn/DOT) Cultural Resources Unit (CRU), the Minnesota State Historic Preservation Office (SHPO), and the FHWA. As a result of the Phase I and Phase II studies, CRU determined, and SHPO concurred, that there would be an adverse effect to the St. Paul and Pacific Railroad Corridor. A consensus was reached regarding the impacts and the proposed mitigation of Section 4(f) resources. A copy of correspondence between CRU and SHPO is attached. A copy of the Memorandum of Agreement between the FHWA, Mn/DOT and Minnesota SHPO is also attached.

ATTACHMENTS

- **Avoidance Alternative Location**
- **Minnesota State Historic Preservation Office Concurrence Letter**
- **Section 106 Memorandum of Agreement**



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DRAFT SECTION 4(f) EVALUATION: AVOIDANCE ALTERNATIVE

ENVIRONMENTAL ASSESSMENT

T.H. 169 - SP 7106-73 and 7106-71

Figure 3

Minnesota
Historical Society

State Historic Preservation Office

February 5, 2009

Mr. Craig Johnson
Cultural Resources Unit
MN Dept. of Transportation
Transportation Building, MS 620
395 John Ireland Boulevard
St. Paul, MN 55155-1899

Re: S.P. 7106-71 & 7106-73, T.H. 169
Grade-separated interchanges & overpasses at various locations
Zimmerman & Elk River, Sherburne County
SHPO Number: 2009-0776

Dear Mr. Johnson:

Thank you for the opportunity to review and comment on the above project. It has been reviewed pursuant to the responsibilities given the State Historic Preservation Officer by the National Historic Preservation Act of 1966 and the Procedures of the Advisory Council on Historic Preservation (36CFR800), and to the responsibilities given the Minnesota Historical Society by the Minnesota Historic Sites Act and the Minnesota Field Archaeology Act.

Based on our review of the survey reports submitted, we have the following comments on this project at this time:

1. We concur with the determination that there are no National Register eligible archaeological properties on the parcels surveyed. We note that additional survey is yet to be completed.

2. We concur with the determination that the St. Paul and Pacific Railroad corridor District meets National Register criteria.

3. The submittal recommends that a portion of the Vernon Cemetery and the Farmers and Merchants Bank of Zimmerman both meet National Register criteria. We do not feel that there is adequate justification for the significance of either of these properties, and recommend that they are not eligible to the Register.

We look forward to working with you to complete this review after the remaining survey work has been completed. Contact us at 651-259-3456 with questions or concerns.

Sincerely,

Dennis A. Gimmestad
Government Programs & Compliance Officer

cc: Andrew Schmidt, Summit Envirosolutions
Michael Justin, HDR
Michael Kolb, Strata Morph
Tom Cinadr, SHPO

Minnesota
Historical Society
STATE HISTORIC PRESERVATION OFFICE

June 19, 2009

Mr. Craig Johnson
Cultural Resources Unit
MN Dept. of Transportation
Transportation Building, Mail Stop 620
395 John Ireland Blvd.
St. Paul, MN 55155-1899

RE: S.P. 7106-71 & 7106-73, T.H. 169
Grade-separated interchanges and overpasses at various locations
Zimmerman & Elk River, Sherburne County
SHPO Number: 2009-0776

Dear Mr. Johnson:

Thank you for your letter regarding the above-referenced project.

We concur with your assessment that the project will have an adverse effect on the St. Paul and Pacific Railroad Historic District.

We note that your letter acknowledges that an archaeological survey of this project is yet to be completed. We will not be able to reach a determination of effect for the project as a whole until that survey is reviewed.

Contact us at (651) 259-3456 with questions or concerns.

Sincerely,

Dennis A. Gimmestad
Government Programs & Compliance Officer

U.S. Department of Transportation
Federal Highway Administration

Minnesota Division

380 Jackson Street
Galtier Plaza, Suite 500
St. Paul, MN 55101-4802

651.291.6100
Fax 651.291.6000

www.fhwa.dot.gov/mndiv

October 28, 2009

Mr. Don Kilma
Director
Office of Federal Agency Programs
Advisory Council on Historic Preservation
Old Post Office Building
1100 Pennsylvania Avenue, NW Suite 809
Washington, D.C. 20004

Re: Section 106 Memorandum of Agreement
SP 7106-71 & 7106-73, TH-169 Freeway Conversion Project City of Otsego, Wright County & Cities of Elk River & Zimmerman & Livonia Township, Sherburne County, Minnesota

Dear Mr. Klima:

We have consulted with the Minnesota State Historic Preservation Officer and the Minnesota Department of Transportation, and we have agreed on measures to mitigate the effects on the historic property for the above referenced project; as documented in the enclosed executed Memorandum of Agreement (MOA). By copy of this letter, a copy of the fully executed MOA is being provided to all the signatories of the MOA.

If you have any questions about the project or the enclosed MOA, please contact me at (651) 291-6126.

Sincerely yours,

Timothy J. Anderson, PE
Highway Engineer

Enclosure

TJA/jer

cc: 1 Mn/DOT – Craig Johnson, MS 620
1 SHPO – Dennis Gimmestad
1 RF
1 Anderson

SECTION 106 MEMORANDUM OF AGREEMENT
BETWEEN
THE FEDERAL HIGHWAY ADMINISTRATION (FHWA)
AND THE
MINNESOTA STATE HISTORIC PRESERVATION OFFICE (SHPO)
PURSUANT TO 36 CFR 800.6 (B) (IV)
REGARDING THE TRUNK HIGHWAY 169 FREEWAY CONVERSION PROJECT
(S.P. 7106-71 AND S.P. 7106-73)
IN
OTSEGO, WRIGHT COUNTY, MINNESOTA
ELK RIVER, SHERBURNE COUNTY, MINNESOTA
LIVONIA TOWNSHIP, SHERBURNE COUNTY, MINNESOTA
ZIMMERMAN, SHERBURNE COUNTY, MINNESOTA

WHEREAS, the Minnesota Department of Transportation (Mn/DOT) plans to reconstruct Trunk Highway (TH) 169 as a freeway facility from the TH 10/101/169 system interchange in Elk River to County State Aid Highway (CSAH) 4 in Zimmerman. The project also includes reconstruction of TH 101 from the CSAH 39 interchange in Otsego to the TH 10/101/169 system interchange, including reconstruction of the TH 101 bridge over the Mississippi River; and

WHEREAS, the Federal Highway Administration (FHWA) is providing Federal-Aid highway funds to Mn/DOT for preliminary engineering and design for interchange construction at CSAH 4 and TH 169 in the City of Zimmerman (S.P. 7106-71); and

WHEREAS, the Project is not funded for construction within the 2009-2028 planning period for Mn/DOT District 3. The TH 169 freeway conversion from TH 10 in Elk River to Zimmerman is identified in the *Draft District 3 Highway Investment Plan 2009-2028* (February 2009) as an unfunded high priority need; and

WHEREAS, the FHWA, in consultation with the Minnesota State Historic Preservation Office (SHPO) identified the St. Paul and Pacific (BNSF) Railroad Corridor Historic District as a historic property eligible for the National Register of Historic Places; and

WHEREAS, the FHWA, in consultation with the SHPO, has determined that reconstruction an approximately one-mile long segment of the St. Paul and Pacific (BNSF) Railroad Corridor Historic District on a new alignment located approximately 75 feet to the north of the existing alignment will have adverse effects to the property under Section 106 of the National Historic Preservation Act and its implementing regulations (36 CFR 800); and

WHEREAS, the FHWA has consulted with the SHPO and the Minnesota Department of Transportation (Mn/DOT) pursuant to 36 CFR 800.6(b)(1) to resolve the adverse effects of the undertaking on historic properties; and

WHEREAS, the FHWA has notified the Advisory Council on Historic Preservation (ACHP) of its finding of adverse effect in accordance with 36 CFR 800.6(a)(1), and has provided the documentation specified in 36 CFR 800.11(e) and the ACHP has declined to participate in the consultation;

WHEREAS, the FHWA, in consultation with the SHPO, has invited Mn/DOT to sign this MOA as an invited signatory in accordance with 36 CFR 800 (c) (4); and

WHEREAS, since this project has the same adverse effect on the St. Paul and Pacific (BNSF) Railroad Corridor Historic District as the TH 10 freeway facility project in Elk River (S.P. 7102-123), the mitigation to resolve the adverse effect is the same for both projects and require separate MOA's; and

NOW, THEREFORE, the FHWA, the SHPO, and Mn/DOT agree that upon the FHWA's approval of the undertaking, the FHWA will ensure that the following stipulations shall be implemented in order to take into account the effect of the undertaking on historic properties.

STIPULATIONS

The FHWA will ensure that the following measures are carried out:

STIPULATION I. INTERPRETIVE DISPLAY

A. The Mn/DOT will develop an interpretive display (e.g., kiosk) for the St. Paul and Pacific (BNSF) Railroad Corridor Historic District. This interpretive display will focus on the role of the St. Paul and Pacific (BNSF) Railroad Corridor Historic District in the development of the Elk River area and the importance of the railroad corridor in providing railroad access to communities along the Mississippi River. The interpretive display will be placed on Mn/DOT-owned property at the Elk River Northstar Commuter Rail Park and Ride facility (north of the St. Paul and Pacific [BNSF] Railroad Corridor). The placement of the interpretive display on Mn/DOT property at the Northstar Commuter Rail Park and Ride facility will be coordinated with the SHPO.

B. Mn/DOT will submit a draft of the interpretive display content and draft design of the interpretive display, including how it relates to the Park and Ride facility and Northstar Commuter rail station to the SHPO for review and concurrence.

C. Mn/DOT will construct and install the interpretive display at the Elk River Northstar Commuter Rail Park and Ride facility within one (1) year of project letting.

STIPULATION II. AMENDMENTS

Any signatory to this Memorandum of Agreement (MOA) may request in writing to the FHWA that it be amended, whereupon the parties shall consult to consider the proposed amendment. The regulations at 36 CFR 800 shall govern the execution of any such amendment.

STIPULATION IIII. DISPUTE RESOLUTION

Disputes regarding the completion of the terms of this agreement shall be resolved by the signatories. If the signatories cannot agree, any one of the signatories may request the participation of the ACHP to assist in resolving the dispute.

STIPULATION IV. TERMINATION

Any signatory to this MOA may terminate the agreement by providing thirty (30) days' written notice to the other signatories, provided the signatories consult during the period prior to termination to agree on amendments or other actions that would avoid termination.

STIPULATION V. DURATION

If the terms of this agreement have not been completed within two (2) years from the date the project is let, this agreement will be considered null and void. If the FHWA anticipates that the agreement will not be implemented within this timeframe, it will notify the signatories in writing at least thirty (30) days prior to the agreement becoming invalid. The agreement may be extended by the written concurrence of the signatories. If the agreement becomes invalid and the FHWA elects to continue with the undertaking, the FHWA will reinitiate review of the undertaking in accordance with 36 CFR 800.

Execution of this MOA by the FHWA and the SHPO and implementation of its terms evidence that the FHWA has taken into account the effects of its undertaking on historic properties and has afforded the ACHP opportunity to comment.

FEDERAL HIGHWAY ADMINISTRATION (FHWA)

By: Cheryl B. Martin ______________________ 10/22/09
for Derrell Turner, Division Administrator Date

MINNESOTA STATE HISTORIC PRESERVATION OFFICE (SHPO)

By: ______________________ 9/28/09
Nina Archibal, State Historic Preservation Officer Date
Britta L. Bloomberg, Deputy SHPO

Invited Signatories:

MINNESOTA DEPARTMENT OF TRANSPORTATION (Mn/DOT)

By: ______________________ 9/30/09
Thomas K. Sorel, Commissioner Date

APPENDIX J

Right of Way Tables

Appendix J – Right of Way (Total Takes)

The following tables document right of way impacts (total parcel acquisitions) for the proposed project from the Highway 10/101/169 interchange in Elk River to the Highway 169/CSAH 4 interchange in Zimmerman. Right of way impacts (total and partial acquisitions) are illustrated in Figures 10A through 10E in Appendix A.

Segment One: Urban Elk River

TABLE J-1
TH 10/101/169 INTERCHANGE COMMERCIAL PARCELS

Parcel ID #	Address	Current Land Use	Zoned Land Use	Name
75-003-1101	N/A	Right of Way(1)	Light Industrial	N/A
75-003-1102	N/A	Right of Way	Light Industrial	N/A
75-003-4100	N/A	Vacant Land	Vacant Land	N/A
75-003-4203	NA	Right of Way(2)	Light Industrial	N/A

N/A: not applicable.
(1) This parcel is located in the northeast quadrant of the Highway 10/101/169 interchange and is owned by the State of Minnesota as public right of way.
(2) This parcel is located in the northwest quadrant of the Highway 10/101/169 interchange and is under easement as public right of way.

TABLE J-2
MAIN STREET COMMERCIAL PARCELS

Parcel ID #	Address	Current Land Use	Zoned Land Use	Business Name
75-134-4113	279 Carson St NW	Commercial	Commercial	AJ Complete Auto
75-759-0125	18267 Carson Ct NW	Commercial	Commercial	Walgreen’s
75-134-4110	260 Carson St NW	Commercial	Commercial	Pizza Hut
75-134-4111	200 Main St NW	Commercial	Commercial	Super America
75-802-0105	229 Carson St NW	Commercial	Commercial	Sonic
75-430-0105	231 Main St NW	Commercial	Commercial	Mixed Businesses(1)
75-670-0105	221 Main St NW	Commercial	Commercial	Mixed Businesses(2)
75-759-0010	(not available)	Commercial	Commercial	(not available) – outlot
75-709-0245	(not available)	Commercial	Commercial	(not available) – dumpster
75-709-0250	(not available)	Commercial	Commercial	(not available) – dumpster
75-709-0255	(not available)	Commercial	Commercial	(not available) – dumpster
75-709-0260	11070 183rd Cir NW – Suite C	Commercial	Commercial	Hardy & Stephens Counseling Assocation
75-709-0265	11070 183rd Cir NW – Suite B	Commercial	Commercial	(vacant)
75-709-0270	11070 183rd Cir NW – Suite A	Commercial	Commercial	(vacant)
75-709-0275	11040 183rd Cir NW – Suite C	Commercial	Commercial	(vacant)
75-709-0280	11040 183rd Cir NW – Suite B	Commercial	Commercial	(vacant)
75-709-0285	11040 183rd Cir NW – Suite A	Commercial	Commercial	BDM Consulting Engineers & Surveyors, PLC

(1) Coldwell Banker Vision, Mortgages Unlimited, Law offices of the Public Defender, MetLife Auto & Home.
(2) First American Title, Healing Choices Natural Health Care, Aflec.

TABLE J-3
MAIN STREET RESIDENTIAL PARCELS

Parcel ID #	Address	Current Land Use	Zoned Land Use
75-404-0123	236 2nd St NW	Residential	Residential
75-404-0125	210 Evans Ave NW	Residential	Residential

TABLE J-4
SCHOOL STREET COMMERCIAL PARCELS

Parcel ID #	Address	Current Land Use	Zoned Land Use	Business Name
75-445-0120	710 Dodge Ave NW	Commercial	Commercial	Mixed Businesses[(1)]
75-445-0110	253 A 8th St NW	Commercial	Commercial	Mixed Businesses[(2)]
75-445-0010	(not available)	Commercial	Commercial	(undeveloped)

[(1)] Barrington Oaks Veterinary, Bashaw Dental Center, Lighthouse Chiropractic Health Center, Summit Mortgage Corporation, Sound Decision Hearing Center.
[(2)] Central Minnesota Mental Health, William R. Dodds Ltd.

TABLE J-5
SCHOOL STREET RESIDENTIAL PARCELS

Parcel ID #	Address	Current Land Use	Zoned Land Use
75-422-0110	18837 Dodge St NW	Residential	Residential
75-422-0120	266 Elk Hills Dr NW	Residential	Residential
75-422-0130	242 Elk Hills Dr NW	Residential	Residential
75-516-0180	18847 Dodge St NW	Residential	Residential
75-516-0170	18857 Dodge St NW	Residential	Residential

TABLE J-6
193RD AVENUE COMMERCIAL PARCELS

Parcel ID #	Address	Current Land Use	Zoned Land Use	Business Name
75-572-0105	19230 Evans St NW	Commercial	Commercial	Mixed Businesses[(1)]
75-572-0110	19260 Evans St NW	Commercial	Commercial	Dollar Store
75-558-0105	11554 193rd Ave NW	Commercial	Commercial	Super America

[(1)] White & Associates, Quest LLC, Pathways Psychological Services, Sungard Wealth Management Service, River Collection & Recovery Service Incorporated, WR Appraisals, Permanent Choice Laser Center, Econar Energy Systems Corp, No Place Like Home, Hess Law Office, SK Dokken Attorney at Law.

TABLE J-7
197TH AVENUE RESIDENTIAL PARCELS

Parcel ID #	Address	Current Land Use	Zoned Land Use
75-510-0175	11537 197th Ave NW	Residential	Residential

Segment Two: Rural Elk River and Southern Livonia Township

TABLE J-8
221ST AVENUE COMMERCIAL AND AGRICULTURAL PARCELS

Parcel ID #	Address	Current Land Use	Zoned Land Use	Business Name
75-110-2400	11684 219th Ave NW	Commercial	Commercial Reserve Transition	Greenscape Landscaping
75-110-2101	21884 Hwy 169	Agricultural	Agricultural Conservation (ME)	(not applicable)
75-110-2200	(not available)	Commercial	Agricultural Conservation (ME)	Barton Sand and Gravel
75-110-2202	(not available)	Commercial	Agricultural Conservation (ME)	(undeveloped)
75-103-3205	(not available)	Commercial	Agricultural Conservation	(undeveloped)
75-103-3300	(not available)	Commercial	Agricultural Conservation	(undeveloped)
75-110-2100	11631 219th Ave NW	Ag. / Comm.	Commercial Reserve Transition	Rin Tin Tin Kennels

(ME) = Mineral Excavation

TABLE J-9
CSAH 25/19 COMMERCIAL AND AGRICULTURAL PARCELS

Parcel ID #	Address	Current Land Use	Zoned Land Use(1)	Business Name
30-022-2300	25140 Hwy 169	Ag. / Comm.	General Rural	Schmiege's Salvage
30-022-2315	25145 Hwy 169	Res. / Comm.	General Rural	Schmiege's Salvage
30-027-2110	11840 243rd Ave NW	Res. / Comm.	General Rural	Ed's Sales
30-021-1100	25220 Hwy 169	Ag. / Comm.	General Rural	Cracker Box Antiques
30-027-2105	(not available)	Active Agricultural	General Rural	N/A
30-027-2403	24357 Hwy 169	Ag. / Comm / Res.	General Rural	Brionix Racing

N/A: not applicable.
(1)Sherburne County. 2008. Sherburne County Web Site (online). Livonia Township Zoning Map accessed 2008-09-05 at http://www.sherburne.co.mn.us/pubworks/gis/mapindex.htm.

TABLE J-10
CSAH 25/19 RESIDENTIAL PARCELS

Parcel ID #	Address	Current Land Use	Zoned Land Use(1)
30-027-2400	24345 Hwy 169	Ag. / Res.	General Rural
30-022-2320	25110 Hwy 169	Residential	General Rural
30-022-2310	25060 Hwy 169	Residential	General Rural
30-022-2305	25050 Hwy 169	Residential	General Rural

(1)Sherburne County. 2008. Sherburne County Web Site (online). Livonia Township Zoning Map accessed 2008-09-05 at http://www.sherburne.co.mn.us/pubworks/gis/mapindex.htm.

Segment Three: Zimmerman and Northern Livonia Township

TABLE J-11
CSAH 4 COMMERCIAL PARCELS

Parcel ID #	Address	Current Land Use	Zoned Land Use	Business Name
95-009-3408	26229 Fremont Dr	Commercial	Highway Commercial	UBC[(1)]
95-009-3407	26275 Fremont Dr	Commercial	Highway Commercial	Gold's Gym
95-009-4300	12200 Fremont Ln	Commercial	Highway Commercial	Barefoot Driving Range[(2)]

[(1)] One parcel owned by United Building Centers (UBC) would be acquired to accommodate the proposed Highway 169 alignment. It was assumed that acquisition of this parcel would require relocation of the entire UBC operation.
[(2)] The CSAH 4 interchange and frontage road would not require acquisition of the entire parcel. However, anticipated right of way impacts would preclude this parcel from functioning as a golf driving range.

TABLE J-12
CSAH 4 RESIDENTIAL PARCELS

Parcel ID #	Address	Current Land Use	Zoned Land Use
95-414-0705	12392 Fremont Ln	Residential	Residential
95-414-0706	12384 Fremont Ln	Residential	Residential
95-414-0707	(not available)	Residential	Residential
95-414-0710	(not available)	Residential	Residential
95-414-0305	12385 Fremont Ln	Residential	Residential
95-414-0310	12395 Fremont Ln	Residential	Residential
95-414-0315	26329 Terrace Dr	Residential	Residential
95-414-0320	26337 Terrace Dr	Residential	Residential
95-414-0325	26353 Terrace Dr	Residential	Residential
95-414-0110	26305 Fremont Dr	Residential	Residential
95-414-0120	26316 Terrace Dr	Residential	Residential
95-414-0130	26315 Fremont Dr	Residential	Residential
95-414-0150	26333 Fremont Dr	Residential	Residential
95-414-0160	26334 Terrace Dr	Residential	Residential
95-414-0210	26357 Fremont Dr	Residential	Residential
95-414-0220	26374 Terrace Dr	Residential	Residential
95-414-0230	26388 Terrace Dr	Residential	Residential
95-414-0240	26404 Terrace Dr	Residential	Residential
95-414-0260	(not available)	Residential	Residential
95-414-0270	26420 Terrace Dr	Residential	Residential
95-414-0280	26434 Terrace Dr	Residential	Residential