Minnesota Department of Transportation

TH 34 Passing Lanes from Detroit Lakes to Nevis

Environmental Assessment Worksheet

December 2013

ENVIRONMENTAL ASSESSMENT WORKSHEET

This Environmental Assessment Worksheet (EAW) form follows the July 2013 format which is available at the Environmental Quality Board's website at: http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm. The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.

Cumulative potential effects can either be addressed under each applicable EAW Item, or can be addresses collectively under EAW Item 19.

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: TH 34 Passing Lanes from Detroit Lakes to Nevis

2. Proposer: MnDOT

Contact person:	Thomas Lundberg
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3. RGU: MnDOT

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4. Reason for EAW Preparation: (check one)

Required:
☐ EIS Scoping
☒ Mandatory EAW

Discretionary:
☐ Citizen petition
☐ RGU discretion
☐ Proposer initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s):
4410.4300, subpart 22: Highway Projects

5. Project Location:
County: Becker and Hubbard
City/Township: City of Detroit Lakes, Detroit Township, Erie Township, Height of Land Township, Wolf Lake Township, Carsonville Township, Osage Township, Nevis Township, City of Nevis, Mantrap Township, Akeley Township

PLS Location (¼, ¼, Section, Township, Range):

Project Section	Township	Range	Section
1	139N	41W	NW ¼ - SE ¼ 26
2	139N	40W	30, 29
3	139N	40W	SE ¼ - SE ¼ 23, SW ¼ - SW ¼ 24
4	139N	39W	16, 15, 10
5	140N	37W	31, 32, 33
6	140N	36W	21, 22, 27, 28
7	140N	33W	2
8	141N	32W	30, 31

Watershed (81 major watershed scale): Otter Tail River, Crow Wing River

At a minimum attach each of the following to the EAW:

- **County map showing the general location of the project (see Figure 1);**
- **U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable) (see Figure 2a-h); and**
- **Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan (see Figures 3-6).**

6. Project Description:

a. Provide the brief project summary to be published in the *EQB Monitor,* (approximately 50 words).

This project involves constructing improvements to Trunk Highway (TH) 34 at eight locations between Detroit Lakes and Akeley (just east of Nevis) to provide turn lanes and/or passing lanes. The improvements will affect approximately 12 miles of the 57 mile corridor.

b. Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.

TH 34 is a two-lane rural highway that provides the primary east-west route between Detroit Lakes and Walker, Minnesota, a distance of approximately 68 miles. TH 34 has been long-targeted for improvements and has recently received funding authorization through Minnesota's Corridors of Commerce program, which has two major goals: to provide additional highway capacity on segments where there are currently bottlenecks in the system, and to improve the movement of freight and reduce barriers to commerce.

To achieve the Corridors of Commerce goals, this project will provide preliminary and detailed design services for the construction of passing lanes, turning lanes, and intersection improvements at eight designated locations on TH 34 between Detroit Lakes and Akeley (just east of Nevis), Minnesota.

The project includes eight sections of TH 34 as shown in **Figure 1**. The eight sections are located at the following reference points, which relate to the marked mile posts along the highway, with Detroit Lakes starting at approximately Reference Point (RP) 34 and Akeley at approximately RP 93. All work will be performed within existing state right-of-way. The work is planned to be completed during the 2014 construction season.

Section 1	RP: 36.7 to 37.1	Add center left turn lane for CR 141 – minor widening split to both sides of roadway
Section 2	RP: 38.2 to 40.5	Add center left turn for CSAH 29 and widen TH 34 to the south for passing lane
Section 3	RP: 43.2 to 43.8	Remove center depressed median and perpetuate center left turn
Section 4	RP: 47.0 to 48.6	Widen TH 34 to the north and south for passing lanes (4 lanes wide)
Section 5	RP: 58.0 to 59.9	Widen TH 34 to the north for westbound (WB) passing lane, than ½ mile gap, widen to the south for eastbound (EB) passing lane
Section 6	RP: 66.5 to 68.4	Widen TH 34 to the north and south for passing lanes (4 lanes wide)
Section 7	RP: 87.0 to 88.6	Widen TH 34 to the south for WB passing lane
Section 8	RP: 89.9 to 91.5	Widen TH 34 to the south for EB passing lane

Proposed work also includes extending approximately 31 centerline culverts. A few of these culverts may require replacing, or jacking in new culverts depending on existing culvert conditions.

c. Project magnitude:

Table 6-1. Project Magnitude

Total Project Acreage	106.5 acres*
Linear project length	57 miles (12 miles of improvements)
Number and type of residential units	N/A
Commercial building area (in square feet)	N/A
Industrial building area (in square feet)	N/A
Institutional building area (in square feet)	N/A
Other uses – specify (in square feet)	N/A
Structure height(s)	N/A

*area within proposed construction limits only

d. 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.

Freight movements, mobility, and safety are the driving factors behind the need for the passing lanes and the intersection improvements. The heavy commercial freight traffic that uses TH 34 is about 6 percent of the total motor vehicle use. TH 34 is also very heavily used by recreational traffic. It is designated as the Lake Country Scenic Byway which includes a loop up to Itasca State Park along with connections to the Smokey Hills State Forest and the Chippewa National

Forest. The mixed use on the highway, especially during the peak season can result in drivers seeking opportunities to pass slower moving vehicles – and the movements are not always safe. Providing passing opportunities and turning lanes should enhance highway safety and mobility by reducing pressure for traffic to make high-risk passes when traveling behind slower moving vehicles, commercial trucks and recreation traffic. The TH 34 project corridor is presently operating on average several miles per hour below the 55 mph inter-regional corridor target, and this trend will continue to decline as traffic continues to increase. In addition, an excessive crash history at the TH 34/County State Aid Highway (CSAH) 141 intersection exists along with the TH 34/CSAH 29 Intersection, necessitating designated left and right turn lanes to be added to these intersections.

e. Are future stages of this development including development on any other property planned or likely to happen? ☐ Yes ☒ No

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

f. Is this project a subsequent stage of an earlier project? ☐ Yes ☒ No

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

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

Table 7-1. Cover Types

Section		Wetland (acres)	Wood (acres)	Grass (acres)	Crop (acres)	Landscaped (acres)	Impervious (acres)	Wet Ditch (acres)*	Total (acres)
1	Before	0	0	0.8	0	0	3.1	0	3.9
	After	0	0	0.6	0	0	3.3	0	
2	Before	0.1	0	5.9	0	0	13.9	0.2	20.1
	After	0	0	3.1	0	0	16.8	0.2	
3	Before	0	0	1.7	0	0	4.6	0	6.3
	After	0	0	1.2	0	0	5.1	0	
4	Before	0	0.1	13.2	0	0	8.1	0	21.4
	After	0	0	9.8	0	0	11.6	0	
5	Before	0.6	1.0	5.7	0	0	9.2	0	16.5
	After	0	0	4.8	0	0	11.7	0	
6	Before	0	0	10.3	0	0	6.8	0	17.1
	After	0	0	8.8	0	0	8.3	0	
7	Before	0	0	3.5	0	0	5.3	0	8.8
	After	0	0	2.9	0	0	5.9	0	
8	Before	0	0	5.6	0	0	6.8	0	12.4
	After	0	0	3.6	0	0	8.8	0	
Total (acres)	**Before**	**0.7**	**1.1**	**46.7**	**0**	**0**	**57.8**	**0.2**	**106.5****
	After	**0**	**0**	**34.8**	**0**	**0**	**71.5**	**0.2**	

*Roadside ditches will be replaced adjacent to the road improvements.

** Total represents area within proposed construction limits for the eight project sections

8. Permits and approvals required: List all known local, state, and federal permits, approvals, certifications 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.

Table 8-1. Permits and Approvals Required

Permit/Approval Type	Unit of Government	Status
Federal		
Section 404 Permit	U.S. Army Corps of Engineers	To be submitted
State		
EIS Need Decision	Mn/DOT	In Progress
Geometric Layout	Mn/DOT	In Progress
Construction Plans	Mn/DOT	In Progress
Wetland Conservation Act (Replacement Plan)	MnDOT	In Process
Section 401	MPCA	To be submitted
National Pollutant Discharge Elimination System Stormwater Permit Construction Activities	MPCA	In Progress
Section 106 (Historic/Archeological)	Mn/DOT CRU	Complete
Local		
Land alterations, impervious surface, culverts	Pelican River Watershed District	In Progress

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 9-18, or the RGU can address all cumulative potential effects in response to EAW Item No. 19. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 19

9. Land use:

a. Describe:

i. Existing land use of the site as well as areas adjacent to and near the site, including parks, trails, prime or unique farmlands.

Land use adjacent to the project area is variable, including rural residential, agricultural/cultivated, farmsteads and other rural areas, grassland and forest, with some urban and industrial land within the towns and cities. Based on aerial photography, general land uses by project section are summarized in **Table 9-1**.

Table 9-1. Adjacent Existing Land Uses by Project Section

Section	Existing Use(s)
1	Wetlands, urban residential, industrial, forest, grassland
2	Wetlands, grassland, forest, rural residential, farmland
3	Wetlands, grassland, rural residential, forest
4	Farmland, wetland, forest
5	Forest, wetland, farmland, rural residential
6	Rural residential, farmland, forest, grassland, wetland
7	Forest, farmland, rural residential, trail
8	Forest, grassland, rural residential, trail

The proposed roadway improvements will impact existing land uses in the eight designated sections. There may be some access changes which affect distinct parcels, but these would not change the existing land use.

Prime or Unique Farmlands

According to the Natural Resources Conservation Service (NRCS) Web Soil Survey, 19 of the 39 soil types within the study area are classified as prime farmland or farmland of statewide importance. The project will stay within existing highway right-of-way, and will not affect these farmlands.

Parks and Trails

The following trails and publicly owned lands were identified near the project area:

- The Otter Tail River State Water Trail crosses TH 34 approximately ¾ mile west of Section 3 (**Figure 5c**). This trail provides guidance for navigating by water through a system of lakes and rivers and travels along the Otter Tail River, outside this section.
- The east 1,600 feet of Section 5 passes through the Smokey Hills State Forest **(Figure 5e**).
- The Heartland State Trail runs adjacent to Sections 7 & 8 along the north side of TH 34. It is a paved surface, multiple-use trail (**Figures 5g and 5h**).
- Snowmobile trails are allowed within the right-of-way in portions of Sections, 1, 4, 7 and 8, as shown in **Figures 5a, 5d, 5g and 5h**. Other unmarked, locally known trails may also be present

The Otter Tail River Water Trail, Smokey Hills State Forest, and the Heartland State Trail would not be impacted by the proposed improvements. Snowmobile trails that follow ditch bottoms will not be impacted as construction will occur in summer, and any modifications to ditch bottoms (ditch checks; reconstructed ditches) will be designed to allow continued snowmobile use. Ditch checks will have 1:6 slopes and ditch bottoms will be at least eight feet wide. MnDOT staff will coordinate with the DNR area Supervisor prior to the start of construction activities.

Grading for the future expansion of the Heartland State Trail within Section 6 (along the north side) will be included as part of this project to accommodate the planned future expansion of the Heartland State Trail.

ii. Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

Table 9-2. Adjacent Planned Land Uses by Project Section

Section	Planned Use(s)
1	Residential
2	Residential, Undeveloped
3	Commercial
4	Natural Resource Priority Area; Ag Practices and Natural Resource Overlap
5	Ag Practices and Natural Resource Overlap, Public Lands
6	Ag Practices Protection Area, Commercial
7	Unknown*
8	Unknown*

Source: Becker County Comprehensive Plan (2003)
* No comprehensive plan available for Hubbard County

The proposed roadway improvements will not impede future land use plans for the eight designated sections.

iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

General Zoning
Most of the land area surrounding the project area in Becker County (Sections 1 through 6) is placed in the General Agriculture classification. This district is intended to allow suitable areas to be retained in agricultural use and prevent scattered non-farm development. Hubbard County (Sections 7 and 8) does not regulate zoning, except for within shoreland areas.

Shoreland
Both Becker County and Hubbard County have a Shoreland Ordinance consistent with Minnesota DNR rules. Only two DNR waterbodies within the project area have shoreland zones (Section 1-Pelican River and Section 2-Schultz Lake, a Natural Environment Lake). Public roadways are allowed within shoreland zones, provided that specified conditions are met and a conditional use permit is secured. The existing right-of-way will not be expanded in either of these sections.

Floodplain
Only one area of the project crosses a river, Section 1 at the Pelican River. There are no floodplain maps available for the part of the Pelican River that falls within Section 1 (Federal Emergency Management Agency or FEMA maps). There will be no modification to the river banks or culvert at this location. Because the river has been channelized in this location with high banks, no floodplain impacts are expected.

Transportation Designations
MnDOT has designated the TH 34 corridor as an Interregional Corridor, meant to provide transportation service across counties and link the state's regional centers.

b. Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.

The proposed improvements are consistent with the requirements of current zoning and other special district regulations. Specifically, implementing passing lanes and turning lanes would strengthen Highway 34's designation as an Interregional Access Management Corridor by providing more efficient travel and connections to service centers.

The project will not result in a substantial change in land use. Project construction will occur entirely within existing right-of-way along an existing road. Therefore, the project is compatible with nearby land uses, zoning, and plans.

c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 9b above.

Not applicable.

10. Geology, soils and topography/land forms:

a. Geology - Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.

According to GIS data obtained from the DNR online Data Deli, the project area is underlain by Late Archaean landforms consisting primarily of basalt, granite, greywacke, and metavolcanic rock. No sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions were identified within the project area.

b. Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 11.b.ii.

Thirty-nine different soil types are present in the general project area. A portion of the soils within the project area are not suitable for the planned roadway improvements and soil amendments will be required. The construction operations include stripping existing shoulder and topsoil at edge of roadway, and filling along roadway to create new lanes and shoulders, and re-grading slopes in widening areas. Full depth excavation into virgin material is not anticipated for this project. Approximately 88,000 cubic yards of embankment and 83,000 cubic yards of excavation will be required for the improvements (covering 12 miles for the eight sections). Due to the anticipated amount of soil that will need to be hauled away, erosion and sediment control

inspections will include an emphasis on sediment tracking and measures to prevent it. During construction operations, stringent erosion and sediment control practices will be implemented to avoid impacting downstream water bodies.

The steepest slopes within the project area are located within Sections 1 and 2, with 5 percent roadway gradients and 3H:1V side slopes adjacent to roadway ditches in several areas. Two areas (Sections 7 and 8) may have 1: 2 slopes with guard rail, otherwise 1:4 will be used where possible on new slopes, except where needed to minimize wetland impacts.

Temporary stabilization measures such as erosion control blanket will be used on any impacted steep slopes to prevent erosion and sedimentation of ditches during construction. Vegetation establishment will be used to permanently stabilize side slopes, with proposed roadway ditches vegetated based on anticipated runoff velocities.

11. Water Resources:

a. Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.

i. Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.

Nearby streams are identified on **Figure 1**. DNR public waters and public waters wetlands that are present within each Section are labeled on **Figures 3a-q**. Descriptions of these and other nearby resources are described in **Table 11-1**.

Table 11-1. Water Resources

Section	Water Resources
1	TH 34 crosses the Pelican River with an existing 44 inch by 72 inch box culvert; the river is identified as an altered DNR Public Water under county ditch authority (**Figure 3a**).
2	The Struss Wildlife/Waterfowl Production Area is located south of the project area (USGS Topographic Maps, DNR Correspondence). Schultz Lake is located along the north side of Section 2 and Shultz Lake WMA is located north and south of TH 34 (**Figure 5b**).
3	TH 34 crosses the Otter Tail River approximately ¾ mile west of Section 3 (**Figure 5c**).
4	Height of Land Lake, a designated impaired lake, is located approximately 0.3 miles north of Section 4 (**Figure 1**).
5	Wolf Lake, a Site of Biodiversity Significance, is located 1.5 miles south of Section 5 (**Figure 1**).
6	TH 34 crosses the Straight River, a DNR Public Waterway and designated trout stream (impaired stream), approximately ¾ mile west of Section 6.Straight Lake (PWI #10P), a designated impaired lake, is located just north of the river crossing (**Figure 5f**)
7	No DNR water resources are located in or near this section.
8	No DNR water resources are located in or near this section.

No calcareous fens are located within one mile of the project area (DNR Division of Ecological Resources GIS data, 2008).

The project area has the potential to impact up to 13 wetlands and 5 wet roadside ditches, as noted is **Table 11-2** and shown in **Figures 3a-q**. The figures represent the wetlands that are impacted only; the amount of impact is provided in **Table 11-2** due to small impact sizes. Roadside ditches with wetland characteristics are evaluated by the Army Corps of engineers for jurisdiction and are therefore listed here. All wetland impacts are located in Sections 2 and 5, and all identified wet ditches that are impacted are located in Section 2.

Table 11-2. Wetland Impacts by Section

Project Section	Wetland ID	NWI Type	Field Wetland Type	C-39 Type	DNR #	Dominant wetland vegetation	Estimated impact (sq. ft.)
2	27	PEMC	wet meadow, shallow marsh	2, 3	284P	cattail/canary	3,300
2	28	PEMB	wet meadow	2	N/A	canary/phragmites	1,550
5	29	PEMB	wet meadow	2	N/A	cattail/sedge	1,985
5	30	PEMC	wet meadow	2	N/A	sedge	0
5	31	PEMB	wet meadow	2	N/A	sedge	0
5	32	PEMB	wet meadow	2	N/A	sedge	628
5	33	PEM/ SSC	wet meadow, shallow marsh	2, 6	N/A	sedge	355
5	34	PEMC	wet meadow	2	N/A	sedge/cattail	1,222
5	35	PEMC	shallow marsh	3	N/A	cattail	3,380
5	36	PEMC	seasonally flooded	1, 2	N/A	sedge/canary	4,925
5	37	PFO6C	forested	7	N/A	ash/cattail	1,750
5	38	PEMC	shallow marsh	3	N/A	cattail	0
5	39	PEMA	seasonally flooded	1	N/A	canary	1,350
5	40	PEMB	wet meadow, shallow marsh	2, 6	N/A	sedge/cattail	7,200
5	41	PFO6C	tamarack swamp	8	N/A	sedge/alder/tamarack	1,680
5	42	PEMC	wet meadow	2	N/A	sedge	1,030
5	43	PEMB	wet meadow	2	N/A	sedge	0
						Total Wetland Impact	**30,355 (0.7 acres)**
2	D8						1,145
2	D9						1,180
2	D11						350
2	D12						1,970
2	D13						2,750
						Total Wet Ditch Impact	**7,395 (0.2 acres)**

ii. Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

Section 1 of the project area is within the Detroit Lakes Wellhead Protection Area.

Using GIS data from the Minnesota County Well Index, 56 wells were located within ¼ mile of the proposed limits of construction in Becker and Hubbard Counties. The unique well numbers are provided on **Figures 3a-q**.

Groundwater is generally located at least three feet below the lowest existing roadway ditches, and is shallowest where the roadway passes near large wetland area.

b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.

i. Wastewater - For each of the following, describe the sources, quantities, and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.

1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

2) If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system.

3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges.

No impacts to existing wastewater treatment or conveyance systems are anticipated.

ii. Stormwater - Describe the quantity and quality of stormwater runoff at the site prior to and post construction. Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters). Discuss any environmental effects from stormwater discharges. Describe stormwater pollution prevention plans including temporary and permanent runoff controls and potential BMP site locations to manage or treat stormwater runoff. Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction.

The addition of turn and passing lanes will result in a net increase of approximately 13.7 acres in impervious area within the project limits, which will have a direct increase in stormwater runoff. Per the Pelican River Watershed District rules, the project cannot result in increases in stormwater discharge rates to a lake or stream, or to adjoining properties for the 5-year, 25-year, and 100-year 24-hour rainfall events. Section 1 is the only part of the project that drains to

the Pelican River Watershed. To mitigate the runoff increase, check dams will be installed as part of a design for modified roadway ditches to detain the additional runoff volume and to allow for volume reduction via infiltration, where feasible, in conjunction with vegetated swales. These Best Management Practices will provide for the partial removal of phosphorous and total suspended solids to maintain stormwater quality with the increased runoff.

In each Section of the project area, runoff is currently conveyed via vegetated swales with concentrated flow within the right-of-way or via overland flow onto adjacent properties outside of the right-of-way. This conveyance will continue with the proposed improvements, with ditch checks added where necessary to enhance infiltration and minimize runoff.

Section 1 runoff is conveyed to the Pelican River, which is classified as an altered DNR Public Water (within 200 feet). Section 2 contributes runoff to Schultz Lake and several wetlands (within 200 feet). Section 3 drains to the Otter Tail River (within 4,000 feet) Section 4 contributes runoff to Height of Land Lake (within 1,800 feet), while Section 5 drains to Wolf Lake (1.5 miles). Section 6 contributes runoff to Straight Lake and the Straight River (within 4,000 feet). Section 7 and a portion of Section 8 runoff is directed to wooded areas outside of the right-of-way, with the remainder of Section 8 draining to Owl Lake (within 2,000 feet).

iii. Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.

No water appropriation or construction dewatering is anticipated. If localized dewatering is necessary due to high precipitation, the contractor will be required to obtain the necessary permits and implement appropriate sediment control best management practices.

iv. Surface Waters

a) Wetlands - Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed, and identify those probable locations.

The passing and turn lanes will result in up to 0.7 acres of wetland impacts, with all of the wetland impacts occurring in Sections 2 and 5. Wetlands are prevalent along most of the TH 34 corridor and therefore the project was designed to avoid the majority of the wetlands within the right-of-way through careful selection of the passing lane locations. **Figure 7** illustrates the difference in passing lane locations between the 2002 Corridor Study and the

current project. Sections 2, 4, and 8 were shortened and shifted to avoid/minimize wetland impacts. Sections 4 and 6 were shortened and passing lane areas consolidated to avoid wetland impacts. Within Sections 2 and 5, the roadway improvements were aligned and designed to have minimal wetland impacts.

In an effort to further minimize these impacts, slope modifications will be evaluated to minimize wetland impacts while maintaining safety. The impact stated here represents the worst case for evaluation purposes and it is expected to decrease through the use of design modifications. Final wetland impacts and documentation of avoidance and minimization efforts will be included in the required permit review process with the Army Corps of Engineers and other regulatory bodies.

The grading of roadway ditches will cause up to an additional 0.2 acres of impacts to areas with wetland characteristics that will be evaluated by the Army Corps of Engineers. These ditches will be reconstructed and their functions replaced adjacent to the new roadway improvements. Currently, the Corps counts these impacts in determining the type of wetland permit necessary for a project, but does not typically require additional replacement for these ditches as they will be replaced in kind within the project area as part of the project.

Wetland mitigation credits from the same Bank Service Area as the wetland impacts (BSA 4) will be used to compensate for the wetland impacts. Approximately up to 1.4 acres of credits will be withdrawn from available credits in MnDOT's or the Board of Water and Soil Resource's wetland bank depending on credit type and availability at the time of permit application review.

b) Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.

Surface water features such as lakes, streams, and ponds are not anticipated to be physically altered or indirectly impacted with the proposed improvements. No work within the Pelican River is proposed in Section 1; the culvert requires no modifications. Highway drainage ditches located adjacent to the roadway are anticipated to be re-graded in areas of added turn lanes and passing lanes. In these areas, the cross-section of the ditch will be preserved by re-grading a new adjacent ditch within the right-of-way. In order to provide treatment volumes equal to jurisdictional requirements, a portion of existing ditches will be modified to act as Best Management Practices (BMPs) to allow infiltration, where feasible, and retain stormwater to maintain current water runoff volumes and water quality.

Ditches and other waterways that cross under TH 34, may have their culverts extended where to road surface is widened. A few culverts will be replaced (via jacking) or lined. The impacts to these crossings will be minimized through use of erosion control BMP's and by maintaining existing culvert sizes and locations.

No impacts to the number of type of watercraft on any water body are anticipated.

12. Contamination/Hazardous Materials/Wastes:

a. Pre-project site conditions - Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.

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, which also can increase project costs.

According to the Minnesota Pollution Control Agency's (MPCA) "What's In My Neighborhood?" GIS database, there are multiple known contaminated sites along the project corridor. Within approximately 500 feet of the project corridor, five small quantity generators, six tank sites, seven leak sites, and one Petroleum Remediation Program site are mapped. In addition, a permit by rule landfill is mapped just outside of the project corridor; however the location could be within the corridor. Sites within Becker and Hubbard County with poor locations (specifically zip code centroid, county centroid, interpolation other, interpolation unknown, no coordinates, and unknown) sites were identified. In some cases sites were eliminated based on city/township name. In Hubbard County (Nevis or Akeley), three leaks sites and eighteen tank sites have poor locations. There are no other poor location sites within Hubbard County not identified in Nevis or Akeley that were not able to be ruled out. In Becker County (Detroit Lakes), four leak sites, twenty tank sites, and one permit by rule landfill site have poor locations. Within Becker County not listed within Detroit Lakes; four tank sites, one leak site, and one Voluntary Investigation and Cleanup site have poor locations.

MPCA regulatory file reviews are being completed for the project. Potentially contaminated properties will be evaluated to determine if they are likely to be impacted by construction. 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 in accordance with all applicable state and federal regulations.

If previously unknown contaminated materials are encountered during construction, a contingency plan is inplace that requires the Contractor to immediately stop work and notify the Project Engineer. MnDOT's Environmental Consultant will then evaluate the contamination, in consultation with MnDOT, and develop a plan for properly handing and treating contaminated soil and or/groundwater in accordance with all applicable state and federal regulations.

b. Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.

All waste materials will be collected and stored in metal dumpsters. Dumpsters will be emptied as needed and the waste will be hauled offsite and disposed of properly. All sanitary waste shall be collected from the portable units as required by local regulation.

c. Project related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any above or below ground tanks to store petroleum or other materials. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

All hazardous waste materials shall be disposed of in the manner specified by local or state regulation or by the manufacturer. Whenever possible, vehicle refueling and maintenance should not be performed on the construction site. However, any vehicle refueling or maintenance that must take place on the construction site must have proper spill prevention controls in place prior to commencing work. The Contractor's personnel shall be instructed in these practices and the Contractor's Erosion Control Supervisor shall be responsible for seeing that these practices are followed.

d. Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize, or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.

Normal construction wastes are anticipated. Toxic or hazardous materials such as fuel for construction equipment and materials used in the construction of roads (paint, contaminated rags, acids, bases, herbicides, and pesticides) will likely be used during site preparation and road construction. Although spills of these materials are not planned, any spills of reportable quantities that occur will be reported to the Minnesota Duty Officer and the contractor will clean up spilled material according to state requirements.

Toxic or hazardous substances may be used during project construction (petroleum products such as diesel fuel, hydraulic fluid, and chemical products such as sealants).

- Products will be kept in their original containers unless cannot be resealed. Original labels and Material Safety Data Sheets will be retained on site and accessible at all times; they contain important product and safety information. If surplus product must be disposed of, manufacturers' or local and State recommended methods for proper disposal will be followed. An effort will be made to store only enough products required to do the job.
- All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure with secondary containment.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used up before disposing of the container.
- Manufacturers' recommendations for proper use and disposal will be followed.

The Contractor's site superintendent will inspect daily to ensure proper use and disposal of materials onsite.

13. Fish, wildlife, plant communities, and sensitive ecological resources (rare features): Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

Fish
Section 1 of the project area crosses the Pelican River, which is designated as an altered Public Water under county ditch authority. A state-listed threatened fish species was observed in Pelican River in 1975, although no recent sightings have been recorded. The Straight River, a designated Trout Stream, crosses TH 34 approximately ¾ mile west of Section 6.

Wildlife
The Struss Wildlife/Waterfowl Production Area and the Schultz Lake Wildlife Management Area are both located along Section 2 of the project area (USGS Topographic Maps, DNR Correspondence).

Habitat
The project area consists almost entirely of maintained roadside right-of-way but does contain some forested areas, grassland, wetland, and agricultural/cultivated areas, adjacent to residential, farmland and urban/light industrial areas. Roadside right-of-way, residential areas, forest, and open space support wildlife, though the habitat is considered relatively low quality. The eastern bluebird and American kestrel commonly use natural cavities or nest boxes next to grassy roadsides. Other species include game birds, ducks, songbirds, sparrow, robin, rabbits, short-tailed shrew, squirrels and other small rodents, mink, muskrat, badger, red fox, deer, raccoon, and skunk.

Wetland habitats in or near the project area consist primarily of wet meadows, sedge meadows, shallow marshes, seasonally flooded basins, and one large tamarack swamp that may provide habitat for wetland species such as turtles, geese, amphibians, snakes, birds, and some small mammals.

Vegetation
Vegetation related to this project is quite variable ranging from wet to dry sites containing planted landscape vegetation and established roadside turf, as well as wetlands and wooded areas. Natural vegetation communities are present on the outer edges of the right-of-way, including a one dry prairie on the backslope that contains rare plants (just west of Section 6).

a. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-____) and/or correspondence number (ERDB _____) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

Threatened and Endangered Species
According to the official County Distribution of Minnesota's Federally-Listed Threatened, Endangered, Proposed, and Candidate Species list (revised in October 2013), maintained by the Service, neither Becker or Hubbard Counties currently contain known populations of federally-listed species or have designated critical habitat. Both counties are within the distribution range of the Northern long-eared bat (Myotis septentrionalis) which is currently proposed for listing as an endangered species in both project counties (Federal Register October 2, 2013). This is a federal issue and will be addressed by the lead federal agency (ACOE) in their permitting process.

A state-listed threatened fish species was observed in Pelican River in 1975, although no recent sightings have been recorded. A species of special concern has been recorded just west of Section 6 along the south side of the road in a remnant dry prairie. However, extent along the highway was not specified in DNRs NHIS database.

Sensitive Ecological Resources/Vegetation
Natural vegetation communities are present throughout the corridor. A dry prairie was identified along the right-of-way line of the south side of the road at the forested boundary, just west of Section 6.This area is also designated as a Site of Biodiversity Significance by the DNR NHIS database due to the presence of rate plants. Impacts to this area or rare plants are not anticipated.

b. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

Fish
If the identified fish species is still present in the Pelican River, any potential impacts to the state-threated fish are anticipated to be minimal based on no channel modifications being proposed and the minimization and mitigation measures described in section C below. No impacts to the Straight River are anticipated due to distance from the project area.

Wildlife
All work will be conducted within existing state right-of-way. Therefore, no impacts to the Struss Wildlife Protection Area or the Schultz Lake Wildlife Management Area are anticipated.

The project will result in minimal loss of maintained roadside right-of-way, tree cover, and grassland. Based on the minimal extent of the project construction limits, the low quality of existing habitat within the right of way, and the availability of adjacent habitat, impacts to wildlife habitat will be negligible.

Vegetation
Impacts to vegetation will occur at sites requiring culvert repairs/replacements and along stretches of road widening. Anticipated impacts to roadside vegetation are tree removals, impacts to tree root systems as well as impacts to turf and forbs.

- **Section #1** –Impacts to vegetation are anticipated to be minimal.
- **Section #2** –Depending on construction limits, there will be impacts to vegetation along the south roadside. Vegetation consists of natural trees, shrubs and associated plants as well as landscape trees and turf on private properties. Root systems of some trees will likely be impacted.
- **Section #3** – The maintained-turf median will be removed.
- **Section #4** – The possibility of tree impacts throughout Section #4 range from possible to likely on both sides of the road.
- **Section #5** – There is potential for impacts to large, visible trees along both sides of the road.
- **Section #6** - Tree impacts are also possible along both sides of the road.
- **Section 7** – Tree impacts are likely on the south side of the road.
- **Section 8** – Tree impacts are likely on the south side of the road.

Threatened and Endangered Species
Section 7 consultation is a federal requirement and will be addressed through the review of the federal wetland permit. No impacts to rare species are anticipated.

Any potential impacts to the state-threated fish species observed in the Pelican River in 1975 are anticipated to be minimal due to the minimization and mitigation measures described.

Sensitive Ecological Resources
The dry prairie along Section 6 is sensitive to soil disturbance, incidental herbicide exposure, hydrologic alterations, competition from non-native, sod-forming grasses, introduction of weed seeds, and shading by encroaching shrubs. However, due to distance from the project area and the minimization and mitigation strategies described in section C below, impacts to this site are expected to be negligible.

Invasive Species
Spotted knapweed (*Centaurea stoebe*), a noxious weed, was recorded just west of Section 6. It is likely that mowing (haying) and recreational vehicle activities (an ATV trail) have spread this infestation along TH 34 for some distance. Further disturbance in this area is likely to facilitate the spread of spotted knapweed. It is also anticipated that some of the more common noxious weeds (i.e. Canada thistle, spotted knapweed, common tansy and common buckthorn) may be encountered within the area of this project.

c. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to fish, wildlife, plant communities, and sensitive ecological resources.

Fish / Threatened and Endangered Species
Impacts to the Pelican River and fish species will be avoided as no work will be conducted within the stream banks. To avoid indirect impacts to water quality, the project will adhere to stringent erosion prevention and sediment control practices, including following work exclusion dates for non-trout waters (March 15-June 15) as shown in Appendix A.

Wildlife
Areas adjacent to Wildlife Management Areas, such as the Struss Wildlife Protection Area or the Schultz Lake Wildlife Management Area, will be managed to stay free of weeds and will be replanted with a native seed mix that does not conflict with DNR's vegetation management of the area.

Vegetation
To the maximum extent practicable, efforts will be made to protect large, visible hardwoods and conifers that may be considered landmarks, including a white pine at RP 46.4 EB, a white pine at RP 45 WB or the hardwood at RP 45.2 EB. Efforts may include fencing to protect roots.
As construction limits are defined, the presence of, or lack thereof, areas of natural vegetation and/or trees to be protected will be verified. If necessary, vegetation and trees will be protected with fencing. At a minimum, fencing will be placed as close as possible to the construction limits and this fencing will not be removed or crossed by construction activities (Standard Specification 2572.3).

When tree roots are encountered, all root cutting will be done as cleanly as possible and the roots covered immediately to prevent excess drying (Standard Specification 2572.3 A.2). In addition and where practical, supplemental water may be provided to landscape trees in maintained landscapes where root systems are disrupted (Standard Specification 2572.3 A.3).

Areas near or under trees and the remnant prairie at RP 66.4 will not be used as staging areas for parking, equipment or materials.

Sensitive Ecological Resources
The dry prairie site along Section 6 will be protected in accordance with MnDOT Standard Specification 2572.3. All construction activity will be restricted from the area of environmental sensitivity, and all disturbed areas within Section 6 will be revegetated with native vegetation suitable to the local habitat (see Appendix A). Therefore, no impacts to rare plants or Sites of Biodiversity Significance are anticipated.

Invasive Species
To provide better vegetation coverage on the dry soils of Section 6 and to better control spotted knapweed, dry sandy soils will be replanted with seed mix '35-221 Dry General Prairie.'
The following guidelines will help to limit the spread of noxious weeds during the construction phase:

- identify where weeds are present
- prioritize these areas for weed control before construction begins
- prevent movement of soil harboring a strong seed bank (soil under a weed infestation)

- prevent the spread of reproductive weed parts (seed and roots) by cleaning equipment before it is moved from one site to another
- post construction monitor for noxious weeds and control as necessary
- BMPs for construction equipment cleaning before relocation between project sections will be implemented

14. Historic properties: Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

Four buildings that are listed on the National Register of Historic Places were identified within one mile of Section 1 of the project area in Detroit Lakes. These buildings include the Northern Pacific Passenger Depot, the Detroit Lakes Carnegie Library, the Graystone Hotel, and Holmes Block. These buildings are not adjacent to or accessed from the existing TH 34 right of way. No other buildings, structures, sites, objects, or districts were identified near the project area.

The Flat Lake Mounds property in Becker County is listed on the State Register of Historic Places (Minnesota Statues Section 138.664). However, this property is not within the project vicinity.

Correspondence with the Cultural Resources Unit (CRU) of MnDOT's Office of Environmental Services indicates that TH 34 is a historic roadway and that there are historic and archaeological sites near the road in several places. However, these resources were not identified.

Trunk Highway 34 is built on top of a historic roadway and passes through potentially archeological sensitive areas, particularly the section between Detroit Lakes and the south shore of Height of Land Lake, however, this project takes place entirely within existing right of way and will not disturb previously undisturbed ground. CRU determined on December 3, 2013 that the project has no potential to affect properties listed in the State or the National Registers of Historic Places or to affect known or suspected archaeological sites. Therefore, no consultation with the MHS or the OSA is required and the historical/archaeological review is complete. Correspondence from CRU is included in Appendix A.

15. Visual: Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

There are no existing scenic overlooks or views of note within any of the project sections. The project will not create any vapor plumes or intense lighting. Therefore, no mitigation is required.

16. Air:

a. Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants, and any greenhouse gases. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.

Not applicable.

b. Vehicle emissions - Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.

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 and the congestion levels in a given area. The air quality impacts from the project are analyzed by addressing criteria pollutants, a group of common air pollutants regulated by the U.S. Environmental Protection Agency (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. The Federal Highway Administration (FHWA) provides guidance for the assessment of Mobile Source Air Toxic (MSAT) effects for transportation projects in the National Environmental Policy Act (NEPA) process. A qualitative evaluation of MSATs has been performed for this project as documented below. The scope and methods of the analysis performed were developed in collaboration with the Minnesota Department of Transportation (MnDOT) and Minnesota Pollution Control Agency (MPCA).

<u>NAAQS Criteria Pollutants</u>

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 NO_X 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 for ozone and has begun developing a regional ozone modeling effort. Ozone concentrations in the lower atmosphere are influenced by a complex relationship of precursor concentrations, meteorological conditions, and regional influences on background concentrations. MPCA states in *Air Quality in Minnesota: 2013 Report to the Legislature* (January, 2013) that:

> *All areas of Minnesota currently meet the federal ambient 8-hour standard for ozone but Minnesota is at risk for being out of compliance. In 2008, EPA tightened the federal eight-hour ambient air standard for ozone to 75 parts per billion (ppb). EPA plans to propose a revised ozone standard in September 2013, with a final standard planned for 2014. Preliminary documents indicate that EPA believes the scientific evidence on the health impacts of ozone shows that the current ambient standard is insufficient to protect public health. EPA's Clean Air Scientific Advisory Committee has recommended that a new ambient standard be set in the range of 60-70 ppb to ensure public health protection with an adequate margin of safety. In 2010, EPA proposed a revised ozone standard in the range of 60-70 ppb but withdrew the proposal in fall 2011. Many areas of Minnesota would not meet the revised standard if the EPA sets the standard at the lowest end of the advisory committee's recommended range.*

The project is located in an area that has been designated as an unclassifiable/attainment area for ozone. This means that the project area has been identified as a geographic area that meets the national health- based standards for ozone levels, and therefore is exempt from performing further ozone analyses.

Particulate Matter

Particulate matter (PM) is the term for particles and liquid droplets suspended in the air. Particles come in a wide variety of sizes and have been historically assessed based on size, typically measured by the diameter of the particle in micrometers. $PM_{2.5}$ or fine particulate matter refers to particles that are 2.5 micrometers or less in diameter. PM_{10} refers to particulate matter that is 10 micrometers or less in diameter.

Motor vehicles (i.e., cars, trucks, and buses) emit direct PM from their tailpipes, as well as from normal brake and tire wear. Vehicle dust from paved and unpaved roads may be re-entrained, or re-suspended, in the atmosphere. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as sulfur dioxide, nitrogen oxides, and VOCs. $PM_{2.5}$ can penetrate the human respiratory system's natural defenses and damage the respiratory tract when inhaled. Numerous scientific studies have linked particle pollution exposure to a variety of problems, including:

- Premature death in people with heart or lung disease,
- Nonfatal heart attacks,
- Irregular heartbeat,
- Aggravated asthma,
- Decreased lung function, and
- Increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.

Source: http://www.epa.gov/air/particlepollution/health.html

On December 14, 2012, the EPA issued a final rule revising the annual health NAAQS for fine particles ($PM_{2.5}$). The EPA website states:

> *With regard to primary (health-based) standards for fine particles (generally referring to particles less than or equal to 2.5 micrometers (mm) in diameter, $PM_{2.5}$), the EPA is strengthening the annual $PM_{2.5}$ standard by lowering the level to12.0 micrograms per cubic meter ($\mu g/m^3$). The existing annual standard, 15.0$\mu g/m^3$, was set in 1997. The EPA is revising the annual $PM_{2.5}$ standard to 12.0$\mu g/m^3$ so as to provide increased protection against health effects associated with long- and short-term exposures (including premature mortality, increased hospital admissions and emergency department visits, and development of chronic respiratory disease), and to retain the 24-hour $PM_{2.5}$ standard at a level of 35$\mu g/m^3$ (the EPA issued the 24-hour standard in 2006). The EPA is revising the Air Quality Index (AQI) for $PM_{2.5}$ to be consistent with the revised primary $PM_{2.5}$ standards.*
>
> Source: http://www.epa.gov/pm/actions.html

The EPA also retained the existing standards for coarse particle pollution (PM_{10}). The NAAQS 24-hour standard for PM_{10} is 150 $\mu g/m^3$ which is not to be exceeded more than once per year on average over three years.

The Clean Air Act conformity requirements include the assessment of localized air quality impacts of federally-funded or federally-approved transportation projects that are located within $PM_{2.5}$ nonattainment and maintenance areas and deemed to be projects of air quality concern. The project is located in an area that has been designated as an unclassifiable/attainment area for PM. This means that the project area has been identified as a geographic area that meets the national health- based standards for PM levels, and therefore is exempt from performing PM analyses.

Nitrogen dioxide (Nitrogen oxides)

Nitrogen oxides, or NO_X, 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 NO_X are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels. The MPCA's *Air Quality in Minnesota: 2013 Report to the Legislature* (January 2013) indicates that

> *On road gasoline vehicles and diesel vehicles account for 44% of NO_X emissions in Minnesota. In additions to being a precursor to ozone, NO_X can worsen respiratory irritation, and increase risk of premature death from heart or lung disease.*

Nitrogen dioxide (NO_2), which is a form of nitrogen oxide (NO_X), is regularly monitored. Minnesota currently meets federal nitrogen dioxide standards, according to the *2013 Annual*

Air Monitoring Network Plan (July 2012). A monitoring site meets the annual NAAQS for NO_2 if the annual average is less than or equal to 53 parts per billion (ppb). The 2011Minnesota NO_2 monitoring site averages ranged from 5 ppb to 9 ppb; therefore, Minnesota currently meets the annual NAAQS for NO_2."

The EPA's regulatory announcement, EPA420-F-99-051 (December 1999), describes the Tier 2 standards for tailpipe emissions, and states:

> *The new tailpipe standards are set at an average standard of 0.07 grams per mile for nitrogen oxides for all classes of passenger vehicles beginning in 2004. This includes all light-duty trucks, as well as the largest SUVs. Vehicles weighing less than 6000 pounds will be phased-in to this standard between 2004 and 2007.*
>
> *As newer, cleaner cars enter the national fleet, the new tailpipe standards will significantly reduce emissions of nitrogen oxides from vehicles by about 74 percent by 2030. The standards also will reduce emissions by more than 2 million tons per year by 2020 and nearly 3 million tons annually by 2030.*

Within the project area, it is unlikely that NO_2 standards will be approached or exceeded based on the relatively low ambient concentrations of NO_2 in Minnesota and on the long-term trend toward reduction of NO_X emissions. Because of these factors, a specific analysis of NO_2 was not conducted for this project.

Sulfur Dioxide

Sulfur dioxide (SO_2) and other sulfur oxide gases (SO_X) 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 when SO_2 levels increase. Once emitted into the atmosphere, SO_2 can be further oxidized to sulfuric acid, a component of acid rain. Emissions of sulfur oxides from transportation sources are a small component of overall emissions and continue to decline due to the desulphurization of fuels.

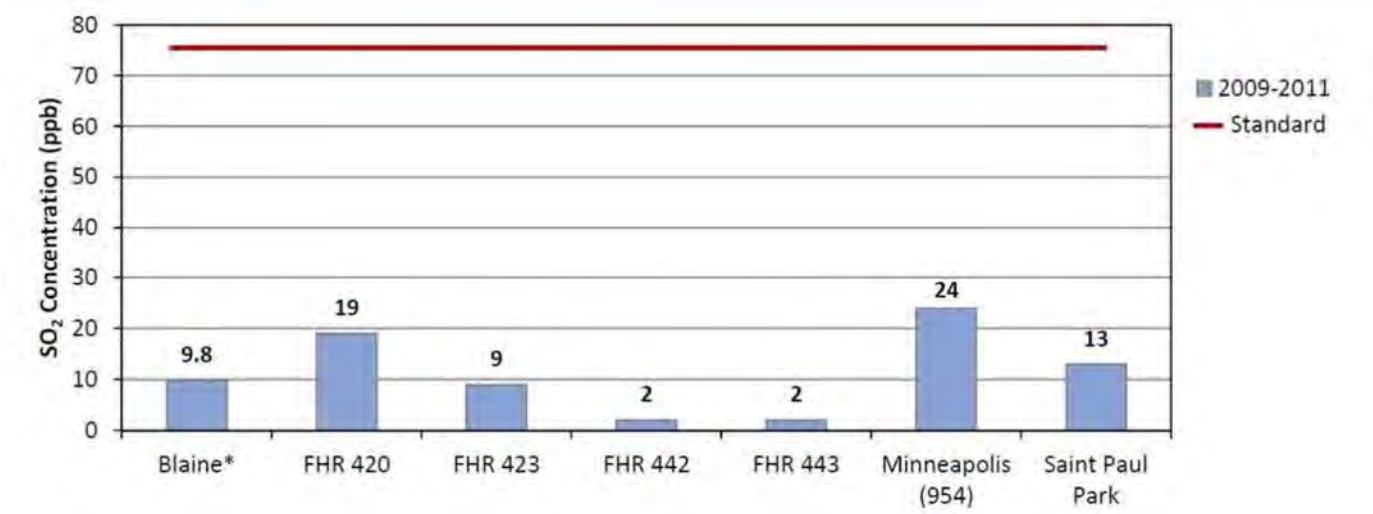
MPCA monitoring shows ambient SO_2 concentrations at 32 percent of federal standards in 2011, in other words consistently below state and federal standards. (Source: *Air Quality in Minnesota: 2013 Report to the Legislature*, January 2013) MPCA also states that about 70 percent of SO_2 released into the air comes from electric power generation. Therefore a much smaller proportion is attributable to on-road mobile sources. The MPCA has concluded that long-term trends in both ambient air concentrations and total SO_2 emissions in Minnesota indicate steady improvement.

In the "*Annual Air Monitoring Network Plan for Minnesota, 2013*", it states the following with regard to SO_2:

> *On June 2, 2010, the EPA finalized revisions to the primary SO_2 NAAQS. EPA established a new 1-hour standard which is met if the three-year average of the annual 99th percentile daily maximum 1-hour SO_2 concentration is less*

than 75 ppb. In addition to creating the new 1-hour standard, the EPA revoked the existing 24-hour and annual standards. Figure 24 [**Figure 16-1** below] *describes the 2009 -2011 average 99th percentile 1-hour SO_2 concentration and compares them to the 1-hour standard. Minnesota averages ranged from 2 ppb at FHR 442 and FHR 443 to 24 ppb in Minneapolis (954); therefore, all Minnesota sites currently meet the1- hour NAAQS for SO_2.*

Figure 16-1. One-Hour SO_2 Concentrations Compared to the NAAQs



* The monitoring site did not meet the minimum completeness criteria for design value calculations. A site meets the completeness requirement if 75% of required sampling days are valid for each calendar quarter included in the design value calculation. SO_2 at Duluth was part of a one year assessment and not intended to collect 3 years of data for design value calculations.

Because of these factors, an analysis for sulfur dioxide 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

This project is not located in an area where conformity requirements apply, and the scope of the project does not indicate that air quality impacts would be expected. Furthermore, the USEPA has approved a screening method to determine which intersections need a CO hotspot analysis. The results of the screening procedure demonstrate that traffic volumes are below the threshold of 79,400 ADT and do not require a detailed hotspot analysis. Therefore, no further air quality analysis is necessary.

Improvements in vehicle technology and in motor fuel regulations continue to result in reductions in vehicle emission rates. The EPA MOVES 2010b emissions model estimates that emission rates will continue to fall from existing rates through year 2030. Consequently, year 2030 vehicle-related CO concentrations in the study area are likely to be lower than

existing concentrations even considering any increase in development-related and background traffic.

Mobile Source Air Toxics

(Source: Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA, December 6, 2012)

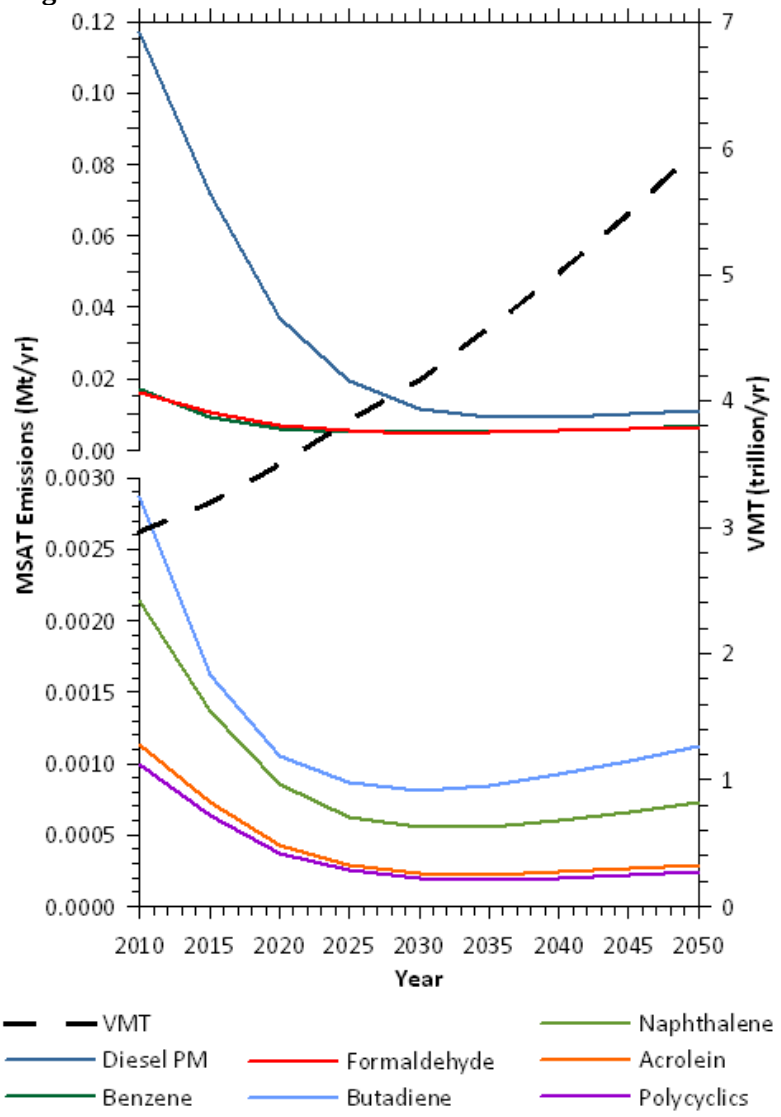
Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://www.epa.gov/iris/). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butidiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

Motor Vehicle Emissions Simulator (MOVES)

According to EPA, MOVES improves upon the previous MOBILE model in several key aspects: MOVES is based on a vast amount of in-use vehicle data collected and analyzed since the latest release of MOBILE, including millions of emissions measurements from light-duty vehicles. Analysis of this data enhanced EPA's understanding of how mobile sources contribute to emissions inventories and the relative effectiveness of various control strategies. In addition, MOVES accounts for the significant effects that vehicle speed and temperature have on PM emissions estimates, whereas MOBILE did not. MOVES2010b includes all air toxic pollutants in NATA that are emitted by mobile sources. EPA has incorporated more recent data into MOVES2010b to update and enhance the quality of MSAT emission estimates. These data reflect advanced emission control technology and modern fuels, plus additional data for older technology vehicles.

Based on an FHWA analysis using EPA's MOVES2010b model, as shown in **Figure 16-2**, even if vehicle-miles travelled (VMT) increases by 102 percent as assumed from 2010 to 2050, a combined reduction of 83 percent in the total annual emissions for the priority MSAT is projected for the same time period.

Figure 16-2. National MSAT Emission Trends 1999 - 2050 for Vehicles Operating on Roadways Using EPA's MOVES2010b Model



Source: EPA MOVES2010b model runs conducted during May - June 2012 by FHWA.
http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/nmsatetrends.cfm

Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.

The implications of MOVES on MSAT emissions estimates compared to MOBILE are: lower estimates of total MSAT emissions; significantly lower benzene emissions; significantly higher diesel PM emissions, especially for lower speeds. Consequently, diesel PM is projected to be the dominant component of the emissions total. (Source: http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/aqintguidmem.cfm)

MSAT Research

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA.

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, we are duly expected by the public and other agencies to address MSAT impacts in our environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this field.

NEPAContext

The NEPA requires, to the fullest extent possible, that the policies, regulations, and laws of the Federal Government be interpreted and administered in accordance with its environmental protection goals. The NEPA also requires Federal agencies to use an interdisciplinary approach in planning and decision-making for any action that adversely impacts the environment. The NEPA requires and FHWA is committed to the examination and avoidance of potential impacts to the natural and human environment when considering approval of proposed transportation projects. In addition to evaluating the potential environmental effects, we must also take into account the need for safe and efficient transportation in reaching a decision that is in the best overall public interest. The FHWA policies and procedures for implementing NEPA are contained in regulation at 23 CFR Part 771.

Incomplete or Unavailable Information for Project Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile Source Air Toxic analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision

framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

Qualitative MSAT Analysis

For the Build Alternative in this EAW, the amount of MSAT emitted would be proportional to the average daily traffic, or ADT, assuming that other variables such as fleet mix are the same. The ADT estimated for the Build Alternative does not differ from that for the No Build Alternative, because the proposed project is intended to improve traffic flow on TH 34 during peak period traffic operation, and not influence regional travel patterns. Since no change in ADT is expected through the project corridor, or along parallel routes, no changes in MSAT emissions are expected compared to the No Build Alternative. There is a potential for lower MSAT emission rates due to increased speeds; according to EPA's MOVES2010b model, emissions of all of the priority MSAT decrease as speed increases. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA- projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The passing lane sections contemplated as part of the project alternative will have the effect of moving some traffic closer to nearby homes schools, and businesses; therefore, under each alternative there may be localized areas where ambient concentrations of MSAT could be higher under the Build Alternative than the No Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the expanded roadway sections that would be built along TH 34. However, the magnitude and the duration of these potential increases compared to the No Build Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. In sum, when a highway is widened, the localized level of MSAT emissions for the Build Alternative could be higher relative to the No Build Alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). 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.

c. Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 16a). Discuss the effect of dust and odors in the vicinity of the project

including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

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 MnDOT specification in place at the time of project construction. After construction is complete, dust levels are anticipated to be minimal because all soil surfaces exposed during construction would be in permanent cover (i.e., paved or re-vegetated areas).

17. Noise: Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

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 logarithmic increase in sound energy relative to a reference energy level. A sound increase of 3 dB is barely perceptible to the human ear, a 5 dB increase is clearly noticeable, and a 10 dB increase is heard twice as loud. For example, if the sound energy is doubled (e.g. the amount of traffic doubles), there is a 3 dB increase in noise, which is just barely noticeable to most people. On the other hand, if traffic increases to where there is 10 times the sound energy level over a reference level, then there is a 10 dB increase and it is heard twice as loud.

For traffic noise, an adjustment, or weighting, of the high and low-pitched sounds is made to approximate the way that an average person hears sounds. The adjusted sound levels are stated in units of "A-weighted decibels" (dBA). 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 hour of the day and/or night that has the highest noise levels. These numbers are identified as the L_{10} and L_{50} levels.

The following chart provides a rough comparison of the noise levels of some common noise sources.

Table 17-1. Decibel Level of Common Noise Sources

Sound Pressure Level (dBA)	Noise Source
140	Jet Engine (at 25 meters)
130	Jet Aircraft (at 100 meters)
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 traffic volume 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 receptor increases. A rule of thumb is that after 50 feet from the noise source, doubling the distance from the noise source will decrease the noise level by 3 dBA on hard surfaces (e.g. concrete and water) and by 4.5 dBA on soft ground (e.g. grass).

State of Minnesota Noise Regulations

State noise standards are for a one-hour period and apply to outdoor areas. The standards are in terms of the L_{10} and L_{50} noise descriptors. The L_{10} is the highest sound level exceeded ten percent of the time or six minutes out of an hour. The L_{50} is the highest sound level exceeded fifty percent of the time or thirty minutes out of an hour.

Table 17-2 provides the Minnesota State Noise Standards for three Noise Area Classifications (NAC), and for daytime, nighttime, L_{10} and L_{50}. The standards for NAC-1 apply to residential areas and other uses intended for overnight sleeping (hotels, motels, mobile homes, etc.). The NAC-1 standards also apply to schools, churches, medical services, and park areas. The nighttime standards differ from the daytime standards only in areas intended for overnight sleeping. The NAC-1 daytime standards apply during nighttime hours at other NAC-1 uses not intended for overnight sleeping.

Table 17-2. Minnesota State Noise Standards

Noise Area Classification	General Land Use Type	Sound Level (dBA)			
		Day (0700-2200)		Night (2200-0700)	
		L_{10}	L_{50}	L_{10}	L_{50}
1	Residential	65	60	55	50
2	Commercial	70	65	70	65
3	Industrial	80	75	80	75

State statutes designate that state noise standards do not apply to:

> "An existing or newly constructed segment of a highway, provided that all reasonably available noise mitigation measures, as approved by the Commissioners of the Minnesota Department of Transportation and Minnesota Pollution Control Agency, are employed to abate noise."

Methodology and Assumptions

As part of the EAW, a detailed noise analysis has been conducted, and a proposed noise mitigation plan prepared. Within the limits of the areas of passing lane construction there are often several closely located noise receptors where noise levels and noise barrier effects vary little with location. In these circumstances the several receptors are grouped as one receptor for the purpose of noise level analysis.

For the purpose of noise analysis and mitigation, only those areas where the construction of passing lanes will cause a change to the existing and future noise levels will be considered for noise impact and mitigation analysis.

Existing (2013) and future noise levels (2034) were modeled using the Federal Highway Administration (FHWA) noise prediction model STAMINA 2.0, as modified for use by MnDOT's MINNNOISEV31 noise prediction model. Noise projections were based on a 2 percent growth rate from 2013 traffic counts, Automated Traffic Recording device (ATR) 221, and 2012 AADT from MnDOT Traffic Mapping Application to 2034 volumes. Truck percentages were based on field data counts during noise measurements and were confirmed to be accurate from Heavy Commercial Vehicle (HCV) data from the Traffic Mapping Application. Nighttime volumes were calculated from the ATR 221 data and Nighttime AADT percentages were assumed to be the same across the entire corridor. Vehicle speeds were assumed to be the posted speed along the corridor (55 mph). No shielding factors were used and ground cover was assumed to be soft ground and an alpha factor of 0.5 was used. The highest noise hour was determined using the ATR 221 data and assumed to be the same along the entire corridor. The hour was determined by looking at the highest volume hour and the highest truck volume hour. The highest daytime noise hour is between 5:00 - 6:00 pm and the highest nighttime hour is between 10:00 – 11:00 pm.

Noise Sensitive Areas

The analysis for this project was broken down into eight Noise Sensitive Areas (NSA) corresponding to the eight construction section locations. **Figures 6a-h** show the eight construction sections.

Section 1

NSA 1 is located just east of Detroit Lakes and consists of 11 receptors (**Figure 6a**). Eight of the 11 receptors represent residential areas and three receptors represent commercial properties. The eight

residential receptors represent approximately 18 residential properties and the three commercial receptors represent approximately five commercial properties. **Table B-1 and B-2** in **Appendix B** show the 11 modeled receptor noise levels in all scenarios. Within NSA 1, seven of the 11 receptors exceeded the Minnesota State Noise Standards thresholds for daytime build and nighttime build conditions. Due to several of the receptors exceeding noise standards, a noise abatement analysis was completed and is further discussed in the section below. Noise abatement measures were modeled in five locations in NSA 1.

Section 2
NSA 2 is located between CSAH 25 and McKenzie Road and consists of 20 receptors (**Figure 6b)**. Nineteen of the receptors represent residential properties that consist of 23 residential buildings. One receptor represents one commercial property. **Tables B-1 and B-2** in **Appendix B** show the 20 modeled receptors in all scenarios. Within NSA 2, 19 of the 20 receptors exceeded Minnesota State Noise Standards for nighttime build conditions and 17 of the 20 receptors exceeded noise standards for build conditions. Noise abatement measures were modeled in 21 locations in NSA 2.

Section 3
NSA 3 is located near CSAH 29 starting 1500 feet west of CSAH 29 and continuing 1500 feet east of CSAH 29 (**Figure 6c).** All eight of the receptors correspond to residential properties and **Tables B-1 and B-2** in **Appendix B** show the eight modeled receptors in all scenarios. Within NSA 3, seven of the eight receptors exceed Minnesota State Noise Standards during the nighttime conditions and four of the eight receptors in the build conditions. Noise abatement measures were modeled in seven locations in NSA 3.

Section 4
NSA 4 is located between CSAH 56 on the west end and SW Height of Land Drive on the east end (**Figure 6d)**. Three of the four receptors are considered to be residential receptors and the other is a cemetery. **Tables B-1 and B-2** in **Appendix B** shows the four modeled receptors in all scenarios. Within NSA 4, two of four receptors exceeded the Minnesota State Noise Standards for nighttime conditions and none of the receptors exceeded daytime thresholds. Noise abatement measures were modeled in four locations in NSA 4.

Section 5
NSA 5 is located near 480th Avenue starting 3000 feet to the west of 480th Avenue and continuing 4500 feett to the east of 480th Avenue (**Figure 6e)**. All five of the receptors are residential receptors. **Tables B-1 and B-2** in **Appendix B** show the five modeled receptors in all scenarios. Within NSA 5, three of the five receptors exceeded Minnesota State Noise Standards during the nighttime conditions and none of the five exceeded noise standards during the daytime conditions. Noise abatement measures were modeled in five locations in NSA 5.

Section 6
NSA 6 is located near Witter Avenue starting 2500 feet and continuing to CSAH 125 (**Figure 6f). Tables B-1 and B-2** in **Appendix B** show the two modeled receptors in all scenarios. Within NSA 6, both receptors exceeded Minnesota Noise Standards in the daytime and nighttime conditions. Noise abatement measures were modeled in five locations in NSA 6.

Section 7
NSA 7 starts approximately 1500 feet east of CSAH 10 and continues to approximately 1200 feet west of 269th Avenue (**Figure 6g)**. All four of the receptors are residential receptors. **Tables B-1 and B-2** in **Appendix B** shows the four modeled receptors in all scenarios. Within NSA 7, two of the four receptors exceeded Minnesota State Noise Standards for the nighttime condition and none of the four exceeded daytime noise standards. Noise abatement measures were modeled in three locations in NSA 7.

Section 8
NSA 8 is located near 285th Avenue starting approximately 2000 feet west of 285th Avenue and continuing up to 285th Avenue (**Figure 6h)**. **Tables B-1 and B-2** in **Appendix B** show the three modeled receptors in all scenarios. Within NSA 8, all three of the receptors exceeded Minnesota State Noise Standards for the nighttime condition and none of the receptors exceeded the daytime thresholds. Noise abatement measures were modeled in five locations in NSA 8.

Future Development Setbacks
Within project limits, noise must be evaluated every 50 feet from the roadway to determine noise levels in areas where undeveloped land has a potential to be developed. Noise was modeled every 50 feet up to 500 feet at all NSA locations. **Tables B-36 and B-37** in **Appendix B** show the results of the analysis. The results are summarized below and identify the minimum distance new residential development can be located adjacent to the roadway and not have traffic noise exceed daytime and nighttime thresholds.

Table 17-3. Minimum Future Development Setbacks to Avoid Traffic Noise Impacts by Section

Location	Daytime (feet)	Nighttime (feet)
Section 1	250	>500
Section 2	200	>500
Section 3	200	500
Section 4	200	500
Section 5	100	300
Section 6	150	500
Section 7	100	400
Section 8	150	350

Heartland State Trail
The Heartland State trail runs along TH 34 starting east of Nevis and continuing west through the project area. Minnesota Noise Standards state that a park or recreational trail is considered NAC-2, therefore the noise standards for L_{10} and L_{50} are 70 dBA and 65 dBA, respectively. Receptor LOC 8-50 located in **Tables B-36 and B-37** in **Appendix B** and **Figure 6g** correspond to the location of the trail with respect to the roadway. The receptor represents a worst-location for the trail, and noise levels are not expected to be higher at other locations of the trail in the project area. At this receptor the L_{10} and L_{50} noise levels were 64.7 dBA and 54.2 dBA, respectively. Neither the L_{10} nor L_{50} noise levels exceed the state standards, so noise abatement treatments were not considered at any locations along the trail.

Noise Abatement Analysis
Noise barrier construction decisions are based on a process of evaluating feasibility and reasonableness. Feasibility is determined by the physical and/or engineering constraints and the acoustic ability of the

wall. There are three reasonableness factors that must be met in order for a noise wall to be considered feasible and reasonable:

1. A noise reduction of at least 7 dBA must be achieved at one receptor behind each potential wall.
2. A cost effectiveness calculation must be completed using the following criteria:
    a. Each benefitted receptor (i.e. a reduction of 5 dBA or more) behind the wall contributes $43,500 to the total maximum cost of the wall. The total cost of the wall is calculated at $20 per square foot.
    b. Additional items such as rub rail, guard rail, purchased right-of-way, etc. must be included in the cost estimate of a proposed noise wall.
3. The viewpoints of the property owners and residents of all benefitted receptors shall be solicited and considered in reaching a decision on the abatement measures to be provided. See Section 5.3.3 of the MnDOT Noise policy (effective date: June 1st, 2011) for a detailed explanation of the voting system. A simple majority (greater than 50 percent) of all possible voting points (not just the ones that reply) for each potential noise abatement measure must vote "down" the abatement measure to remove it from future consideration.

There are several steps in the process of evaluating a noise wall. First the cost-effective noise wall height is determined for each segment of the project area. For this study, three heights were analyzed at all potential wall locations, 20, 15, and 10 feet. If a 20 foot noise wall meets the criteria listed above then the wall is considered to be feasible and reasonable and no other action is taken or required. If the 20 foot wall does not meet the criteria, then a 15 foot high wall is analyzed in the same process as the 20 foot wall. If the 15 foot wall does not meet the criteria, then a 10 foot wall is analyzed using the same criteria as the 20 and 15 foot walls. If none of the heights meet the criteria then the potential noise wall is removed from further consideration.

Noise walls were evaluated at all locations along the proposed project areas where future L_{10} and L_{50} values exceeded either the nighttime or daytime noise standards. The modeled walls were then evaluated for noise level reductions that are at least 7 dBA at any receptor. The walls that did not receive a 7 dBA reduction at a receptor behind the wall were removed from future consideration. These walls are listed below:

- Walls 1.5 and 1.6
- Walls 2.4-2.7
- Walls 2.8 and 2.9
- Wall 2.13
- Walls 2.17-2.19
- Wall 2.21
- Walls 2.24 and 2.25
- Walls 3.1-3.7
- Walls 4.1 and 4.2
- Walls 5.3 and 5.4
- Walls 6.1-6.5
- Walls 7.2, 7.5 and 7.6
- Walls 8.2-8.7

Once walls that did not achieve a 7 dBA reduction were removed from consideration, the remaining walls were analyzed for cost effectiveness. The walls that were not considered to be cost effective based on the criteria above were removed from consideration. These walls are listed below:

- Walls 1.2-1.4
- Walls 2.1-2.3
- Walls 2.11 and 2.12
- Walls 2.14-2.16
- Walls 2.22 and 2.23
- Wall 2.26
- Wall 3.8
- Walls 4.3 and 4.4
- Walls 5.1 and 5.2
- Wall 5.7

The cost-effective calculations are in **Tables B-3 – B-35** in **Appendix B**.

Noise wall 1.1 located in NSA 1 on the north side of TH 34 is the only wall to meet both monetary and acoustic criteria. Noise wall 1.1 is approximately 1,045 feet long, and is proposed for construction at a height of 16 feet. The 16-foot high wall provides a 7 decibel or more reduction at 2 receptors corresponding to 4 benefitted receivers and a 5 decibel reduction at 4 receptors corresponding to 8 benefitted receivers. The total cost of wall 1.1 at 16 feet high is $418,000 not including right-of-way acquisition and other associated costs; it only includes the $20 per square foot calculation outline in the noise policy. The cost-effectiveness of wall 1.1 is $41,800 per benefitted receptor.
Wall 1.1 was also analyzed and calculated at other heights. At 20 feet high there are 8 benefitted receivers. The total cost of the wall is $418,000 at a cost of $52,250 per benefitted receiver. Since the cost per benefitted receiver exceeds the threshold of $43,500, the barrier is therefore not cost-effective, and is not proposed.

At a height of 18 feet, Wall 1.1 is not modeled because the number of benefitted receivers for both a 20-foot and 16-foot high wall has been found to be eight. Therefore, other heights between 16- and 20-foot heights will also have eight benefitted receivers. With the same number of benefitted receivers, the cost-effectiveness of wall heights of 19, 18, and 17 feet exceed the cost-effectiveness criteria. Therefore, no walls between heights of 18 through 17 feet high are proposed for construction as part of the project.

Minnesota noise policy states that all reasonably available mitigation measures are to be included in a project that has noise impacts. Under this description, MnDOT proposes the longest and tallest wall that is reasonable and feasible, which meets the description of “all reasonably available mitigation measures.” Therefore, a 16’ high wall is proposed as part of the project.

At a height of 14 feet, Wall 1.1 provides a 7 decibel or more reduction at 1 receptor corresponding to 2 benefitted receivers and a 5 decibel reduction at 3 receptors corresponding to 7 benefitted receivers. The total cost of wall 1.1 at 14 feet high is $292,600 not including right-of-way acquisition and other associated costs; it only includes the $20 per square foot calculation outline in the noise policy. The cost-effectiveness of wall 1.1 is $41,800 per benefitted receptor. However, this wall is not proposed for construction as part of the project since the 16-foot high wall has been proposed.

Wall heights lower than 14 feet do not meet the cost-effectiveness criteria and are not proposed for construction as part of the project.

Since Wall 1.1 was found to be reasonable and feasible at 16-feet high, it is proposed for construction as part of the project.

Construction Noise
The construction activities associated with implementation of the proposed project will 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 17-4**) shows peak noise levels monitored at 50 feet from various types of construction equipment. This equipment is primarily associated with site grading/site preparation, which is generally the roadway construction phase associated with the greatest noise levels.

Table17-4. 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

Elevated noise levels are, to a degree, unavoidable for this type of project. MnDOT will require that construction equipment be properly muffled and in proper working order. While MnDOT and its contractor(s) are exempt from local noise ordinances, it is the practice to require contractor(s) to comply with applicable local noise restrictions and ordinances to the extent that is reasonable. Advanced notice will be provided to affected communities of any planned abnormally loud construction activities. It is anticipated that night construction will not be required to minimize traffic impacts and to improve safety. However, construction will be limited to daytime hours as much as possible. This project is expected to be under construction for approximately 20 months.

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 any 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 17-4**, it is limited in duration to the activities noted above (e.g., bridge construction). The use of pile drivers, jack hammers, and pavement sawing equipment will be prohibited during nighttime hours.

Noise Conclusions
In general, the construction of passing lanes on TH 34 will increase the noise levels in the area. The existing noise levels in many of the project areas already exceed state standards, and the data shows that most areas in the future build year will continue to exceed standards. Noise walls were modeled along

most of the corridor to try to decrease future noise levels, however all but one wall was not cost effective. Noise levels will range from a -1.0 to 2.8 dBA decrease/increase in the future build year compared to existing noise levels. This increase will be small considering the human ear can only perceive a 3 decibel difference.

Cost effectiveness of noise barriers were calculated at all locations that were warranted along the corridor and only one wall was cost effective and feasible. Wall 1.1 is proposed at a length of 1,045 feet and a height of 16- feet tall. Final mitigation decisions and voting will be subject to input from the affected property owners and final design considerations.

18. Transportation

a. Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.

The purpose of this traffic analysis is to discuss the current and future AADTs along the corridor and to discuss any existing and future safety concerns. Existing AADT numbers were gathered from MnDOT's traffic mapping application. Crash reports and crash history were received from MnDOT and gathered from the crash application. The capacity was determined using the steps outlined in the Highway Capacity Manual (HCM) for uninterrupted flow on a rural two-lane highway.

AADT

The existing AADT was determined from information received from MnDOT for all eight locations. The future AADT was found by growing the existing AADT by 2 percent a year to account for a steady increase in volume and for any potential development that might happen along the corridor. The existing and future AADTs are summarized below in **Table 18-1**.

Table 18-1. Existing and Future AADT

Location	Existing AADT	Future AADT
1	7,250	10,774
2	6,575	9,770
3	4,375	6,501
4	3,250	4,830
5	2,400	3,566
6	3,500	5,201
7	2,850	4,235
8	2,850	4,235

Crash History

A crash history analysis was completed for the most recently available five years. A crash history search was conducted for the years of 2008-2013. Over the five-year span, one fatality was recorded throughout all eight locations. No severity level A crashes were reported, 14 severity B crashes were reported, 25 severity C crashes were reported, and 66 property damage only crashes were reported. A total of 106 crashes were reported over the last five years. A cost benefit

analysis completed for the project summarizes the total crash value over the last five years for these 106 crashes and the overall cost of the project and the proposed reduction in crash rates over the project corridor.

Capacity
Existing and future capacity was calculated for the project area using the methodology in the HCM 2010. The values are summarized in **Table 18-2**.

Table 18-2. HCM Capacity Data

Direction	Existing	Build
One way	1200 pcphln*	1300 pcphln
Two way	2400 pcphln	2600 pcphln

*passenger cars per hour per lane

b. Discuss the effect 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.

Providing the proposed passing opportunities and turning lanes should enhance highway safety and mobility by reducing pressure for traffic to make high-risk passes when traveling behind slower moving vehicles, commercial trucks and recreation traffic. The TH 34 project corridor is presently operating on average several miles per hour below the 55 mph inter-regional corridor target, and this trend will continue to decline as traffic continues to increase. In addition, an excessive crash history at the TH 34/CSAH 141 intersection exists along with the TH 34/CSAH 29 Intersection, necessitating designated left and right turn lanes to be added to these intersections.

This project is not designed to increase highway capacity.

c. Identify measures that will be taken to minimize or mitigate project related transportation effects.

Not applicable

19. Cumulative potential effects: (Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

a. Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

Cumulative effects are defined as "the impact on the environment which result from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency or persons undertakes such actions." The geographic area considered are those areas directly adjacent to TH 34 and near the project sections, and the timeframe of the next few years. The project impacts described herein for the TH 34 project

include impacts to increased impervious surfaces and therefore increased stormwater runoff, potential affects to wetlands, and increased traffic noise.

b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

The proposed project presents opportunities to improve existing conditions or mitigate potential impacts. Required stormwater management techniques will be implemented to reduce impacts of increased impervious surface and remove pollutants. It is the intent of this project to design and construct stormwater featurese to meet the requirements of the Pelican River Watershed. Any potential wetland impacts associated with this project will be mitigated through in-kind replacement and wetland bank credits.

Any present or future development projects are required to go through local development review process. The potential cumulative effect of impacts would be mitigated by each project. Wetland impacts and stormwater management techniques are required to meet City, State, and Federal regulations. Therefore, no cumulative effects are anticipated as a result of project specific mitigation being implemented.

c. Discuss 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 these cumulative effects.

Not applicable.

20. Other potential environmental effects: If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

Cost-Effectiveness Analysis
The cost-effectiveness analysis revealed that the project alternative selected yields a benefit to cost ratio of 1.40. The passing lanes alternative is considered cost-effective since the present value of benefits exceed the present value of costs of implementing the project. The full analysis is available from the district project manager.

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 9c and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature _____ Date December 16, 2013

Title Chief Environmental Officer

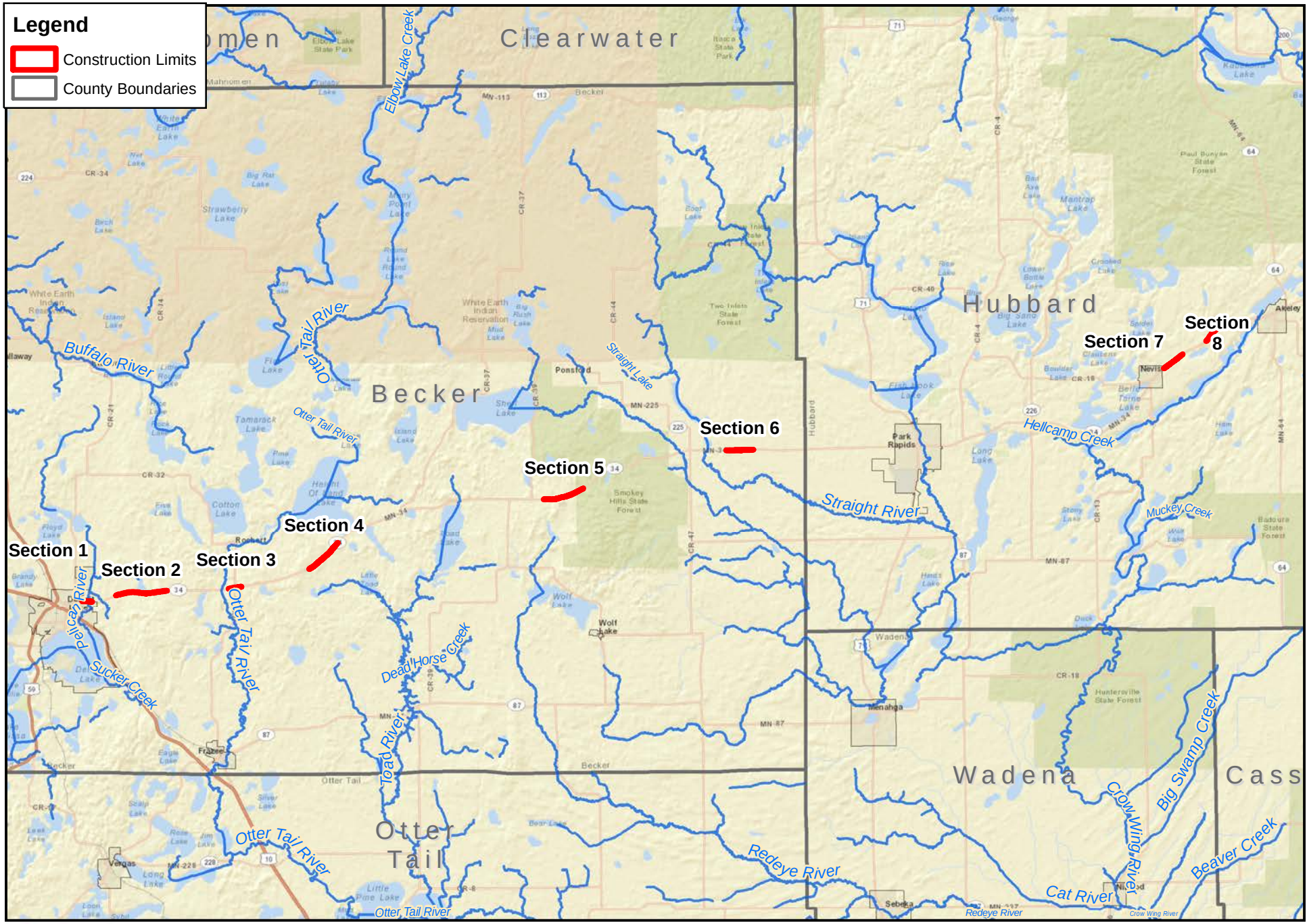


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Figure 1. Project Location
Becker and Hubbard Counties
TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

Construction Limits

Pelican

Sucker

1357

1360

26

34

Detroit Lakes

Tr Pk

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NORTH

0 0.125 0.25 0.5 Miles

Figure 2a. USGS 7.5 MinuteTopographic Map Section 1

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

Construction Limits

Schultz Lake

NATIONAL WATERFOWL PRODUCTION AREA

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NORTH 0 0.25 0.5 1 Miles

Figure 2b. USGS 7.5 MinuteTopographic Map Section 2

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

Construction Limits

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NORTH 0 0.125 0.25 0.5 Miles

Figure 2c. USGS 7.5 MinuteTopographic Map Section 3

TH 34 Passing Lanes: Environmental Assessment Worksheet

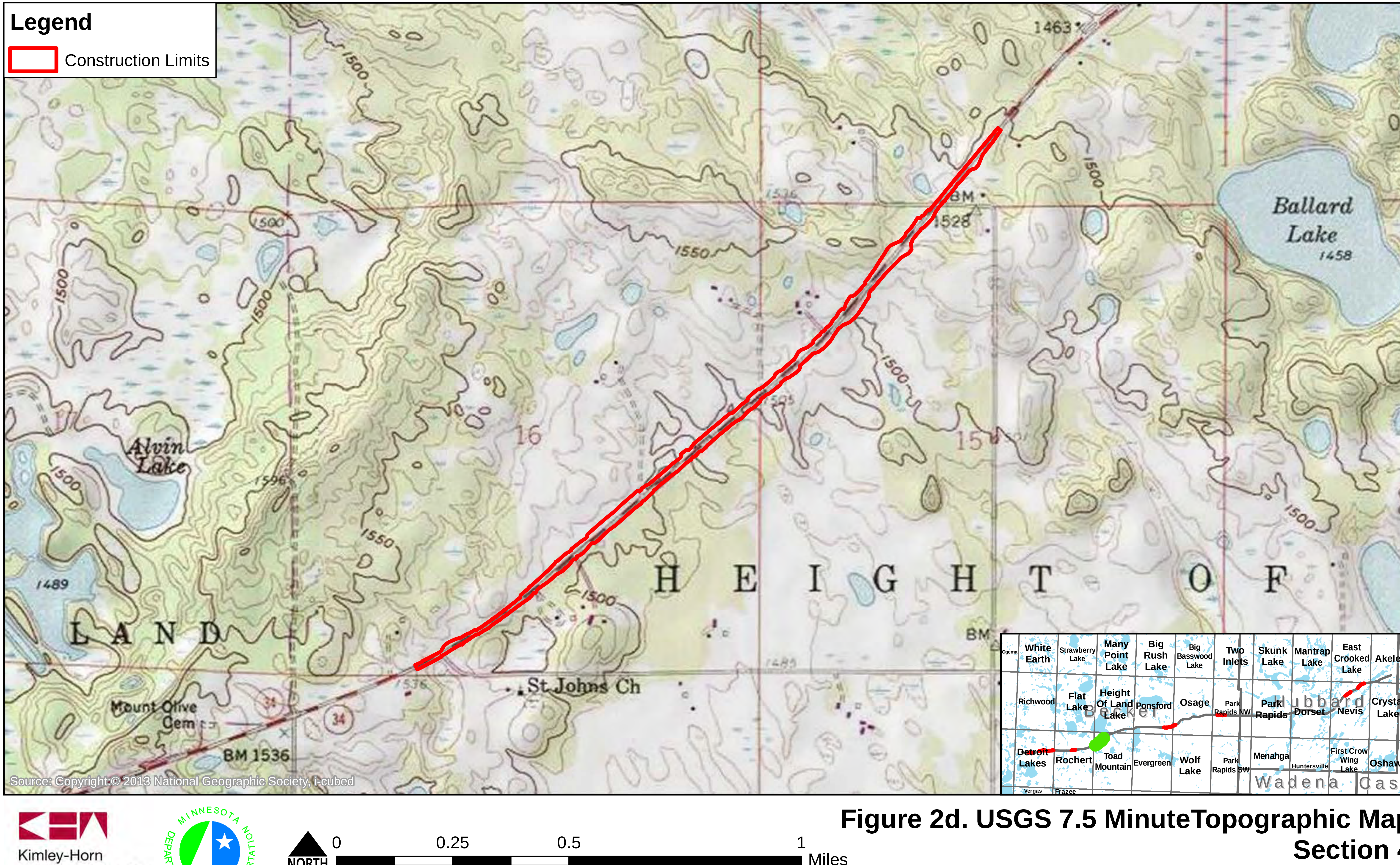

Figure 2d. USGS 7.5 MinuteTopographic Map Section 4

TH 34 Passing Lanes: Environmental Assessment Worksheet

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Legend

Construction Limits

FOREST BOUNDARY

Gravel Pits

Snellman

Snellman Cem

BM

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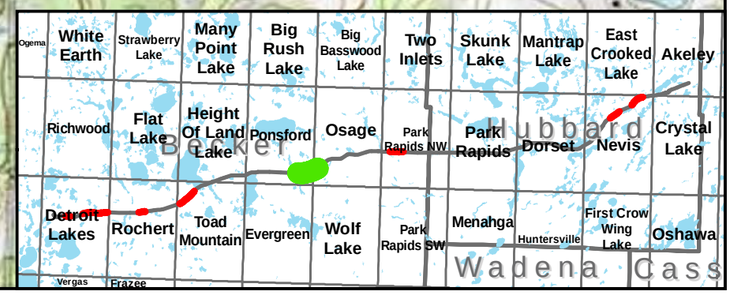

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NORTH 0 0.25 0.5 1 Miles

Figure 2e. USGS 7.5 MinuteTopographic Map Section 5

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

Construction Limits

Straight Lake

Valines Lake

BM 1483

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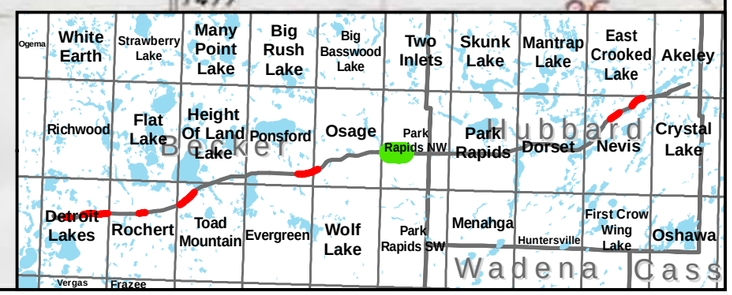

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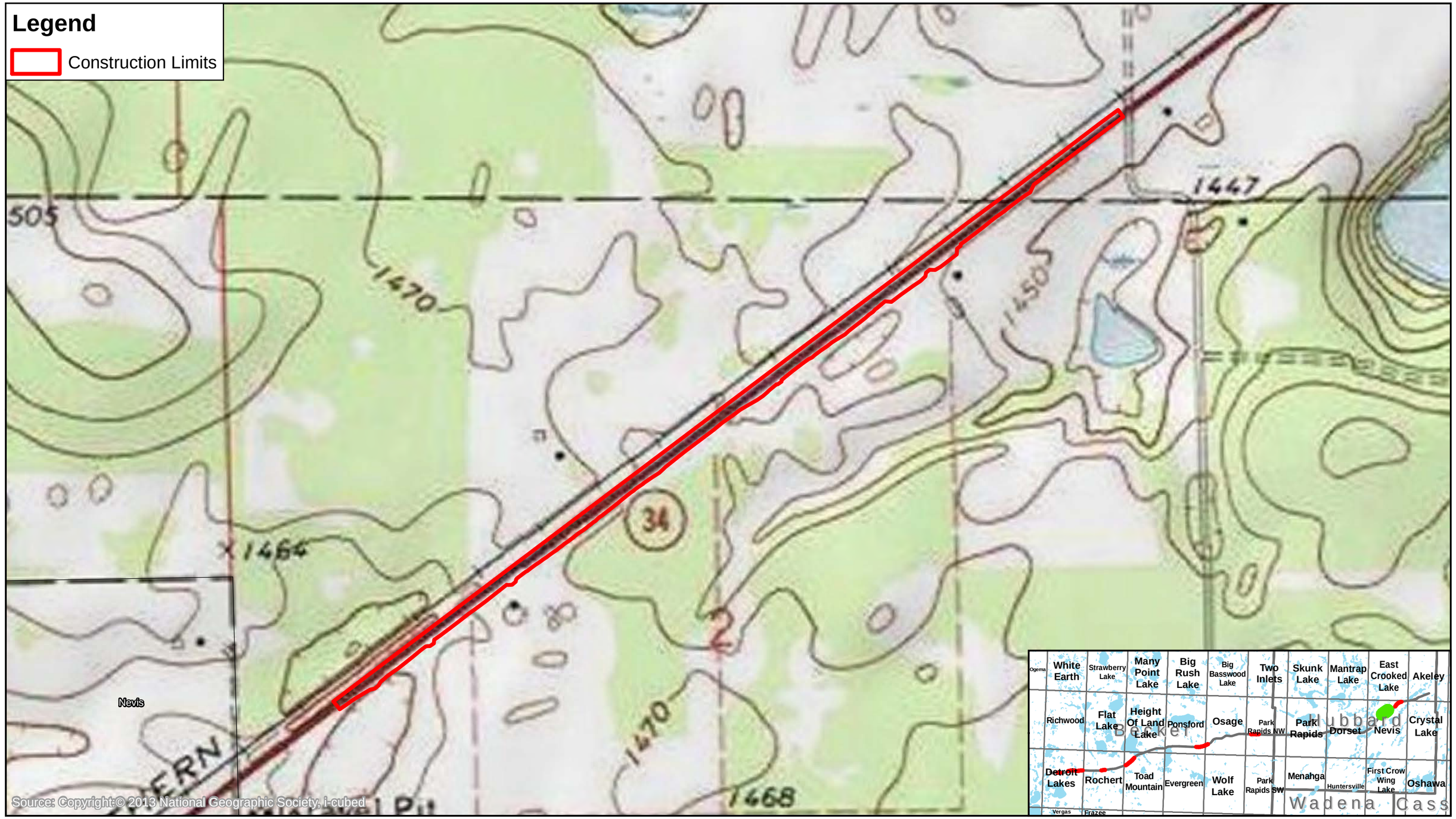
NORTH 0 0.25 0.5 1 Miles

Figure 2f. USGS 7.5 MinuteTopographic Map Section 6

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

Construction Limits



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NORTH 0 0.125 0.25 0.5 Miles

Figure 2g. USGS 7.5 MinuteTopographic Map Section 7

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

Construction Limits

1454

1500

BURLINGTON

Gravel Pit

1474

1467

1460

A K E L E

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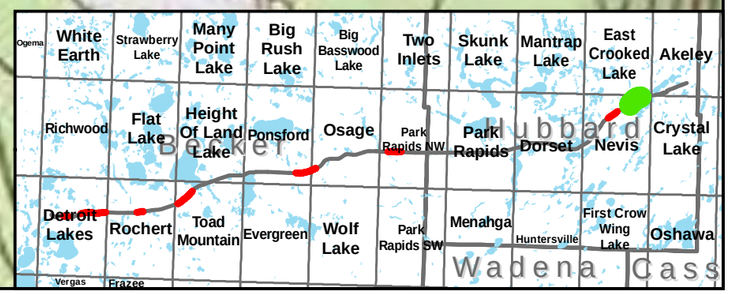

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NORTH

0 0.125 0.25 0.5 Miles

Figure 2h. USGS 7.5 MinuteTopographic Map Section 8

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

- Construction Limits
- County Well Inventory
- PWI Watercourses

MnDOT Surveyed Wetlands

- Impacted Wetlands
- Unimpacted Wetlands

*See Table 11-2 for Impact Acreage

NWI Wetland Types

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland

00196695
W22
W22a
W23
W23a
D6
00495568
00106136
00132316
Pelican River

Source: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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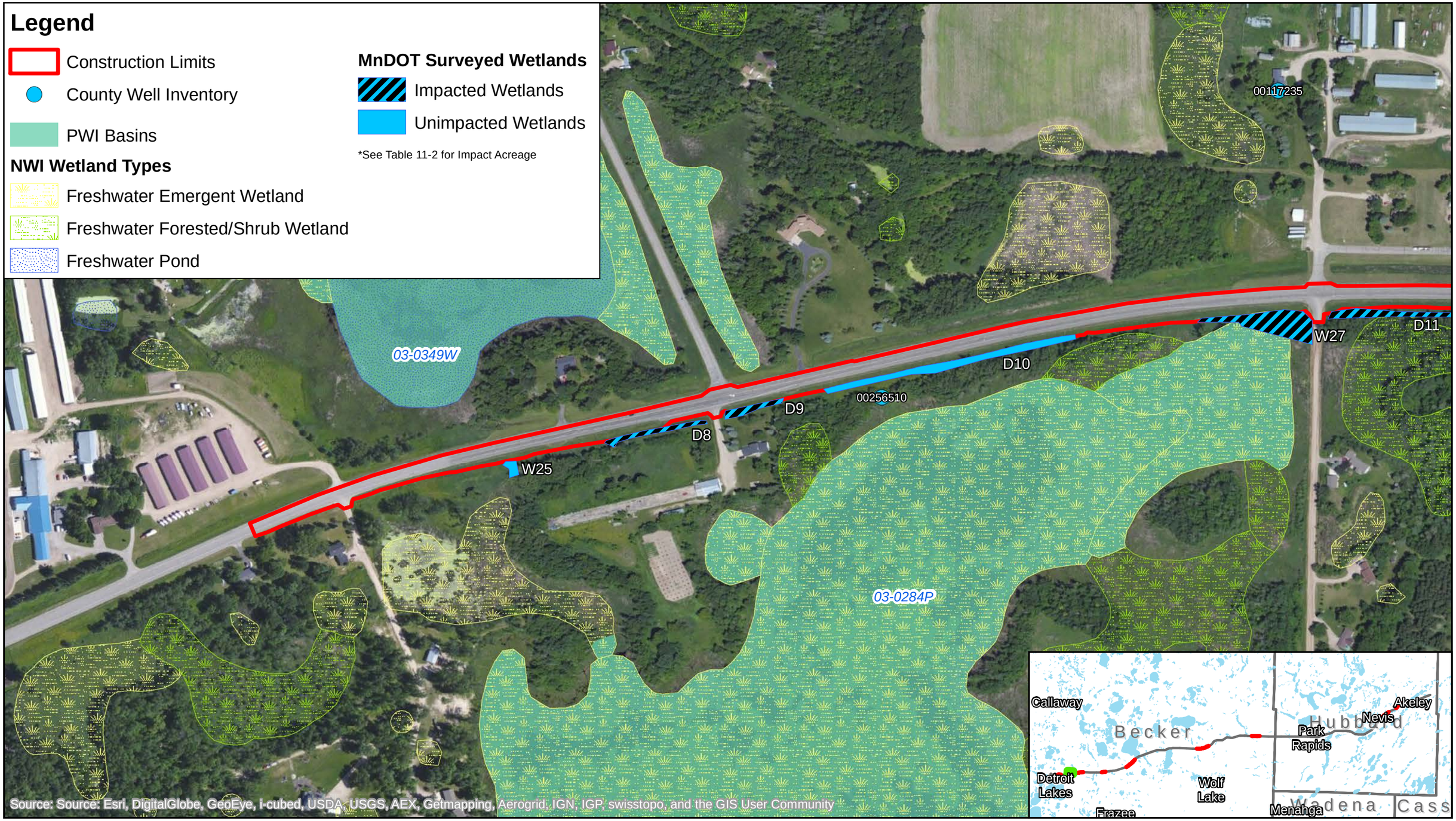
NORTH 0 400 800 1600 Feet

Figure 3a. Water Resources Section 1

TH 34 Passing Lanes: Environmental Assessment Worksheet



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NORTH 0 400 800 1600 Feet

Figure 3b. Water Resources Section 2

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

- Construction Limits
- County Well Inventory
- PWI Basins

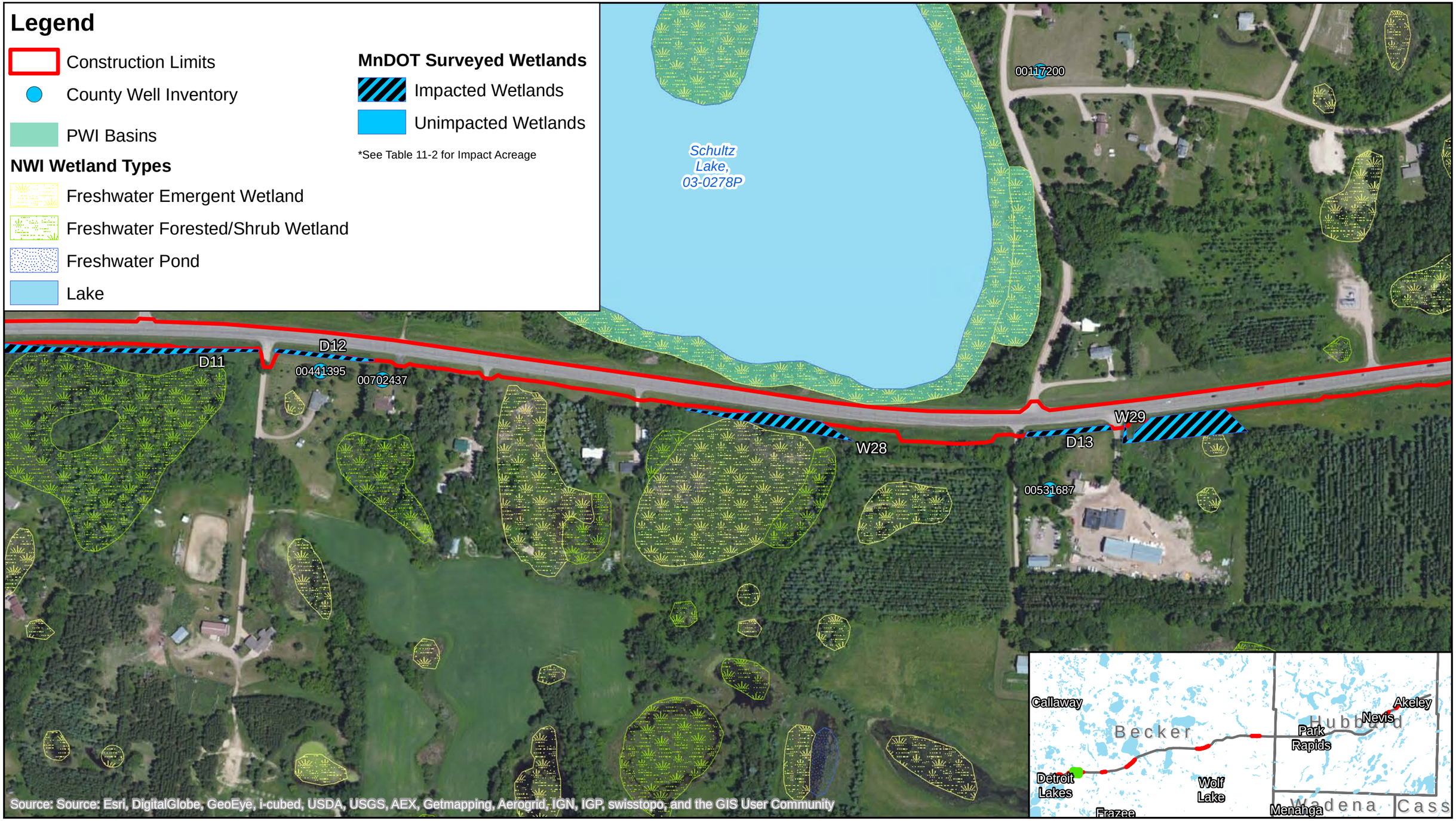
NWI Wetland Types

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake

MnDOT Surveyed Wetlands

- Impacted Wetlands
- Unimpacted Wetlands

*See Table 11-2 for Impact Acreage



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NORTH 0 400 800 1600 Feet

Figure 3c. Water Resources Section 2

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

- Construction Limits
- County Well Inventory

NWI Wetland Types

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

MnDOT Surveyed Wetlands

- Impacted Wetlands
- Unimpacted Wetlands

*See Table 11-2 for Impact Acreage

00530761
00100869
00467781
00166102
W30a
W30b

Source: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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NORTH 0 400 800 1600 Feet

Figure 3d. Water Resources Section 2

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

- Construction Limits
- County Well Inventory
- PWI Watercourses

NWI Wetland Types

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

MnDOT Surveyed Wetlands*

- Impacted Wetlands
- Unimpacted Wetlands

*See Table 11-2 for Impact Acreage

00765485
00765483
00765487
00329574
00765484
00765481
00768266
00765482
00166374
00765491
00765489
00765493
W1
00117262
00765488
00328595
00765490
00769448
00765492
00473211
00768315
00649776
00516201

Source: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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NORTH 0 395 790 1580 Feet

Figure 3e. Water Resources Section 3

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

- Construction Limits
- County Well Inventory

NWI Wetland Types

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

MnDOT Surveyed Wetlands

- Impacted Wetlands
- Unimpacted Wetlands

*See Table 11-2 for Impact Acreage

00564909

00464830

00505853

Source: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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NORTH

0 400 800 1600 Feet

Figure 3f. Water Resources Section 4

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

- Construction Limits
- County Well Inventory

NWI Wetland Types

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

MnDOT Surveyed Wetlands

- Impacted Wetlands
- Unimpacted Wetlands

*See Table 11-2 for Impact Acreage

00117221

00121848

Source: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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NORTH 0 400 800 1600 Feet

Figure 3g. Water Resources Section 4

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

Construction Limits

County Well Inventory

NWI Wetland Types

Freshwater Emergent Wetland

Freshwater Forested/Shrub Wetland

Freshwater Pond

MnDOT Surveyed Wetlands

Impacted Wetlands

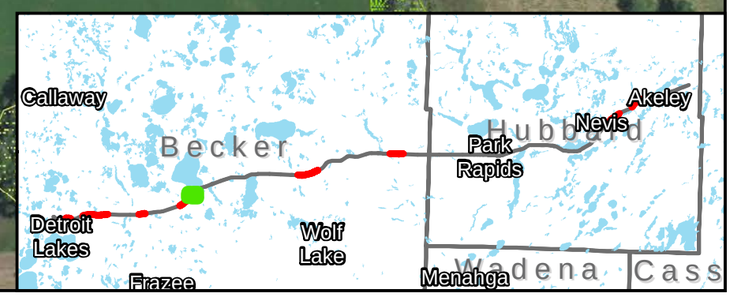
Unimpacted Wetlands

*See Table 11-2 for Impact Acreage

00426138

00117221

Source: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



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NORTH 0 400 800 1600 Feet

Figure 3h. Water Resources Section 4

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

- Construction Limits
- County Well Inventory

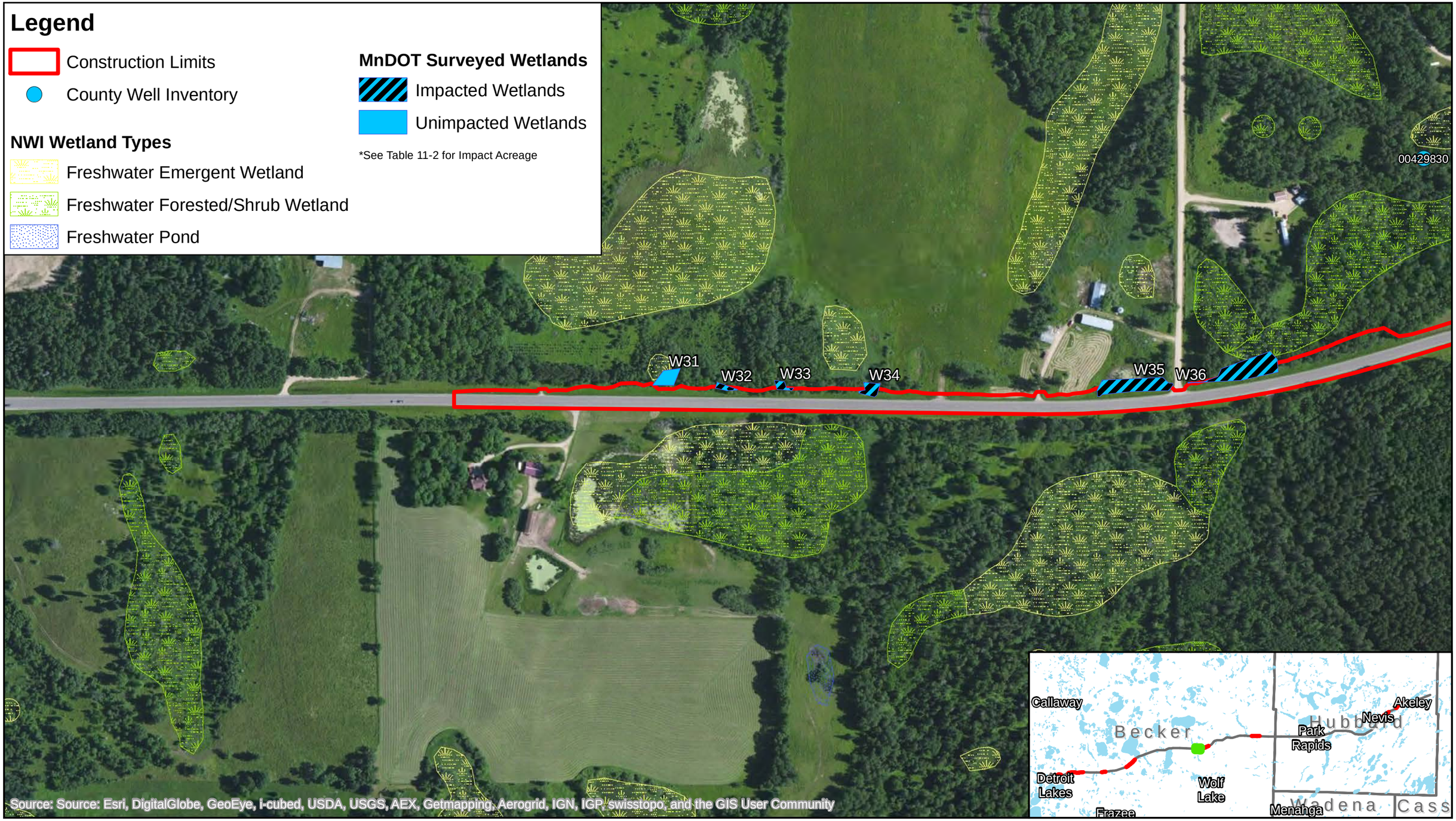
NWI Wetland Types

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

MnDOT Surveyed Wetlands

- Impacted Wetlands
- Unimpacted Wetlands

*See Table 11-2 for Impact Acreage



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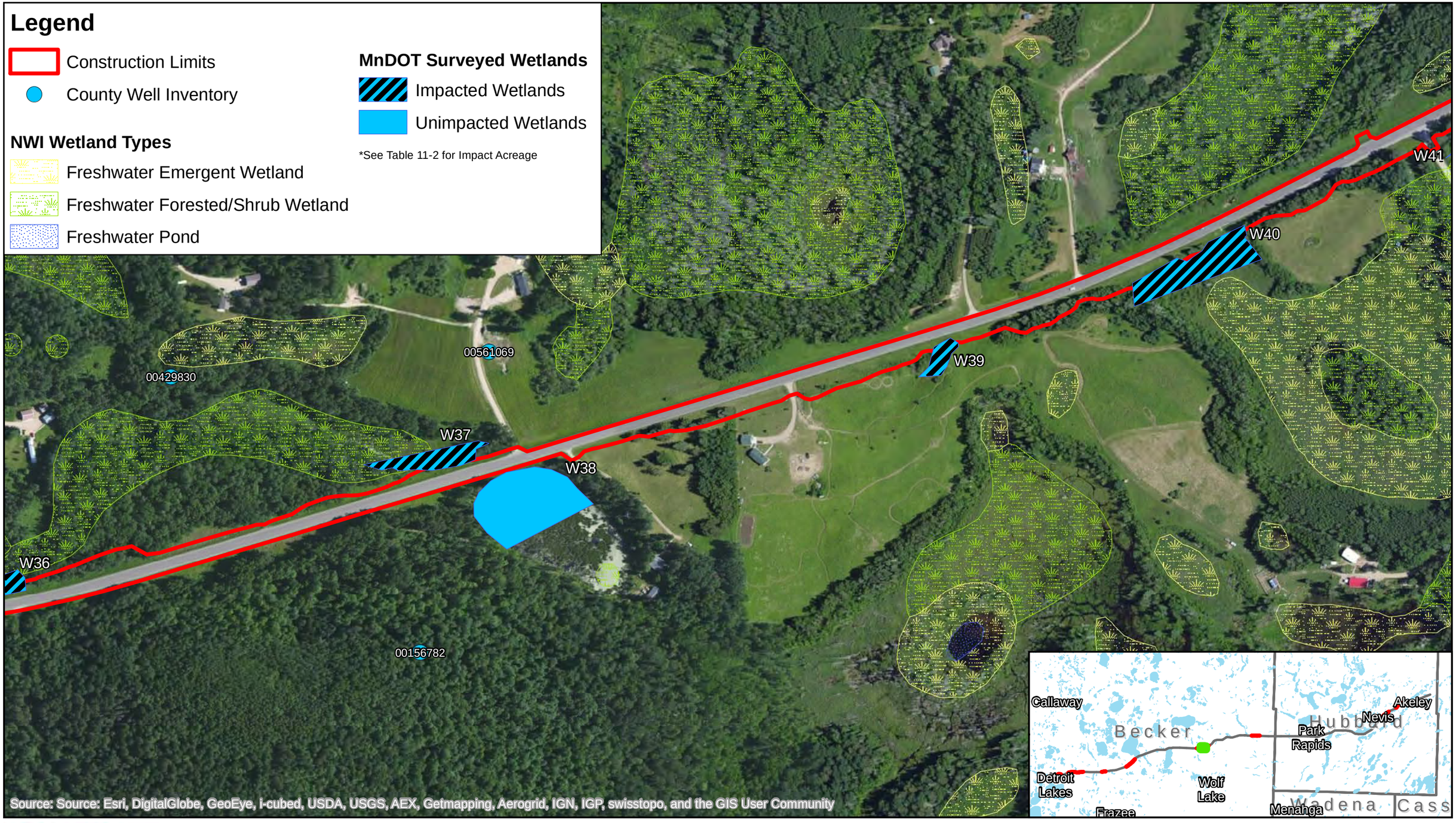
NORTH 0 400 800 1600 Feet

Figure 3i. Water Resources Section 5

TH 34 Passing Lanes: Environmental Assessment Worksheet



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NORTH 0 400 800 1600 Feet

Figure 3j. Water Resources Section 5

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

Construction Limits

NWI Wetland Types

Freshwater Emergent Wetland

Freshwater Forested/Shrub Wetland

Freshwater Pond

MnDOT Surveyed Wetlands

Impacted Wetlands

Unimpacted Wetlands

*See Table 11-2 for Impact Acreage

W43

W42

W41

W40

Callaway

Becker

Detroit Lakes

Wolf Lake

Frazee

Park Rapids

Nevis

Akeley

Hubbard

Menahga

Wadena

Cass

Source: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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NORTH

0 400 800 1600 Feet

Figure 3k. Water Resources Section 5

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

- Construction Limits
- County Well Inventory
- PWI Basins

NWI Wetland Types

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

MnDOT Surveyed Wetlands

- Impacted Wetlands
- Unimpacted Wetlands

*See Table 11-2 for Impact Acreage

00423703

00438635

03-1105W

Source: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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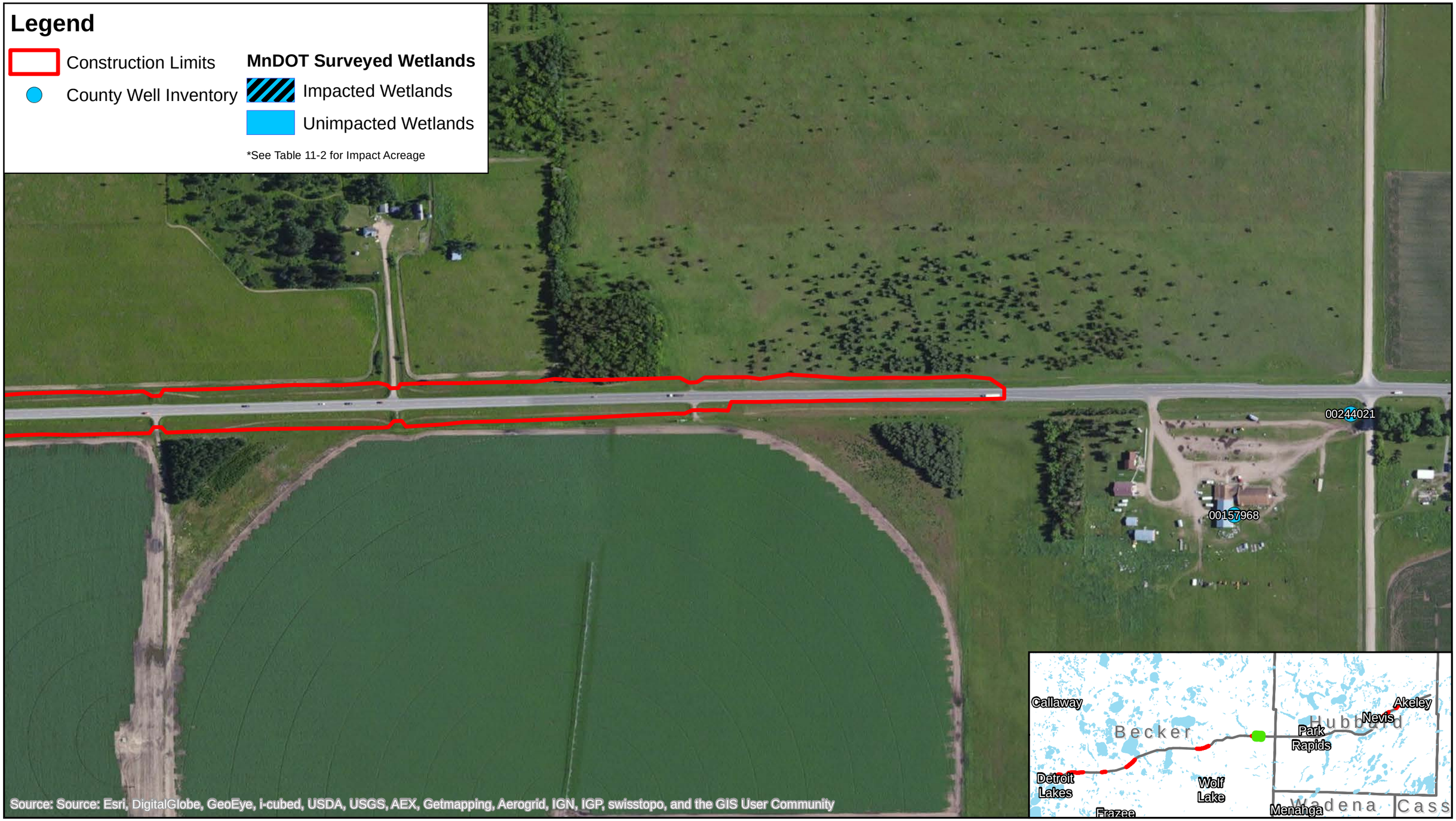
NORTH 0 400 800 1600 Feet

Figure 3l. Water Resources Section 6

TH 34 Passing Lanes: Environmental Assessment Worksheet



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NORTH 0 400 800 1600 Feet

Figure 3m. Water Resources Section 6

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

- Construction Limits
- County Well Inventory

NWI Wetland Types

- Freshwater Forested/Shrub Wetland
- Freshwater Pond

MnDOT Surveyed Wetlands

- Impacted Wetlands
- Unimpacted Wetlands

*See Table 11-2 for Impact Acreage

00101632
00132607

Source: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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NORTH 0 400 800 1600 Feet

Figure 3n. Water Resources Section 7

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

- Construction Limits
- County Well Inventory
- PWI Basins

NWI Wetland Types

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake

MnDOT Surveyed Wetlands

- Impacted Wetlands
- Unimpacted Wetlands

*See Table 11-2 for Impact Acreage

00108547

00226297

Owl Lake, 29-0073P

Source: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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NORTH

0 400 800 1600 Feet

Figure 3o. Water Resources Section 7

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

Construction Limits

MnDOT Surveyed Wetlands

Impacted Wetlands

Unimpacted Wetlands

*See Table 11-2 for Impact Acreage

Source: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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NORTH 0 400 800 1600 Feet

Figure 3p. Water Resources Section 8

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

- Construction Limits
- PWI Basins

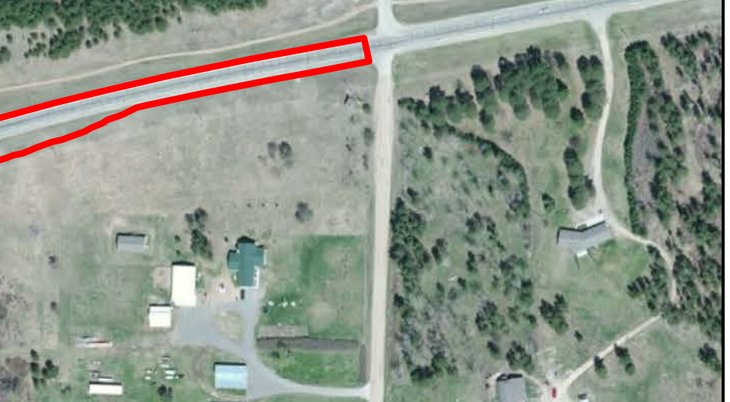
NWI Wetland Types

- Lake

MnDOT Surveyed Wetlands

- Impacted Wetlands
- Unimpacted Wetlands

*See Table 11-2 for Impact Acreage



Source: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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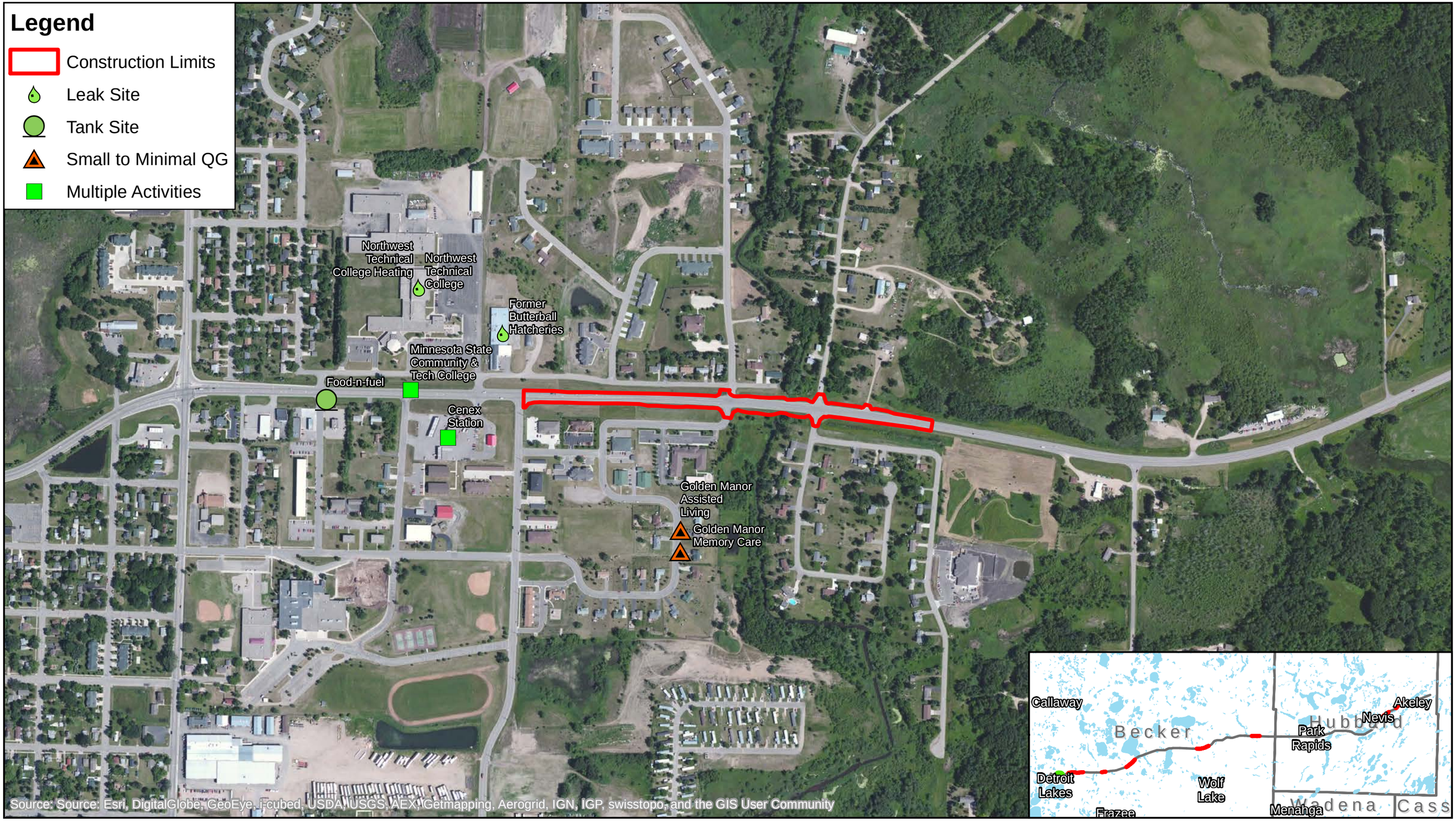
NORTH

0 400 800 1600 Feet

Figure 3q. Water Resources Section 8

TH 34 Passing Lanes: Environmental Assessment Worksheet



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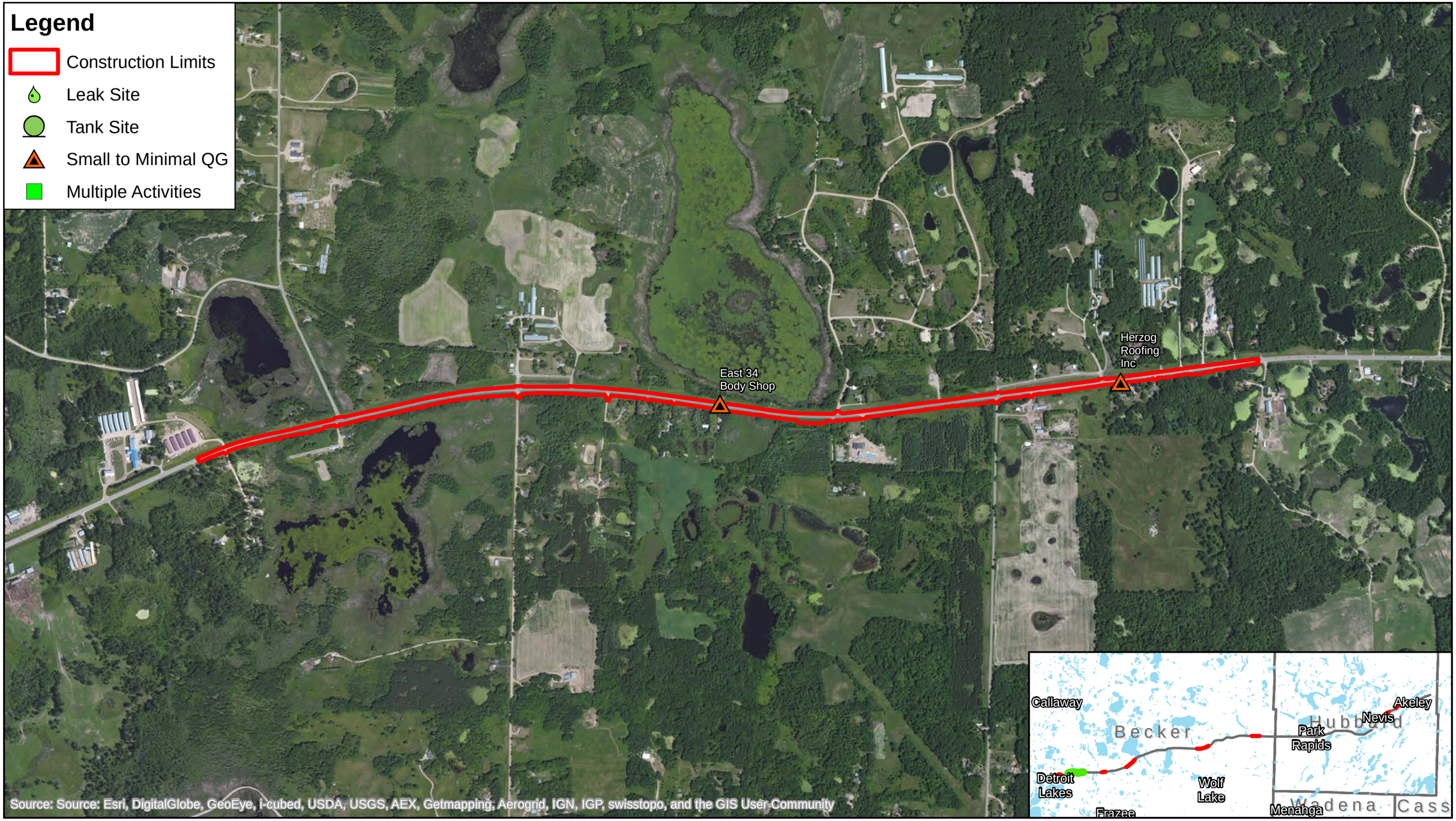
NORTH 0 0.125 0.25 0.5 Miles

Figure 4a. Hazardous Materials Section 1

TH 34 Passing Lanes: Environmental Assessment Worksheet



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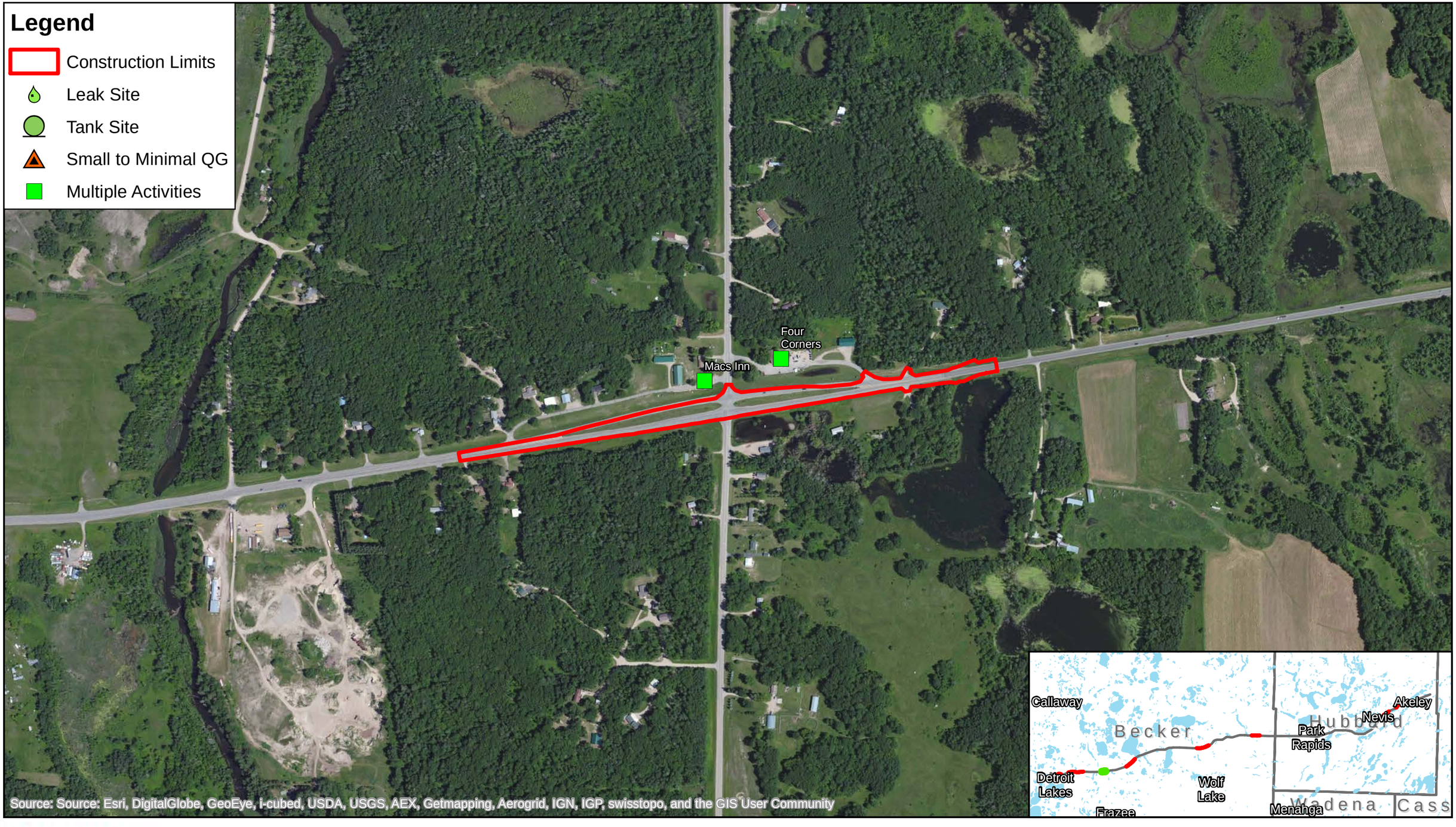
NORTH 0 0.25 0.5 1 Miles

Figure 4b. Hazardous Materials Section 2

TH 34 Passing Lanes: Environmental Assessment Worksheet



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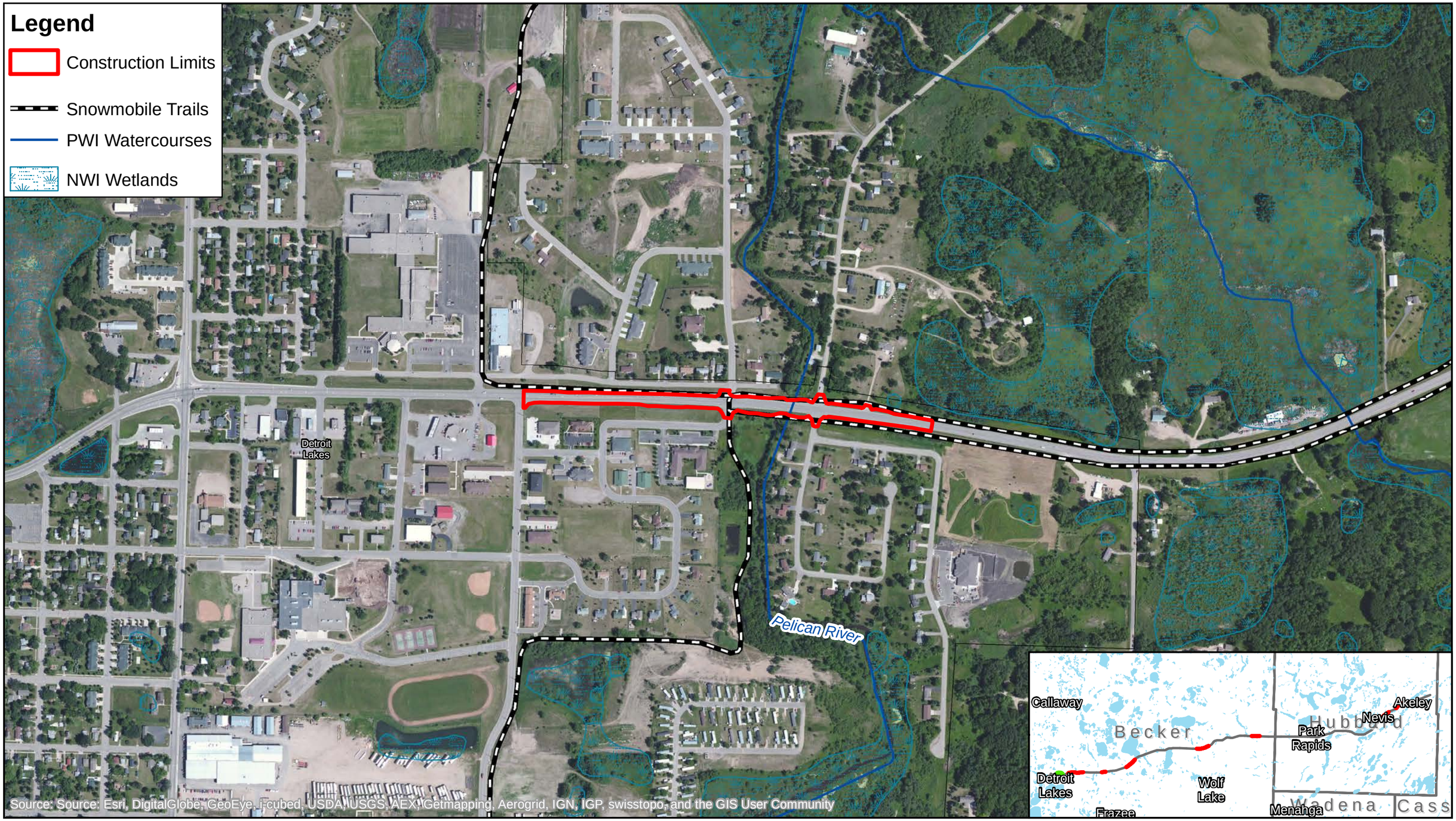
NORTH 0 0.125 0.25 0.5 Miles

Figure 4c. Hazardous Materials Section 3

TH 34 Passing Lanes: Environmental Assessment Worksheet



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MINNESOTA DEPARTMENT OF TRANSPORTATION

NORTH 0 0.125 0.25 0.5 Miles

Figure 5a. Fish, Wildlife, and Habitat Section 1

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

- Construction Limits
- Snowmobile Trails
- PWI Watercourses
- PWI Basins
- NWI Wetlands
- Waterfowl Production Area
- Wildlife Management Area
- County Forest
- Sites of Biodiversity Significance

St. Patrick Lake, 03-0277P

Schultz Lake, 03-0278P

03-0349W

03-0284P

Shultz Lake Wildlife Management Area

Struss Waterfowl Production Area

Leitheiser Lake, 03-0357P

Source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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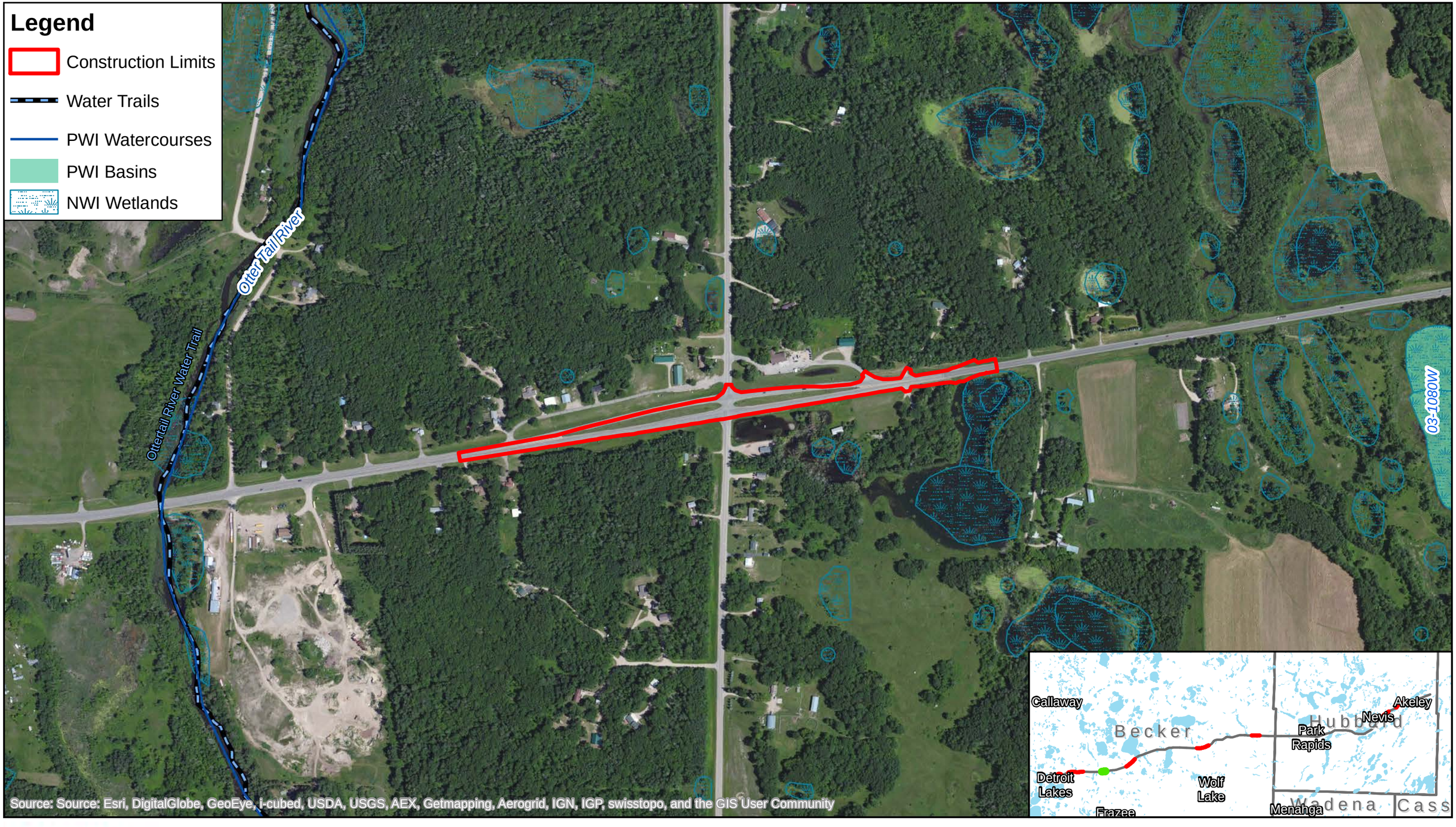
MINNESOTA DEPARTMENT OF TRANSPORTATION

NORTH 0 0.25 0.5 1 Miles

Figure 5b. Fish, Wildlife, and Habitat Section 2

TH 34 Passing Lanes: Environmental Assessment Worksheet



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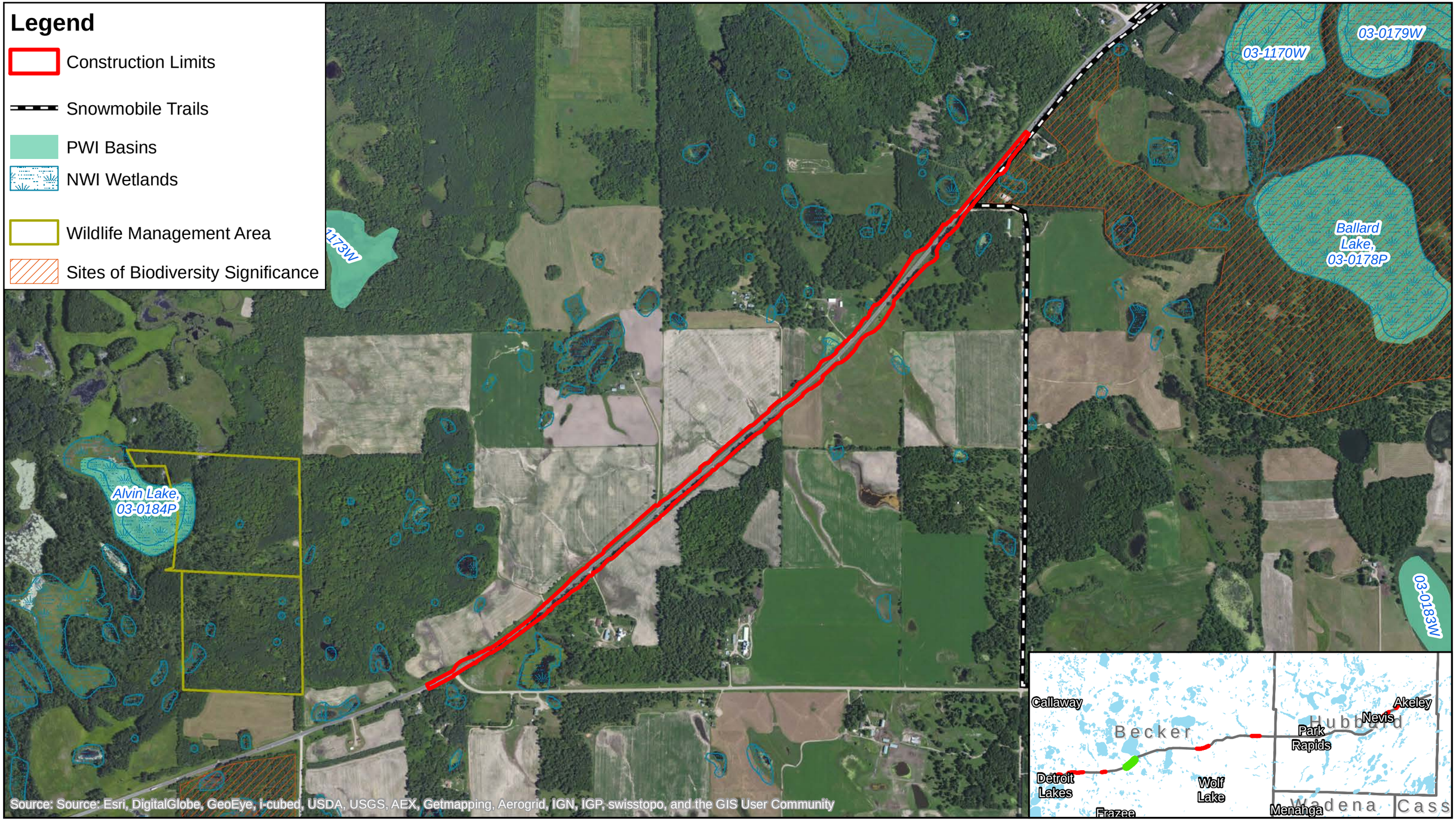
NORTH 0 0.125 0.25 0.5 Miles

Figure 5c. Fish, Wildlife, and Habitat Section 3

TH 34 Passing Lanes: Environmental Assessment Worksheet



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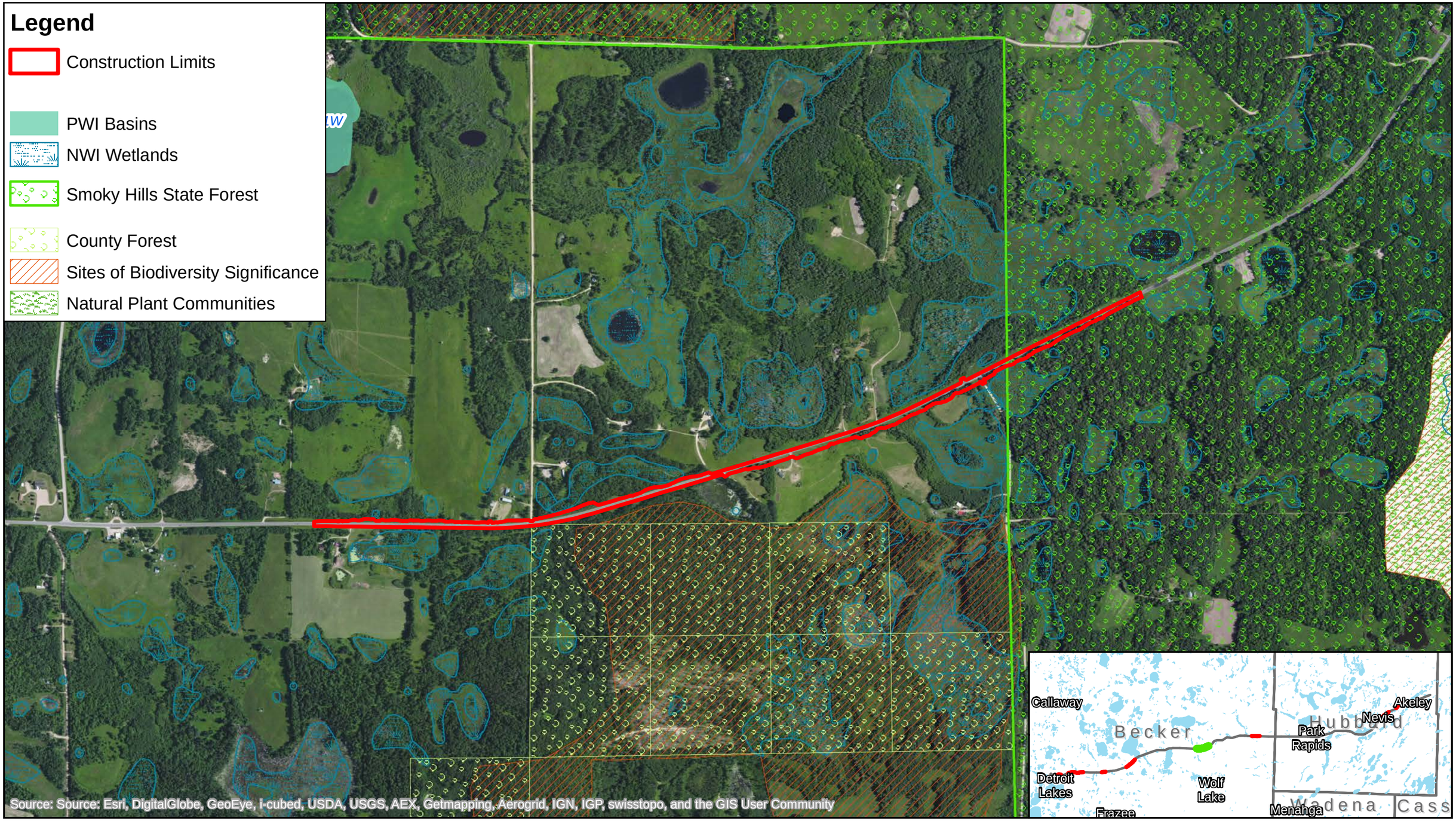
NORTH 0 0.25 0.5 1 Miles

Figure 5d. Fish, Wildlife, and Habitat Section 4

TH 34 Passing Lanes: Environmental Assessment Worksheet



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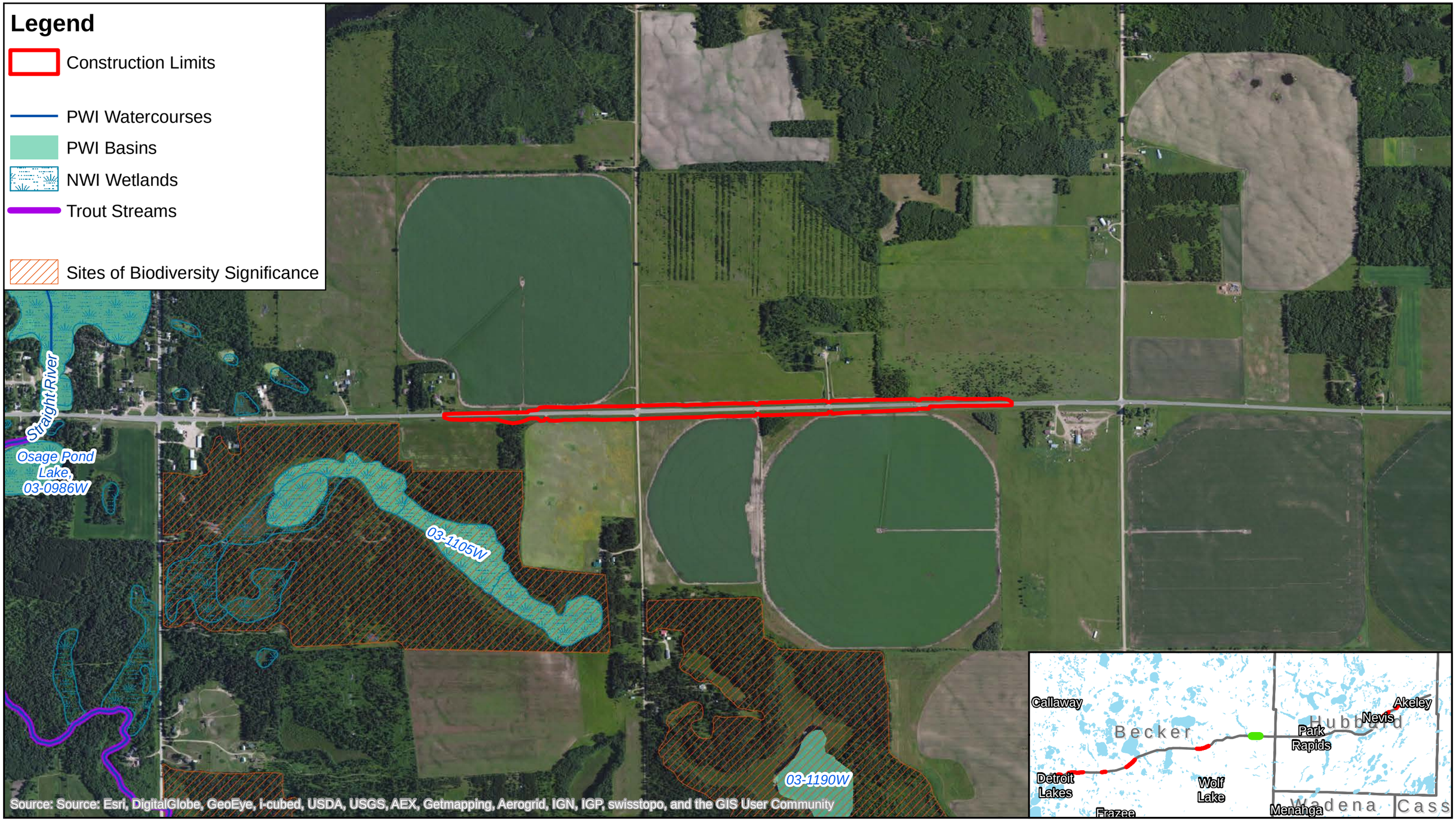
MINNESOTA DEPARTMENT OF TRANSPORTATION

NORTH 0 0.25 0.5 1 Miles

Figure 5e. Fish, Wildlife, and Habitat Section 5

TH 34 Passing Lanes: Environmental Assessment Worksheet



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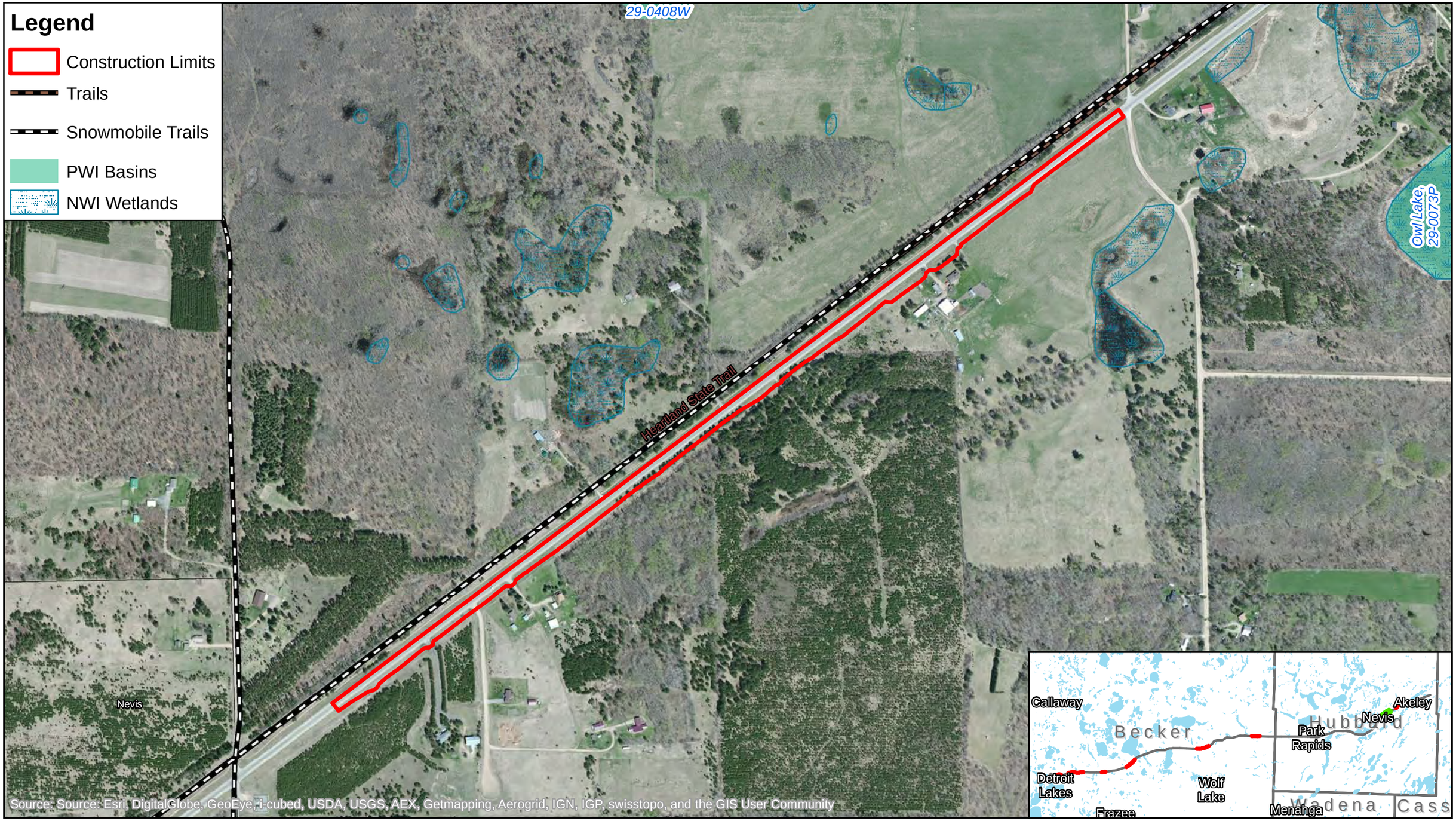
NORTH 0 0.25 0.5 1 Miles

Figure 5f. Fish, Wildlife, and Habitat Section 6

TH 34 Passing Lanes: Environmental Assessment Worksheet



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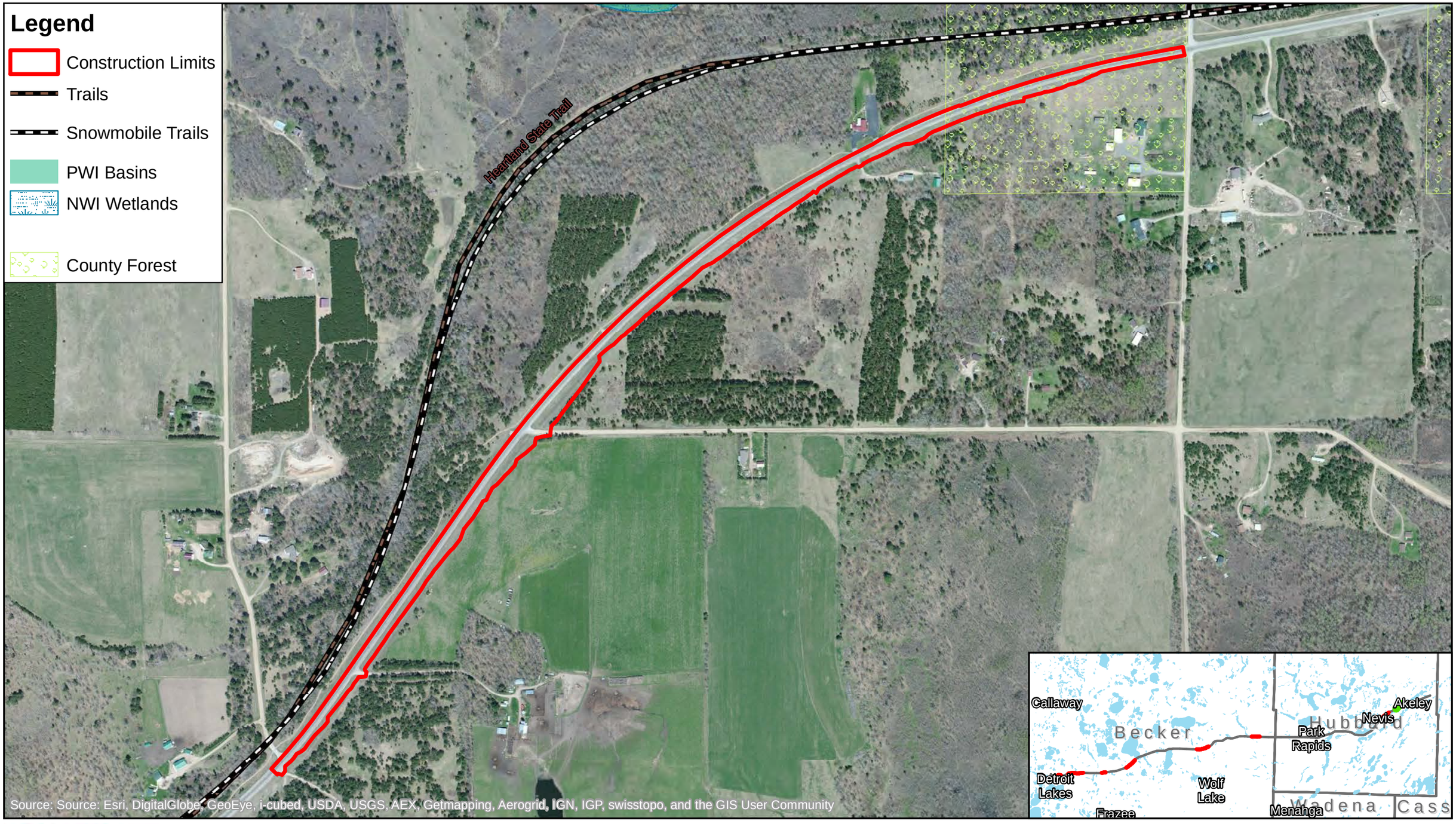
NORTH 0 0.125 0.25 0.5 Miles

Figure 5g. Fish, Wildlife, and Habitat Section 7

TH 34 Passing Lanes: Environmental Assessment Worksheet



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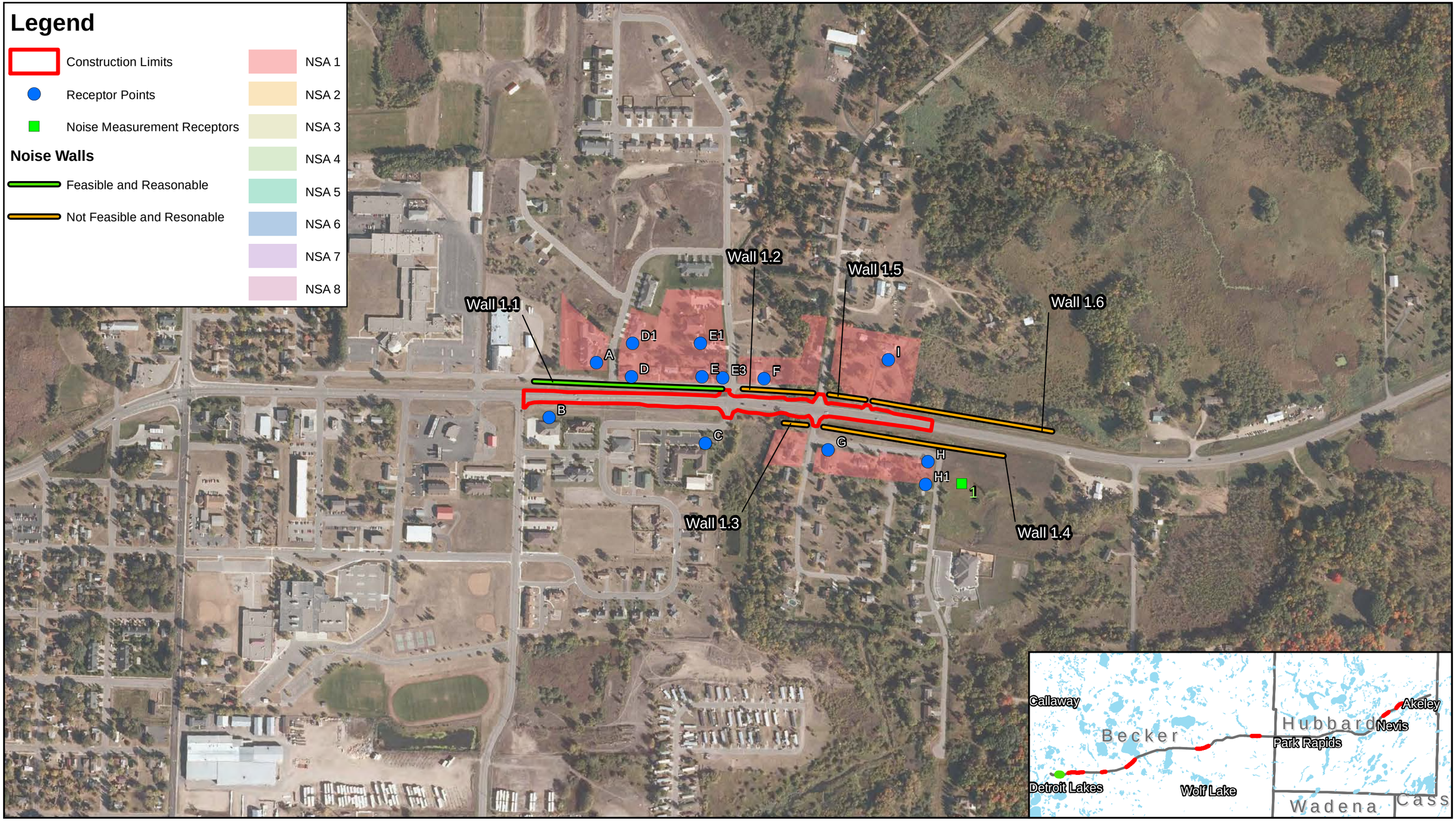
NORTH 0 0.125 0.25 0.5 Miles

Figure 5h. Fish, Wildlife, and Habitat Section 8

TH 34 Passing Lanes: Environmental Assessment Worksheet



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NORTH 0 0.125 0.25 0.5 Miles

Figure 6a. Noise Section 1

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

- Construction Limits
- Receptor Points
- Noise Measurement Receptors

Noise Walls

- Feasible and Reasonable
- Not Feasible and Resonable

- NSA 1
- NSA 2
- NSA 3
- NSA 4
- NSA 5
- NSA 6
- NSA 7
- NSA 8

Wall 2.1
Wall 2.2
Wall 2.3
Wall 2.4
Wall 2.5
Wall 2.6
Wall 2.7
Wall 2.8
Wall 2.9
Wall 2.11
Wall 2.12
Wall 2.13
Wall 2.14
Wall 2.15
Wall 2.16
Wall 2.17
Wall 2.18
Wall 2.19
Wall 2.21
Wall 2.22
Wall 2.23
Wall 2.24
Wall 2.25
Wall 2.26

J K L M N O P Q R S T U V W X Y Z AA BB CC

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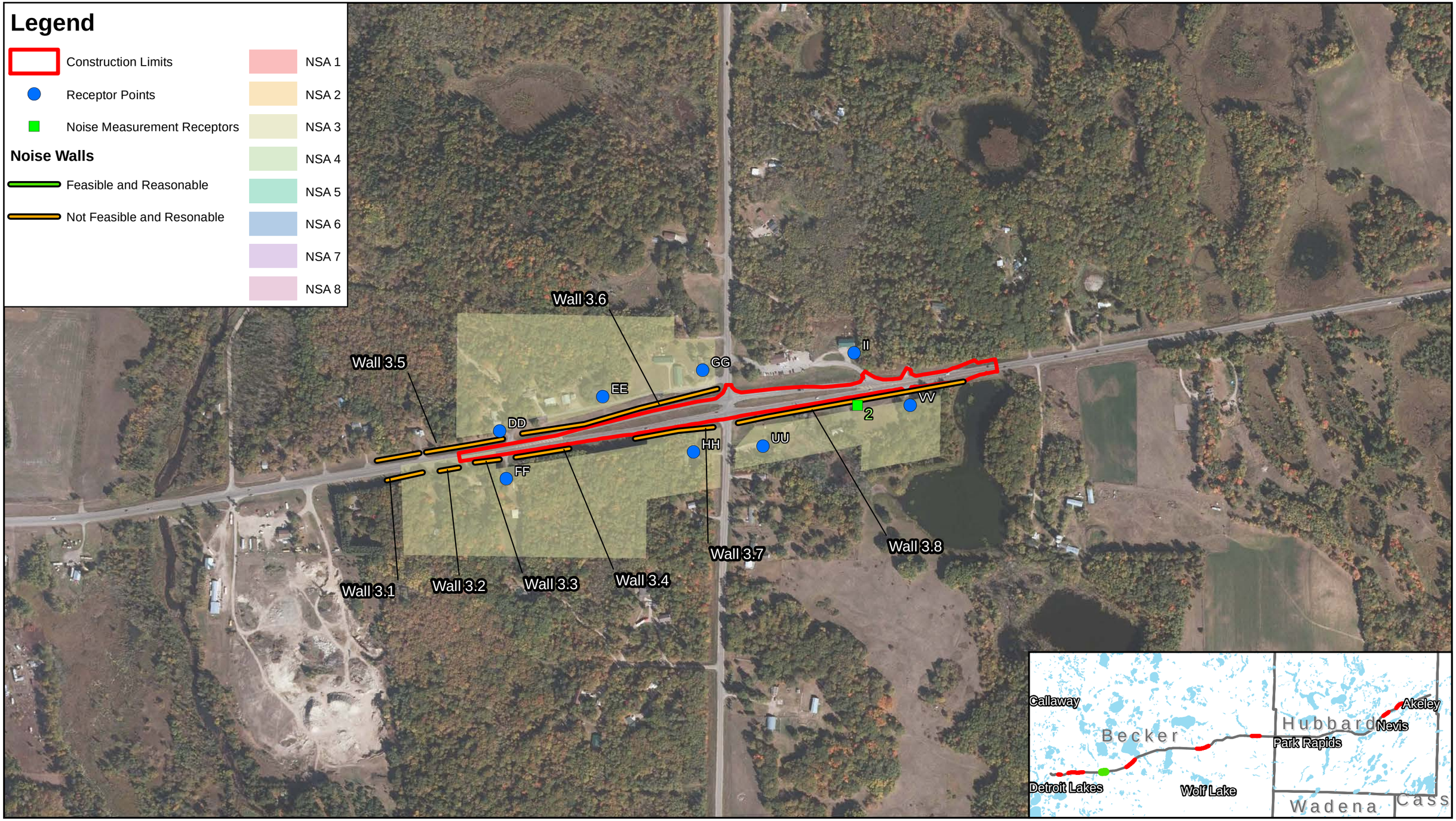
NORTH 0 0.25 0.5 1 Miles

Figure 6b. Noise Section 2

TH 34 Passing Lanes: Environmental Assessment Worksheet



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NORTH 0 0.125 0.25 0.5 Miles

Figure 6c. Noise Section 3

TH 34 Passing Lanes: Environmental Assessment Worksheet

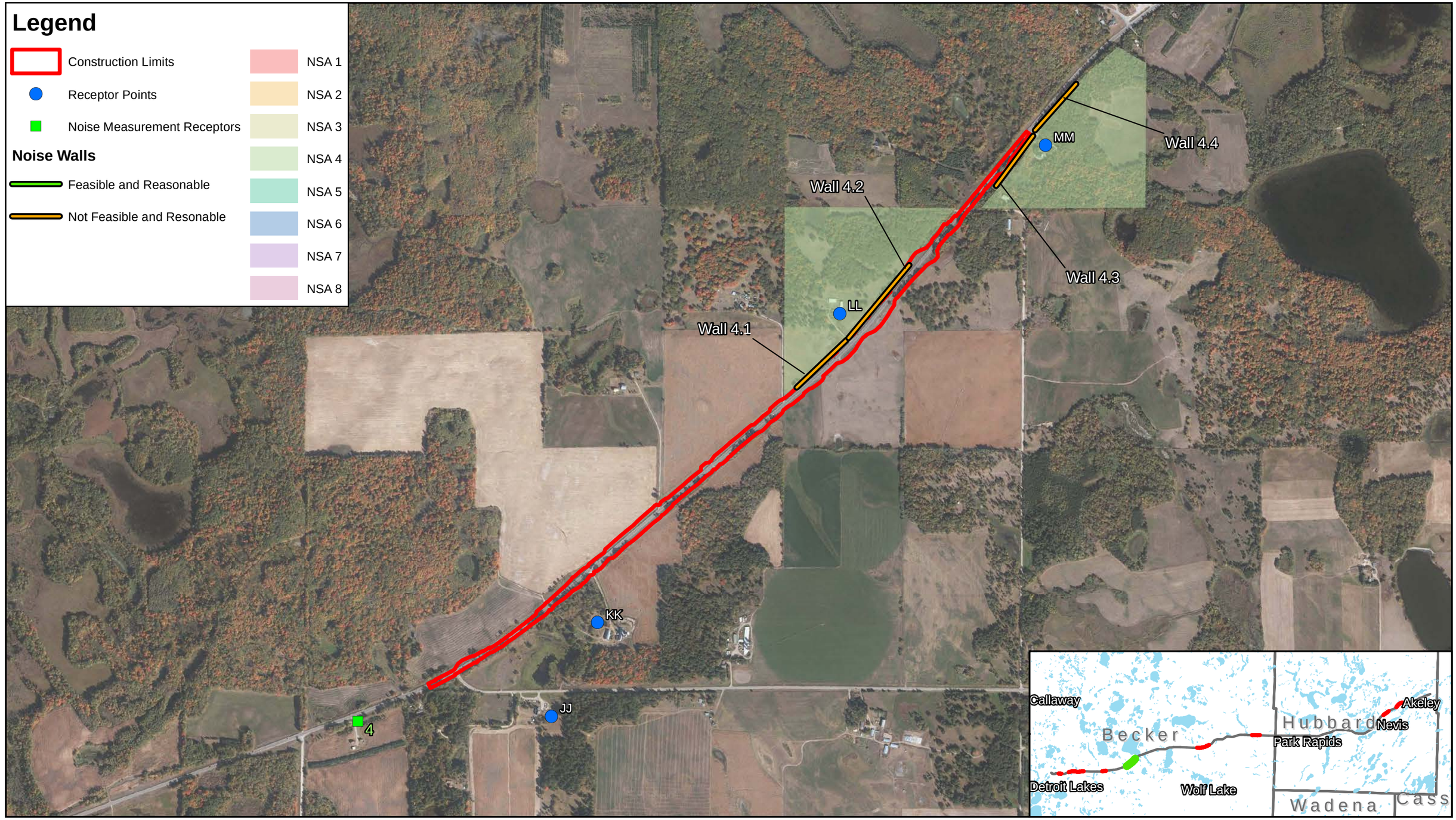
Legend

- Construction Limits
- Receptor Points
- Noise Measurement Receptors

Noise Walls

- Feasible and Reasonable
- Not Feasible and Resonable

- NSA 1
- NSA 2
- NSA 3
- NSA 4
- NSA 5
- NSA 6
- NSA 7
- NSA 8



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NORTH 0 0.25 0.5 1 Miles

Figure 6d. Noise Section 4

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

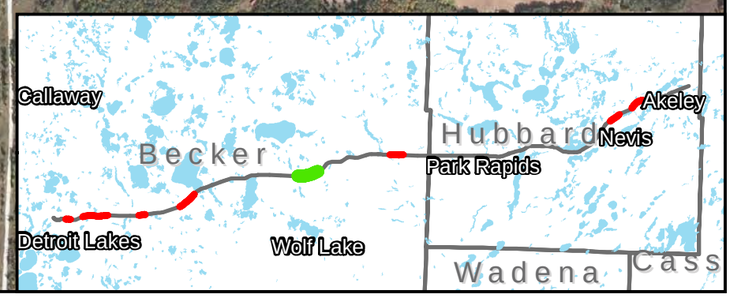
- Construction Limits
- Receptor Points
- Noise Measurement Receptors

Noise Walls

- Feasible and Reasonable
- Not Feasible and Resonable

- NSA 1
- NSA 2
- NSA 3
- NSA 4
- NSA 5
- NSA 6
- NSA 7
- NSA 8

Wall 5.3
Wall 5.4
PP
RR
QQ
6
OO
5
NN
Wall 5.1
Wall 5.2
Wall 5.7



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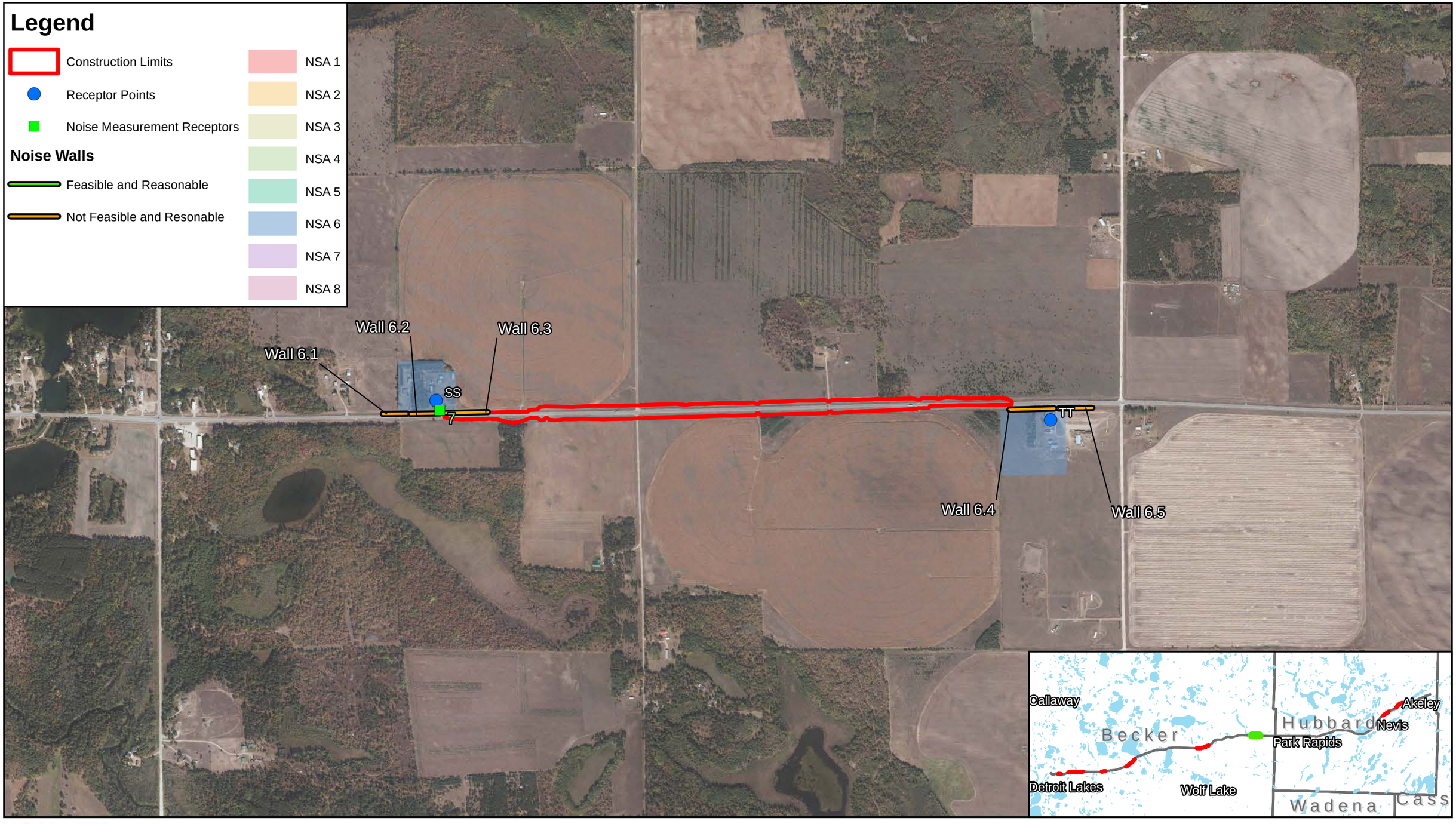
NORTH 0 0.25 0.5 1 Miles

Figure 6e. Noise Section 5

TH 34 Passing Lanes: Environmental Assessment Worksheet



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NORTH 0 0.25 0.5 1 Miles

Figure 6f. Noise Section 6

TH 34 Passing Lanes: Environmental Assessment Worksheet

Legend

- Construction Limits
- Receptor Points
- Noise Measurement Receptors

Noise Walls

- Feasible and Reasonable
- Not Feasible and Resonable

- NSA 1
- NSA 2
- NSA 3
- NSA 4
- NSA 5
- NSA 6
- NSA 7
- NSA 8

Wall 8.4
Wall 8.3
BBB
10
DDD
Wall 8.2
CCC
Wall 8.5
Wall 8.6
Wall 8.7
LOC 8-50
AAA
9
8
ZZ
Wall 7.6
Wall 7.5
YY
XX
WW
Wall 7.2

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MINNESOTA DEPARTMENT OF TRANSPORTATION

NORTH 0 0.25 0.5 1 Miles

Figure 6g. Noise Sections 7 and 8

TH 34 Passing Lanes: Environmental Assessment Worksheet

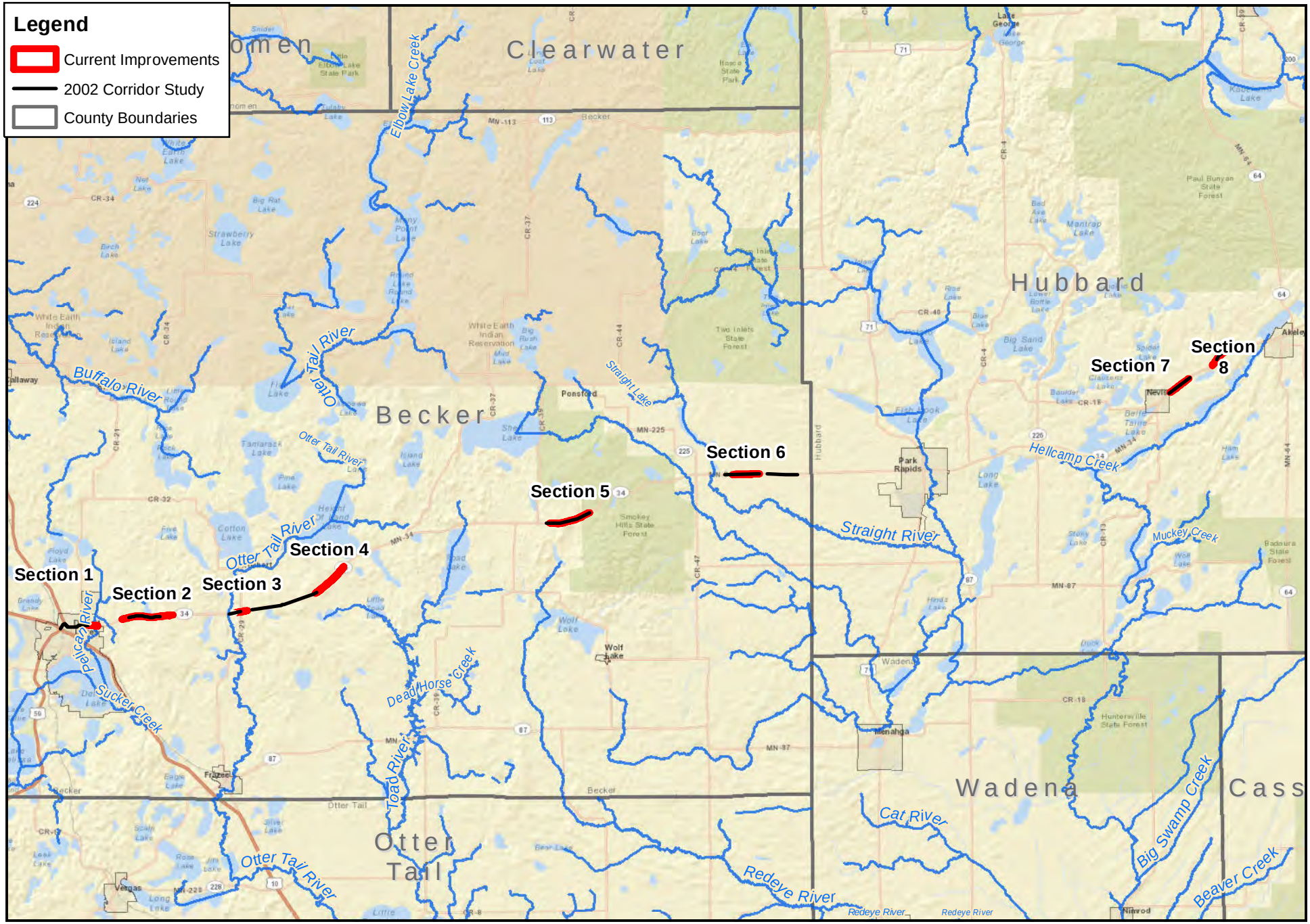

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Figure 7. Comparison of Alternatives
Becker and Hubbard Counties
TH 34 Passing Lanes: Environmental Assessment Worksheet

Appendix A: Agency Correspondence

1. Minnesota Department of Natural Resources (DNR) Response
2. DNR Ecological Features Basemaps
3. DNR Work Exclusion Dates
4. MnDOT Roadside Vegetation Management Unit Response
5. Endangered Species Act (ESA) Section 7 Determination
6. MnDOT Cultural Resources Unit Response

Cooper, Laura

From: Kunkel, Beth
Sent: Monday, November 25, 2013 9:21 AM
To: Haase, Rachel
Subject: FW: DNR response to MnDOT Early Notification Memo TH34 (SP0303-64) Becker and Hubbard Co
Attachments: MnDOT ENM location maps.pdf; Early Memo SP 0303-64, TH 34.pdf; DNRbasemaps.pdf; work exclusion dates.pdf; Area of Environmental Sensitivity.pdf

Fyi – please save to 34 design folder for eaw.
Thx

From: Munsterteiger, Paul (DOT) [mailto:paul.munsterteiger@state.mn.us]
Sent: Monday, November 25, 2013 9:00 AM
To: Kunkel, Beth
Cc: Lundberg, Thomas (DOT); Crawford, John
Subject: FW: DNR response to MnDOT Early Notification Memo TH34 (SP0303-64) Becker and Hubbard Co

Mornin Beth, Attached are the Early Notification Memo comments back from The Mn/DNR. Most of their concerns we should be able to handle with a "No construction proposed" type of answer write-up in the EAW. The rest of the concerns, we should be able to handle with statements concerning fencing, native seed mixes, general permit for culverts, ect. All in all looks minor in nature. Any questions, please call me. Thanks Beth. See ya.

From: Leete, Peter (DOT)
Sent: Sunday, November 24, 2013 2:05 PM
To: Munsterteiger, Paul (DOT)
Cc: Carlstrom, Mark A (DNR); Moore, Bob T (DNR); Straumanis, Sarma (DOT); Alcott, Jason (DOT); Troyer, Brett (DOT); Stenlund, Dwayne (DOT); Sullivan, Dan (MPCA); Joyal, Lisa (DNR); Kestner, Nathan (DNR); Olson, Nathan W (DNR); Kingsley, Doug W (DNR); Siira, Emily (DNR); Hoverson, Darrin (DNR); Naplin, Rob L (DNR)
Subject: DNR response to MnDOT Early Notification Memo TH34 (SP0303-64) Becker and Hubbard Co

Paul,
This email is the DNR response for your project records. I have not sent this out for full DNR review, however I've looked at the information in the Early Notification memo regarding the proposed TH34 'Corridor of Commerce' project to construct passing or turn lanes on TH34 between Detroit Lakes and Nevis. My understanding is that all work will occur within the existing right of way. Please consider the following comments:

1. For MnDOT planning purposes, I have attached a map of the project area (DNRbasemap.pdf) showing locations of DNR concern such as Public Waters (in dark blue), designated aquatic invasive species (red), snowmobile Trails (in pink), green shaded polygons for areas of Biodiversity Significance, and various polygons of rare features from the Natural Heritage Information System (NHIS) database (in magenta). If you have any questions regarding proposed work near any of these polygons, please give me a call. Your GIS folks also can access most of this data from the DNR's Data Deli website at http://deli.dnr.state.mn.us/. The following files will allow the creation of the same map and ease your cross reference for road locations.
   MCBS Railroad Rights-of-Way Prairies
   MCBS Native Plant Communities
   MCBS Sites of Biodiversity Significance
   Public Waters Inventory (PWI) Watercourse Delineations
   Public Waters Inventory (PWI) Basin Delineations

DNR managed lands such as Wildlife Management Areas, Public Access, State Parks, State Forests, etc
Trout streams
Snowmobile Trails

2. There are several DNR Public Waters in the project area. These are identified in dark blue on the attached DNRbasemaps.pdf. The project has numerous culvert repairs or replacements. Though details of locations is not known at this time. Should plans develop to include work in the identified Public Waters, please contact me as further review may be required.

   Be aware that these Public Waters may also be less than 200' from areas to be worked. Please be aware that the MPCA NPDES general permit for authorization to discharge stormwater associated with construction activities (permit MN R10001) recognizes the DNR "work in water restrictions" during specified fish migration and spawning time frames. During the restriction period, all exposed soil areas that are within 200 feet of the water's edge and drain to these waters, must have erosion prevention stabilization activities initiated immediately after construction activity has ceased (and be completed within 24 hours). For restriction dates in this area see the attached map.

3. Please remind contractors that a separate water use permit is required for withdrawal of more than 10,000 gallons of water per day or 1 million gallons per year from surface water or ground water. GP1997-0005 (temporary water appropriations) covers a variety of activities associated with road construction and should be applied of if applicable. An individual appropriations permit may be required for projects lasting longer than one year or exceeding 50 million gallons. Information is located at: http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/permits.html

4. The Minnesota Natural Heritage Information System has been reviewed to determine if any rare plant or animal species, native plant communities, or other significant natural features are known to occur within an approximate one-mile radius of the project area. In order to protect the inadvertent release of the location of specific listed or rare species contained in the NHIS, I have only labeled their status on the attached 'DNRbasemap.pdf'. Based on this review, there are rare features in the area searched (for details, please contact me). Following are specific comments for only those elements that may be impacted by the proposed project. Rare feature occurrences that are not listed below are not likely to be negatively impacted by the proposed project.
   - Segment #1 crosses the Pelican River. Be aware that rare fish have been found in the river nearby, though they was last observed in 1975. I believe these species are likely to take evasive actions to avoid harm. However, to minimize the need for them to even do so, avoiding stream bank impact, and minimizing the time in the water should culvert work be proposed, and have stringent erosion prevention and sediment control practices in place is of utmost importance.
   - Segment #6 is near a Site of Biodiversity Significance. Rare plants have been found along the right of way line at the forested boundary. It is not known if there is potential for these plants to be closer to the proposed area of work. The concern along this segment is that soil disturbance, incidental herbicide exposure, hydrologic alterations, competition from non-native, sod-forming grasses, introduction of weed seeds, or shading by encroaching shrubs can all lead to degradation of these sites. Typically a mill and overlay will not directly cause any issues. However we do have guidance (based on your spec 2572.3) for protection of areas such as these. Best Practices #4, #5, and #9 of the attached 'AES.pdf' should suffice.
     - 4. Protect and preserve vegetation from damage in accordance with MnDOT Spec 2572.3
     - 5. Prohibit vehicle and construction activities, including the location of field offices, storage of equipment and other supplies at least 25 feet outside the dripline of trees or other identified Area of Environmental Sensitivity to be preserved, also in accordance with MnDOT spec 2572.3
     - 9. Revegetate disturbed soils with native species suitable to the local habitat

The entire collection of best practices is attached or may be found at: http://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/gp_2004_0001_manual.html

5. Segment #2 passes the Schultz Lake Wildlife Management Area (WMA). Please contact the Area Wildlife office in Detroit lakes (218-846-8375) should there be any work outside the existing right of way. Generally, we ask that any revegetation proposed in areas adjacent to WMAs be weed free and of a native mix that does not conflict with our vegetation management of the area.

6. Segment #5 has a short segment within the Smokey Hills State Forest. If there is work proposed outside the existing right of way, please contact the DNR Forestry Office in Park Rapids (218-732-3309).

7. The Heartland State Trail runs adjacent to Segments #7 & #8. The project does not appear to impact this trial, though there may be cooperative opportunities should the trial folks have any needs along these two segments. Please contact the Area Supervisor in Bemidji (David Schotsko) at 218-308-2367 regarding potential cooperative work.

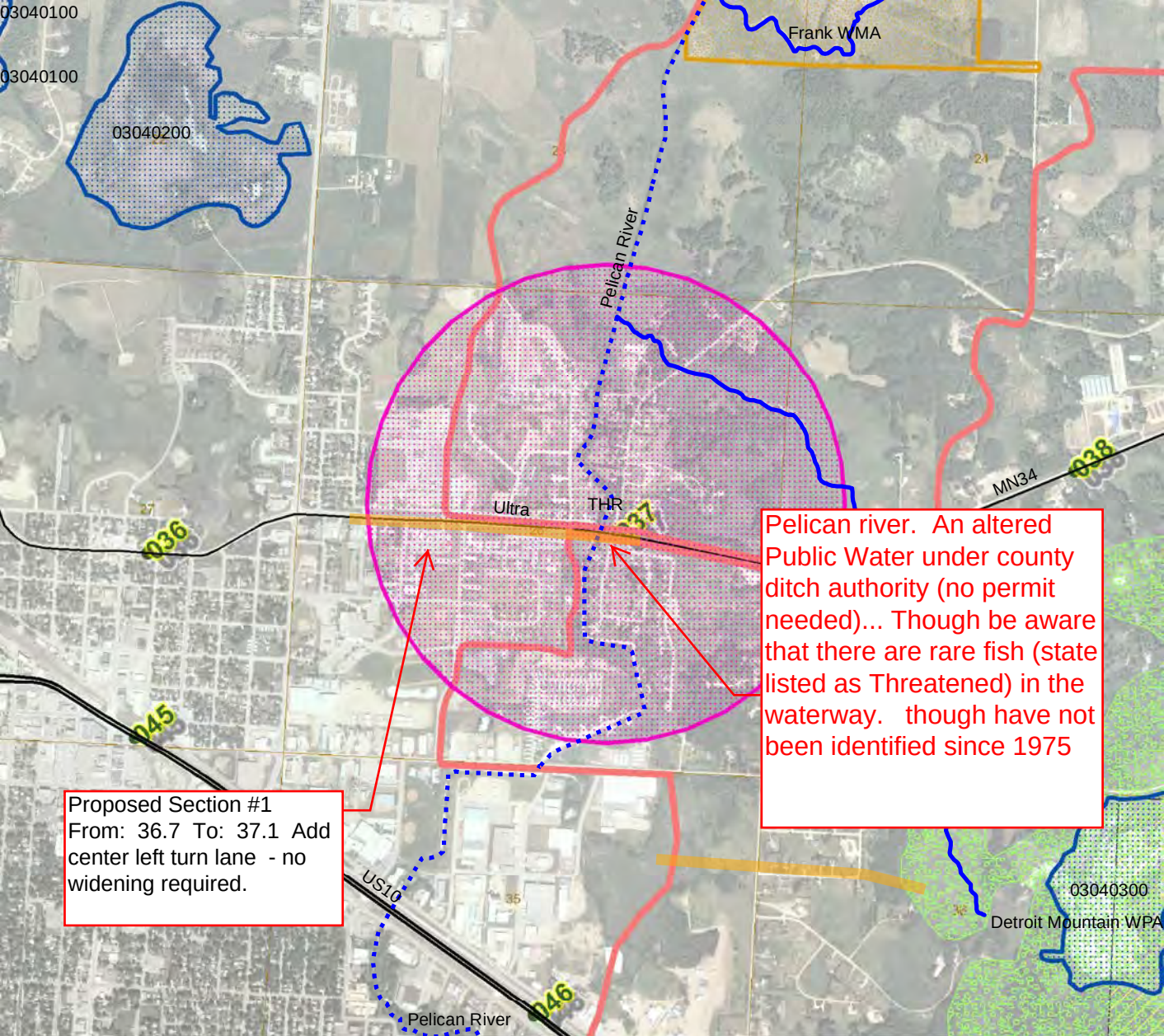
DNR folks, if I've missed anything, or have any suggestions for MnDOT to consider, please respond ASAP to Paul, and myself.

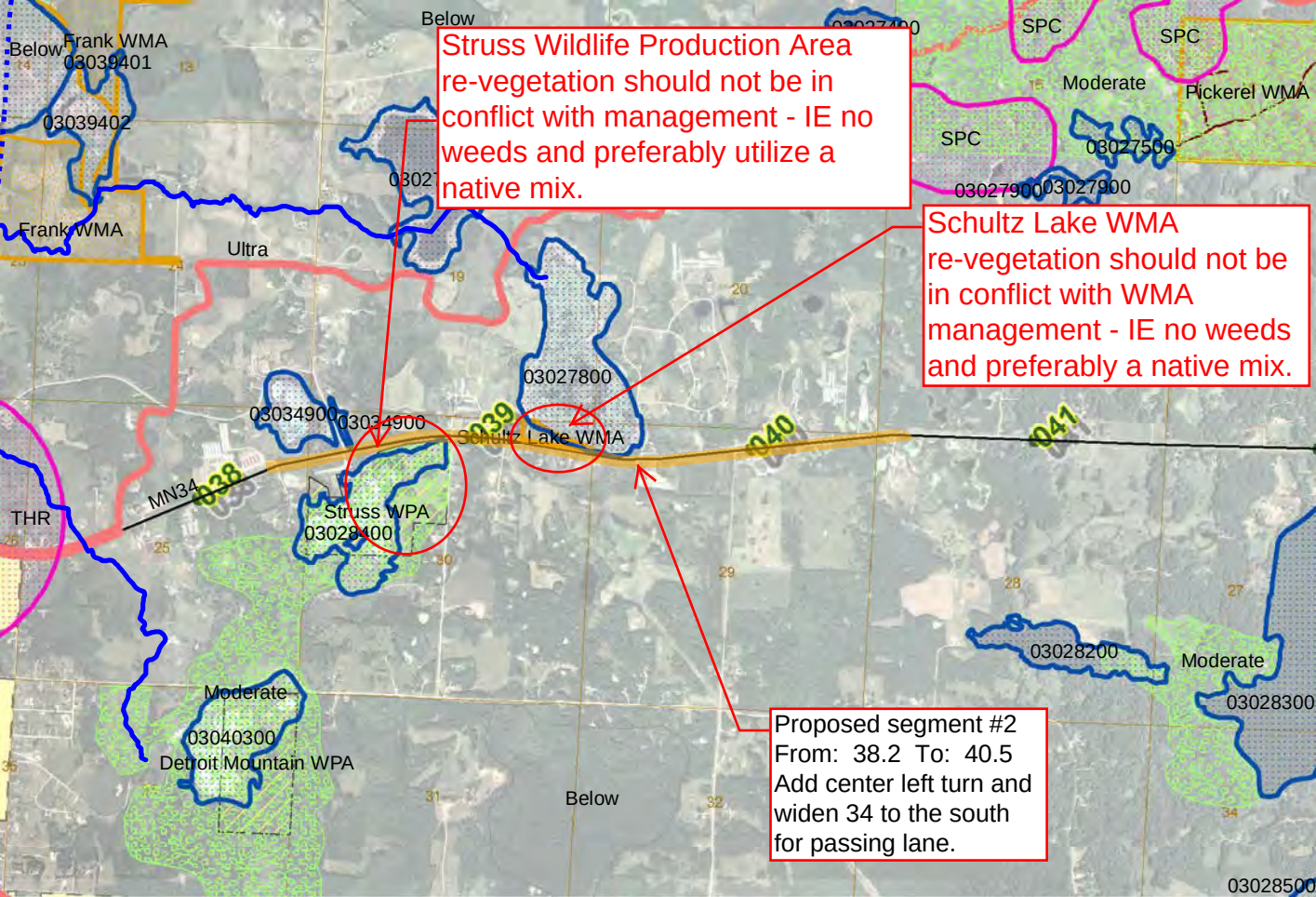
Contact me if you have questions

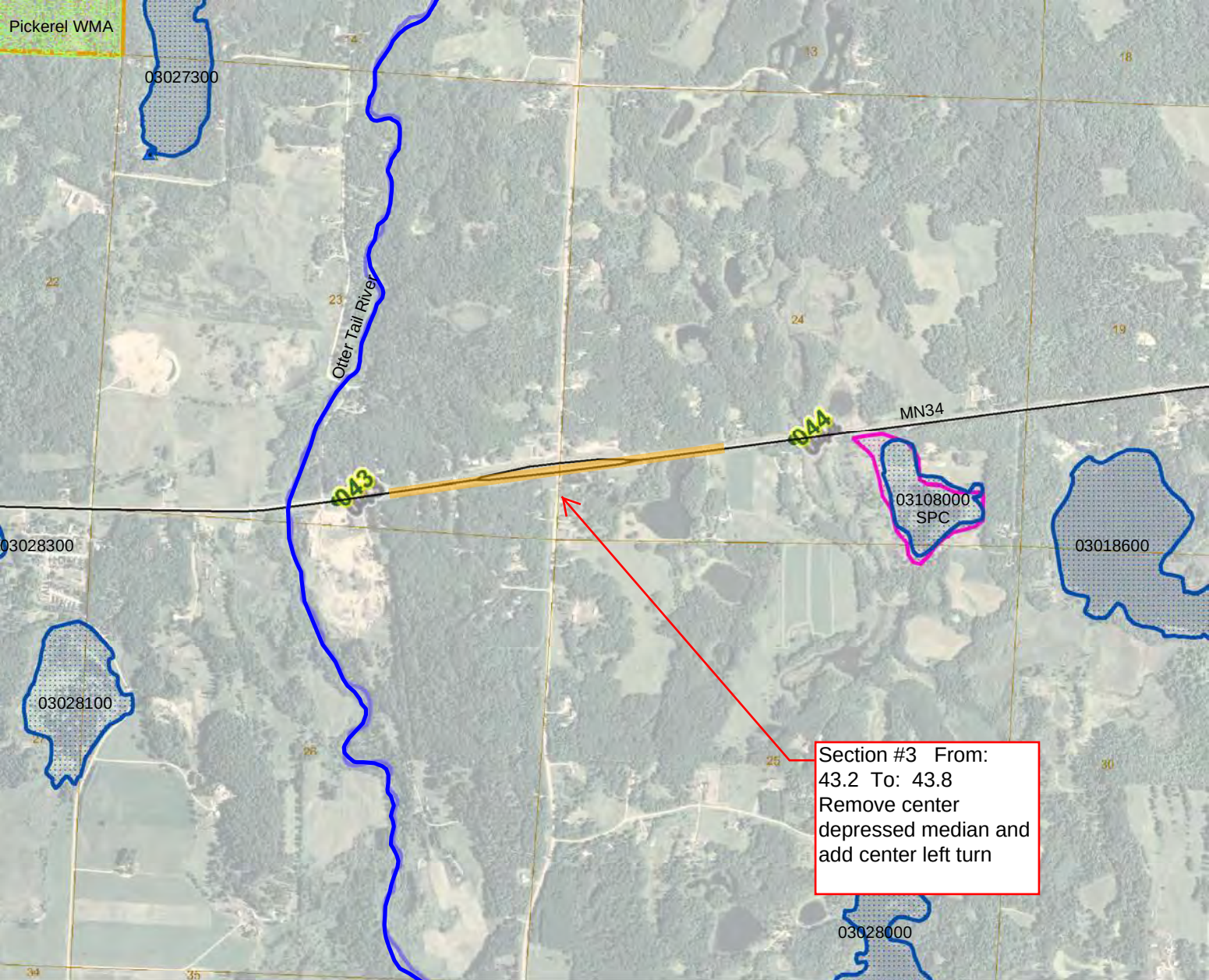
peter

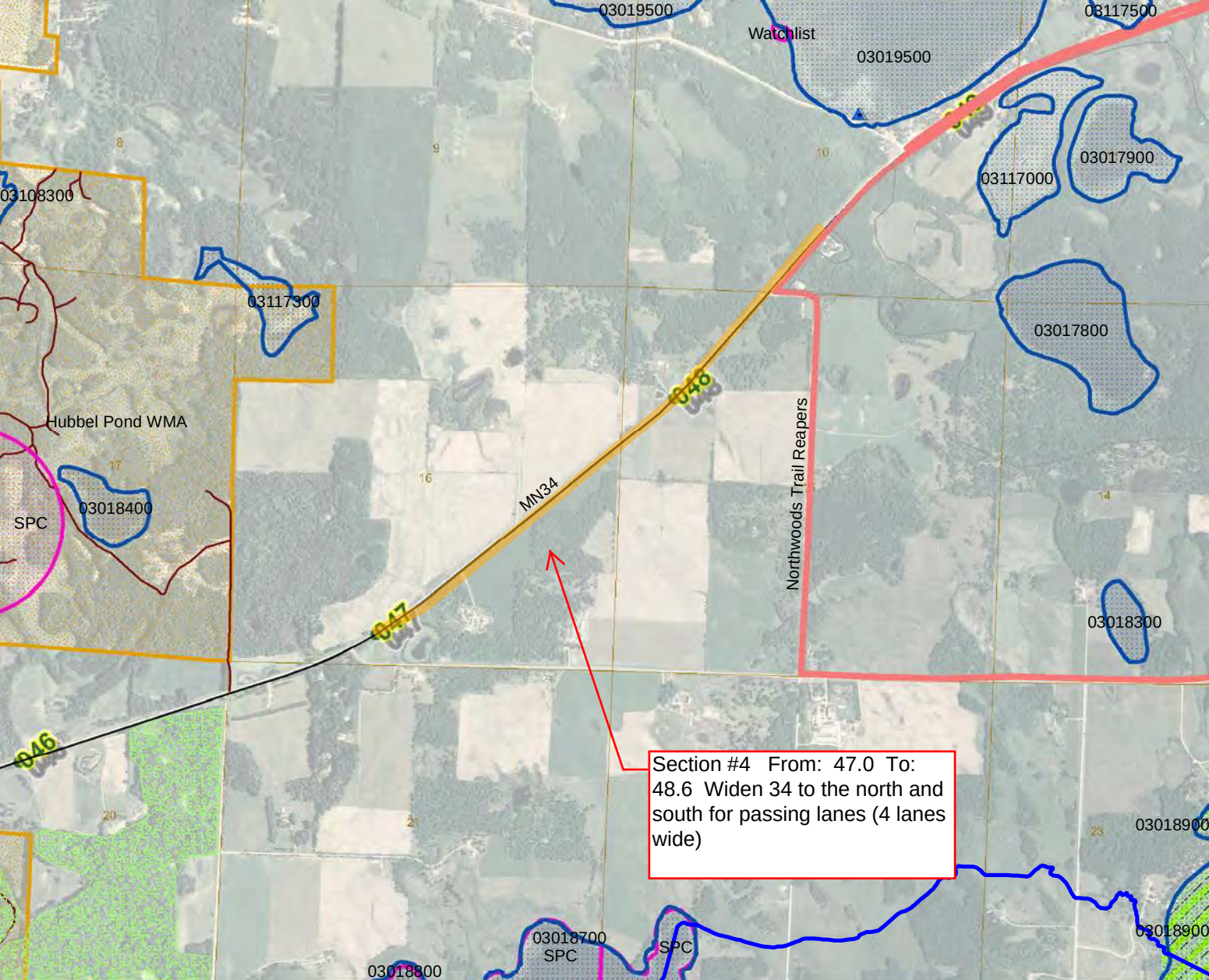
Peter Leete
Transportation Hydrologist (DNR-MnDOT Liaison)
DNR Ecological & Water Resources
Ph: 651-366-3634

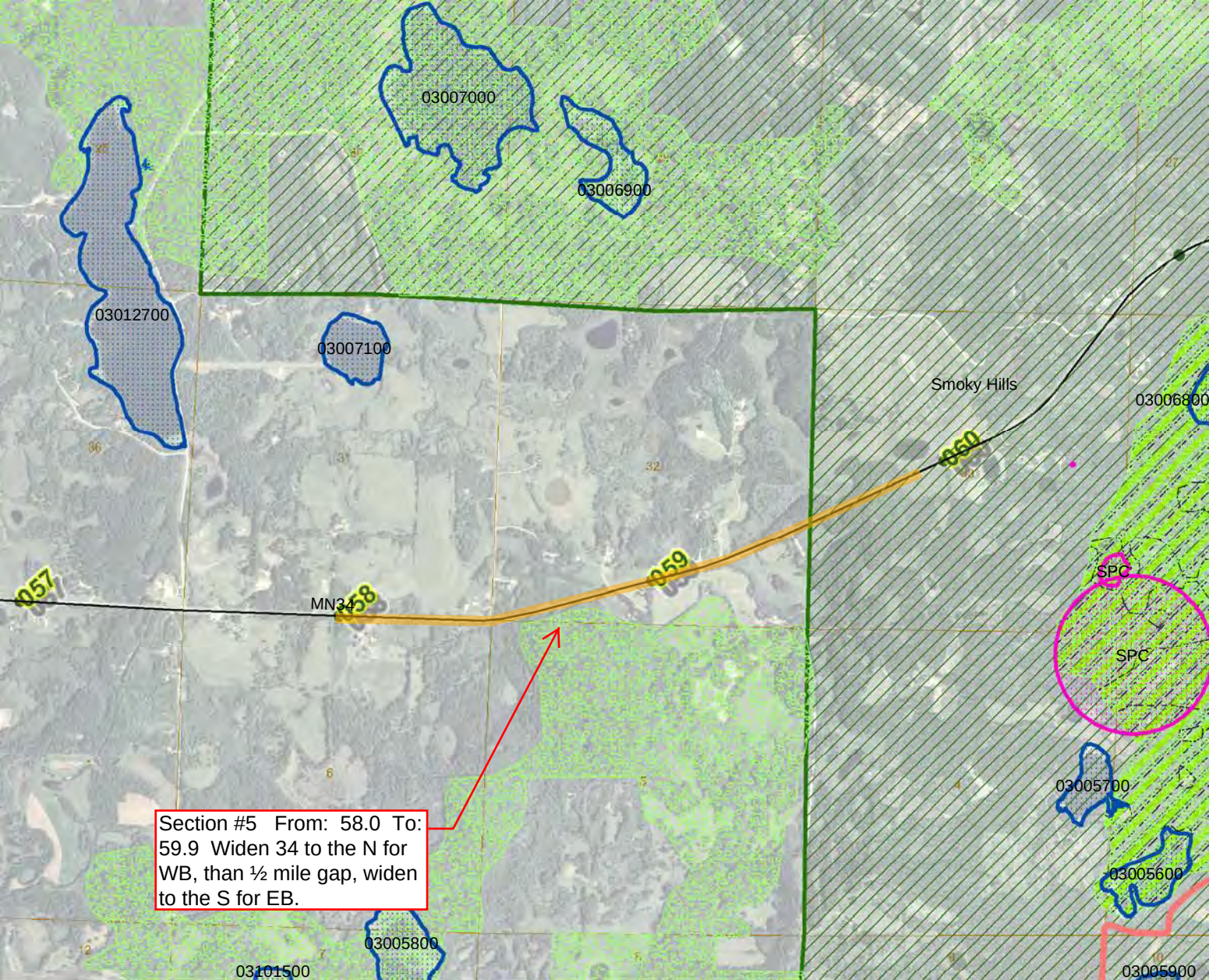
Office location: MnDOT's Office of Environmental Stewardship

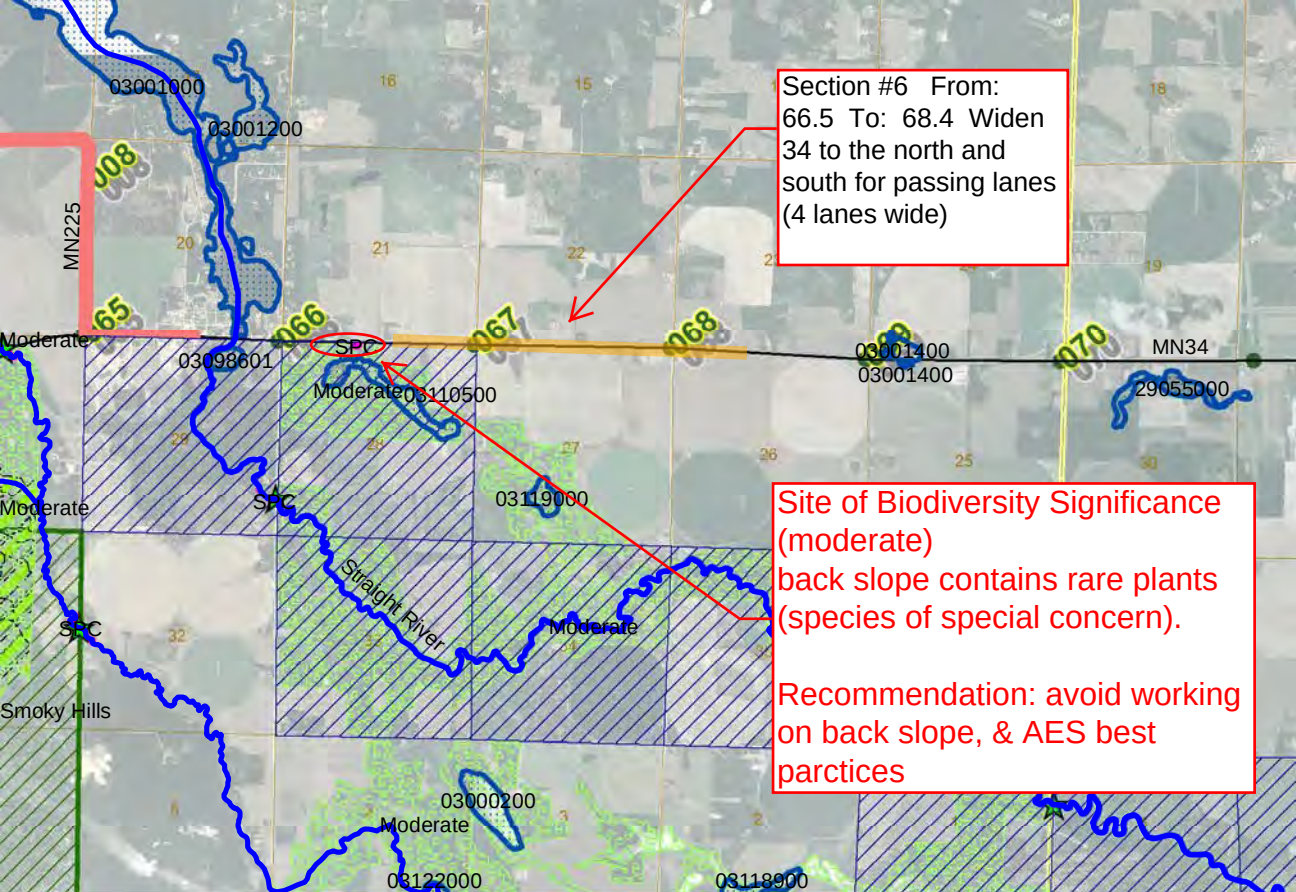

03040100
03040100
03040200
Frank WMA
Pelican River
Ultra
THR
MN34
036
038
045
046
US10
Pelican River
03040300
Detroit Mountain WPA
Pelican river. An altered Public Water under county ditch authority (no permit needed)... Though be aware that there are rare fish (state listed as Threatened) in the waterway. though have not been identified since 1975
Proposed Section #1
From: 36.7 To: 37.1 Add center left turn lane - no widening required.

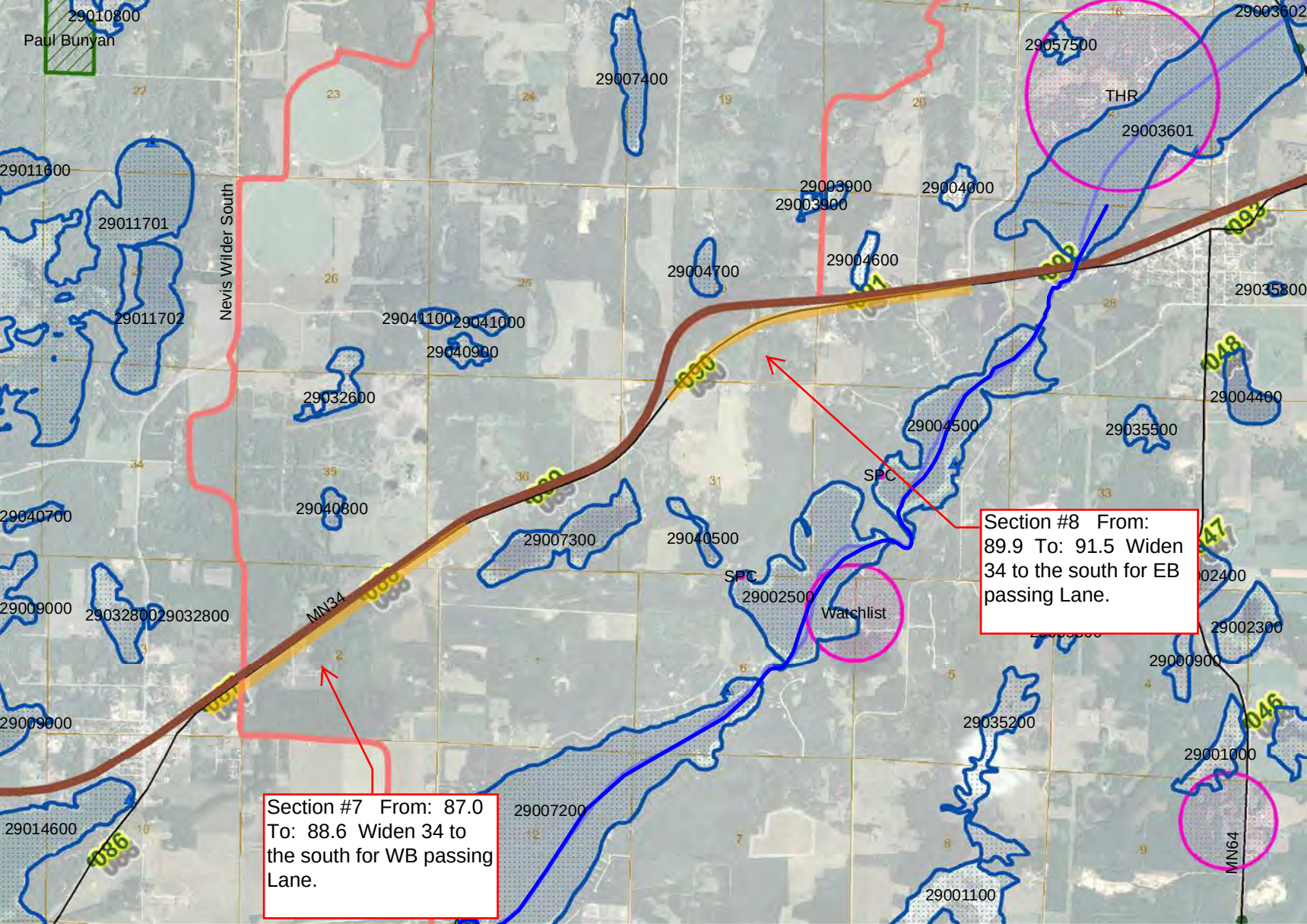

Struss Wildlife Production Area re-vegetation should not be in conflict with management - IE no weeds and preferably utilize a native mix.
Schultz Lake WMA re-vegetation should not be in conflict with WMA management - IE no weeds and preferably a native mix.
Proposed segment #2
From: 38.2 To: 40.5
Add center left turn and widen 34 to the south for passing lane.
Below
Frank WMA
03039401
03039402
Frank WMA
Ultra
03027
03027400
SPC
SPC
Moderate
Pickerel WMA
SPC
03027500
03027900
03027900
03027800
03034900
03034900
Schultz Lake WMA
039
040
041
038
MN34
THR
Struss WPA
03028400
03028200
Moderate
03028300
Moderate
03040300
Detroit Mountain WPA
Below
03028500


Pickerel WMA
03027300
Otter Tail River
MN34
043
044
03108000
SPC
03018600
03028300
03028100
03028000
Section #3 From: 43.2 To: 43.8
Remove center depressed median and add center left turn


03019500
Watchlist
03019500
03117500
03017900
03117000
03108300
03117300
03017800
Hubbel Pond WMA
MN34
Northwoods Trail Reapers
SPC
03018400
03018300
Section #4 From: 47.0 To: 48.6 Widen 34 to the north and south for passing lanes (4 lanes wide)
03018900
03018700
SPC
SPC
03018900
03018800


03007000
03006900
03012700
03007100
Smoky Hills
03006800
060
059
058
057
MN34
SPC
SPC
03005700
03005600
03005800
03101500
03005900
Section #5 From: 58.0 To: 59.9 Widen 34 to the N for WB, than ½ mile gap, widen to the S for EB.

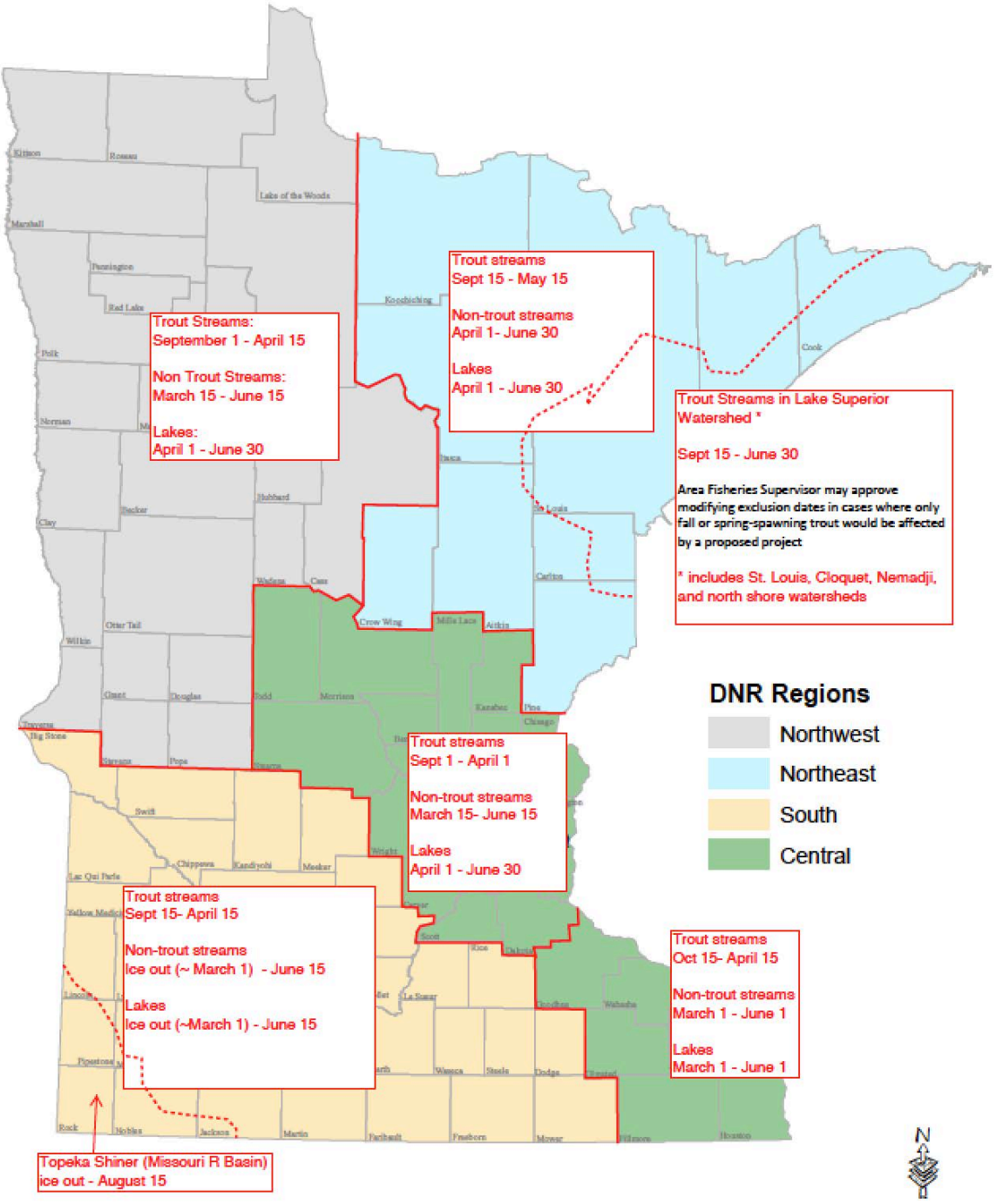

Section #6 From:
66.5 To: 68.4 Widen
34 to the north and
south for passing lanes
(4 lanes wide)
Site of Biodiversity Significance
(moderate)
back slope contains rare plants
(species of special concern).
Recommendation: avoid working
on back slope, & AES best
parctices
03001000
03001200
MN225
065
066
067
068
070
MN34
Moderate
03098601
SPC
Moderate
03110500
03001400
03001400
29055000
Moderate
SPC
03119000
Straight River
Moderate
SPC
Smoky Hills
03000200
Moderate
03122000
03118900


29010800
Paul Bunyan
29007400
29003602
29057500
THR
29003601
29011600
29011701
Nevis Wilder South
29003900
29003900
29004000
29004600
29004700
29035800
29011702
29041100
29041000
29040900
29032600
29004400
29004500
29035500
SPC
29040700
29040800
29007300
29040500
SPC
29002500
Watchlist
29009000
29032800
29032800
MN34
29002300
29000900
29009000
29035200
29001000
29014600
29007200
MN64
29001100
Section #8 From: 89.9 To: 91.5 Widen 34 to the south for EB passing Lane.
Section #7 From: 87.0 To: 88.6 Widen 34 to the south for WB passing Lane.

WORK EXCLUSION DATES TO ALLOW FOR FISH SPAWNING AND MIGRATION

To allow for fish migration or spawning, no in-water work is allowed in Public Waters during these dates*.

The Work Exclusion Dates below shall be incorporated into project scheduling and staging to protect fish spawning and migration. Work may be conducted elsewhere on a project during these dates; however no work shall occur within Public Waters during the specified exclusion dates without written approval from the DNR.



* Where the **permittee** demonstrates that a project will minimize impacts to fish habitat or if work during this time is essential, work during this period may occur only upon written approval of the DNR Area Fisheries Manager. Contact information for Area Fisheries Managers:
http://files.dnr.state.mn.us/fisheries/management/dnr_fisheries_managers.pdf

Minnesota Department of Transportation
Roadside Vegetation Management Unit
395 John Ireland Boulevard
Saint Paul, MN 55155

Mail Stop: 620
Office Phone: 651-366-3600
Fax: 651-366-3603

Memo

TO: Paul Munsterteiger,
Environmental Coordinator

FROM: Dave Hanson
Urban Forester, OES

DATE: November 26, 2013

SUBJECT: S.P. 0303-64 (TH 34),
Construction of passing lanes between Detroit Lakes and Nevis,
Vegetation Review.

In preparing this vegetation review background information, GIS layers, Videologs, and Google maps/images were used. This review is in response to ENM dated November 4, 2013.

Vegetation:
Vegetation related to this project is quite variable ranging from wet to dry sites containing planted landscape vegetation and established roadside turf. Naturally occurring trees and plants are present including a dry prairie containing a species of special concern. The surrounding land use is variable ranging from recreation and agriculture to commercial/industrial and residential.

Potential Impacts:
This vegetation review outlines vegetation impacts according to RP sections described in the ENM.

Impacts will occur at sites requiring culvert repairs/replacements and along stretches of road widening.

Along stretches of roadway expansion, anticipated impacts to roadside vegetation are tree removals, impacts to tree root systems as well as impacts to turf and forbs including a dry prairie at RP 66.5.

Section #1 – RP 36.7 to 37.1, addition of a center left turn lane.
Area is in town, road widening is not anticipated - impacts to vegetation are minimal to none.

Section #2 – RP 38.2 to 40.5, addition of a center left turn lane and widen TH 34 to the south.
Depending on construction limits, there will be impacts to vegetation along the south roadside. Vegetation consists of natural trees, shrubs and associated plants as well as landscape trees and turf on private properties.
Clean up brush and trees as needed from clear zones and backslopes. Root systems of some trees will likely be impacted (see 'Protection of Vegetation' section below).

Section #3 – RP 43.2 to 43.8, remove center depressed median and add center left turn lane.
Stating the obvious, currently the median is maintained turf, it will be removed.

Section #4 – RP 47.0 to 48.6, widen TH 34 to north and south for passing lane construction (4 lanes wide).

Approximate RP locations based on 2010 and 2012 VideoLogs.			
East bound – south side of road		**West bound** – north side of road	
47.016 - 47.13	Tree impacts likely	48.534 - 48.441	Tree impacts likely, small diameter stems
47.177 - 47.261	Tree impacts likely		
47.280	Tree impacts likely	48.374 - 48.241	Tree impacts likely
47.460 - 47.582	Tree impacts possible	48.241 - 48.175	depends on backslope change
47.649 - 47.725	Tree impacts possible	48.156 - 48.070	Tree impacts likely
47.753 - 47.782	Tree impacts possible	47.86 - 47.84	Tree impacts likely
48.114	Tree impacts likely	47.218 - 47.160	Tree impacts likely, small diameter stems
48.133 - 48.208	Tree impacts likely		
48.256 - 48.5	Tree impacts likely	47.066 - 47.020	depends on backslope change

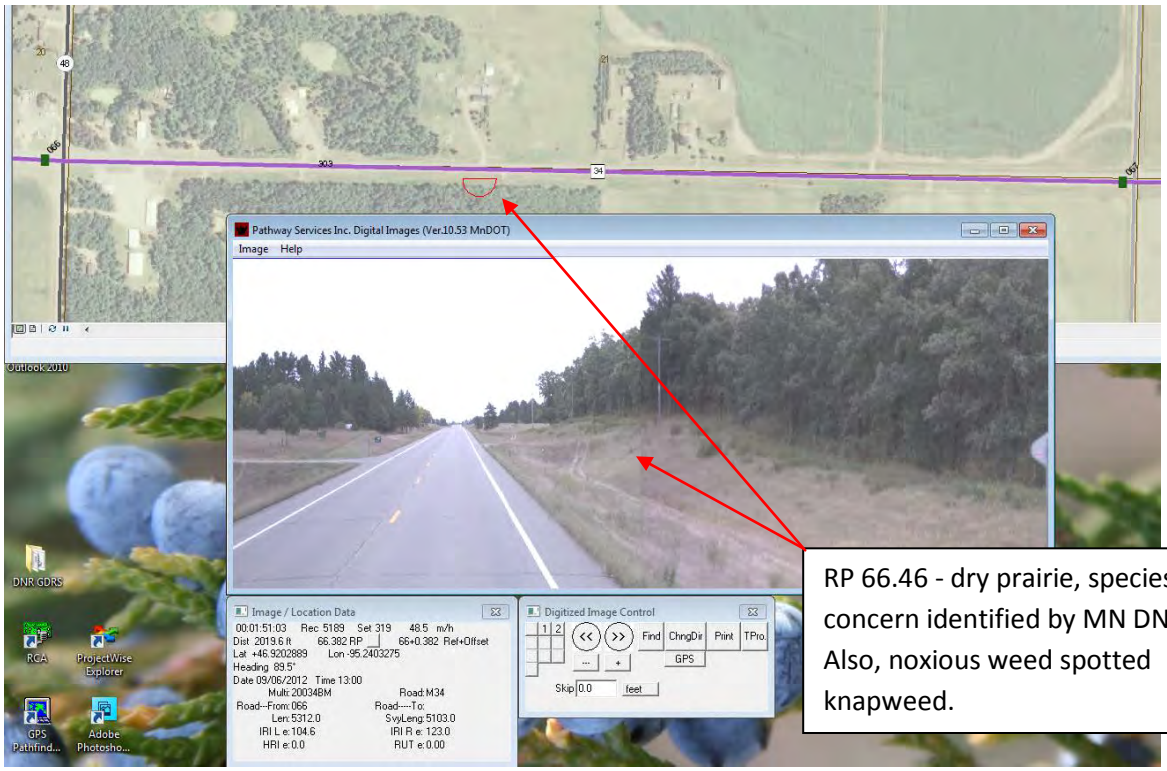
Section #5 – RP 58.0 to 59.9, widen TH 34 to north for WB passing lane, then a ½ mile gap (approximate RP 59.25-58.75 -best guess) before widening to south for EB passing lane . There is potential for impacts to large, visible trees between these reference points.

Approximate RP locations based on 2010 and 2012 VideoLogs.			
East bound – south side of road		**West bound** – north side of road	
59.25 - 59.29	Tree impacts likely	58.75 - 58.5	Tree impacts likely
59.366 - 59.89	Tree impacts likely	58.42 - 58.37	Tree impacts possible
		58.3 - 58.0	Tree impacts likely

Within District 2 and into Hubbard County.

Section #6 – RP 66.5 to 68.4, widen TH 34 to north and south for passing lane construction (4 lanes wide). Just prior to this stretch, approximately RP 66.46 along the south side of the road near the tree line is a dry prairie and a species of special concern has been recorded here. However, extent along the highway was not specified in DNRs NHIS database. Spotted knapweed (*Centaurea stoebe*), a noxious weed, was also recorded here. An ATV trail passes through this site so expect spotted knapweed has been moved along the trail.

To provide better vegetation coverage in the future on the dry soils and to better control spotted knapweed, consider re-planting these dry sandy soils with seed mix '35-221 Dry General Prairie.'



Approximate RP locations based on 2012 VideoLogs.	
66.59	Tree impacts possible - north side
67.55	Tree impacts possible - north side
67.9	Tree impacts likely - south side
68.0	Tree impacts possible - south side

Section #7 – RP 87.0 to 88.6, widen TH 34 to south for WB passing lane construction.

Approximate RP locations based on 2012 VideoLogs.	
East bound – south side of road	
87.030 - 87.164	Tree impacts likely
87.739 - 88.0	Tree impacts likely

Section #8 – RP 89.9 to 91.5, widen TH 34 to south for EB passing lane construction.

Approximate RP locations based on 2012 VideoLogs.	
East bound – south side of road	
90.16 - 90.47	Tree impacts possible
91.108 - 91.448	Tree impacts likely

As project initiation draws near and construction limits have been defined a site visit could be made if deemed necessary. At this time, such a site visit is not anticipated.

Protection of Vegetation:

Efforts should be made to protect large, visible hardwoods and conifers that may be considered landmarks, the effort may be as simple as fencing to protect roots. If there are any doubts or questions please give me a call and a site visit will be arranged. Examples include a white pine visible via VideoLog at RP 46.4 EB, a white pine at RP 45 WB or the hardwood at 45.2 EB that would require a health assessment.

Further, Standard Specification 2572.3 discusses construction requirements related to trees and vegetation protection. As construction limits are defined, verify the presence of, or lack thereof, areas of natural vegetation and/or trees to be protected and if necessary, protect with fencing. At a minimum, fencing (Standard Specification 2572.3 A.1) should be placed as close as possible to the construction limits and this fencing should not be removed or crossed by construction activities. Again, a site visit is not anticipated but could be arranged.

When tree roots are encountered, all root cutting should be done cleanly and the roots covered immediately to prevent excess drying – for more information refer to Standard Specification 2572.3 A.2. In addition and where practical, depending on seasonal rainfall supplemental water would benefit landscape trees in maintained landscapes where root systems are disrupted per Standard Specification 2572.3 A.3.

Areas near or under trees and the remnant prairie at RP 66.4 should not become staging areas for parking, equipment or materials. Activities of that nature further compact soils resulting in additional stress on already stressful roadsides.

Noxious Weeds:
As reported above at approximate RP 66.5 to 68.4 spotted knapweed (*Centaurea stoebe*) has been recorded. Spotted knapweed is a noxious weed on the Minnesota Department of Agriculture's 'Prohibited Control' list, meaning that efforts must be made to prevent the spread, maturation and dispersal of any propagating parts. It is likely that mowing (haying) and recreational vehicle activities have spread this infestation along TH 34 for some distance.

Available resources, including GIS layers do not identify other noxious weed infestations along the project. Having stated that, it is anticipated that some of the more common noxious weeds (i.e. Canada thistle, spotted knapweed, common tansy and common buckthorn) may be encountered within the area of this project. Following are some general guidelines that can help to limit the spread of noxious weeds during the construction phase:

- identify where weeds are present
- prioritize these areas for weed control before construction begins
- prevent movement of soil harboring a strong seed bank (soil under a weed infestation)
- prevent the spread of reproductive weed parts (seed and roots) by cleaning equipment before it is moved from one site to another
- post construction monitor for noxious weeds and control as necessary.

Vegetation Replacement:
There may be opportunities with this project to plant trees and shrubs as well as other vegetative areas. It is recommended that replanting plans incorporate native plant materials and seed mixes appropriate to site conditions. Local seed source is recommended and the Roadside Vegetation Management Unit can help with sourcing. A general discussion of vegetation protection and replacement can be found in HPDP Vegetation Subject Guidance.

In reference to **Section #6 - RP 66.5 to 68.4** (as identified in the ENM) consider re-planting these dry sandy soils with seed mix '35-221 Dry General Prairie' to provide better vegetation coverage on the dry soils and to provide competition to better control spotted knapweed.

For other specific recommendations please contact the Roadside Vegetation Management unit once construction limits are clearly defined. Thank you for the opportunity to review this project, if there are further concerns as this project draws closer please feel free to contact me.

Dave Hanson

Cc. Lynn Clarkowski
Roadside Vegetation Management Unit

Cooper, Laura

From: Munsterteiger, Paul (DOT) <paul.munsterteiger@state.mn.us>
Sent: Monday, December 02, 2013 7:28 AM
To: Kunkel, Beth
Subject: FW: S.P. 0303-64- ESA (Section 7) - Determination that the proposed action is not likely to jeopardize the continued existence of the Northern long-eared bat
Attachments: Area of Environmental Sensitivity.pdf; DNR response to MnDOT Early Notification Memo TH34 (SP0303-64) Becker and Hubbard Co

Mornin Beth, This is for you files/information. Have a great day. See ya.

From: Alcott, Jason (DOT)
Sent: Wednesday, November 27, 2013 1:21 PM
To: Munsterteiger, Paul (DOT); Larry Puchalski (lawrence.s.puchalski@usace.army.mil)
Cc: Lindeberg, Mark (DOT); Clarkowski, Lynn (DOT); Moynihan, Debra (DOT); Leete, Peter (DOT); Phil_Delphey@fws.gov
Subject: S.P. 0303-64- ESA (Section 7) - Determination that the proposed action is not likely to jeopardize the continued existence of the Northern long-eared bat

Lawrence Puchalski, ACOE
Paul Munsterteiger, MnDOT

Section 7 Determination For:
S.P. 0303-64, Trunk Highway 34
Passing Lane Construction – 4 Sections
Becker and Hubbard Counties

Action Area
The proposed action involves the construction of passing lanes along Trunk Highway 34 in Becker and Hubbard Counties.

Federally-Listed Species/Designated Critical Habitat in the Action Area
Section 7 of Endangered Species Act of 1973, as amended (Act), requires each Federal agency to review any action that it funds, authorizes or carries out to determine whether it may affect threatened, endangered, proposed species or listed critical habitat. Federal agencies (or their designated representatives) must consult with the U.S. Fish and Wildlife Service (Service) if any such effects may occur as a result of their actions. Consultation with the Service is not necessary if the proposed action will not directly or indirectly affect listed species or critical habitat. If a federal agency finds that an action will have no effect on listed species or critical habitat, it should maintain a written record of that finding that includes the supporting rationale. **According to the official County Distribution of Minnesota's Federally-Listed Threatened, Endangered, Proposed, and Candidate Species list (revised in October 2013), maintained by the Service, neither Becker or Hubbard Counties currently contain known populations of federally-listed species or have designated critical habitat.**

Proposed Federal Species in the Action Area
Section 7(a)(4) requires Federal agencies to confer with the Services on any agency action that is likely to jeopardize the continued existence of any species proposed for listing or result in the adverse modification of critical habitat proposed to be designated. A conference may involve informal discussions between the Services, the action agency, and the applicant. Following informal conference, the Services issue a conference report containing recommendations for reducing adverse effects. These recommendations are discretionary, because an agency is not prohibited from jeopardizing the continued existence of a proposed species or from adversely modifying proposed critical habitat. However, as soon as a listing action is finalized, the prohibition against jeopardy or adverse modification applies, regardless of the stage of the action. **According to the official County Distribution of Minnesota's Federally-Listed Threatened, Endangered, Proposed, and Candidate Species list (revised in October 2013), maintained by the**

Service, both Becker and Hubbard Counties are within the distribution range of the Northern long-eared bat (*Myotis septentrionalis*) which is currently proposed for listing as an endangered species in both project counties (Federal Register October 2, 2013). After coordination with the Service, I believe that it is reasonable to make the determination that the proposed action is not likely to jeopardize the continued existence of this species. Please note: if the project has not been completed by the time the listing becomes official, further coordination and possible consultation with the Service may be necessary.

As an item of information, the Minnesota Department of Natural Resources also reviewed this project for potential impacts to sensitive species and that information has been attached.

Please contact me if you have any questions.

Sincerely,

Jason Alcott
Minnesota Department of Transportation
Office of Environmental Stewardship
395 John Ireland Boulevard
St. Paul, MN 55155
Phone: 651-366-3605
Email: Jason.alcott@state.mn.us

Minnesota Department of Transportation

Office of Environmental Services
Mail Stop 620
395 John Ireland Boulevard
St. Paul, MN 55155

Office Tel: (651) 245-8276
Fax: (651) 366 3603

December 03, 2013

Re: S.P. 0303-64
Passing lanes on TH34 in Becker/Hubbard Counties

Dear Mr. Munsterteiger:

Your request for review of the above-referenced project indicates that no FHWA funds will be used, and there will be a Corps permit required. We have reviewed the above-referenced undertaking pursuant to MnDOT's responsibilities under the Minnesota Historic Sites Act (MS 138.665-.666), the Field Archaeology Act of Minnesota (MS 138.40); and the Private Cemeteries Act (MS 307.08, Subd. 9 and 10). A Section 106 review will be conducted for the portion of the project identified by the Corps of Engineers as being within the Corp permit area.

The project will use state funds; therefore, a review per Minnesota statutes 138.661-138.669 (Minnesota Historic Sites Acts) and 138.31-138.42 (Minnesota Field Archaeology Act) is required. These statutes require Mn/DOT to consult with the Minnesota Historical Society (MHS) when its undertakings have the potential to affect historic properties listed in the State or National Registers of Historic Places, or to consult with MHS and the Office of the State Archaeologist (OSA) when its undertakings have the potential to affect known or suspected archaeological sites.

Although Trunk Highway 34 is built on top of a historic roadway and passes through potentially archeological sensitive areas, particularly the section between Detroit Lakes and the south shore of Height of Land Lake, this project takes place entirely within existing right of way and will not disturb previously disturbed ground. It is the determination of this office that the proposed undertaking has **no potential to affect properties** listed in the State or the National Registers of Historic Places or to affect known or suspected archaeological sites. Therefore, no consultation with the MHS or the OSA is required and the historical/archaeological review should be considered completed. If the project does receive FHWA funds or the project scope changes, the Cultural Resources Unit should be notified to determine if additional review is required.

Sincerely,

Linda Pate

Linda Pate
Historian
Cultural Resources Unit

cc: Kristen Zschomler, Mn/DOT CRU
Mn/DOT CO/CRU Files
Mn/DOT CRU Project File

Appendix B Noise Tables and Other Applicable Documents
Noise Model Results

Table B-1 Daytime Noise Results

Receptor ID	NAC: Noise Area Classification	Modeled Existing (2013)[1]		Modeled No Build (2030)[1]		Difference Between Existing (2013) and No Build (2030)		Modeled Build (2030)[1]		Difference Between Existing (2013) and Build (2030)	
		L 10	L 50	L 10	L 50	L 10	L 50	L 10	L 50	L 10	L 50
State Daytime Noise Standards											
Residential NAC-1		65	60	65	60	-	-	65	60	-	-
Commercial NAC-2		70	65	70	65	-	-	70	65	-	-
Industrial NAC-3		80	75	80	75	-	-	80	75	-	-
NSA 1											
A	NAC-1	58.9	52.0	60.9	54.8	2.0	2.8	61.8	55.8	2.9	3.8
B	NAC-2	62.9	54.8	64.9	57.7	2.0	2.9	66.8	59.1	3.9	4.3
C	NAC-2	57.7	51.2	59.6	53.9	1.9	2.7	59.8	54.3	2.1	3.1
D	NAC-1	62.3	54.5	64.3	57.3	2.0	2.8	64.5	57.7	2.2	3.2
D1	NAC-1	54.9	49.0	56.7	51.6	1.8	2.6	58.1	53.0	3.2	4.0
E	NAC-1	61.6	54.0	63.6	56.9	2.0	2.9	63.8	57.1	2.2	3.1
E1	NAC-2	55.1	49.3	56.9	51.9	1.8	2.6	57.3	52.5	2.2	3.2
F	NAC-1	61.2	53.7	63.2	56.5	2.0	2.8	63.2	56.7	2.0	3.0
G	NAC-1	58.6	51.9	60.6	54.7	2.0	2.8	61.1	55.4	2.5	3.5
H	NAC-1	59.4	52.7	61.3	55.5	1.9	2.8	64.1	57.0	4.7	4.3
H1	NAC-1	56.2	50.2	58.0	52.8	1.8	2.6	60.5	54.2	4.3	4.0
NSA 2											
I	NAC-1	55.5	49.7	57.4	52.3	1.9	2.6	59.3	53.3	3.8	3.6
J	NAC-2	66.9	58.7	69.1	61.6	2.2	2.9	69.4	61.8	2.5	3.1
K	NAC-1	**68.3**	59.7	**70.5**	**62.6**	2.2	2.9	**70.0**	**62.3**	1.7	2.6
L	NAC-1	**66.6**	58.5	**68.7**	**61.4**	2.1	2.9	**68.4**	**61.2**	1.8	2.7
M	NAC-1	64.2	56.7	**66.3**	59.6	2.1	2.9	**66.2**	59.5	2.0	2.8
N	NAC-1	64.9	57.2	**67.0**	**60.1**	2.1	2.9	**67.0**	**60.1**	2.1	2.9
O	NAC-1	58.3	52.2	60.2	54.9	1.9	2.7	60.2	54.9	1.9	2.7
P	NAC-1	61.3	54.5	63.3	57.4	2.0	2.9	63.4	57.4	2.1	2.9
Q	NAC-1	65.0	57.3	**67.1**	**60.2**	2.1	2.9	**67.1**	**60.2**	2.1	2.9
R	NAC-1	**65.3**	57.6	**67.4**	**60.5**	2.1	2.9	**67.4**	**60.5**	2.1	2.9
S	NAC-1	63.9	56.5	**66.0**	59.4	2.1	2.9	**65.9**	59.3	2.0	2.8
T	NAC-1	**65.3**	57.7	**67.4**	**60.6**	2.1	2.9	**67.4**	**60.5**	2.1	2.8
U	NAC-2	64.0	56.6	66.0	59.5	2.0	2.9	65.9	59.3	1.9	2.7
V	NAC-2	69.2	62.2	**71.2**	**65.1**	2.0	2.9	68.9	61.3	-0.3	-0.9
W	NAC-1	**69.0**	**62.0**	**71.0**	**64.9**	2.0	2.9	**68.2**	**60.9**	-0.8	-1.1
X	NAC-1	**66.8**	**60.6**	**68.7**	**63.3**	1.9	2.7	**65.9**	59.3	-0.9	-1.3
Y	NAC-1	**67.8**	**61.4**	**69.8**	**64.2**	2.0	2.8	**66.9**	**60.1**	-0.9	-1.3
Z	NAC-1	**66.1**	**60.1**	**68.0**	**62.9**	1.9	2.8	**65.1**	58.8	-1.0	-1.3
AA	NAC-1	**67.9**	**61.4**	**69.9**	**64.2**	2.0	2.8	**67.3**	**60.4**	-0.6	-1.0
BB	NAC-1	64.9	57.5	**66.9**	**60.4**	2.0	2.9	**66.5**	59.7	1.6	2.2
CC	NAC-1	63.8	57.0	**65.8**	59.9	2.0	2.9	**65.2**	58.7	1.4	1.7
NSA 3											
DD	NAC-1	**67.1**	58.2	**69.3**	**61.2**	2.2	3.0	**69.2**	**61.1**	2.1	2.9
EE	NAC-1	63.6	55.4	**65.7**	58.4	2.1	3.0	64.9	57.9	1.3	2.5
FF	NAC-1	64.2	56.0	**66.4**	59.0	2.2	3.0	**66.4**	59.1	2.2	3.1
GG	NAC-1	62.4	54.4	64.5	57.4	2.1	3.0	63.3	56.8	0.9	2.4
HH	NAC-1	62.6	54.6	64.7	57.5	2.1	2.9	**65.4**	58.3	2.8	3.7
II	NAC-2	62.9	55.0	65.0	57.9	2.1	2.9	64.6	57.7	1.7	2.7
UU	NAC-1	61.7	54.0	63.7	56.9	2.0	2.9	64.4	57.5	2.7	3.5

Note:

[1]Bold values exceed daytime noise standards

Appendix B Noise Tables and Other Applicable Documents
Noise Model Results

Table B-1 Daytime Noise Results

Receptor ID	NAC: Noise Area Classification	Modeled Existing (2013)[1]		Modeled No Build (2030)[1]		Difference Between Existing (2013) and No Build (2030)		Modeled Build (2030)[1]		Difference Between Existing (2013) and Build (2030)	
		L 10	L 50	L 10	L 50	L 10	L 50	L 10	L 50	L 10	L 50
State Daytime Noise Standards											
Residential NAC-1		65	60	65	60	-	-	65	60	-	-
Commercial NAC-2		70	65	70	65	-	-	70	65	-	-
Industrial NAC-3		80	75	80	75	-	-	80	75	-	-
NSA 4											
JJ	NAC-1	48.9	42.8	50.8	45.5	1.9	2.7	50.8	45.5	1.9	2.7
KK	NAC-1	54.7	48.0	56.7	50.7	2.0	2.7	56.7	50.8	2.0	2.8
LL	NAC-1	58.0	50.6	60.0	53.4	2.0	2.8	60.0	53.4	2.0	2.8
MM	NAC-1	59.6	51.7	61.7	54.6	2.1	2.9	61.7	54.5	2.1	2.8
NSA 5											
NN	NAC-1	59.1	49.9	61.3	52.8	2.2	2.9	61.2	52.7	2.1	2.8
OO	NAC-1	58.5	49.6	60.7	52.5	2.2	2.9	60.8	52.6	2.3	3.0
PP	NAC-1	52.6	45.0	54.5	47.8	1.9	2.8	54.6	47.8	2.0	2.8
QQ	NAC-1	60.9	51.4	63.1	54.3	2.2	2.9	63.5	54.5	2.6	3.1
RR	NAC-1	54.6	46.3	56.7	49.1	2.1	2.8	56.8	49.4	2.2	3.1
SS	NAC-1	63.7	55.4	**65.8**	58.3	2.1	2.9	**65.8**	58.3	2.1	2.9
NSA 6											
TT	NAC-1	62.9	54.7	65.0	57.6	2.1	2.9	**65.1**	57.7	2.2	3.0
NSA 7											
VV	NAC-1	**65.5**	56.9	**67.7**	59.9	2.2	3.0	**67.9**	**60.1**	2.4	3.2
WW	NAC-1	54.3	46.8	56.3	49.7	2.0	2.9	56.5	49.9	2.2	3.1
XX	NAC-1	61.4	52.5	63.6	55.5	2.2	3.0	63.7	55.5	2.3	3.0
YY	NAC-1	55.2	47.8	57.2	50.6	2.0	2.8	57.1	50.6	1.9	2.8
ZZ	NAC-1	62.1	53.0	64.3	56.0	2.2	3.0	64.5	56.1	2.4	3.1
NSA 8											
AAA	NAC-1	56.7	48.9	58.7	51.8	2.0	2.9	58.4	51.4	1.7	2.5
BBB	NAC-1	62.8	53.5	64.9	56.5	2.1	3.0	64.5	56.1	1.7	2.6
CCC	NAC-1	60.7	52.1	62.9	55.0	2.2	2.9	63.2	55.2	2.5	3.1
DDD	NAC-1	57.3	49.4	59.3	52.2	2.0	2.8	58.9	51.5	1.6	2.1

Note:

[1]Bold values exceed daytime noise standards

Appendix B Noise Tables and Other Applicable Documents
Noise Model Results

Table B-2 Nighttime Noise Results

Receptor ID	NAC: Noise Area Classification	Modeled Existing (2013)[1]		Modeled No Build (2030)[1]		Difference Between Existing (2013) and No Build (2030)		Modeled Build (2030)[1]		Difference Between Existing (2013) and Build (2030)	
		L 10	L 50	L 10	L 50	L 10	L 50	L 10	L 50	L 10	L 50
State Daytime Noise Standards											
Residential NAC-1		55	50	55	50	-	-	55	50	-	-
Commercial NAC-2		70	65	70	65	-	-	70	65	-	-
Industrial NAC-3		80	75	80	75	-	-	80	75	-	-
NSA 1											
A	NAC-1	**55.8**	47.7	**57.9**	**50.5**	2.1	2.8	**59.5**	**52.5**	3.7	4.8
B	NAC-2	59.5	50.4	61.7	53.3	2.2	2.9	63.8	55.2	4.3	4.8
C	NAC-2	54.6	46.9	56.7	49.7	2.1	2.8	57.4	50.9	2.8	4.0
D	NAC-1	**59.0**	50.0	**61.2**	**53.0**	2.2	3.0	**61.6**	**53.7**	2.6	3.7
D1	NAC-1	51.9	44.8	53.9	47.6	2.0	2.8	**55.7**	49.6	3.8	4.8
E	NAC-1	**58.4**	49.6	**60.5**	**52.5**	2.1	2.9	**61.1**	**53.4**	2.7	3.8
E1	NAC-2	52.2	45.1	54.1	47.8	1.9	2.7	**55.2**	49.5	3.0	4.4
F	NAC-1	**57.9**	49.3	**60.1**	**52.2**	2.2	2.9	**61.9**	**54.7**	4.0	5.4
G	NAC-1	**55.5**	47.6	**57.6**	**50.5**	2.1	2.9	**59.4**	**53.1**	3.9	5.5
H	NAC-1	**56.3**	48.4	**58.4**	**51.2**	2.1	2.8	**61.9**	**54.2**	5.6	5.8
H1	NAC-1	53.2	45.9	**55.2**	48.7	2.0	2.8	**58.3**	**51.4**	5.1	5.5
NSA 2											
I	NAC-1	52.6	45.4	54.5	48.2	1.9	2.8	**57.5**	**51.0**	4.9	5.6
J	NAC-2	63.7	54.4	65.8	57.2	2.1	2.8	66.1	57.4	2.4	3.0
K	NAC-1	**65.0**	**55.3**	**67.1**	**58.1**	2.1	2.8	**66.7**	**57.8**	1.7	2.5
L	NAC-1	**63.4**	**54.2**	**65.5**	**57.0**	2.1	2.8	**65.2**	**56.8**	1.8	2.6
M	NAC-1	**61.1**	**52.4**	**63.1**	**55.2**	2.0	2.8	**63.0**	**55.1**	1.9	2.7
N	NAC-1	**61.8**	**52.9**	**63.8**	**55.7**	2.0	2.8	**63.8**	**55.7**	2.0	2.8
O	NAC-1	**55.4**	48.2	**57.3**	**50.8**	1.9	2.6	**57.3**	**50.8**	1.9	2.6
P	NAC-1	**58.4**	**50.4**	**60.3**	**53.1**	1.9	2.7	**60.4**	**53.1**	2.0	2.7
Q	NAC-1	**61.9**	**53.1**	**63.9**	**55.9**	2.0	2.8	**63.9**	**55.8**	2.0	2.7
R	NAC-1	**62.2**	**53.3**	**64.2**	**56.1**	2.0	2.8	**64.3**	**56.1**	2.1	2.8
S	NAC-1	**60.8**	**52.3**	**62.9**	**55.0**	2.1	2.7	**62.8**	**55.0**	2.0	2.7
T	NAC-1	**62.2**	**53.4**	**64.3**	**56.2**	2.1	2.8	**64.2**	**56.1**	2.0	2.7
U	NAC-2	60.9	52.4	62.9	55.1	2.0	2.7	62.8	55.0	1.9	2.6
V	NAC-2	66.3	58.1	68.2	60.8	1.9	2.7	65.6	56.9	-0.7	-1.2
W	NAC-1	**66.0**	**57.9**	**68.0**	**60.6**	2.0	2.7	**65.0**	**56.4**	-1.0	-1.5
X	NAC-1	**63.9**	**56.5**	**65.8**	**59.2**	1.9	2.7	**62.8**	**55.0**	-1.1	-1.5
Y	NAC-1	**65.0**	**57.4**	**66.8**	**60.0**	1.8	2.6	**63.7**	**55.7**	-1.3	-1.7
Z	NAC-1	**63.3**	**56.1**	**65.2**	**58.7**	1.9	2.6	**62.1**	**54.4**	-1.2	-1.7
AA	NAC-1	**65.0**	**57.4**	**66.9**	**60.1**	1.9	2.7	**64.2**	**56.0**	-0.8	-1.4
BB	NAC-1	**61.8**	**53.3**	**63.8**	**56.0**	2.0	2.7	**63.4**	**55.3**	1.6	2.0
CC	NAC-1	**60.8**	**52.9**	**62.8**	**55.6**	2.0	2.7	**62.1**	**54.4**	1.3	1.5
NSA 3											
DD	NAC-1	**63.7**	**53.8**	**65.9**	**56.7**	2.2	2.9	**65.8**	**56.6**	2.1	2.8
EE	NAC-1	**60.3**	**51.1**	**62.5**	**53.9**	2.2	2.8	**61.7**	**53.5**	1.4	2.4
FF	NAC-1	**60.9**	**51.6**	**63.1**	**54.5**	2.2	2.9	**63.1**	**54.6**	2.2	3.0
GG	NAC-1	**59.1**	50.0	**61.3**	**52.9**	2.2	2.9	**60.2**	**52.4**	1.1	2.4
HH	NAC-1	**59.3**	**50.2**	**61.4**	**53.0**	2.1	2.8	**62.2**	**53.8**	2.9	3.6
II	NAC-2	59.6	50.6	61.8	53.5	2.2	2.9	61.4	53.2	1.8	2.6
UU	NAC-1	**58.5**	49.6	**60.5**	**52.4**	2.0	2.8	**61.2**	**53.1**	2.7	3.5

Note:
[1]Bold values exceed daytime noise standards

Appendix B Noise Tables and Other Applicable Documents
Noise Model Results

Table B-2 Nighttime Noise Results

Receptor ID	NAC: Noise Area Classification	Modeled Existing (2013)[1]		Modeled No Build (2030)[1]		Difference Between Existing (2013) and No Build (2030)		Modeled Build (2030)[1]		Difference Between Existing (2013) and Build (2030)	
		L 10	L 50	L 10	L 50	L 10	L 50	L 10	L 50	L 10	L 50
State Daytime Noise Standards											
Residential NAC-1		55	50	55	50	-	-	55	50	-	-
Commercial NAC-2		70	65	70	65	-	-	70	65	-	-
Industrial NAC-3		80	75	80	75	-	-	80	75	-	-
NSA 4											
JJ	NAC-1	46.0	38.6	47.9	41.3	1.9	2.7	47.9	41.3	1.9	2.7
KK	NAC-1	51.7	43.7	53.7	46.5	2.0	2.8	53.7	46.5	2.0	2.8
LL	NAC-1	54.8	46.3	**56.9**	49.1	2.1	2.8	**56.9**	49.0	2.1	2.7
MM	NAC-1	**56.4**	47.3	**58.5**	**50.1**	2.1	2.8	**58.5**	**50.1**	2.1	2.8
NSA 5											
NN	NAC-1	**55.3**	45.0	**57.8**	48.1	2.5	3.1	**57.7**	48.1	2.4	3.1
OO	NAC-1	54.8	44.7	**57.2**	47.8	2.4	3.1	**57.4**	47.9	2.6	3.2
PP	NAC-1	49.0	40.3	51.4	43.3	2.4	3.0	51.4	43.4	2.4	3.1
QQ	NAC-1	**57.1**	46.5	**59.6**	49.6	2.5	3.1	**59.9**	49.8	2.8	3.3
RR	NAC-1	50.9	41.5	53.4	44.6	2.5	3.1	53.5	44.8	2.6	3.3
SS	NAC-1	**60.3**	**50.8**	**62.6**	**53.9**	2.3	3.1	**62.6**	**53.9**	2.3	3.1
NSA 6											
TT	NAC-1	**59.5**	**50.2**	**61.8**	**53.3**	2.3	3.1	**61.9**	**53.4**	2.4	3.2
NSA 7											
VV	NAC-1	**62.2**	**52.5**	**64.3**	**55.4**	2.1	2.9	**64.5**	**55.6**	2.3	3.1
WW	NAC-1	51.2	42.5	53.0	45.0	1.8	2.5	53.2	45.3	2.0	2.8
XX	NAC-1	**58.1**	48.1	**60.0**	**50.7**	1.9	2.6	**60.2**	**50.8**	2.1	2.7
YY	NAC-1	52.1	43.5	53.9	46.0	1.8	2.5	53.8	46.0	1.7	2.5
ZZ	NAC-1	**58.7**	48.6	**60.7**	**51.2**	2.0	2.6	**60.9**	**51.3**	2.2	2.7
NSA 8											
AAA	NAC-1	53.5	44.6	**55.3**	47.1	1.8	2.5	55.0	46.7	1.5	2.1
BBB	NAC-1	**59.4**	49.1	**61.3**	**51.6**	1.9	2.5	**60.9**	**51.3**	1.5	2.2
CCC	NAC-1	**57.4**	47.7	**59.3**	**50.2**	1.9	2.5	**59.7**	**50.4**	2.3	2.7
DDD	NAC-1	54.0	45.0	**55.9**	47.6	1.9	2.6	**55.4**	46.8	1.4	1.8

Note:
[1]Bold values exceed daytime noise standards

Table B-3: NSA 1 – Wall 1.1 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 Foot High Wall											
A	2	61.8	56.8	5.0	0	0	None>=7	1,045	10,450	$ 209,000	N/A*
D	2	64.5	60.9	3.6	0	0					
D1	1	58.1	56.0	2.1	0	0					
E	3	63.8	60.4	3.4	0	0					
E1	1	57.3	56.2	1.1	0	0					
E3	1	63.8	61.8	2.0	0	0					
14 Foot High Wall											
A	2	61.8	54.7	7.1	2	2	7	1,045	14,630	$ 292,600	**$ 41,800**
D	2	64.5	57.5	7.0	2	0					
D1	1	58.1	53.9	4.2	0	0					
E	3	63.8	57.8	6.0	3	0					
E1	1	57.3	54.9	2.4	0	0					
E3	1	63.8	61.0	2.8	0	0					
15 Foot High Wall											
A	2	61.8	54.3	7.5	2	2	7	1,045	15,675	$ 313,500	$ 44,786
D	2	64.5	56.7	7.8	2	2					
D1	1	58.1	53.4	4.7	0	0					
E	3	63.8	57.3	6.5	3	0					
E1	1	57.3	54.7	2.6	0	0					
E3	1	63.8	60.9	2.9	0	0					
16 Foot High Wall											
A	2	61.8	53.9	7.9	2	2	8	1,045	16,720	$ 334,400	**$ 41,800**
D	2	64.5	55.9	8.6	2	2					
D1	1	58.1	53.0	5.1	1	0					
E	3	63.8	56.9	6.9	3	0					
E1	1	57.3	54.5	2.8	0	0					
E3	1	63.8	60.8	3.0	0	0					
20 Foot High Wall											
A	2	61.8	53.0	8.8	2	2	8	1,045	20,900	$ 418,000	$ 52,250
D	2	64.5	53.4	11.1	2	2					
D1	1	58.1	52.0	6.1	1	0					
E	3	63.8	55.8	8.0	3	3					
E1	1	57.3	54.0	3.3	0	0					
E3	1	63.8	60.6	3.2	0	0					

Notes:

This noise wall is cost-effective at a height of 16 feet, and is therefore proposed as part of the project.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-4: NSA 1 – Wall 1.2 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
F	2	68.2	65.3	2.9	0	0	None>=7	400	4,000	$ 80,000	N/A*
15 foot high wall											
F	2	68.3	62.2	6.1	2	0	None>=7	400	6,000	$ 120,000	N/A*
20 foot high wall											
F	2	68.3	60.1	8.2	2	2	2	400	8,000	$ 160,000	$ 80,000

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-5: NSA 1 – Wall 1.3 & 1.4 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
G	2	65.6	64.6	1.0	0	0	None>=7	1,155	11,550	$ 231,000	N/A*
H	3	66.1	64.5	1.6	0	0					
H1	1	62.5	61.4	1.1	0	0					
15 foot high wall											
G	2	65.6	63.6	2.0	0	0	None>=7	1,155	17,325	$ 346,500	N/A*
H	3	66.1	61.9	4.2	0	0					
H1	1	62.5	59.4	3.1	0	0					
20 foot high wall											
G	2	65.6	62.5	3.1	0	0	4	1,155	23,100	$ 462,000	$ 115,500
H	3	66.1	58.5	7.6	3	3					
H1	1	62.5	56.8	5.7	1	0					

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-6: NSA 1 – Wall 1.5 & 1.6 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
I	1	62.5	61.5	1.0	0	0	None>=7	1,245	12,450	$ 249,000	N/A*
15 foot high wall											
I	1	62.5	59.9	2.6	0	0	None>=7	1,245	18,675	$ 373,500	N/A*
20 foot high wall											
I	1	62.5	57.9	4.6	0	0	None>=7	1,245	24,900	$ 498,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-7: NSA 2 – Wall 2.1, 2.2, & 2.3 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
K	1	70.0	68.5	1.5	0	0	None>=7	530	5,300	$ 106,000	N/A*
L	1	68.4	64.9	3.5	0	0					
15 foot high wall											
K	1	70.0	67.6	2.4	0	0	None>=7	530	7,950	$ 159,000	N/A*
L	1	68.4	61.9	6.5	1	0					
20 foot high wall											
K	1	70.0	67.2	2.8	0	0	1	530	10,600	$ 212,000	N/A*
L	1	68.4	60.6	7.8	1	1					

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-8: NSA 2 – Wall 2.4 & 2.5 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
M	1	66.2	64.3	1.9	0	0	None>=7	850	8,500	$ 170,000	N/A*
15 foot high wall											
M	1	66.2	62.4	3.8	0	0	None>=7	850	12,750	$ 255,000	N/A*
20 foot high wall											
M	1	66.2	60.7	5.5	1	0	None>=7	850	17,000	$ 340,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-9: NSA 2 – Wall 2.6 & 2.7 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
N	1	67.0	64.8	2.2	0	0	None>=7	600	6,000	$ 120,000	N/A*
15 foot high wall											
N	1	67.0	62.2	4.8	0	0	None>=7	600	9,000	$ 180,000	N/A*
20 foot high wall											
N	1	67.0	60.3	6.7	1	0	None>=7	600	12,000	$ 240,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-10: NSA 2 – Wall 2.8 & 2.9 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
O	1	60.2	59.5	0.7	0	0	None>=7	1,735	17,350	$ 347,000	N/A*
15 foot high wall											
O	1	60.2	58.1	2.1	0	0	None>=7	1,735	26,025	$ 520,500	N/A*
20 foot high wall											
O	1	60.2	55.8	4.4	0	0	None>=7	1,735	34,700	$ 694,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-11: NSA 2 – Wall 2.21 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
P	2	63.4	63.0	0.4	0	0	None>=7	510	5,100	$ 102,000	N/A*
15 foot high wall											
P	2	63.4	61.6	1.8	0	0	None>=7	510	7,650	$ 153,000	N/A*
20 foot high wall											
P	2	63.4	59.6	3.8	0	0	None>=7	510	10,200	$ 204,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-12: NSA 2 – Wall 2.22 & 2.23 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
Q	1	67.1	64.9	2.2	0	0	None>=7	610	6,100	$ 122,000	N/A*
R	2	67.4	65.6	1.8	0	0					
15 foot high wall											
Q	1	67.1	61.7	5.4	1	0	None>=7	610	9,150	$ 183,000	N/A*
R	2	67.4	64.2	3.2	0	0					
20 foot high wall											
Q	1	67.1	58.9	8.2	1	1	1	610	12,200	$ 244,000	$ 244,000
R	2	67.4	63.4	4.0	0	0					

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-13: NSA 2 – Wall 2.24 & 2.25 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
S	1	65.9	64.0	1.9	0	0	None>=7	810	8,100	$ 162,000	N/A*
15 foot high wall											
S	1	65.9	62.1	3.8	0	0	None>=7	810	12,150	$ 243,000	N/A*
20 foot high wall											
S	1	65.9	60.7	5.2	1	0	None>=7	810	16,200	$ 324,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-14: NSA 2 – Wall 2.26 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
T	2	67.4	65.1	2.3	0	0	None>=7	575	5,750	$ 115,000	N/A*
15 foot high wall											
T	2	67.4	62.7	4.7	0	0	None>=7	575	8,625	$ 172,500	N/A*
20 foot high wall											
T	2	67.4	60.2	7.2	2	2	2	575	11,500	$ 230,000	$ 115,000

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-15: NSA 2 – Wall 2.11 & 2.12 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
W	3	68.2	66.8	1.4	0	0	None>=7	1,080	10,800	$ 216,000	N/A*
X	1	65.9	62.6	3.3	0	0					
Y	1	66.9	61.9	5.0	1	0					
15 foot high wall											
W	3	68.2	65.3	2.9	0	0	2	1,080	16,200	$ 324,000	$ 162,000
X	1	65.9	59.4	6.5	1	0					
Y	1	66.9	59.0	7.9	1	1					
20 foot high wall											
W	3	68.2	64.2	4.0	0	0	2	1,080	21,600	$ 432,000	$ 216,000
X	1	65.9	56.8	9.1	1	1					
Y	1	66.9	56.6	10.3	1	1					

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-16: NSA 2 – Wall 2.13 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
Z	2	65.1	64.7	0.4	0	0	None>=7	610	6,100	$ 122,000	N/A*
15 foot high wall											
Z	2	65.1	63.4	1.7	0	0	None>=7	610	9,150	$ 183,000	N/A*
20 foot high wall											
Z	2	65.1	61.2	3.9	0	0	None>=7	610	12,200	$ 244,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-17: NSA 2 – Wall 2.14, 2.15, & 2.16 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
AA	3	67.3	64.6	2.7	0	0	None>=7	455	4,550	$ 91,000	N/A*
15 foot high wall											
AA	3	67.3	61.7	5.6	3	0	None>=7	455	6,825	$ 136,500	N/A*
20 foot high wall											
AA	3	67.3	60.0	7.3	3	3	3	455	9,100	$ 182,000	$ 60,667

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-18: NSA 2 – Wall 2.18 & 2.19 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
BB	1	66.5	65.4	1.1	0	0	None>=7	550	5,500	$ 110,000	N/A*
15 foot high wall											
BB	1	66.5	64.1	2.4	0	0	None>=7	550	8,250	$ 165,000	N/A*
20 foot high wall											
BB	1	66.5	63.0	3.5	0	0	None>=7	550	11,000	$ 220,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-19: NSA 2 – Wall 2.17 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
CC	1	65.2	63.8	1.4	0	0	None>=7	615	6,150	$ 123,000	N/A*
15 foot high wall											
CC	1	65.2	62.2	3.0	0	0	None>=7	615	9,225	$ 184,500	N/A*
20 foot high wall											
CC	1	65.2	60.2	5.0	0	0	None>=7	615	12,300	$ 246,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-20: NSA 3 – Wall 3.5 & 3.6 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
DD	3	69.2	67.7	1.5	0	0	None>=7	1,795	17,950	$ 359,000	N/A*
EE	3	64.9	64.3	0.6	0	0					
GG	2	63.3	61.8	1.5	0	0					
15 foot high wall											
DD	3	69.2	66.3	2.9	0	0	None>=7	1,795	26,925	$ 538,500	N/A*
EE	3	64.9	62.7	2.2	0	0					
GG	2	63.3	60.5	2.8	0	0					
20 foot high wall											
DD	3	69.2	65.3	3.9	0	0	None>=7	1,795	35,900	$ 718,000	N/A*
EE	3	64.9	60.0	4.9	0	0					
GG	2	63.3	59.2	4.1	0	0					

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-21: NSA 3 – Wall 3.1, 3.2, 3.3, & 3.4 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
FF	4	66.4	65.7	0.7	0	0	None>=7	800	8,000	$ 160,000	N/A*
15 foot high wall											
FF	4	66.4	64.6	1.8	0	0	None>=7	800	12,000	$ 240,000	N/A*
20 foot high wall											
FF	4	66.4	63.5	2.9	0	0	None>=7	800	16,000	$ 320,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-22: NSA 3 – Wall 3.7 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
HH	1	65.4	64.0	1.4	0	0	None>=7	460	4,600	$ 92,000	N/A*
15 foot high wall											
HH	1	65.4	62.0	3.4	0	0	None>=7	460	6,900	$ 138,000	N/A*
20 foot high wall											
HH	1	65.4	59.8	5.6	1	0	None>=7	460	9,200	$ 184,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-23: NSA 3 – Wall 3.8 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
UU	2	64.4	62.5	1.9	0	0	None>=7	1,285	12,850	$ 257,000	N/A*
VV	1	67.9	65.1	2.8	0	0					
15 foot high wall											
UU	2	64.4	60.4	4.0	0	0	None>=7	1,285	19,275	$ 385,500	N/A*
VV	1	67.9	62.2	5.7	1	0					
20 foot high wall											
UU	2	64.4	58.5	5.9	2	0	3	1,285	25,700	$ 514,000	$ 171,333
VV	1	67.9	59.1	8.8	1	1					

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-24: NSA 4 – Wall 4.1 & 4.2 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
LL	1	60.0	58.8	1.2	0	0	None>=7	1,810	18,100	$ 362,000	N/A*
15 foot high wall											
LL	1	60.0	56.0	4.0	0	0	None>=7	1,810	27,150	$ 543,000	N/A*
20 foot high wall											
LL	1	60.0	53.7	6.3	1	0	None>=7	1,810	36,200	$ 724,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-25: NSA 4 – Wall 4.3 & 4.4 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
MM	2	61.7	57.6	4.1	0	0	None>=7	1,380	13,800	$ 276,000	N/A*
15 foot high wall											
MM	2	61.7	55.5	6.2	2	0	None>=7	1,380	20,700	$ 414,000	N/A*
20 foot high wall											
MM	2	61.7	54.3	7.4	2	2	2	1,380	27,600	$ 552,000	$ 276,000

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-26: NSA 5 – Wall 5.1 & 5.2 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
NN	2	61.2	57.3	3.9	0	0	None>=7	495	4,950	$ 99,000	N/A*
15 foot high wall											
NN	2	61.2	55.0	6.2	2	0	None>=7	495	7,425	$ 148,500	N/A*
20 foot high wall											
NN	2	61.2	53.2	8.0	2	2	2	495	9,900	$ 198,000	$ 99,000

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-27: NSA 5 – Wall 5.3 & 5.4 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
OO	1	60.8	58.2	2.6	0	0	None>=7	855	8,550	$ 171,000	N/A*
15 foot high wall											
OO	1	60.8	56.0	4.8	0	0	None>=7	855	12,825	$ 256,500	N/A*
20 foot high wall											
OO	1	60.8	54.5	6.3	1	0	None>=7	855	17,100	$ 342,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-28: NSA 5 – Wall 5.7 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
QQ	1	63.5	58.2	5.3	1	0	None>=7	380	3,800	$ 76,000	N/A*
15 foot high wall											
QQ	1	63.5	55.9	7.6	1	1	1	380	5,700	$ 114,000	$ 114,000
20 foot high wall											
QQ	1	63.5	54.8	8.7	1	1	1	380	7,600	$ 152,000	$ 152,000

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-29: NSA 6 – Wall 6.1, 6.2, & 6.3 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
SS	2	65.8	63.2	2.6	0	0	None>=7	1,075	10,750	$ 215,000	N/A*
15 foot high wall											
SS	2	65.8	60.4	5.4	2	0	None>=7	1,075	16,125	$ 322,500	N/A*
20 foot high wall											
SS	2	65.8	58.9	6.9	2	0	None>=7	1,075	21,500	$ 430,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-30: NSA 6 – Wall 6.4 & 6.5 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
TT	2	65.1	63.2	1.9	0	0	None>=7	875	8,750	$ 175,000	N/A*
15 foot high wall											
TT	2	65.1	61.1	4.0	0	0	None>=7	875	13,125	$ 262,500	N/A*
20 foot high wall											
TT	2	65.1	59.2	5.9	2	0	None>=7	875	17,500	$ 350,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-31: NSA 7 – Wall 7.2 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
XX	2	63.7	60.6	3.1	0	0	None>=7	635	6,350	$ 127,000	N/A*
15 foot high wall											
XX	2	63.7	57.8	5.9	2	0	None>=7	635	9,525	$ 190,500	N/A*
20 foot high wall											
XX	2	63.7	56.0	7.7	2	2	2	635	12,700	$ 254,000	$ 127,000

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-32: NSA 7 – Wall 7.5 & 7.6 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
ZZ	2	64.5	60.9	3.6	0	0	None>=7	295	2,950	$ 59,000	N/A*
15 foot high wall											
ZZ	2	64.5	58.9	5.6	2	0	None>=7	295	4,425	$ 88,500	N/A*
20 foot high wall											
ZZ	2	64.5	58.1	6.4	2	0	None>=7	295	5,900	$ 118,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-33: NSA 8 – Wall 8.2, 8.3, & 8.4 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
BBB	1	64.5	62.9	1.6	0	0	None>=7	320	3,200	$ 64,000	N/A*
15 foot high wall											
BBB	1	64.5	61.8	2.7	0	0	None>=7	320	4,800	$ 96,000	N/A*
20 foot high wall											
BBB	1	64.5	61.3	3.2	0	0	None>=7	320	6,400	$ 128,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-34: NSA 8 – Wall 8.5 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
CCC	1	63.2	61.1	2.1	0	0	None>=7	345	3,450	$ 69,000	N/A*
15 foot high wall											
CCC	1	63.2	58.6	4.6	0	0	None>=7	345	5,175	$ 103,500	N/A*
20 foot high wall											
CCC	1	63.2	56.4	6.8	1	0	None>=7	345	6,900	$ 138,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-35: NSA 8 – Wall 8.6 & 8.7 Cost Effectiveness

Receiver ID	# of Receivers	Build No Wall (dBA)	Build Wall (dBA)	Reduction (dBA)	Benefitted Receiver (≥ 5 dBA)	Design Goal (≥ 7 dBA)	Total # of Benefitted Receiver	Length in Feet	Area in SF	Total Cost	Cost per Receiver
10 foot high wall											
DDD	3	58.9	58.4	0.5	0	0	None>=7	350	3,500	$ 70,000	N/A*
15 foot high wall											
DDD	3	58.9	57.5	1.4	0	0	None>=7	350	5,250	$ 105,000	N/A*
20 foot high wall											
DDD	3	58.9	55.7	3.2	0	0	None>=7	350	7,000	$ 140,000	N/A*

Notes:

None of the wall heights meet the cost-effectiveness criteria of $43,500/benefitted receiver, and therefore no wall is proposed in this area.

* No receptor achieved a 7 decibel reduction, and the specific height does not meet the cost-effectiveness criteria.

Table B-36 - Daytime Potential Development Noise Analysis Results

RECEIVER	L10 dBA	L50 dBA
LOC 1-50	**72.8**	**64.6**
LOC 1-100	**69.3**	**62.1**
LOC 1-150	**67.0**	**60.3**
LOC 1-200	**65.2**	58.9
LOC 1-250	63.7	57.7
LOC 1-300	62.4	56.7
LOC 1-350	61.4	55.8
LOC 1-400	60.4	55.0
LOC 1-450	59.5	54.2
LOC 1-500	58.7	53.6
LOC 2-50	**71.4**	**63.2**
LOC 2-100	**68.3**	**61.0**
LOC 2-150	**66.1**	59.4
LOC 2-200	64.5	58.2
LOC 2-250	63.1	57.2
LOC 2-300	61.9	56.3
LOC 2-350	60.9	55.5
LOC 2-400	60.0	54.8
LOC 2-450	59.2	54.1
LOC 2-500	58.5	53.5
LOC 3-50	**70.3**	**61.8**
LOC 3-100	**67.4**	59.8
LOC 3-150	**65.3**	58.3
LOC 3-200	63.7	57.1
LOC 3-250	62.4	56.0
LOC 3-300	61.3	55.2
LOC 3-350	60.3	54.4
LOC 3-400	59.4	53.7
LOC 3-450	58.6	53.0
LOC 3-500	57.8	52.4
LOC 4-50	**69.7**	**60.4**
LOC 4-100	**67.0**	58.5
LOC 4-150	**65.1**	57.1
LOC 4-200	63.5	56.0
LOC 4-250	62.3	55.1
LOC 4-300	61.2	54.3
LOC 4-350	60.3	53.6

Table B-36 - Daytime Potential Development Noise Analysis Results

RECEIVER	L10 dBA	L50 dBA
LOC 4-400	59.5	53.0
LOC 4-450	58.7	52.4
LOC 4-500	58.0	51.9
LOC 5-50	**67.6**	57.5
LOC 5-100	64.1	55.0
LOC 5-150	61.8	53.3
LOC 5-200	60.1	52.0
LOC 5-250	58.8	51.0
LOC 5-300	57.6	50.1
LOC 5-350	56.6	49.3
LOC 5-400	55.7	48.7
LOC 5-450	54.9	48.0
LOC 5-500	54.2	47.5
LOC 6-50	**69.7**	**61.1**
LOC 6-100	**66.9**	59.1
LOC 6-150	64.9	57.6
LOC 6-200	63.3	56.5
LOC 6-250	62.0	55.5
LOC 6-300	60.9	54.7
LOC 6-350	59.9	53.9
LOC 6-400	59.1	53.3
LOC 6-450	58.3	52.7
LOC 6-500	57.6	52.1
LOC 7-50	**66.8**	57.9
LOC 7-100	64.7	56.3
LOC 7-150	63.1	55.1
LOC 7-200	61.7	54.1
LOC 7-250	60.6	53.2
LOC 7-300	59.6	52.5
LOC 7-350	58.8	51.8
LOC 7-400	58.0	51.2
LOC 7-450	57.3	50.7
LOC 7-500	56.6	50.2
LOC 8-50	**68.5**	59.0
LOC 8-100	**65.5**	56.8
LOC 8-150	63.4	55.3
LOC 8-200	61.8	54.0

Table B-36 - Daytime Potential Development Noise Analysis Results

RECEIVER	L10 dBA	L50 dBA
LOC 8-250	60.5	53.0
LOC 8-300	59.3	52.1
LOC 8-350	58.3	51.3
LOC 8-400	57.4	50.6
LOC 8-450	56.6	50.0
LOC 8-500	55.9	49.4

Note: Bold numbers represent locations that would exceed state standards

Table B-37 - Nighttime Potential Development Noise Analysis Results

RECEIVER	L10 dBA	L50 dBA
LOC 1-50	**69.4**	**60.1**
LOC 1-100	**66.1**	**57.7**
LOC 1-150	**63.9**	**55.9**
LOC 1-200	**62.1**	**54.6**
LOC 1-250	**60.7**	**53.5**
LOC 1-300	**59.5**	**52.5**
LOC 1-350	**58.4**	**51.6**
LOC 1-400	**57.5**	**50.8**
LOC 1-450	**56.7**	**50.1**
LOC 1-500	**55.9**	49.5
LOC 2-50	**68.0**	**58.7**
LOC 2-100	**65.1**	**56.6**
LOC 2-150	**63.0**	**55.1**
LOC 2-200	**61.4**	**53.9**
LOC 2-250	**60.1**	**52.9**
LOC 2-300	**59.0**	**52.1**
LOC 2-350	**58.0**	**51.3**
LOC 2-400	**57.1**	**50.6**
LOC 2-450	**56.4**	**50.0**
LOC 2-500	**55.6**	49.5
LOC 3-50	**66.8**	**57.3**
LOC 3-100	**64.1**	**55.3**
LOC 3-150	**62.1**	**53.8**
LOC 3-200	**60.6**	**52.6**
LOC 3-250	**59.3**	**51.7**
LOC 3-300	**58.2**	**50.8**
LOC 3-350	**57.2**	**50.1**
LOC 3-400	**56.4**	49.4
LOC 3-450	**55.6**	48.8
LOC 3-500	54.9	48.2
LOC 4-50	**66.2**	**55.9**
LOC 4-100	**63.6**	**54.0**
LOC 4-150	**61.7**	**52.6**
LOC 4-200	**60.3**	**51.6**
LOC 4-250	**59.1**	**50.7**
LOC 4-300	**58.1**	49.9
LOC 4-350	**57.2**	49.2

Table B-37 - Nighttime Potential Development Noise Analysis Results

RECEIVER	L10 dBA	L50 dBA
LOC 4-400	**56.4**	48.6
LOC 4-450	**55.7**	48.1
LOC 4-500	**55.0**	47.6
LOC 5-50	**63.9**	**52.7**
LOC 5-100	**60.5**	**50.3**
LOC 5-150	**58.4**	48.6
LOC 5-200	**56.7**	47.4
LOC 5-250	**55.4**	46.4
LOC 5-300	54.3	45.5
LOC 5-350	53.3	44.8
LOC 5-400	52.5	44.1
LOC 5-450	51.7	43.5
LOC 5-500	51.0	43.0
LOC 6-50	**66.3**	**56.7**
LOC 6-100	**63.6**	**54.7**
LOC 6-150	**61.7**	**53.3**
LOC 6-200	**60.2**	**52.2**
LOC 6-250	**59.0**	**51.3**
LOC 6-300	**57.9**	**50.5**
LOC 6-350	**57.0**	49.7
LOC 6-400	**56.2**	49.1
LOC 6-450	**55.4**	48.5
LOC 6-500	54.7	48.0
LOC 7-50	**63.2**	**53.0**
LOC 7-100	**61.1**	**51.5**
LOC 7-150	**59.5**	**50.3**
LOC 7-200	**58.3**	49.3
LOC 7-250	**57.2**	48.5
LOC 7-300	**56.2**	47.8
LOC 7-350	**55.4**	47.2
LOC 7-400	54.7	46.6
LOC 7-450	54.0	46.1
LOC 7-500	53.4	45.6
LOC 8-50	**64.7**	**54.2**
LOC 8-100	**61.8**	**52.0**
LOC 8-150	**59.8**	**50.5**
LOC 8-200	**58.3**	49.3

Table B-37 - Nighttime Potential Development Noise Analysis Results

RECEIVER	L10 dBA	L50 dBA
LOC 8-250	**57.0**	48.3
LOC 8-300	**55.9**	47.4
LOC 8-350	54.9	46.7
LOC 8-400	54.1	46.0
LOC 8-450	53.3	45.4
LOC 8-500	52.6	44.8

Note: Bold numbers represent locations that would exceed state standards