Environmental Assessment

Minnesota Power
115 kV Line #28
Reroute Project

City of Nashwauk
Itasca County
Minnesota

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Local Unit of Government: City of Nashwauk

Project title: Minnesota Power 115 kV Line #28 Reroute Project

Proposer: Minnesota Power

Contact Person:	Bryan Adams	Bob Lindholm
Title:	City of Nashwauk	Minnesota Power
Address:	301 Central Avenue	30 West Superior Street
City, State, ZIP:	Nashwauk, MN, 55769	Duluth, MN, 55805
Phone:	(218) 885-1210	(218) 355-3342
Fax:	(218) 885-1305	(218) 723-3916
E-mail:	badams.nashwauk@mchsi.com	rlindholm@allete.com

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Project Description Summary:

The Minnesota Power 115 kV Line #28 Reroute Project (proposed Project) would reroute and reconstruct approximately 6.5 miles of the existing Minnesota Power (MP) 115 kV Line #28. The reroute is necessary to provide Essar Steel Minnesota (ESM) access to additional iron mining resources. ESM plans to construct taconite mining facilities and conduct open pit mining operations where the present Line #28 is located.

Project location:

Itasca County, City of Nashwauk (See Table 1 below and Figure 1.)

Table 1. Township, Range and Section locations for the Project.

Township (T)	Range (R)	Section (S)
T56N	R22W	5,6
T56N	R23W	2,3,4
T57N	R22W	30,31
T57N	R23W	25,26,35,36

Background Information:
The City of Nashwauk has jurisdiction under the Power Plant Siting Act for evaluating the proposed Project under the local review process (Minn. Rules Chapter 7850.5300). On January 12, 2009 the City of Nashwauk adopted an ordinance establishing a local review process for qualifying electric projects. On February 24, 2009 the Itasca County Board passed a resolution delegating certain permitting authorities to the City of Nashwauk. (See Appendix A).

Minnesota Power submitted a route permit application to the City of Nashwauk on August 19, 2009. The application was reviewed by the Nashwauk Planning and Zoning Department and accepted as complete. A copy of the application is on file with the City of Nashwauk.

Within ten-days of the submittal, Minnesota Power provided notice that a route permit had been applied for through the local review process to the MPUC, in accord with Minn. Stat. § 216E.05, subd. 3 and Minn. Rules Chapter 7850.5300, subp. 3. The August 21, 2009 letter is in included in Appendix B.

The Nashwauk Planning Commission held a Scoping Meeting on September 16, 2009 at Nashwauk City Hall to obtain public input regarding the scope of this Environmental Assessment (EA). Notice of the Scoping Meeting was published in the Scenic Range News on August 27 and September 3, 2009, mailed to the MPUC general notification list and mailed to local landowners. The public notice, landowner letter, comments and mailing list for the Scoping Meeting are included in Appendix B. There were several questions from the Nashwauk Planning Commission during the Scoping Meeting related to the project schedule and environmental review process. There were no questions or comments from the audience.

Environmental Review Process:
In accord with Minn. Rules Chapter 7850.5300, subp. 5, the City of Nashwauk is required to submit notice to the Minnesota Public Utilities Commission (MPUC) regarding the availability of this EA. A copy of the notice shall be published in the EQB Monitor and can be obtained at http://www.eqb.state.mn.us/monitor.html. The notice provides information about how copies of this EA may be obtained and how opportunity for public comment will be afforded, including submitting comments to the City of

Nashwauk. In accord with Minn. Rules Chapter 7850.5300, subp. 5, the City of Nashwauk shall provide a copy of this EA to the MPUC.

The City of Nashwauk is allowed to make a final decision on the proposed Project no sooner than ten days have passed since its notice of the completion of the Environmental Assessment is published in the EQB Monitor (Minn. Rules Chapter 7850.5300, subp. 5). The decision will be to approve or deny a Route Permit to Minnesota Power for the proposed Project (Minn. Stat. § 216E.05, subd. 1(a) and Minn. Rules Chapter 7850.5300, subp. 1).

Detailed Project Description:
MP (the Applicant) is proposing to reroute and reconstruct approximately 6.5 miles of an existing 115 kV transmission line, MP Line #28 (Figure 1). The reroute would begin in T56N, R23W and travel northeast through Sections 3 and 4. The reroute continues north through T57N, R23W, Section 35. It turns east and travels through T57N, R23W, Sections 25 and 26. In T57N, R22W, the reroute turns south and travels through Section 31. The reroute continues in a southeasterly direction through T56N, T22W, Section 6, crossing U.S. 169 where it would reconnect with the existing MP Line #28. The proposed alignment for the reroute is parallel and adjacent to the proposed alignment for portions of three 230 kV transmission lines proposed to serve the ESM Project.

The western segment of the Project extends from the westernmost end of the proposed route to the preferred location for the 230 kV Steel Plant Substation and would be constructed adjacent to a proposed 230 kV HVTL. The eastern segment of the Project extends from the Steel Plant Substation to the easternmost end of the proposed route and would be constructed adjacent to a proposed 230 kV HVTL.

The Applicant would reconstruct the 115 kV transmission line using wood H-Frame structures (Appendix C). The typical height of the H-Frame structures would be 55-80 feet; taller structures may be required for exceptionally long spans and in circumstances that required additional vertical clearance. The average span length would be 500 to 800 feet, with spans over 1,000 feet in certain topographies. The proposed right-of-way width would be 100 feet. This environmental analysis is based on a 3,000-foot route width in which to locate the proposed right-of-way for the transmission line. Approximately 60 structures would be needed for the 6.5 mile long transmission line reroute. The dismantling/salvage cost estimate is $150,000. The cost to construct the rerouted transmission line is estimated at $2.75 million. Environmental impacts would occur where transmission line pole structures are installed and accessed and where tall growing vegetation would be permanently removed in the right-of-way.

Following the receipt of all required permits, acquisition of land rights and in conformance with Essar Steel's plant construction and mining plans; construction of the proposed Project could commence in early 2010 and take approximately 6 months to complete.

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:
Currently, MP's Line #28 crosses the ESM Project area that contains iron resources. The purpose of rerouting the line is to allow access to this area for future mining activities. The reroute would be completed by MP in cooperation with ESM. A route permit is required from the City of Nashwauk using the local review process (Minnesota Rules 7850.5300). Appendix A includes a copy of the City of Nashwauk's ordinance creating a local environmental review and routing process, as well as Itasca County's resolution delegating its responsibilities to the City of Nashwauk as the Local Environmental Review/Permitting governmental unit for the permit process.

Are future stages of this development including development on any other property planned or likely to happen? ___Yes _X_ No

Is this project a subsequent stage of an earlier project? _X_ Yes __No
ESM has obtained state approvals to reactivate the former Butler Taconite mine by developing new facilities, including a taconite pellet plant and steel production plant. The ESM proposal was reviewed according to the Minnesota Environmental Policy Act process. An Environmental Impact Statement was developed and a Record of Decision was made August 10, 2007 (See http://www.dnr.state.mn.us/input/environmentalreview/minnsteel/index.html). ESM has obtained necessary permits and has begun construction of the mining facility.

In addition to this proposed 115 kV reroute project, the Nashwauk Public Utilities Commission and Minnesota Power submitted a route permit application to the MPUC on June 1, 2009 for construction of four 230 kV transmission lines and two 230 kV substations that would provide electric power to the ESM facility (See http://www.energyfacilities.puc.state.mn.us/Docket.html?Id=24526). The Office of Energy Security will be developing an Environmental Impact Statement for the 230 kV project. Portions of the 230 kV proposed routes (Routes 2, 3 and 4) would parallel this proposed 115 kV reroute for part of its length. See Figure 2.

This transmission line reroute project is necessary to accommodate construction of the ESM Facility and allow access to iron resources for future mining operations. MP has elected to use the State's Local Review process for this reroute.

Project magnitude:
Total project: 6.5 miles; 79 acres (based on 100-foot-wide right-of-way).

Permits and approvals required:
See Table 2 below.

Table 2. List of identified local, state, and federal permits and approvals.

Permit/Decision	Jurisdiction
Federal Approvals	
Section 404 Wetland Permit	US Army Corps of Engineers
Endangered Species Consultation	US Fish and Wildlife Service
Minnesota State Approvals	
Cultural and Historic Resources Review	State Historic Preservation Office
Utility Permit	Department of Transportation
Endangered Species Consultation	Department of Natural Resources Ecological Services
License to Cross Public Lands and Waters	Department of Natural Resources Lands and Minerals
Public Waters Work Permit	Department of Natural Resources Waters
Section 401 Water Quality Certification	Pollution Control Agency
National Pollutant Discharge Elimination System Permit	Pollution Control Agency
Noxious Weed Management Plan	Department of Agriculture
Local Approvals	
Route Permit	City of Nashwauk
Wetland Conservation Act Permit/Exemption	Itasca Soil and Water Conservation District, City of Nashwauk
Road Crossing/Right-of-Way Permits	County, Township, City
Public Lands Permits	County, Township, City
Building Permits	County, Township, City
Overwidth and/or Load Permits	County, Township, City
Driveway Access Permits	County, Township, City

Land use:
Ecological Region - The proposed 115kV Reroute Project is situated within the Nashwauk Uplands DNR Ecological Subregion which is located in the Mississippi – Grand Rapids watershed (USGS Hydrologic Unit Code [HUC] #7010103). Pre-settlement vegetation in the area generally consisted of mixed hardwood and coniferous forests. Today, the dominant vegetation is quaking aspen (DNR ECS, 2008). Approximately 48 percent of the reroute is forested, with forestry being a common land use in this region (Figure 3). About 34 percent is shrub land while less than one percent is in agriculture use

(crop/grasslands). The southeast corner of the area, near the City of Nashwauk, consists of Mesabi Iron Range mine lands.

Mesabi Iron Formation - The existing 115 kV Boswell to Nashwauk Line #28 (Line #28) crosses the Mesabi Iron Formation (Formation) northwest of Penguilly. The proposed reroute of Line #28 would also need to cross the Formation, since the west leg of Line #28 (Boswell to Essar plant area) is located north of the Formation (aligned southwest to northeast) and the Nashwauk Substation terminus lies south of the Formation. The proposed route is 3,000 feet wide at the location of the Formation crossing. Multiple private interests and the state of Minnesota hold mineral and surface rights within the proposed route.

The owners of mineral and surface rights have expressed a strong interest to locate the rerouted Line #28 near the northeast side of the proposed route to minimize the impact to future mining activities. Additionally, significant topography from past mining activities poses a challenge for constructing and maintaining a high voltage transmission line across the Formation. Further, the Applicant, MP, and the Nashwauk Public Utilities Commission, co-applicant in another docket (E280/TL-09-512) are proposing to construct a 230 kV transmission line within this same 3000-foot wide route. The proposed plan would be to construct the rerouted Line #28 and the proposed 230 kV line in a parallel alignment across the Formation. Both transmission lines would be designed as single circuit, H-frame lines. The H-frame design is better able to accommodate the rough terrain of the surface dumps and the long spans to cross the water-filled open pit mining area.

Human Settlement - Human settlement in this area is generally limited to the area between Big and Little Sucker Lakes, which the proposed alignment avoids. The scattered upland clearings within the project area are typically associated with these residential developments.

Compatibility with Plans - Rerouting of the 115 kV transmission line is compatible with the current and proposed use of the area for mining operations. There are no known conflicts with environmental hazards due to past site uses. The proposed alignment for the reroute would be adjacent to the proposed 230 kV transmission lines and would be located adjacent to a proposed natural gas pipeline. However, no conflicts are anticipated.

Cover types:
See Table 3 below and Figure 3.

Table 3. Cover type information for the proposed 115 kV reroute.

Land Cover Types*	3,000-foot-wide Route (Acres)	100-foot-wide Right-of-way (Acres)
Aquatic Environment	**131**	**<1**
Aquatic	123	<1
Marsh	8	0
Agriculture	**70**	**1**
Grassland	67	<1
Cropland	3	<1
Forest	**1,138**	**47**
Lowland Conifer	<1	0
Upland Conifer	41	2
Lowland Deciduous	22	0
Upland Deciduous	1,075	45
Shrubland	**789**	**20**
Lowland Shrub	31	0
Upland Shrub	758	20
Developed	**227**	**9**
Total	**2,355**	**78**

**Developed using MNDNR GAP Classifications (MNDNR GAP, 2002).*

Approximately 47 acres of forest and 20 acres of shrubland would be converted to grasslands within the proposed transmission line right-of-way.

Fish, wildlife, and ecologically sensitive resources:
Wildlife in the project area consist of small mammals such as voles, shrews, mice, and rabbits; larger mammals, such as beaver, bobcat, coyote, gray wolf, river otter, fox, white tailed deer, and black bear; as well as waterfowl and songbirds (forest, wetland, and grassland species). Fish, reptiles, and amphibians, such as snakes, turtles, toads, and frogs inhabit wetlands and open water areas. This wildlife, which includes both resident and migratory species, uses the habitat within the area for forage, shelter, breeding habitat, and/or stopover during migration. Many of the species present are closely associated with riparian, wetland, and forest habitats.

Habitat fragmentation can cause habitat loss and degradation for species that require large tracts of contiguous land. Habitat fragmentation occurs when a large intact habitat is broken into separate parts because of development. Construction of the transmission

line on a new cross-country route within forested habitat may cause habitat fragmentation. Creation of edge tends to benefit common species at the expense of those species that have either very large home ranges or very specific habitat requirements, such as deep woods raptors and songbirds. In addition to the immediate habitat change within the right-of-way, vegetation changes adjacent to the right-of-way may also occur. Approximately 1.5 mile of the reroute would consist of new cross-country right-of-way.

Wildlife could be impacted in the short-term within the immediate area of construction. Mortality could occur to less mobile or burrowing species due to construction traffic and vegetation removal. During early spring and early summer, construction activities may cause birds to abandon nest sites and or young. Impacts would be minimized through construction timing and off-season tree and shrub removal, to the extent practicable. The Applicant is planning to construct the transmission line in the winter season.

Avian collisions are a possibility after the completion of the transmission line, particularly if the lines cross river corridors or other focused flyways.

Habitat conversion and fragmentation would be minimized to the extent practicable by routing the line next to existing rights-of-way. Right-of-way clearing in forested areas would be minimized to the extent practicable, while maintaining adequate clearance for safety and security of the transmission line in accord with federal regulations and industry standards.

The Applicant would address avian issues by working with the DNR and the USFWS.

Are any state-listed (Threatened, Endangered, or Special concern [TES]) species, rare plant communities, or other sensitive ecological resources on or near the site?
_X_Yes __No
There are sixteen State listed TES records representing five *Botrychium* species and one *Platanthera* species within one mile of the edge of the proposed reroute. This includes three endangered, one threatened, and two special concern species. See Table 4 below.

Table 4. State listed TES Species Located Within One Mile of the Reroute

Scientific Name	Common Name	Type	State Status	Last Observed	NHIS Records	Habitat Present?
Botrychium oneidense	Blunt-lobed Grapefern	Plant	E	2005	1	Likely, Forest
Botrychium pallidum	Pale Moonwort	Plant	E	1999	1	Likely, Forest Edge
Platanthera flava var. herbiola	Tubercled Rein-orchid	Plant	E	2005	3	Unlikely, Wet

Scientific Name	Common Name	Type	State Status	Last Observed	NHIS Records	Habitat Present?
						Meadow
Botrychium rugulosum	St. Lawrence Grapefern	Plant	T	2005	3	Likely, Forest & Forest Edge
Botrychium minganense	Mingan Moonwort	Plant	SPC	2005	2	Likely, Forest and Forest Edge
Botrychium simplex	Least Moonwort	Plant	SPC	1999	6	Likely, Openings and Forest Edge

(MNDNR NHIS, 2008; Habitat Present based on GAP data)

The Final EIS completed for the Minnesota Steel Project identified a number of locations where state listed *Botrychium* and *Platanthera* were present, based on botanical surveys completed in 1999 and 2005 (DNR and USACE, 2007). The project applied for a take permit from the DNR based on the surveys and the likelihood that impacts to state listed threatened and/or endangered species would occur. There are no documented records of any state listed species in the reroute. Approximately 0.75 mile of the proposed reroute has not been surveyed.

In addition to the plants listed above, the project area includes suitable habitat for the grey wolf (*Canis lupus*), which has been reclassified as federally Threatened in Minnesota (see US Fish and Wildlife Service June 29, 2009 news release at http://www.fws.gov/midwest/News/release.cfm?rid=92.

The U.S. Fish and Wildlife Service identifies the Canada lynx as Threatened. Field surveys for the lynx were conducted in 2006-2007 for the Minnesota Steel Project, and concluded that:

> "…the proposed Project may affect lynx found in the vicinity of the project site, but that the project would not adversely affect lynx populations or their critical habitat. They concluded that lynx likely do not reside in the study area…"

The Applicant would continue to consult with the DNR and the U.S. Fish and Wildlife Service regarding threatened and endangered species and their potential presence within the project area. Impacts to threatened, endangered, and sensitive species and communities would be avoided to the extent practicable. In the event that avoiding impacts to threatened or endangered species is not feasible, the project would work

closely with the regulatory agencies to identify appropriate measures to minimize and mitigate impacts.

Physical impacts on water resources. Will the project involve the physical or hydrologic alteration (dredging, filling, stream diversion, outfall structure, diking, and impoundment) of any surface waters such as a lake, pond, wetland, stream or drainage ditch? __Yes _X_No
Detailed wetland field surveys have not been completed. The NWI mapping identifies a number of wetlands within the 3,000-foot-wide route, including emergent, shrub and forested wetland types (Figure 4). However, since the reroute will only require 100 feet of right-of-way, it is anticipated that all of these wetlands would be avoided. Wetland determinations and, if necessary, delineations would be completed prior to project construction. No permanent wetland impacts to forested or other wetland types are anticipated.

Temporary impacts to wetlands may occur at crossing locations, particularly for riparian wetlands. No staging or stringing setup areas would be placed within or adjacent to water resources, to the extent practicable. The Applicant would avoid major disturbance of individual wetlands and drainage systems during construction. This would be done by spanning wetlands and drainage systems, where possible. When it is not possible to span the wetland, the Applicant would consider several options to minimize impacts:

- Construction during frozen ground conditions.
- Crews accessing the wetland along the right-of-way, existing roads, or trails to result in the least amount of physical impact to the wetland (*i.e.,* shortest route).
- The structures assembled on upland areas before they are brought to the site for installation.
- If winter construction is not possible, construction mats could be used where wetlands would be impacted. Additionally, the Applicant has access to all-terrain construction vehicles that are designed to minimize soil impact in wet areas.
- Wetlands impacted would be restored as required by the US Army Corps of Engineers (USACE) regulations and Minnesota Wetland Conservation Act (WCA) rules, as applicable.

Water use. Will the project involve installation or abandonment of any water wells, connection to or changes in any public water supply or appropriation of any ground or surface water (including dewatering)? __Yes _X_No
Temporary dewatering may be necessary during construction and installation of the structures positioned in low groundwater table areas. The Applicant would obtain a dewatering permit from the DNR, if appropriate, and would comply with standard best management practices for erosion control and water quality.

Water-related land use management district. Does any part of the project involve a shoreland zoning district, a delineated 100-year flood plain, or a state or federally designated wild or scenic river land use district? __Yes _X_No

Water surface use. Will the project change the number or type of watercraft on any water body? __Yes _X_No

Erosion and sedimentation:

The majority of the proposed right-of-way area (79 acres) would incur temporary or permanent disturbance. Disturbance would range from temporary vehicle impacts on access trails during construction to the permanent impact of removal of trees and soil excavation and removal at the structure locations. Approximately 1,200 square feet would be disturbed for installation of the H-Frame structures, assuming 60 structures are required. See question 19 for erosion hazard information.

The Applicant would work with ESM to identify and use material and equipment staging areas and access locations used for construction of the ESM Project. The Applicant would maintain sound water and soil conservation practices during construction and operation of the Project to protect topsoil and adjacent water resources and minimize soil erosion. Construction would be completed according to construction storm water NPDES permit requirements. Practices may include:

- Containment of stockpiled material away from stream banks and lake shorelines.
- Reseeding and vegetating disturbed areas as required by the NPDES permit.
- Implementing erosion and sediment controls as required by the NPDES permit.
- Structures and disturbed areas would be located 300 feet from rivers and lakes, where possible.
- Wastewater from concrete batching or other construction operations would not enter streams or other surface waters without using turbidity control methods. Wastewaters discharged would be free of settleable material.

Water quality - surface water runoff:

All rivers, streams, and ditches would be spanned by transmission line conductors (wires), no structures would be located within these features, and direct impacts are not anticipated. Indirect impacts may include sediment reaching surface waters during construction due to ground disturbance by excavation and grading. This could temporarily degrade water due to increased turbidity.

Best management practices would be installed and maintained to prevent soil erosion from entering surface water. The Applicant would develop a Stormwater Pollution Prevention Plan (SWPPP) as part of the NPDES permit required by the Minnesota Pollution Control Agency.

Identify routes and receiving water bodies:
The project area is situated in the Mississippi – Grand Rapids watershed (Huc#7010103), although the Mississippi River is located approximately 15 miles to the southwest of the project area. Minor watersheds within the project area are Crooked Lake, Sucker Brook, Ox Hide Lake, and Swan Lake. Surface waters in these watersheds include Sucker Brook and its tributaries and an unnamed Crooked Lake outlet which flow into the Prairie River, as well as Ox Hide Creek and Pickerel Creek which join the Swan River. Big and Little Sucker Lakes, Moose Lake, Swan Lake, Oxhide Lake, Big and Little McCarthy Lakes and Crooked Lake are located along these watercourses, downstream from the project area. These waters generally make their way south to join the Mississippi River.

There could be short term temporary impacts during construction. However, long term impacts are not anticipated because transmission line conductors would span the receiving waters.

Geologic hazards and soil conditions:
Approximate depth (in feet) to ground water: 0 to 76 feet;
Approximate depth to bedrock: Unknown

The project area does not include known geologic hazards such as sinkholes, shallow limestone formations, or karst conditions.

Describe the soils on the site:
Nashwauk fine sandy loam is the most common soil within the route, covering approximately 40 percent of the route area. This soil is well drained, not hydric, and not prime farmland. The following table summarizes the soils located within the route. See Figure 6 and Appendix D for additional soils information.

Table 5. Soils Within the Route

Map Unit	Route Coverage (%)	Farmland Rating	Hydric Rating	Erosion Hazard
Menahga loamy sand, 10 to 30% slopes	<1	Not Prime	Non Hydric	Moderate
Cartho muck	1	Not Prime	All Hydric	Slight
Blackhoof muck	2	Not Prime	All Hydric	Slight
Keewatin silt loam	13	Prime if Drained	Non Hydric	Slight
Nashwauk fine sandy loam, 1 to 10% slopes	40	Prime	Non Hydric	Slight
Nashwauk fine sandy loam, 12 to 35% slopes	6	Not Prime	Non Hydric	Moderate

Map Unit	Route Coverage (%)	Farmland Rating	Hydric Rating	Erosion Hazard
Wildwood muck	<1	Not Prime	All Hydric	Slight
Mooselake and Lupton mucky peats	1	Not Prime	All Hydric	Slight
Menahga and Graycalm soils, 0 to 8% slopes	<1	Not Prime	Non Hydric	Slight
Pits, mine	8	Not Prime	Unknown	Not Rated
Dumps, mine	7	Not Prime	Unknown	Not Rated
Udorthents, nearly level to rolling	5	Not Prime	Non Hydric	Slight
Udorthents, very steep	4	Not Prime	Non Hydric	Severe
Slickens	6	Not Prime	Unknown	Not Rated
Nashwauk-Rock outcrop complex, 6 to 25% slopes	4	Not Prime	Unknown	Moderate
Water	3	Not Prime	Unknown	Not Rated

Solid wastes, hazardous wastes, storage tanks: The project would not generate hazardous wastes.

Toxic or hazardous materials to be used or present at the site:
The project does not include installation of transformers or other equipment that may contain toxic or hazardous materials. Onsite storage of petroleum products or other materials would not be necessary.

Vehicle-related air emissions:
There are no long term expected impacts on air quality from the proposed Project. Temporary and localized impacts to air quality may occur during construction due to the disturbance of topsoil, which raises fugitive dust particles. Temporary impacts from fugitive dust would be minimized or avoided by using BMPs. Oil and other petroleum derivatives would not be used for dust control. Equipment and vehicles that show excessive emissions of exhaust gases due to poor engine adjustments, or other inefficient operating conditions, would not be operated until repairs or adjustments have been made.

Stationary source air emissions:
The area in and around the project is currently in attainment with National and Minnesota Ambient Air Quality Standards (NAAQS and MAAQS), which are shown in Table 6 below, for all criteria pollutants.

The primary air quality concerns related to transmission lines are ozone and nitrogen oxide emissions surrounding the conductor due to corona. Corona consists of the

breakdown or ionization of air within a few centimeters or less of the conductors. It occurs when the electric field intensity, or surface gradient, on the conductor exceeds breakdown strength of air. Usually some imperfection, such as a scratch on the conductor or a water droplet, is necessary to cause corona. Monitored concentrations of ozone due to corona show no significant incremental ozone concentrations at ground level, and minimal (0.8 parts per billion (ppb)) concentrations at an elevation nearer to the transmission line. These concentrations were only detected during heavy corona in foul weather. Additional testing showed that production of nitrogen oxides due to corona is approximately one-fourth of the production of ozone due to corona.

Ozone is a very reactive form of oxygen and combines readily with other elements and compounds in the atmosphere. Ozone forms naturally in the lower atmosphere from lightning discharges and from reactions between solar ultraviolet radiation and air pollutants, such as hydrocarbons, from auto emissions. The natural production rate of ozone is directly proportional to temperature and sunlight and inversely proportional to humidity. Humidity (or moisture), the same factor that increases corona discharges from transmission lines, inhibits the production of ozone.

The Environmental Protection Agency (EPA) has promulgated regulations on the permissible concentrations of ozone and oxides of nitrogen (62 Federal Register 38856). The national standard is 0.08 parts per million (ppm) on an eight-hour averaging period (40 CFR Part 50). The Minnesota State Ambient Standard is 0.08 ppm based upon the fourth highest eight-hour daily maximum average in one year (Minn. R. 7009.0080). As discussed above, incremental concentrations of ozone due to corona would be expected to be on the order of one-tenth of the standard near the transmission line, and insignificant at ground level.

Table 6. National and Minnesota Ambient Air Quality Standards

Averaging		NAAQS	
Emission Type	**Period**	**Primary micrograms/m3 (ppm)**	**Secondary micrograms/m3 (ppm)**
Carbon Monoxide (CO)	8-hour [a]	10,000 (9)	10,000
	1-hour [a]	40,000 (35)	40,000
Sulfur Dioxide (SO_2)	Annual	80 (0.03)	--
	24-hour [a]	365 (0.14)	--
	3-hour [a]	--	1,300 (0.5)
	1-hour [a,e]	1,300 (0.5)	
Nitrogen Dioxide (NO_2)	Annual	100 (0.05)	100
Ozone (O_3)	8-hour [b]	-- (0.08)	-- (0.08)

Averaging		NAAQS	
Emission Type	Period	Primary micrograms/m3 (ppm)	Secondary micrograms/m3 (ppm)
PM_{10}	Annual [e]	50	50
	24-hour [a]	150	150
$PM_{2.5}$ [d]	Annual [d]	15	15
	24-hour [c]	35 65 [e]	35 65 [e]
Lead (Pb)	Three-month (Calendar quarter)	1.5	--

Source: EPA, National Primary and Secondary Ambient Air Quality Standards (40 CFR 50).

a Not to exceed more than once per year, per monitor location, averaged over a three-year period.

b The 8-hour ozone standard is met if the fourth highest 8-hour ozone concentration, averaged over 3 years, is not greater than 0.08 ppm.

c In September 2006 EPA revised the 24-hour PM2.5 standard from 65 µg/m3 to 35 µg/m3, but the previous standard is currently applicable until EPA completes the attainment designation and implementation process. During any 12 consecutive months, 98 percent of the values shall not exceed 35 µg/m3 under the new standard, and 65 µg/m3 under the currently applicable standard. Minnesota has retained the 65 µg/m3 standard.

d Spatial average standard, applied by EPA over a neighborhood scale.

e Standard is only a Minnesota standard.

There are no long term expected impacts on air quality as from the proposed Project. Because this Project is a reroute of an existing 115 kV transmission line and there will be no material increase in transmission line length, there would not be an incremental increase in air emissions.

Odors, noise and dust. Will the project generate odors, noise, or dust during construction or during operation? _X_Yes __No

The Applicant modeled conductor audible noise for 115 kV H-frame and 230/115 kV double circuit structures. Since the Project's proposed alignment is completely parallel to proposed 230 kV lines, the Project's 115 kV line was modeled in a shared right-of-way with the corresponding 230 kV line configurations to provide the cumulative noise levels. The western segment of the Project extends from the westernmost end of the proposed route to the preferred location for the 230 kV Steel Plant Substation and would be constructed adjacent to a proposed 230 kV HVTL that uses 1590 ACSR conductor. The eastern segment of the Project extends from the Steel Plant Substation to the easternmost end of the proposed route and would be constructed adjacent to a proposed 230 kV HVTL that uses 954 ACSR conductor. Appendix C displays the structure figures; Appendix E provides the noise model assumptions for single-circuit and double circuit configurations.

Noise is defined as unwanted sound. It may be comprised of a variety of sounds of different intensities across the entire frequency spectrum. Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, the A-weighted decibel scale (dBA) is often used for noise measurements and analysis as a method to duplicate the response of the human ear. A noise level change of 3 dBA is barely perceptible to average human hearing. A 5 dBA change in noise level is clearly noticeable. A 10 dBA change in noise levels is perceived as a doubling or halving of noise loudness. For reference, Table 7 shows noise levels associated with common, everyday sources and places the magnitude of noise levels discussed here in context.

Table 7. Decibel Levels of Common Noise Sources

Sound pressure level (dBA)	Noise source
140	Jet Engine (at 25 meters)
130	Jet Aircraft (at 100 meters)
120	Rock Concert
110	Pneumatic Chipper
100	Jackhammer (at 1 meter)
90	Chainsaw, Lawn Mower (at 1 meter)
80	Heavy Truck Traffic
70	Business Office, Vacuum Cleaner
60	Conversational Speech, Typical TV Volume
50	Library
40	Bedroom
30	Secluded Woods
20	Whisper

Data from "A Guide to Noise Control in Minnesota," Minnesota Pollution Control Agency, 2008

Typical noise sensitive receptors along the transmission line reroute include residences, churches, schools, and parks where either sleep or outdoor activities occur. Current average noise levels in these areas are typically in the 30 to 50 dBA range and are considered acceptable for residential land use activities. Ambient noise in rural areas is commonly made up of rustling vegetation and infrequent vehicle pass-bys. Higher ambient noise levels, typically 50 to 60 dBA, would be expected near roadways, urban areas, and commercial and industrial properties in the Project Area.

The Minnesota Pollution Control Agency (MPCA) has established standards for the regulation of noise levels. The land use activities associated with residential, commercial, and industrial land have been grouped together into Noise Area Classifications (NAC) (See Minn. R. 7030.0050). Each NAC is then assigned both daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) limits for land use activities within

the NAC (See Minn. R. 7030.0040). Table 8 shows the MPCA daytime and nighttime limits in dBA for each NAC. The limits are expressed as a range of permissible dBA within a one hour period; L50 is the dBA that may be exceeded 50 percent of the time within an hour. L10 is defined as the dBA that may be exceeded 10 percent of the time within an hour. Residences, which are typically considered sensitive to noise, are classified as NAC 1. Note that the utility industry typically reports audible noise emissions at L5 and L50, rather than those at L10. L5 is the noise level exceeded five percent of the time, or for three minutes in an hour.

Table 8. MPCA Noise Limits by Noise Area Classification (dBA)

Noise Area Classification	Daytime		Nighttime	
	L10	L50	L10	L50
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

The level of noise generated by the conductors depends on conductor conditions, voltage level, and weather conditions. Noise emission from a transmission line is greatest during heavy rain and wet conductor conditions. In foggy, damp, or rainy weather conditions, transmission lines can create a subtle crackling sound due to the small amount of electricity ionizing the moist air near the wires. During heavy rain, the general background noise level is usually greater than the noise from a transmission line.

Modeling was completed to determine the level of audible noise from operation of the Project. The rerouted 115 kV transmission line combined with the proposed 230 kV transmission line is anticipated to be essentially inaudible, less than 20 dBA, at the edge of the right-of-way during fair weather conditions. Under wet conditions, the maximum L5 noise level directly under the transmission lines is less than 50 dBA, which is below the most restrictive permissible noise level for NAC (1). Anticipated noise levels for the reroute in fair weather conditions and at the L5 and L50 levels for wet conditions are shown in graphs in Appendix E. The transmission line would be maintained in good working order. Noise associated with the operation of the Project would not require mitigation.

Nearby resources. Are any of the following resources on or near (within 1 mile) the site?

Archaeological, historical, or architectural resources? _X_Yes __No (See Table 9)
Prime or unique farmlands or land within an agricultural preserve? _X_Yes _ No (See Figure 5)
Designated parks, recreation areas, or trails? _X_Yes __No (See Figure 6)
Scenic views and vistas? _X_Yes __No (See Figure 6)
Other unique resources? __Yes _X_No

Archeological, historical or architectural

Table 9, below, presents the results of a search of available background information for the proposed transmission line reroute. Eight architectural sites were previously recorded within one mile of the proposed reroute. Three sites have been recommended as not eligible, one is recommended as eligible, and five have not been evaluated for listing on the NRHP.

The recommended eligible property is over a half a mile away from the edge of the 3,000-foot route. There are no impacts anticipated impacts as a result of constructing the transmission line.

Table 9. Architectural sites within one mile of the project.

County	Site Number	Site Name	Location			NRHP Status
			T	R	S	
Itasca	IC-NWC-001	Nashwauk Hospital	57	22	32	Not evaluated (no longer standing)
Itasca	IC-NWC-003	Ollila Hotel	57	22	32	Recommended as not eligible (no longer standing)
Itasca	IC-NWC-004	Memorial Building	57	22	32	Recommended as eligible
Itasca	IC-NWC-005	Nashwauk Village Hall	57	22	32	Not evaluated
Itasca	IC-NWC-006	Raatama's Department Store	57	22	32	Not evaluated
Itasca	IC-NWC-007	United Methodist Church	57	22	32	Not evaluated
Itasca	IC-NWC-008	Nashwauk High School	57	22	32	Not evaluated
Itasca	IC-NWC-009	Nashwauk Fieldhouse	57	22	32	Not evaluated

No previously recorded archaeological resources have been identified within one mile of the 3,000-foot-wide route.

Prime Farmlands

There are approximately 895 acres of prime farmland in the proposed transmission line 3,000-foot-wide route. Of the 895 acres, approximately 1.95 acres are in agriculture production. The remaining prime farmland acreage within the reroute is predominately forested land. (See Figure 6)

Scenic Views

The Nashwauk viewing platform located on the west side of Nashwauk overlooks a mine pit. (See Figure 7). This viewing platform is approximately 0.5 mile from the proposed alignment for the transmission line reroute. There are minimal anticipated effects on the viewshed in this area.

Visual impacts. Will the project create adverse visual impacts during construction or operation? _X_Yes __No

The proposed Project would add another linear feature in the general project area and is adjacent to the ESM mining operations. This is an industrialized area which has several existing 115 kV transmission lines. The Applicant would continue to work with landowners and public agencies to identify concerns related to the transmission line aesthetics. In general, mitigation includes enhancing positive effects as well as minimizing or eliminating negative effects. Potential mitigation measures include the following:

- Where feasible, the location of transmission line structures, right-of-way, and other disturbed areas would be determined by considering input from landowners or land management agencies to minimize visual impacts.
- Structure types (designs) would be uniform to the extent practical. The Applicant proposes to use wood H-frame structures, which are shorter than single circuit, steel pole structures, but are wider and utilize two poles. The H-frame structures are between 55-80 feet in height. The wood poles are usually considered less intrusive in a rural forested and heavily industrialized environment.
- Care would be used to preserve the natural landscape; construction and operation would be conducted to prevent any unnecessary destruction, scarring or defacing of the natural surroundings.
- New transmission lines would parallel existing (and proposed) rights-of-way to the extent practicable to minimize visual impacts to open spaces.

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

_X_Yes __No

The City of Nashwauk is the regulating authority for this transmission line project. The proposed Project falls within the local land use plan for the city. A building permit may be required for the proposed Project. It is anticipated that the Nashwauk City Council would act on this route permit application upon completion of an environmental assessment.

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

__Yes _X_No

Other potential environmental impacts:
One of the primary concerns raised by the public regarding high voltage transmission line operation is potential impacts of electric and magnetic fields (EMF). EMF exist wherever electricity is produced or used. EMF are invisible lines of force that surround any electrical appliance or wire that is conducting electricity.

Electric Fields
EMF was modeled for 115 kV H-Frame and 230/115 kV double circuit structure configurations. Since the Project's proposed alignment is completely parallel to proposed 230 kV lines, the Project's 115 kV line was modeled in a shared right-of-way with the corresponding 230 kV line configurations (Appendix F). The Project, in conjunction with the proposed 230 kV transmission lines, has a peak magnitude of electric field density of approximately 3.1 kV/m beneath the conductors, one meter above ground level. The predicted levels are significantly less than the maximum limit of 8.0 kV/m that has been a permit condition required by the Office of Energy Security (OES) for other transmission line projects. The standard was designed to prevent serious hazard from shocks when touching large objects, such as tractors, parked under HVTLs of 500 kV or greater. Research has also shown that it is unlikely that implantable medical device interaction would result from typical public exposure to transmission line electric fields.

When an electric field reaches a nearby conductive object, such as a vehicle or a metal fence, it induces a voltage on the object. The magnitude of this voltage is dependent on many factors, including the object's capacitance, shape, size, orientation, location, object to ground resistance, and weather conditions. If the object is insulated or semi-insulated from the ground and a person touches it, a small current would pass through the person's body to the ground. This might be accompanied by a spark discharge and mild shock, similar to what can occur when a person walks across a carpet and touches an object or another person.

The main concern with induced voltage of an object is not the level of the induced voltage, but the current that flows through a person to the ground should the person touch the object. To ensure the safety of persons in the proximity of HVTLs, the NESC requires that any discharge be less than 5 milliAmperes (mA). The Applicant used computer modeling to estimate the spark discharge from a typical school bus (40 feet long by 8.5 feet wide by 10.75 feet high) stopped within the proposed right-of-way. The modeling showed that the spark discharge current would be less than 2 mA. This is significantly less than the 5 mA NESC limit, and unlikely to register as an annoyance. The Applicant would also ensure that any fixed conductive object proximate or parallel to the transmission line, such as a fence or other permanent conductive fixture, would be grounded so any discharge would be less than the 5 mA NESC limit.

High intensity electric fields can have adverse impacts on the operation of pacemakers and implantable cardioverter defibrillators (ICD). Interference with implanted cardiac

devices can occur if the electric field intensity is high enough to induce sufficient body currents to cause interaction. Magnetic fields from transmission lines do not reach levels where they would have adverse impacts on the operation of pacemakers or ICD's.

Modern "bipolar" cardiac devices are much less susceptible to interactions with electric fields. Medtronic and Guidant, manufacturers of pacemakers and ICDs, have indicated that electric fields below 6 kV/m are unlikely to cause interactions affecting operation of most of their devices. The older "unipolar" designs of cardiac devices are more susceptible to interference from electric fields. Research from the early 1990s indicates that the earliest evidence of interference was in electric fields ranging from 1.2 to 1.7 kV/m.

Electric fields for all structure alternatives are well below levels at which modern bipolar devices are susceptible to interaction with the fields (See Appendix F). For older style unipolar designs, the electric fields do exceed levels that research from the 1990s has indicated may produce interference. However, recent research conducted in 2005 concluded that the risk of interference inhibition of unipolar cardiac pacemakers from high voltage power lines in everyday life is small. In 2007, Minnesota Power and Xcel Energy conducted studies with Medtronic under 115kV, 230 kV, 345 kV, and 500 kV transmissions lines to confirm the 2005 findings. The analysis was based on real life public exposure levels under actual transmission lines in Minnesota; no adverse interaction with pacemakers or ICDs occurred (University of Minnesota Power Systems Conference Proceedings 2007). The analysis concluded that although interaction may be possible in unique situations, device interaction due to typical public exposure would be rare.

In the unlikely event a pacemaker is impacted, the effect is typically a temporary asynchronous pacing (commonly referred to as reversion mode or fixed rate pacing). The pacemaker would return to its normal operation when the person moves away from the source of the interference.

Magnetic Fields

With current flow at the conductor's maximum capacity, the Project, in conjunction with the proposed 230 kV transmission lines, would have a peak magnitude of magnetic field density of approximately 343 mG beneath the conductors and drop to less than 36 mG within 100 feet of the centerline of the transmission line structure (Appendix F). The magnetic field density would be significantly less than this during normal operations and, according to the EPA, would be less than the magnetic fields associated with many household appliances. Therefore, the Project would not have direct or indirect effects associated with magnetic fields.

No stray voltage issues are anticipated with this Project. No direct or indirect effects attributed to EMF from the Project are anticipated; therefore, mitigation would not be necessary.

Public and Agency Coordination:
The Applicant engaged interested members of the public, agencies, and local government units through a public notification process to discuss Project alternatives. Detailed information is provided in Appendix G. Two letters were sent to the public, State and federal agencies, and local units of government. The first letter was sent to agencies on December 22, 2008, regarding the proposed Project. The letter was intended to inform various regulatory agencies of the Project and solicit comments to identify potential issues, obtain relevant information, and to identify relevant regulations.

A public meeting invitation was sent on January 29, 2009, to all parties owning property within the Project study area, as well as State and federal agencies, and local units of governments. The invitation included information regarding the meeting, which was held on February 11, 2009, at Nashwauk City Hall. Approximately 130 people attended the open house, which was staffed with City of Nashwauk and Minnesota Power representatives and the Applicant's consultant, HDR Engineering, Inc. The following information was made available to meeting participants:

- Large-scale maps identifying the Project study area;
- Several figures showing the various transmission line structure designs;
- A computer set up to provide interested parties with individual maps of their property; and
- A fact sheet describing the proposed Project

The intent of this meeting was to solicit comments from local landowners and interested agencies on areas of special interest within the Project area and to seek their suggestions on alternative alignments for the proposed transmission line reroute. Meeting minutes and comments are included in Appendix G.

Summary of Public Comments
Several comments have been received as a result of the public participation process. The comments have come in the form of emails, phone calls, verbal communications, and written letters. The most common concerns focused on:

- Avoiding houses
- Using existing transmission line rights-of-way where possible
- Avoiding lakes in the area

Summary of Agency Comments
The letters sent on December 22, 2008, requesting input on the proposed reroute resulted in written responses from the following agencies: the Minnesota Historical Society - State Historic Preservation Office, U.S. Army Corps of Engineers, the Natural

Resource Conservation Service, Minnesota Department of Transportation – Office of Technical Support, Minnesota Department of Transportation - Office of Aeronautics, and the Minnesota Department of Natural Resources. Following is a summary of agency comments.

Minnesota Historical Society - State Historic Preservation Office (SHPO)

The SHPO is recommending that the Applicant conduct an archaeological survey. However, much of the reroute would be located on land that has been previously disturbed by mining activity. The Applicant will provide additional documentation to the SHPO that shows the extent of previous disturbance, and will discuss the need to conduct cultural resource surveys.

U.S. Army Corps of Engineers (USACE)

The USACE provided general information concerning their regulatory program that may apply to the Project. If the final alignment for the proposed reroute involves activity in waters of the United States, the Applicant would follow the required USACE permitting process. The USACE recommends a pre-application meeting if the project is large or becomes controversial.

Natural Resource Conservation Service (NRCS)

The NRCS determined that the Project was exempt from the Federal Farmland Policy Protection Act because there is no federal sponsoring agency involved and there would not be any federal financial or technical assistance needed.

Minnesota Department of Transportation - Office of Technical Support

The letter provided guidelines for transmission line routing on or near Minnesota trunk highways. The proposed guidelines would be taken into consideration as the final right-of-way alignment is determined.

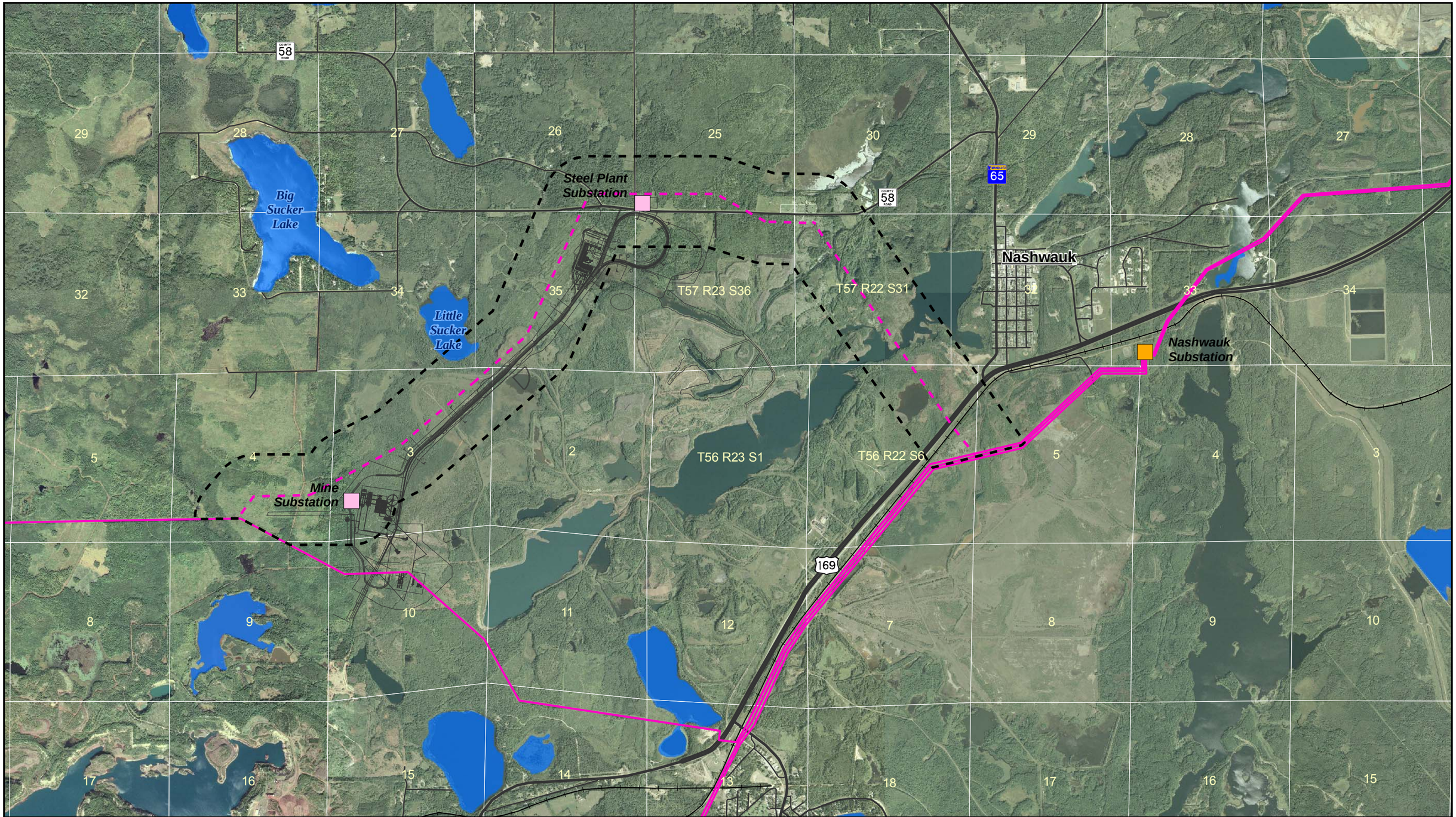
Minnesota Department of Transportation - Office of Aeronautics

The Department reviewed the proposed Project and determined that transmission lines constructed within the Project area would have no substantial adverse effect on the safe and efficient use of navigable airspace.

Minnesota Department of Natural Resources

The DNR Natural Heritage Program reviewed the Project information and submitted a letter dated April 15, 2009. The DNR provided a list of rare features that may be impacted by the proposed Project and requested that the Applicant consider rare features in developing avoidance and/or mitigation measures in the Route Permit Application. The Applicant has committed to continued consultation with the DNR to determine whether additional surveys would be required.

Figures



Proposed 115 kV Route
Existing Substation
Proposed Substation
Proposed 115 kV Transmission Line
Existing 115 kV Transmission Line
DNR Public Water

0 0.5 1 Miles

N

Figure 1 - Project Area
Minnesota Power 115 kV Route Application

HDR
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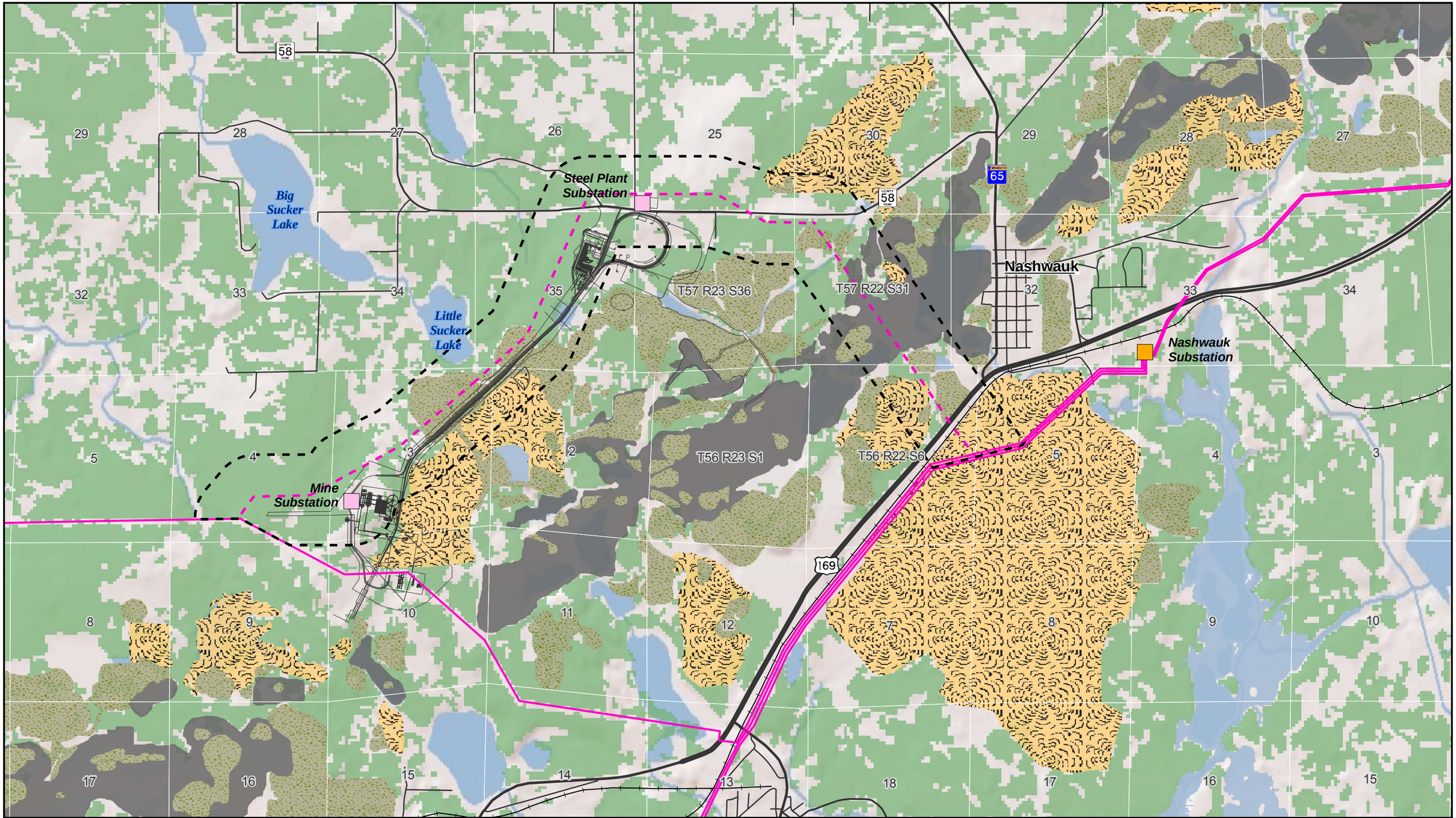

Proposed 115 kV Transmission Line
Existing 115 kV Transmission Line
Proposed 115 kV Route
Proposed Substation
Existing Substation
Mine Pit
Lake
Mine Stockpile
Tailings Basin
Forested Land

0 0.5 1 Miles

Figure 2 - Mining and Forestry Resources
Minnesota Power 115 kV Route Application

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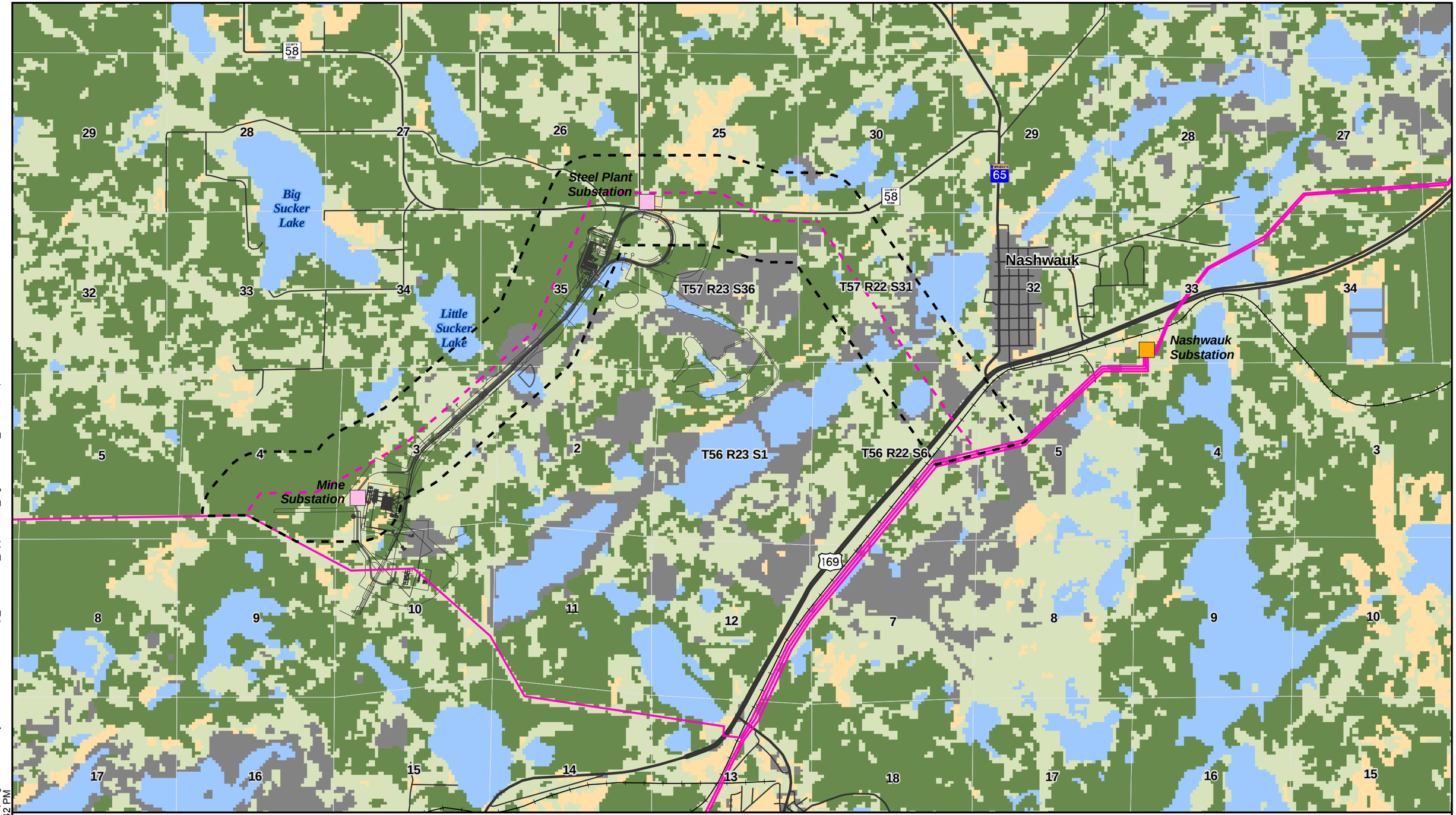

Existing Substation
Proposed Substation
Proposed 115 kV Transmission Line
Existing 115 kV Transmission Line
Proposed 115 kV Route
Aquatic
Forest
Shrub
Cropland / Grassland
Developed

0 0.5 1 Miles

Figure 3 - Land Cover
Minnesota Power 115 kV Route Application

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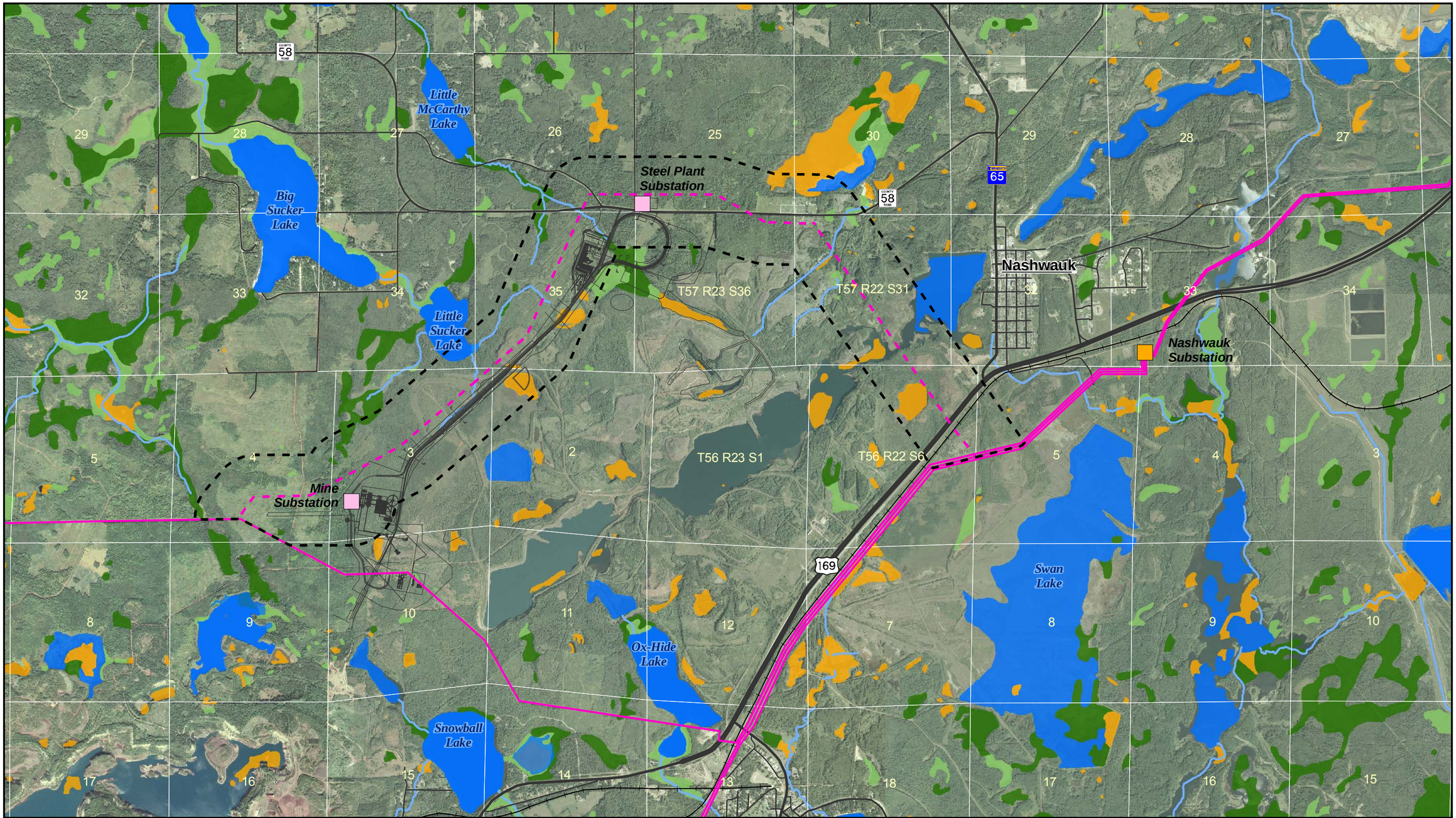

Surface Water
Emergent Wetland
Forested Wetland
Shrub Wetland
DNR Stream
Proposed 115 kV Transmission Line
Existing 115 kV Transmission Line
Proposed 115 kV Route
Proposed Substation
Existing Substation

0 0.5 1 Miles

N

Figure 4 - Water Resources
Minnesota Power 115 kV Route Application

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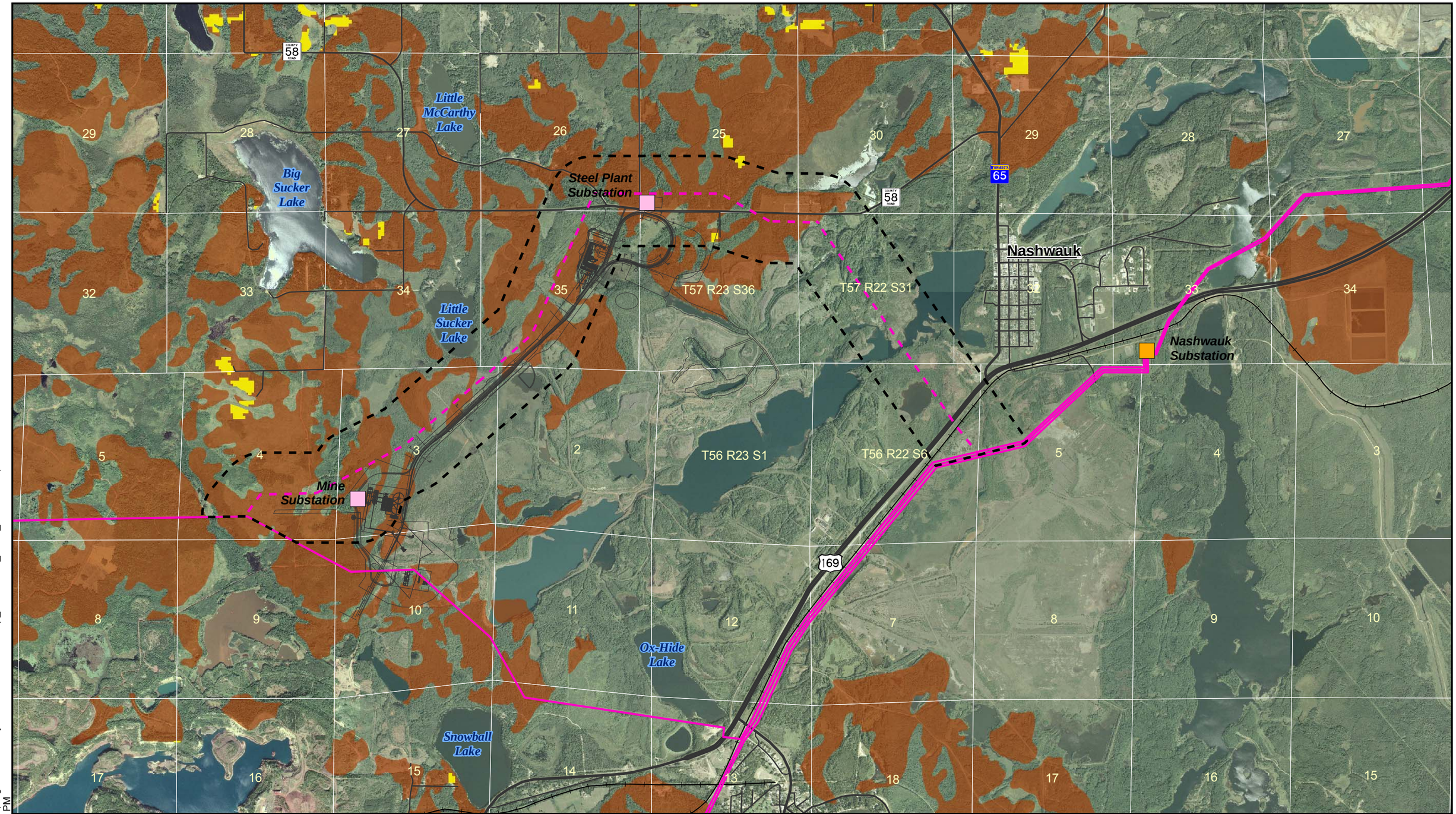

Prime Farmland not used for Agriculture
Prime Farmland used for Agriculture
Proposed 115 kV Transmission Line
Existing 115 kV Transmission Line
Proposed 115 kV Route
Proposed Substation
Existing Substation

0 0.5 1 Miles

N

Figure 5 - Agricultural Resources
Minnesota Power 115 kV Route Application

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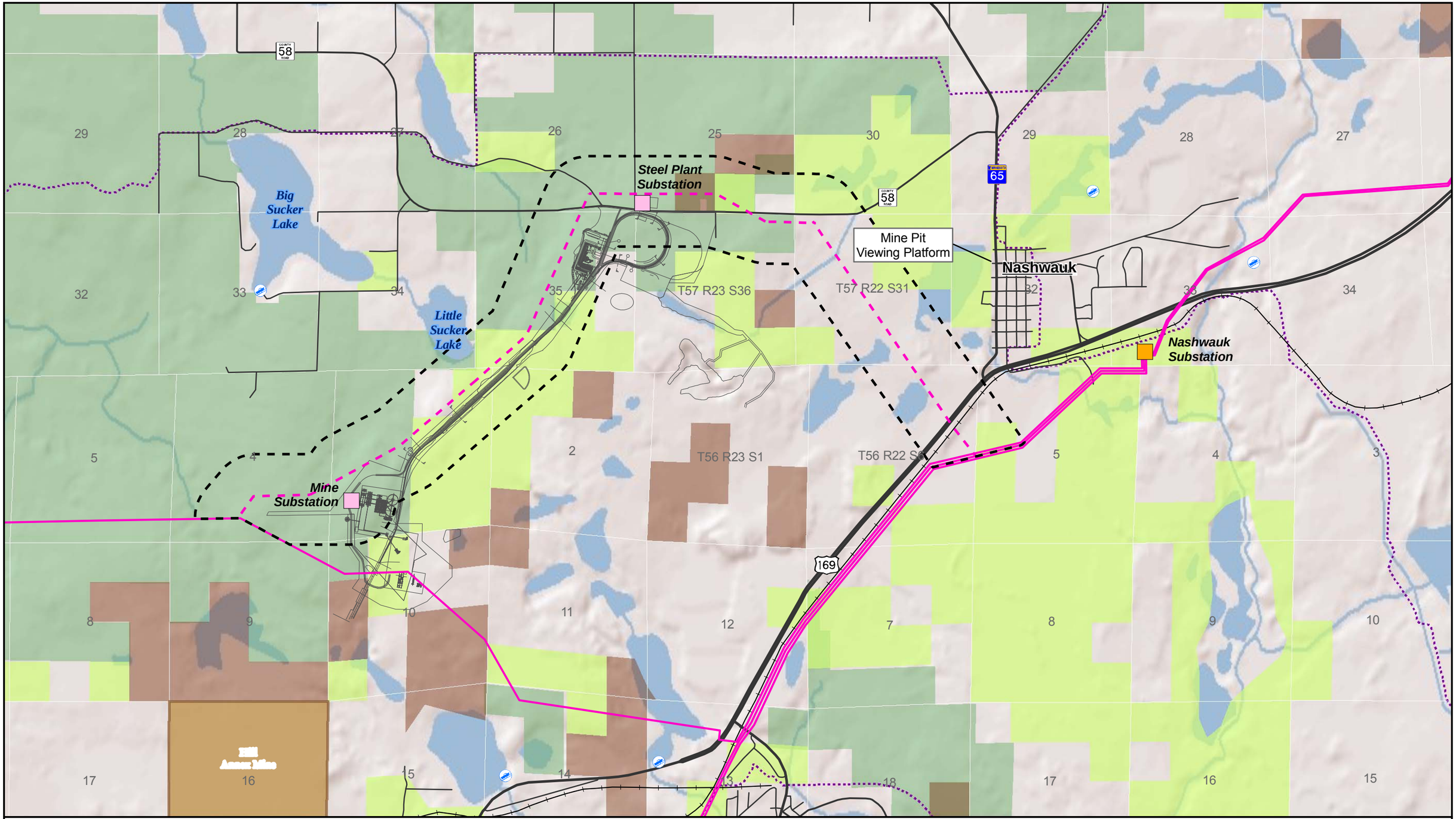

Proposed 115 kV Route
Existing Substation
Proposed Substation
Proposed 115 kV Transmission Line
Existing 115 kV Transmission Line
Boat Access
State Trail
Snowmobile Trail
State Park
State Forest
County Forest
Blandin Paper Land

0 0.5 1 Miles

N

Figure 6 - Recreational Resources
Minnesota Power 115 kV Route Application

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