APPENDIX F
Wetlands Documents –

Documentation for USACE (F1), Floodplain and Wetlands Assessment (F2), MnRAM 3.1 Functions and Values Assessment Summary (F3)

(Note: Color versions of figures in this Appendix are included in the file posted at the DOE NEPA website: http://www.gc.energy.gov/NEPA/final_evironmental_impact_statements.htm)

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APPENDIX F1
Documentation for USACE

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APPENDIX F1: ADDITIONAL DOCUMENTATION SUBMITTED IN SUPPORT OF EXCELSIOR'S APPLICATION FOR A SECTION 404 PERMIT

I. INTRODUCTION: PURPOSE OF THIS APPENDIX

Pursuant to regulations promulgated under the Clean Water Act, Section 404(b), the United States Army Corps of Engineers ("Corps") is required to determine that there is no alternative to a proposed activity that is practicable, is less damaging to the aquatic ecosystem, and has no other significant, adverse environmental effects before discharge of dredged or fill material can be permitted.[1] In addition, the Corps is required under rules governing its implementation of the National Environmental Policy Act ("NEPA") to "consider and express that activity's underlying purpose and need from a public interest perspective."[2] The factors the Corps is required to use in assessing whether a proposed activity is contrary to the public interest are established by rule.[3] The documentation presented in this Appendix F1 is intended to support the Corps' above decision-making efforts by providing the following information:

- Evidence supporting the purpose and need for Excelsior Energy Inc.'s ("Excelsior") Mesaba Energy Project, a nominal 1,200MW_{net} integrated gasification combined cycle ("IGCC") electric power generating station comprised of two 600MWnet units (individually "Mesaba One" and "Mesaba Two"; collectively, the "Project" or the "IGCC Power Station");
- Incentives provided by the State and Federal government in support of the Project; and
- The screening process used to identify two sites to be evaluated as part of Minnesota's Power Plant Siting Act, one site of which is to be designated the preferred site, the other, the alternate site (with respect to the Project, the "West Range Site" and "East Range Site," respectively).

The two sites identified as part of the screening process described herein will be analyzed from a NEPA perspective and presented in the Final EIS, the information included therein providing the basis for a detailed comparison of the two sites' wetland impacts to be presented in Appendix F2.

II. OVERALL PROJECT PURPOSE AND NEED

The EIS includes a statement of the purpose and need for the project from the standpoint of Excelsior, the U.S. Department of Energy ("DOE"), and the State of Minnesota.[4] The Project's purpose and need is summarized in the following two elements:

1. Confirm the commercial viability of generating electrical power by means of a fuel-flexible integrated gasification combined cycle ("IGCC") technology in a utility-scale application; and
2. Help satisfy Minnesota's need for new and diverse sources of baseload electric power.

The considerations specified in Section III of this document provide support for the Project's purpose and need statement.

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[1] *See* 40 C.F.R. § 230.10(a).
[2] *See* 33 C.F.R. pt. 325, App. B, § 9(b)(4).
[3] *See* 33 C.F.R. § 320.4(a).
[4] *See* U.S. Department of Energy and Minnesota Department of Commerce, Mesaba Energy Project Draft Environmental Impact Statement §§ 1.4.1-.2 (Nov. 2007).

III. CONSIDERATIONS SUPPORTING THE PROJECT'S PURPOSE AND NEED

A. Purpose and Need of Demonstrating the Commercial Viability of IGCC Technology

The need to confirm the commercial viability of IGCC technology in a utility-scale application has been determined by the DOE in furtherance of the Clean Coal Power Initiative ("CCPI"). Congress provided funding and guidelines for this program pursuant to Public Law 107-63, enacted in November 2001. Coal accounts for over 94% of the proven fossil energy reserves in the U.S. and supplies over 50% of the nation's electricity.[5] Priorities covered by the President's National Energy Policy "include increasing the domestic energy supply, protecting the environment, ensuring a comprehensive energy delivery system, and enhancing national energy security."[6] Promoting IGCC technology through the CCPI "provides an important platform responding to these priorities."[7] Specifically, "the National Energy Policy seeks to lessen the impact on Americans of energy price volatility and supply uncertainty. Such uncertainty increases as we reduce America's dependence on foreign sources of energy."[8] Because coal is the nation's most abundant domestic fuel resource, the "government's investment in CCPI recognizes the crucial benefits to our nation's economic stability and security that can be achieved through clean coal research."[9] U.S. Senator Norm Coleman also explained one of the important purposes of the Mesaba Energy Project:

> As concerns about natural gas prices and supply grow, this project is a step in the right direction…By increasing efficiency and reducing emissions, this project will continue energy production without forsaking the resources that sustain us. I'm proud [of] the vision for future energy this project sets before Minnesota and the rest of the country as it means greater diversification of energy and reduction of our dependence on foreign sources of oil.[10]

Published in February 2006, the President's *Advanced Energy Initiative* proposes significant new investments and policies in three promising areas: (1) clean coal technology; (2) nuclear power; and (3) renewable solar and wind energy.[11] The *Initiative* states, "To enhance our future energy security, we can and must do more to reduce our future demand for natural gas and foster alternatives for power production."[12] The basis for seeking to reduce the demand for natural gas and the role of the electric power sector in accomplishing it is explained in the *Initiative* as follows:

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[5] Include citation.

[6] U.S. DEPARTMENT OF ENERGY, OFFICE OF FOSSIL ENERGY, NATIONAL ENERGY TECHNOLOGY LABORATORY, CLEAN COAL POWER INITIATIVE 1 (Dec. 2006), http://www.fossil.energy.gov/programs/powersystems/cleancoal/ccpi/Prog052.pdf.

[7] *Id*.

[8] NATIONAL ENERGY POLICY DEVELOPMENT GROUP, NATIONAL ENERGY POLICY xv (2001), http://www.whitehouse.gov/energy/2001/National-Energy-Policy.pdf

[9] U.S. DEPARTMENT OF ENERGY, *supra* note 6, at 2.

[10] Press Release, U.S. Senator Norm Coleman, Coleman Announces $36 Million DOE Grant for Excelsior Energy's Mesaba Energy Project (Oct. 26, 2004), http://coleman.senate.gov/public/index.cfm?FuseAction=PressReleases.Detail&PressRelease_id=187daa08-f220-4765-a174-77958e4ef4d2&Month=10&Year=2004.

[11] NATIONAL ECONOMIC COUNCIL, ADVANCED ENERGY INITIATIVE 10 (2006), http://www.whitehouse.gov/stateoftheunion/2006/energy/energy_booklet.pdf.

[12] *Id.*

> At present, natural gas prices track high crude oil prices because natural gas is often used as a substitute for oil in power production and heating. Furthermore, the tight balance between supply and demand has led to a more volatile market, which can respond dramatically to weather events and geopolitical developments.
>
> This substantial increase in natural gas prices and volatility has had a negative impact on the U.S. industrial sector. High prices for natural gas translate to increased production costs for U.S. companies, which places them at a disadvantage to their foreign competitors. As a result, many firms have either shut down U.S. production facilities altogether or relocated them to another country where energy costs are more competitive with the global market. According to the National Association of Manufacturers, the chemicals and plastics industries, which rely on natural gas both for energy and as a raw material, have lost 250,000 jobs and $65 billion in business because of rising natural gas prices. High natural gas prices similarly harm the competitiveness of U.S. farm products in global markets, as natural gas is a primary input for fertilizer.
>
> Diversification of our electric power sector will ensure the availability of affordable electricity and ample natural gas supplies. At the same time, increased efficiency will help reduce demand for natural gas. By easing the demand pressure on natural gas, prices will drop and U.S. firms will be more competitive in the global market, keeping jobs here at home.[13]

On April 28, 2008, the DOE issued a white paper (Report No. DOE/NETL-2008/1320) entitled "Natural Gas and Electricity Costs and Impacts on Industry, A White Paper on Expected Near-Term Cost Increases" that concluded:

> Natural gas prices continue their recent upward trend. High natural gas prices hurt all natural gas consumers, especially households and natural gas-intensive industry, with recent prices three to four times higher than a decade ago. Trade-exposed industry has been hurt the most. Regions of the country dependent on natural gas fired generation have experienced large increases in the cost of power. Coal-fired generation has restrained the price of electricity and has constrained the price of natural gas from matching the rise in the price of oil. Currently, opposition to coal plants and uncertainty over nuclear power has stymied the construction of new baseload generation. This threatens a capacity shortage in many areas of the country, in the near term. Additionally, should climate change legislation pass, the "dash to gas" will be exacerbated, doubling natural gas consumption for power generation, increasing dependence on foreign energy sources, and sending natural gas and power prices skyward across the country.[14]

The DOE has sought to keep the nation from becoming too reliant on natural gas by sponsoring its Clean Coal Power Initiative Program, one element of which is demonstrating the commercial viability of IGCC. The Project's role in fulfilling DOE's objectives in this regard is, among other things, to i) "make it among the cleanest coal-based power generating plants in the world" and ii) "demonstrate, from a broad perspective, the commercial development, engineering and design necessary to construct a large feedstock-flexible reference plant for IGCC, thus establishing a

[13] *Id.* at 8.
[14] *See* http://www.netl.doe.gov/energy-analyses/pubs/NatGasPowerIndWhitepaper.pdf.

standard replicable design configuration with a sound basis for providing firm installed cost information for future commercialization."[15] Therefore, the Project represents an important step in ensuring that the U.S. can continue to use its most abundant domestic fuel resource to meet growing domestic energy needs in an environmentally sensitive manner.

B. Purpose and Need of Providing New and Maintaining Diverse Baseload Electric Power for Minnesota

The need for new and diverse sources of baseload power to serve Minnesota is documented in recent utility integrated resource plans ("IRPs") filed with the Minnesota Public Utilities Commission ("MPUC") and in other regulatory and commercial filings. Minnesota Statutes Section 216B.2422 and Minnesota Rules Chapter 7843 require many, but not all, of Minnesota's electric utilities to submit IRPs. In the IRPs, the utilities estimate the needs of their customers over the forecast period.[16] Other regulatory filings (such as certificate of need applications pursuant to Minnesota Statutes Section 216B.243) and commercial documents (such as requests for proposals) help produce a more comprehensive view of the need for baseload generation resources in Minnesota.

Table 1 identifies relevant historical utility IRPs and one RFP which Excelsior has used to document Minnesota's current need for more than 2,000 MW of new baseload electric generating capacity by the year 2020.

In a certificate of need docket currently pending before the MPUC, proponents of the Big Stone II conventional coal project have confirmed this view of the need for significant coal baseload additions in the region.[17] Xcel Energy has observed, "Over the past decade, there have been virtually no baseload additions anywhere in the Midwest. As load grows in the Midwest, coupled with the lack of baseload additions, there is less excess baseload generation available in the market."[18]

Other than Mesaba One and Mesaba Two, Big Stone Unit II is the only other planned coal facility with a substantial amount of future output slated to meet Minnesota's baseload power needs. In fact, the coal baseload resources available to serve Minnesota will decline from current levels as evidenced by the conversion of coal units in the Twin Cities to combined cycle natural gas, and Minnesota Power's May 13, 2008 announcement that its share of the Young Unit 2 coal plant is phasing out over the next several years.[19]

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[15] U.S. Department of Energy, 2006, Notice Of Financial Assistance Award Under The Authority Of Public Law 95-91 DOE Organization Act. As Amended By PL 102-486 Energy Policy Act, Attachment A.

[16] *See* Minn. Stat. § 216B.2422, subd. 2.

[17] Uggerud, Ward. Supplemental prefiled testimony. Applicants' Exhibit 114 in MPUC Docket No. CN-05-619.

[18] Direct Testimony and Schedules of Camille A. Abboud, Director of Generation Risk Services at Xcel Energy at 11, In the Matter of the Application of Northern States Power Company d/b/a Xcel Energy for Authority to Increase Rates for Electric Utility Service in Minnesota, Docket No. E002/GR-05-1428 (Minnesota Public Utilities Commission, Nov. 2, 2005).

[19] Press Release, Minnesota Power, Minnesota Power Announces Long Term Project to Accelerate Wind Energy and Cut Back Carbon (May 13, 2008), *available at* http://www.mnpower.com/news/articles/2008/05-12-08_accelerate_wind.pdf.

Table 1. Baseload Electric Power Needs Identified in Completed IRPs/RFP

Utility	Baseload Power Needed (MW)	Data Source
Northern States Power d/b/a Xcel Energy	334	Xcel 2007 IRP, p. 4-14, (Dec. 14, 2007) MPUC Docket RP-07-1572
Minnkota Power Cooperative and Northern Municipal Power Agency	221	Minnkota and NMPA 2006 IRP, pp. 4-2, 9-3, (Jun. 29, 2006); DOC Comments, pp. 2-3 (Feb. 22, 2007), MPUC Docket RP-06-977
Great River Energy	273	GRE 2008 IRP, pp. 58, 70, (Jul. 1, 2008), MPUC Docket RP 08-784
Dairyland Power Cooperative	295	Dairyland 2008 IRP, pp. 14–15, (Jan. 25, 2008), MPUC Docket RP-08-113
Interstate Power and Light	60	IPL 2005 IRP, Appendix 9C (Jan. 3, 2006); Staff Briefing Paper, p. 19, (Mar. 8, 2007), MPUC Docket RP-05-2029
Missouri River Energy Services	135	Big Stone II CON, Addendum to the Testimony of J.P. Schumacher, p. 3, (Dec. 17, 2007), MPUC Docket CN-05-619
Otter Tail Power Company	170	Big Stone II CON, Direct Testimony of Brian Morlock, Exhibit 116-B, (Nov. 13, 2007), MPUC Docket CN-05-619
Minnesota Municipal Power Agency	50	MMPA 2008 IRP, pp. 31, 35, (Aug. 1, 2008), MPUC Docket RP- 08-927
Nashwauk Public Utilities Commission	300	Nashwauk PUC RFP, pp. 2–3, (Oct. 8, 2008)
Southern Minnesota Municipal Power Agency	149	SMMPA 2006 IRP, Initial Filing, p. IV-39 (Jun. 30, 2006), MPUC Docket RP-06-605
Central Minnesota Municipal Power Agency	40	Big Stone II CON, Supplemental Testimony of Robert L. Davis, Exhibit 117-G, (Nov. 13, 2007), MPUC Docket CN-05-619
Total	**2,027**	

Some utilities have proposed new wind generation backed up with natural gas combustion turbines as an alternative to coal generation. However, there are serious questions about the feasibility of achieving all the transmission upgrades and the procurement of a large number of wind turbines in a production-constrained market, both being necessary to support the rapid pace of wind penetration assumed in the utilities' plans. Importantly, the "wind plus gas" strategy does nothing to alleviate serious concerns regarding the reliance on a volatile commodity, natural gas, exposing Minnesota and the nation to further economic distress.

In summary, recent utility IRPs and other regulatory filings show that no plans are underway on the part of utilities to meet significant portions of their growing baseload electric power needs with traditional baseload generating capacity. Mesaba One and Mesaba Two are proposed, in part, to address this significant concern.

IV. ADHERENCE TO EXISTING STATE LAWS, POLICIES AND GOALS

The Project must comply with existing State laws, policies and goals, one of which specifically relates to how and where the Project is sited. Minnesota Rules Chapter 7849 ("Power Plants and Transmission Lines") require the applicant to provide an engineering analysis addressing how

each site could accommodate expansion of generating capacity in the future.[20] Because the MPUC found that Excelsior's site application was complete and a state-appointed Citizen's Advisory Committee chose not to propose any additional sites, the Project has adequately addressed this application requirement.

A more recent requirement, codified in Minnesota Statutes Chapter 216H, establishes statewide reduction goals for greenhouse gases across all sectors of the economy and imposes a moratorium on the construction of new large energy facilities on or after August 1, 2009 unless a state or federal law or rule is in effect that directly limits and substantially reduces statewide power sector carbon dioxide emissions.[21] An exemption from the construction moratorium is provided in the law for new large energy facilities which had filed an application with the MPUC prior to April 1, 2007.[22] Because the applications for Site and Route Permits for Mesaba One and Mesaba Two were filed on June 16, 2006 and were deemed complete on July 28, 2006,[23] they are therefore exempt from, and compliant with, the moratorium mandated by Minnesota Statutes Section 216H.03, Subdivision 3.

V. STATE AND FEDERAL INCENTIVES AVAILABLE TO AN INNOVATIVE ENERGY PROJECT AND CLEAN ENERGY TECHNOLOGY

A. State Incentives

1. Introduction

In its 2003 Special Session, the Minnesota Legislature enacted broad-reaching energy policy legislation that, in addition to addressing the storage of spent nuclear fuel, recognized the need to provide for the development of new and alternative sources of energy.[24] Among the options addressed, the Legislature placed special emphasis upon the development of a project "that makes use of an innovative generation technology utilizing coal as a primary fuel in a highly efficient combined-cycle configuration with significantly reduced sulfur dioxide, nitrogen oxide, particulate, and mercury emissions from those of traditional technologies."[25] The Innovative Energy Project ("IEP") and the Clean Energy Technology ("CET") Statutes (collectively, the "Enabling Statutes") emerged from the 2003 Session with the aim of providing the State with a path forward to resolve critical energy issues. Market conditions that prompted the Legislature to seek to proactively foster the construction of IEPs in northeastern Minnesota included:[26]

- Rising natural gas prices and proposals to significantly increase reliance on gas-based generation. In 2002 through 2003, natural gas prices had begun what proved to be a steady upward climb. In 2002 and 2003, the average price for natural gas had risen to the level of $4.54 to $5.25 per thousand cubic feet and the State had experienced a few winters where

[20] *See* Minn. R. § 7849.5522, subp. 1.I. Expansion of generating capacity in this context implies that adequate resources are available to support a second generating unit of similar size and type to the first.
[21] *See* Minn. Stat. 216H.03, subd. 3.
[22] *See* Minn. Stat. 216H.03, subd. 7.
[23] Minnesota Public Utilities Commission, Order Accepting Joint Application for Filing and Authorizing Public Advisor, Advisory Task Force, and Electronic Dissemination of Proposal, as Modified, Docket No. E-6472/GS-06-668, July 28, 2006.
[24] *See* 2003 Minn. Laws, 1st. Spec. Sess., ch. 11.
[25] *See* 2003 Minn. Laws, 1st. Spec. Sess., ch. 11, art. 4, § 1, *codified as* Minn. Stat. § 216B.1694, subd. 1(1).
[26] *See* EXCELSIOR ENERGY INC., MESABA ENERGY REPORT TO THE MINNESOTA PUBLIC UTILITIES COMMISSION 1–4, MPUC Docket No. E-6472-/M-05-1993 (Dec. 23, 2005).

gas prices peaked above those levels. This early warning sign that market fundamentals were changing prompted concern on the part of policymakers about Xcel's proposed transition from its historically coal-based portfolio to a portfolio that would rely extensively on natural gas-fired generation.

- No plans for baseload. No new baseload facilities were on the drawing board in the State, and it was recognized that baseload resources require significant lead times for development and construction. Xcel forecasted needing an additional 4,100 MW to 5,800 MW of new generating resources by 2017 in its 2002 Resource Plan. The plan called for 1,804 MW of new baseload capacity by 2015.
- Concerns over out-of-state plants. Minnesota's environmental leadership record made it advantageous to site traditional coal-based resources to meet Minnesota's growing needs in neighboring states, resulting in the forfeiture by Minnesota of more than a billion dollars of direct investment for each plant, and the export of jobs and import of the pollution from high emission, conventional coal technologies.
- Transmission constraints. Transmission infrastructure was severely constrained and the region was experiencing a record number of transmission curtailments. Xcel's 2002 Resource Plan stated that "[W]ith few exceptions, major new transmission infrastructure improvements will be necessary for any of the generation options discussed," and concluded that significant lead-time was necessary to complete the transmission planning, permitting and construction process.[27]
- Tightening emission limits. Air emission limits, including mercury, appeared likely to tighten, but the precise form the limits would take was unclear. Pressure had begun to build on the U.S. to adopt some form of limits on greenhouse gases, which could force older, less efficient power plants to shut down.
- Oil price forecasts. Forecasts were emerging that oil production was about to peak, with accompanying rising world oil prices.
- Deteriorating economic conditions in Northeastern Minnesota. The Iron Range had lost an additional 2,000 jobs with the closure of the LTV Mining Company, bringing the total job loss to more than 10,000 in the past decade. Given these concerns, the benefits of locating IGCC generation facilities on the Iron Range were clear.

Since passage of the legislation, the market conditions that were the foundation for the enactment of the Enabling Statutes have become significantly more pronounced, underscoring the importance of the Project to a balanced, hedged energy portfolio for Minnesota. The MPUC has also subsequently confirmed that the project is an Innovative Energy Project under the Enabling Statutes, and is thus entitled to all the regulatory benefits provided therein.[28]

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[27] XCEL ENERGY, 2002 INTEGRATED RESOURCE PLAN 171–79, Dec. 2, 2002, MPUC Docket No. E002/RP-02-2065.

[28] Minnesota Public Utilities Commission, Order Resolving Procedural Issues, Disapproving Power Purchase Agreement, Requiring Further Negotiations, and Resolving to Explore the Potential for a Statewide Market for Project Power Under Minn. Stat. § 216B.1694, Subd. 5, Docket No. E-6472/M-05-1993, Aug. 30, 2007.

2. *Specific Incentives Provided by the Enabling Statutes*

The Minnesota Legislature recognized that special forms of assistance would be necessary to encourage the development of IGCC technology within the state. Thus, the IEP Statute provides important regulatory incentives, including:[29]

- Exemption from the requirements for obtaining a certificate of need;
- Eligibility to increase transmission capacity without additional state review;
- The power of eminent domain for sites and routes approved by the MPUC;
- Status as a "clean energy technology" for the supply of electric energy to a utility that owns a nuclear generating facility;
- The right to enter into a contract with a public utility that owns a nuclear generation facility to provide 450 megawatts of baseload capacity; and
- Eligibility for a $10 million grant from the renewable development account for development and engineering costs.

Without such incentives, it was deemed unlikely that an IGCC power station could be developed within the state. In order to take advantage of these important and unique incentives for an IEP, the Enabling Statutes specify that the project must be located on a site within the Taconite Tax Relief Area ("TTRA") of northeastern Minnesota. A project located elsewhere in the state does not qualify for the incentives.

B. Federal Incentives

1. *Loan Guarantees in General*

Federal loan guarantees are important to the development of innovative and emerging technologies because the lower cost of capital associated with federally guaranteed loans reduces the typically higher financing costs of such projects, making the cost of electricity more competitive.

2. *Loan Guarantees Specific to Mesaba Energy Project*

The United States Congress recognized the importance of the incentives provided by the Enabling Statutes in supporting the widespread commercialization of IGCC technology. The Energy Policy Act of 2005[30] ("EPAct2005") authorized the Secretary of Energy to make eligible for loan guarantees "a project located in a taconite-producing region of the United States that is entitled under the law of the State in which the plant is located to enter into a long-term contract approved by a State public utility commission to sell at least 450 megawatts of output to a utility."[31] Therefore, the Project's location in the TTRA under Minnesota law is a necessary condition for the federal loan guarantee provided in EPAct2005.

3. *Excelsior Is Successfully Pursuing Federal Loan Guarantees*

In August 2006, DOE issued a solicitation inviting pre-applications for loan guarantees. By the December 31, 2006 deadline for this solicitation, DOE had received 143 pre-applications

[29] Minn. Stat. § 216B.1694.
[30] *See* Public Law 109–58, Aug. 8, 2005.
[31] *See* 42 U.S.C. § 16513(c)(1)(C). *See also* 42 U.S.C. § 16514(b)

requesting more than $27 billion in loan guarantee protection (for project costs estimated at more than $51 billion). On October 4, 2007, Excelsior was notified by DOE that it was one of 16 project sponsors who submitted pre-applications for loan guarantees to be invited to submit full applications (the 16 were selected from the 143 applicants submitting pre-application loan guarantee requests). In the announcement, DOE Secretary Samuel Bodman stated:

> Loan guarantees aim to stimulate investment and commercialization of clean energy technologies to reduce our Nation's reliance on foreign sources of energy. Finalizing this regulation for the Department's Loan Guarantee program puts Americans one step closer to being able to use new and novel sources of energy on a mass scale to reduce emissions and allow for vigorous economic growth and increased energy security.[32]

As a result of lower cost debt financing associated with loans guaranteed by the federal government, the Project is expected to achieve cost parity with a conventional, utility-owned supercritical pulverized coal plant that would not have access to such loan guarantees.

On November 19, 2008, Excelsior submitted its application for a loan guarantee under DOE's first Energy Efficiency, Renewable Energy ("EERE") solicitation (DE-PS01-06LG00001).[33] On December 19, 2008, Excelsior was notified by DOE that the information submitted in the application had been judged sufficiently complete for the Loan Guarantee Program Office to move to the due diligence stage in its evaluation of the proposed Mesaba One project.[34]

VI. LIMITATION OF ALTERNATIVES TO SITES WITHIN THE TTRA

A. Demonstrating the Commercial Viability of the EGas™ Process Could Not Be Done Elsewhere in a Timely Manner

The commercial viability of IGCC technology on a utility-scale could, in theory, be demonstrated elsewhere in the United States. However, as outlined in Section 2.1.1.2 of the EIS, the Project was selected for DOE funding as part of a nationwide competitive solicitation process that attracted only two proposed IGCC projects, both of which were ultimately funded.

Despite the limited number of applicants, it is now generally acknowledged that the Mesaba Energy Project, with its local, state, and national cooperation and incentives, is uniquely positioned to demonstrate the commercial viability of an IGCC project on an expedited basis.[35] The important national goals of energy independence, improved environmental performance, and

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[32] Press Release, U.S. Department of Energy, DOE Announces Final Rule for Loan Guarantee Program (Oct. 4, 2007), http://www.doe.gov/5568.htm.

[33] November 19, 2008 letter from Thomas Osteraas to David Schmitzer submitting Mesaba One Loan Guarantee Application.

[34] December 19, 2008 letter from David Schmitzer, Director, Loan Origination, Loan Guarantee Program, U.S. DOE to Thomas Osteraas, Sr. V.P. and General Counsel, Excelsior Energy Inc.

[35] *See* Press Release, Electric Power Research Institute (EPRI), EPRI Announces Completion of First Pre-Design Specification for an IGCC Plant (March 13, 2007), http://www.gasification.org/Docs/News/2007/EPRI%20Predesign%20IGCC.pdf.

deployment of technology capable of dealing with greenhouse gases, place a premium on developing this important energy source as soon as possible.

B. Baseload Electric Power Could Not Be Provided by Sources Outside Minnesota and Still Achieve the Legislature's Long-Term Goals

The provision of additional sources of baseload electric power could theoretically be provided from outside Minnesota. However, the State's goal of maintaining its diverse portfolio of baseload electric power sources and diversifying the long term economy of the Iron Range would remain unfulfilled. Minnesota's 2003 energy act underscores the importance of developing an IEP within the state to provide for the state's long term energy security and, in turn, help protect it from the volatility of rapidly escalating natural gas prices. Baseload coal-fired power generating plants located both within and outside of Minnesota are also now subject to the moratorium established in the state greenhouse gas legislation enacted in 2007.

C. The Project Must Be Located Within the State *and* Within the TTRA

By state statute, to qualify for the essential incentives that the Legislature established for the construction and operation of an IEP, the facility must be built within the TTRA.[36] Without strong regional and state support, as evidenced by the special incentives the 2003 legislation provided to locate within the TTRA, the Project would not likely have been selected in the CCPI Round 2 funding. Further, the United States Congress, by virtue of its specific references to the TTRA in EPAct 2005, recognized the importance of the state incentives to the Project's success and specifically confirmed the importance of locating the Project in the TTRA.[37] Alternatives outside of the TTRA would not be eligible for the state and federal incentives described in the previous section, which would render those alternatives not practicable due to both cost and logistical reasons.

D. DOE and Corps Finding Concerning the Area of Consideration for the Alternatives Analysis

In a July 2008 meeting between the U.S. Army Corps of Engineers and the Department of Energy, the two agencies concurred that, from the standpoint of the Clean Water Act Section 404 analyses, the alternatives analysis would be limited to the TTRA.

VII. ANALYSIS OF ALTERNATIVES WITHIN THE TTRA

A. Site Selection Process

Although numerous studies involving the selection of coal-fired power plant sites have been published, a recent presentation by the U.S. Department of Energy's National Energy Technology Laboratory ("NETL") has briefly described the most critical elements as follows[38]:

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[36] *See* Minn. Stat. § 216B.1694, subd. 1(3).
[37] *See* 42 U.S.C. § 16513(c)(1)(C).
[38] Hoffmann, Feeley, and Carney, "DOE/NETL's Power Plant Water Management R&D Program –Responding to Emerging Issues," 8th Electric Utilities Environmental Conference, Tucson, AZ, January 24-26, 2005. *See* http://www.netl.doe.gov/technologies/coalpower/ewr/pubs/05_EUEC_Hoffmann_1.pdf.

- Access to transmission lines,
- Available fuel, and
- Water.

The state of Wisconsin has published a host of additional power plant siting criteria that are commonly used in the site selection process.[39] Excelsior's site selection efforts addressed these same fundamental concerns and included the following four steps:

- Developing site selection criteria;
- Identifying potential sites;
- Establishing a short list of sites having the greatest likelihood of licensing success; and
- Specifying at least two licensable sites for consideration under rules implementing the State of Minnesota's Power Plant Siting Act, one site of which must be designated as preferred.

Each of these four site selection steps is discussed in further detail below.

1. Step One: Development of Site Selection Criteria

Site selection criteria represent specific elements of concern that are collectively used to characterize the likelihood of a potential site to accommodate the footprint and infrastructure required for Phase I and Phase II of the Mesaba Energy Project (hereafter, "Mesaba One and Mesaba Two," "IGCC Power Station" or the "Station") while minimizing environmental and societal impacts. Excelsior divided its site selection criteria into three categories: permitting, technical, and site control. Permitting criteria focused on issues related to the relative feasibility of obtaining preconstruction permits necessary to construct and operate the IGCC Power Station. Technical criteria focused on the feasibility of constructing and operating the Station, and site control criteria considered the likelihood of obtaining site ownership and control in a timely manner with landowner cooperation. Table 2 lists the specific elements considered under each of these three categories.

[39] Public Service Commission of Wisconsin, "Common Power Plant Siting Criteria." September 1999. *See* http://psc.wi.gov/thelibrary/publications/electric/electric05.pdf.

Table 2. Excelsior's Site Selection Criteria

Code	Permitting Criteria	Description
P1	Air	What is the potential impact on Class I areas, including cumulative impacts of current and proposed projects?
P2	Wetlands	What is the potential for wetland impacts and mitigation if required?
P3	Groundwater	Will there be any solid waste disposal landfills on the site or other structures or operational features that could affect groundwater? If so, what is the depth to groundwater and how might groundwater be impacted?
P4	Floodplains	How will the proposed Project impact floodplains on the site?
P5	Water Supply	Are potential sources of water supply available, in what quantity/quality, and from what source or sources?
P6	Wastewater Discharges	Are publically owned treatment works ("POTW") located in relative proximity to the site, and can such POTWs accommodate plant-derived wastewaters? Are there bodies of water nearby that can accommodate the wastewater after appropriate treatment?
P7	Great Lakes Initiative ("GLI")	Is the proposed site located within the Lake Superior Basin watershed? If so, can wastewater discharges meet the low GLI mercury discharge criteria as such limits can be below the background mercury levels found in some Northeastern Minnesota surface waters?
P8	Natural/Cultural Resources	Does the site present any special concerns with respect to areas of archaeological/architectural importance or with respect to threatened and endangered species?
P9	Land Use	Is the current zoning designation compatible with industrial activities? What are the future land use plans for the proposed site and areas surrounding it?
Code	**Technical Criteria**	**Description**
T1	Plant Expansion	Is there sufficient contiguous acreage, water and related infrastructure available to accommodate the Phase I and Phase II Developments, including rail loop? Is the area sufficiently isolated for safety, security, dissipation of noise, and other considerations?
T2	Physical Characteristics	What are the size, shape, topography, and underlying soil conditions of the site? What are the subsurface characteristics? Are there any geohazards that would preclude use of the proposed site or confine the proposed facilities to specific areas?
T3	Rail Access	Is there adequate rail access for delivery of key pieces of equipment during construction, and for delivery of coal and pet coke for operation? Is it possible to develop more than one rail transportation option? Can Great Lakes ports be utilized to help meet fuel transportation needs?
T4	Transmission	How and where does the generator interconnection to the transmission system occur? What transmission system network reinforcements, beyond the POI, may be required to accommodate planned generating facilities?
T5	Natural Gas	How and where does the interconnection to the natural gas pipeline system occur and what is its available capacity?
T6	Industrial Processing	How close is the nearest large industrial processing facility? Do potential synergies exist with such facilities, including use of warmed water for industrial process uses, syngas as a substitute for natural gas, common use of facilities, etc.?
Code	**Control Criteria**	**Description**
C1	Site Control	Is it likely that site control can be obtained in a timely manner?

2. *Step Two: Identifying Initial Sites*

a) Existing Facilities

Industrial Facilities with Synergistic Processes

Excelsior initiated its siting efforts by identifying within the TTRA numerous sites in separate industrial complexes where the IGCC Power Station might share potential synergies with existing industrial operations. Such industrial sites could represent a desirable option for developing the Station based on the infrastructure that has been constructed to serve existing industrial operations.

However, any IGCC Power Station or other industrial facility cannot be indiscriminately placed in existing industrial locations. For example, many sites on the Iron Range, but off the "iron formation," have been used as auxiliary mining lands and include areas where large quantities of rocks and soil (stripped to expose natural mineral resources) have been placed. These areas, commonly referred to as "mine dumps" are generally not suitable locations upon which to place the IGCC Power Station. In general, the same is true for large areas where tailings[40] have been sluiced and left to settle[41].

The owners of two existing industrial operations, Minntac and United Taconite (owned by United States Steel Corporation and Cleveland-Cliffs Inc/Laiwu Steel Group, respectively,, showed an initial willingness to consider co-locating the IGCC Power Station on their sites. However, after extended negotiations, the owners were unwilling to commit to terms to allow Excelsior to develop the IGCC Power Station on their sites. Their inability and unwillingness to execute agreements for use of their industrial sites for the IGCC Power Station required Excelsior to look at other siting options. Although the two sites are designated as Site Nos. 16 and 17 in this document, efforts to locate the Station at either site were exhausted prior to further expanding Excelsior's site selection process. The general locations for Sites 16 and 17 are identified in Figures 8, 12, 26 and 30. Detailed information that Excelsior developed about these two sites is not disclosed because it is proprietary and/or confidential.

Repowering Existing Electric Utility Steam Generating Units

Excelsior did not consider repowering existing electric utility steam generating units. The basis for this decision was related to one of the Project's original purposes as stated in its June 15, 2004 response to DOE's Phase II CCPI solicitation:

> "The Mesaba Energy Project creates a standard configuration that can be deployed at multiple sites. The Project will demonstrate a technically superior configuration for IGCC projects in a readily replicable design that will offer a sound basis for providing firm installed cost information for future projects. In addition, the Mesaba Energy Project will remove the largest barrier to wide scale market penetration by establishing a competitive commercial and regulatory framework for IGCC projects. The Mesaba Energy Project will demonstrate lump sum turnkey engineering, procurement and construction (EPC) arrangements and limited

[40] Waste or refuse left in various processes of milling, mining, etc. From: Webster's New World College Dictionary, 4th Edition, Michael Agnes, Editor, Wiley Publishing, Inc.

[41] Loose, water-saturated sands and silts of low plasticity may have adequate shear strength under static loading conditions; however, if such materials are subjected to vibratory loading, they may lose strength to the point where they flow like a fluid. The process in which susceptible soils become unstable and flow when shocked by vibratory loading is called liquefaction, and it can be produced by vibration from blasting operations, earthquakes, or reciprocating machinery. In very loose and unstable deposits, liquefaction can occur as the result of disturbances so small that they are unidentifiable. *See* www.usace.army.mil/publications/eng-manuals/em1110-2-1911/c-3.pdf page 7.

recourse project financing, removing significant market penetration barriers for IGCC."

Repowering an existing generating unit would represent a design uniquely tailored to one application and preclude its utilization as a standard design for use at multiple sites based on commercially available power generation technology. Finally, all potential sites within the TTRA that might be used for a repowering demonstration project were either owned or controlled by a utility that consistently opposed the Project, which eliminated repowering or co-siting as an option.

Use of Existing Large Electric Power Generating Facility Sites

Excelsior considered the use of existing LEPGF sites within the TTRA but after discussion with the owners found such sites to be unavailable for the Project's development.

b) Screening Process

Excelsior used geographical information system ("GIS") mapping software to identify areas within the TTRA potentially capable of supporting development of the IGCC Power Station. In general, the areas within the TTRA where Excelsior focused its search depended upon access to existing rail lines (i.e., the means by which coal will be delivered to the Station) and the presence of the following attributes:

- Availability of water for cooling and other Station purposes;
- Proximity to existing high voltage transmission line corridors that can be used to minimize environmental impacts associated with interconnecting the Station to the regional electric grid;
- Feasibility of acquiring large blocks of land in a timely manner;
- Reasonable distance from nearby landowners;
- Reasonable proximity to a major natural gas pipeline; and
- High proportion of upland to wetland areas.

Rail Access

Figure 1 shows the location of major rail trackage within the TTRA. Excelsior has used a six-mile buffer centered on each major rail line (that is, three miles on each side) to provide a general indication of the characteristic area within which Excelsior believes it feasible to construct and operate the IGCC Power Station. The costs and logistical challenges of securing rights of way and constructing rail to a site beyond this buffer, in addition to the likelihood of greater wetland impacts for longer rail alignments, generally renders such sites unworthy of consideration.

Dual rail service via two major rail suppliers using their own track has been identified as a key attribute in Excelsior's siting evaluation. The optionality created by such fuel supply and transportation diversity allows for fuel supply contracting options that will minimize the Project's fuel costs and allow for a fuel and fuel transportation contracting strategy that can incorporate supply contracts of varying terms and supply quantities and spot market access. At a minimum, the Project should have a fuel supply cost that is equal to the fuel supply costs of other regional fossil fueled power plants operated by NSP and Minnesota Power.[42] The dual rail optionality

[42] Excerpt from October 10, 2006 rebuttal testimony of Ralph Olson before the Minnesota Public Utilities Commission. *See* http://www.excelsiorenergy.com/public/index.html to obtain complete testimony of Mr. Olson regarding Excelsior's fuel procurement strategy.

available to the Project should allow for fuel mixes that are lower in overall cost than these regional suppliers over the long term[43].

Water Availability

The Joint Application ("JA") Excelsior submitted in support of the Power Plant Siting Act process identified the IGCC Power Station's water requirements, as shown in Table 3.

Table 3. IGCC Power Station Water Appropriation Requirements

Phase	Average Annual Appropriation (GPM)	Peak Appropriation (GPM)
I	3,500[a]	5,000
I & II	7,000[a]	10,000

[a]Based on 8 COC in the gasification island and the power block cooling towers

New facilities (as defined at 40 CFR 125.83) locating on waters of the United States and i) withdrawing more than 2 million gallons per day, ii) using more than 25% of that volume for cooling purposes, and iii) using a cooling water intake structure ("CWIS") to divert such volumes of water to the source are restricted as to the amount of water that can be withdrawn from such waters. Since the Mesaba Energy Project would be a new facility and would meet these criteria it is subject to rules governing cooling water intake structures (see 66 FR 65256). Such rules restrict the amount of water that can be withdrawn from freshwater rivers, streams, lakes and reservoirs. Withdrawals from freshwater rivers or streams must be no greater than 5 percent of the source waterbody mean annual flow; withdrawals from a lake or reservoir must not disrupt the natural thermal stratification or turnover pattern (except where such disruptions are determined to be beneficial to the management of fisheries). At 40 CFR 125.84(e), the final rule governing CWISs recognized that a State may include more stringent requirements to the location, design, construction and capacity of a CWIS at a new facility[44].

In evaluating flows in freshwater rivers or streams, Excelsior used daily flow information obtained from United States Geological Survey gauging stations. Impacts associated with withdrawals from lakes or reservoirs were estimated using information about the area of the specific resource, its maximum depth, and the area of the littoral zone obtained from the Minnesota Department of Natural Resources' ("MDNR") Lake Finder web site[45]. Excelsior assumed no inflow to such resources (approximating conditions that would be present during times of drought) and calculated the time it would take to lower the level of the lake or reservoir to the point where water in the littoral zone was completely depleted.

[43] Ibid, page 2, line 9.

[44] In the proposed rules, the maximum amount of water that could be withdrawn from a river was 25 percent of the 7Q10 or 5 percent of the mean annual flow, whichever was lower. Although the language including the 7Q10 was dropped from the final rules, the state could deem it appropriate if it appeared that 5% of the mean annual flow did not sufficiently protect aquatic resources.

[45] See http://www.dnr.state.mn.us/lakefind/index.html. The littoral zone is defined as that portion of the lake that is less than 15 feet in depth. The littoral zone is where the majority of the aquatic plants are found and is a primary area used by young fish. This part of the lake also provides the essential spawning habitat for most warmwater fish (e.g. bass, walleye, and panfish).

The use of groundwater in quantities suitable to meet the cooling requirements for the IGCC Power Station are generally discouraged by Minn. R. 4400.3450 ("Prohibited Sites") Subpart 5 ("Sufficient water supply required"). This subpart of Minnesota rules states:

> "No site may be designated that does not have reasonable access to a proven water supply sufficient for plant operation. No use of groundwater may be permitted where removal of groundwater results in material adverse effects on groundwater, groundwater dependent natural resources, or higher priority users in and adjacent to the area, as determined in each case.
>
> The use of groundwater for high consumption purposes, such as cooling, must be avoided if a feasible and prudent alternative exists."

High Voltage Transmission Lines/Natural Gas Pipelines

Excelsior's strategy for interconnecting the Station to a major electrical substation was to use existing HVTL corridors to the extent feasible and to minimize distances to the point of interconnection. The further the Station is located from such substations the higher interconnection costs become. In addition, the lower the HVTL voltage within an existing corridor, the narrower the existing right of way ("ROW") for that corridor is likely to be. The voltage for the preferred generator outlet facilities serving Mesaba One and Two appeared to be 345 kV. The required ROW for the 345 kV tower configuration to be used for these facilities is generally found to be less than or equal to the current ROW serving many of Minnesota Power's 115 kV HVTLs. This would not be the case for the smaller distribution HVTLs found in the TTRA north and east of Virginia, Minnesota.[46] Although there is rail track found north of Virginia, there are no suitable sized HVTL corridors within which Mesaba One and Two transmission outlet facilities could be placed absent the acquisition of additional ROW.

Even though existing rail corridors are present south of and east of Hoyt Lakes, there are no HVTLs corridors of suitable size to accommodate the right of way required for HVTLs sized to carry the output of Mesaba One and Two. A 115 kV HVTL runs along the North Shore of Lake Superior at the extreme southern end of this region, but water could not be feasibly obtained in the quantity required to support Mesaba One and Two.[47]

The only natural gas pipelines capable of providing the capacity required by Mesaba One and Two are the two 36" diameter Great Lakes Gas Transmission Company pipelines that parallel the southeastern boundary of the TTRA. The further the distance between the Station and this pipeline, the more costly it becomes to interconnect them.

Wetlands

Wetlands and open water cover large areas of the TTRA and represent an important factor in Excelsior's siting decision processes. National Wetland Inventory maps obtained from the U.S. Fish and Wildlife Service were used to screen areas where development of the Project would have

[46]HVTLs found north and east of Virginia, Minnesota mostly belong to Great River Energy (GRE). See http://www.greatriverenergy.com/about/brochure1.html for a general comparison of right of way widths found in the Great River Energy transmission line portfolio. Also see http://www.tva.gov/power/rightofway/faq.htm,

[47] The only appropriate source of water in the area just north of Lake Superior is the lake itself. Excelsior does not believe it is reasonable to assume that a large electric power generating plant would be permitted on the shore of Lake Superior. Further, pumping water from the lake in the quantity necessary to meet MEP-I and MEP-II would not be feasible given the distance and head needed for a plant located a sufficient distance away from the lake.

significant impacts. Areas where wetlands represent a primary factor lie in the southern portion of the TTRA within the buffer area of the existing rail lines near the confluence of the St. Louis and Cloquet Rivers. In this proximity, areas that would appear to be capable of supplying sufficient water to Mesaba One and Two were excluded due to their relatively high impact on wetland resources and difficulties associated with obtaining control of the site (see Figures 18, 19 and 20).

Property Size and Ownership

Adequate site size is necessary to support the development of the Mesaba Energy Project. While the IGCC Power Station Footprint occupies approximately 200 acres and represents an absolute minimum, a large amount of additional land is desirable, and in some cases necessary for the associated facilities, particularly the rail loop. Buffer land is also desirable to isolate the IGCC Power Station Footprint from residences and other potentially affected land uses. Site specific variables, such as the orientation of available rail access, introduce variability to the site size required at each site. At a screening level, 400-500 acres is a reasonable range below which the development of the Project is unlikely to be practicable at that site.

The rights of existing homeowners were provided substantial deference to minimize impacts upon individuals, families, and local communities. Obtaining sites that consist primarily of many small landowners was also deemed to present a serious potential logistical problem as compared to acquiring a site from a small number of major landowners who were willing to reach necessary acquisition agreements. Therefore, in its site screening process, deference was given to locations where the number of landowners is low and where no relocation of residents would be dictated. Additionally, sites owned and used by other industrial entities as part of their mineral extraction activities within the iron formation were not obtainable through purchase, making the avoidance of such sites appropriate.

Exclusion Zones

Iron Formation

Although abandoned mine pits in the iron formation represent an area where there is generally an abundance of water, the iron formation itself represents an exclusion zone within which non-mining operations are unlikely to be allowed to locate.[48]

Native American Reservations

The Fond du Lac Indian Reservation located in the south-central-most part of the TTRA is considered an exclusion zone.

c) Search Area

Text boxes included on Figure 1 identify the relatively large areas of the TTRA that were excluded from consideration as IGCC Power Station sites due to a lack of existing rail service, distance from existing track, lack of sufficient transmission line corridors, the ubiquitous presence of wetlands, and/or their lack of sufficient water resources. These exclusions were discussed and justified in the preceding narrative of power plant siting considerations. The cross hatched area in the TTRA shown in Figure 1 (hereafter, the "Search Area") indicates where Excelsior thereafter focused its search for potential sites. Figure 1A is a mapping key that divides the Search Area into twenty-two parcels, each of which is identified by the figure number subsequently used to display the area in greater detail via GIS mapping.

[48] Excelsior's use of water obtained from mining pits will most always be outside the boundaries of the iron formation.

Figures 2 through 23 zoom into various locations within the Search Area to show the sites Excelsior identified as part of its initial screening efforts. In addition, these figures show areas within the Search Area that are located within the six-mile rail buffer area, but were excluded from consideration as practicable alternatives for the IGCC Power Station. Exhibit 1 provides a narrative description for each figure that outlines the general location the figure occupies within the Search Area and provides a general indication of why areas within each figure were not deemed suitable for consideration as potential sites for the Station.

d) Initial Sites Selected

As part of its expanded site selection screening process, Excelsior ultimately identified fifteen sites within the Search Area that appeared to have adequate access to required infrastructure and sufficient space to accommodate a LEGPF, and which appeared to minimize potential land-owner conflicts. Resources used in this process included the most recent plat maps and zoning ordinances for St. Louis and Itasca Counties. Excelsior conducted "windshield" surveys of most sites and, where access could be obtained while maintaining some anonymity, walked the sites to gauge their potential feasibility for the Project's use. Table 4 cross-references the fifteen sites selected with the figure numbers within which each site appears. In addition to the fifteen sites identified during Excelsior's expanded site selection process, Table 4 identifies the two industrial sites (Sites 16 and 17) that were eliminated prior to expanding the search.

Table 4. Excelsior Site/Figure Cross Reference List

Site No.	Site Name	Figure No.
1	Clinton Township South	12,24
2	Clinton Township East	11,25
3	Clinton Township West	11,25
4	Clinton Township North	11,26
5	Manganika Lake	11,26
6	West Aurora	10,27
7	Hoyt Lakes West	10,27
8	West Two Rivers Res.	8,26
9	East Range Site	10,27

Site No.	Site Name	Figure No.
10	Mountain Iron	8,26
11	Leonidas	11,26
12	Buhl	7,28
13	West Chisholm	7,28
14	Hibbing Industrial Park	7,28
15	West Range Site	3,29
16	Minntac Industrial Site	8, 30
17	United Taconite Industrial Site	12, 26

3. Step Three: Narrowing the Number of Potential Sites to Practicable Alternatives

In screening the sites for potential wetland impacts, Excelsior used National Wetland Inventory ("NWI") database information prepared by the U.S. Fish and Wildlife Service from USGS 1:24,000 quadrangle maps.[49] To quantify relative wetland impacts on an equivalent basis, Excelsior used the footprint of the IGCC Power Station prepared by Fluor (this same footprint appears throughout the EIS) and rearranged it in one of four orthogonal directions (that is, at 0º, 90º, 180º, and 270º angles) thought to best accommodate the expected rail configuration. Figures

[49] *See* U.S. Fish & Wildlife Service web site at http://wetlandsfws.er.usgs.gov/NWI/download.html.

24 through 29 show the final configurations analyzed (the power station footprint was moved outside the property boundary Excelsior originally specified where it appeared that some siting impediment within the original boundary might be avoided). This screening analysis considered only the area required to accommodate the Station footprint (approximately 180 acres in area for the two phase development). Further wetland evaluations were precluded at this stage due to the detailed, case-by-case analysis required to correctly establish the grade and orient the rail spur required for each potential IGCC power station layout and correctly align other infrastructure requirements.[50] The results of the wetland screening analysis are presented in Table 5. For the reasons noted in Section VI.A.2.a, detailed information about the two industrial sites is not disclosed.

Excelsior worked with city officials and owners of large blocks of land to gain additional insight into the feasibility of using a site for a LEPGF. Such discussions were very informative and, in the case of Sites No. 7 and 10, led to their ultimate dismissal as a feasible alternative. In addition, Excelsior worked with consultants and city engineers to investigate potential constructability issues on sites deemed to have local government's strong support.

In some instances numerous considerations combined to make a location infeasible as an LEPGF site. For example, in the case of Site No. 3, residential proximity/density, existing land uses (i.e., a county recreation site and numerous farms are located in immediate proximity and/or within the site footprint and likely rights of way for road/rail access), natural features restricting site development (i.e., a small river to the west, lakes to the south and northeast, and wetlands to the east across which access to the site would likely be required) and water supplies that, at best, can be considered marginal.

The distinguishing factors for the fifteen sites are summarized in Table 6, which is based on detailed information about each site as presented in their respective site evaluation sheets provided in Exhibit 2. If a factor either necessitated the dismissal of a site or weighed very heavily against a site, it is shaded and marked in bold in Table 6. Only Site Nos. 9 and 15 had no such factors. Table 7 provides additional narrative that reinforces the rationale for site dismissal, which is further supported by the detailed information in Exhibit 2.

The two practicable sites ultimately selected for use in the Power Plant Siting process are represented by the Preferred (Site No. 15) and Alternate (Site No. 9) sites, otherwise known as the West and East Range Sites, respectively. A third site, the Hibbing Industrial Park, would have been considered a practicable alternative, but an agreement between Iron Range Resources and a private developer seeking to develop the property for other uses precluded its consideration. A more detailed discussion of the impracticability of the Hibbing Industrial Park Site is provided in Section VI.A.4.

[50] Each site must accommodate a rail spur and loop, access roads for employees and construction vehicles, transmission line and natural gas pipeline interconnections, process water pipelines, and other utility connections.

Table 5. NWI Wetland Screening Analysis of Preliminary Sites Selected Under Excelsior's Screening Process*

Alt. Site No.	Site Name	NWI Wetland Parcel No. 1 (Acres)	NWI Wetland Parcel No. 2 (Acres)	NWI Wetland Parcel No. 3 (Acres)	NWI Wetland Parcel No. 4 (Acres)	NWI Wetland Parcel No. 5 (Acres)	NWI Wetland Parcel No. 6 (Acres)	NWI Wetland Parcel No. 7 (Acres)	NWI Wetland Parcel No. 8 (Acres)	NWI Wetland Parcel No. 9 (Acres)	NWI Wetland Total Impacts (Acres)
1	Clinton Township S.	28.1	2.3	2.4							32.8
2	Clinton Township E.	0.7	10.9	7.4	5.4	8.9	5.0				38.4
3	Clinton Township W.	1.2	1.6								2.8
4	Clinton Township N.	30.6	9.9	52.0	0.8						93.3
5	Manganika L.	28.7	16.8								45.5
6	W. Aurora	18.4	3.3	1.1	3.7	0.6					27.1
7	Hoyt Lakes W.	10.1	5.1	1.5	2.6						19.3
8	W. Two Rivers Res.	35.0	6.4	6.1	1.4						48.8
9	Hoyt Lakes E. (East Range Site)	10.5	1.7	2.4							14.6
10	Mountain Iron	16.5	1.7	1.9	2.7						22.8
11	Leonidas	9.0	3. 6	2.7	2.7	8.6	1.0				27.6
12	Buhl	40.7	2.5	5.7	19.2						68.1
13	W. Chisholm	25.0	5.0	1.3	1.5						32.8
14	Hibbing Ind. Park	8.6	18.6	2.3	1.9	1.4	0.9	0.7	0.4	0.5	35.4
15	West Range Site	10.3	0.4								10.7

* Sites 16 and 17 were not screened for NWI wetlands as they were eliminated from consideration prior to expanding Excelsior's site selection process (*see* Section I.A.2.a).

Table 6. Site Selection Screening Summary

Site ID	General Description				Site Attributes					Water Supply			HVTL POI	Proximity to Class I Areas (miles)	
	Size (Acres)	Site Control	Planned/Existing Land Use	Residential Proximity	Physical Features	Site Access		NWI Wetlands	Construct-ability	Potential Source(s)	Adequacy	Water-shed		VNP	BWCA
						Road	Rail								
1	**~380**	Potentially obtainable	**Residential**	**High**	Flat, cleared, wetlands	Good	CN: Good BN: None	**32.8**	Feasible	St. Louis River, Long Lake	**Inadequate**	Lake Superior	Forbes	64	38
2	~620	**Not obtainable; within Environ-mental Setting Boundary of mining company**	**Residential and planned mining/ ancillary use**	**High**	Flat, wetlands	Good	CN: Good BN: None	**38.4**	Feasible	Elbow Lake, Thunderbird Mine Pit	Marginal	Lake Superior	Forbes	60	35
3	**~410**	Potentially obtainable	**Recreation, residential**	**High**	Wooded, lake	Good	CN: Good BN: None	2.8	Feasible	Elbow Lake, Thunderbird Mine Pit	Marginal	Lake Superior	Forbes	61	36
4	**~420**	**Not obtainable, within Environ-mental Setting Boundary of mining company**	**Planned mining/ ancillary use**	Moderate	Wetlands	Good	CN: Good BN: None	**93.3**	Feasible	Various mine dewatering, Virginia WWTP	Marginal	Lake Superior	Forbes	58	33
5	~1,375	Potentially obtainable	**Residential development**	**High**	Lakes	Good	CN: Good BN: None	**45.5**	Feasible	Various mine dewatering, WWTPs	Marginal	Lake Superior	Forbes	58	33
6	~2,500	Potentially obtainable	Zoned forest/ag. management and industrial	**High**	Waste rock, wetlands	Good	CN: Good BN: None	**27.1**	Some areas feasible	Embarrass Lake, mine pits	**Likely inadequate**	Lake Superior	Forbes	55	26
7	~1,630	**Not obtainable, owner unwilling to sell**	**Planned future mining, State Mineral Trust**	Low	Wetland and some former mining	**Poor**	CN: Good BN: None	19.3	Feasible	Abandoned Cliffs Erie mine pits, Colby Lake	Adequate	Lake Superior	Forbes	54	25
8	>2,000	**Not obtainable, within Environ-mental Setting Boundary of mining company**	**Current ancillary mining use (water reservoir)**	Moderate	Wetland	Good	CN: Good BN: None	**48.8**	Feasible	Various mine dewatering, WWTPs	**Likely inadequate**	Lake Superior	Forbes	57	33
9	1,433	Obtainable	Zoned mining; no current or planned land use	Low	Wooded, wetlands	Good	CN: Good BN: None	14.6	Feasible	Abandoned Cliffs Erie mine pits, Colby Lake	Adequate	Lake Superior	Forbes	49	25
10	~1,520	**Likely not obtainable**	**Residential and planned future mining**	**High**	Wooded	Good	CN: Good BN: None	22.8	Feasible	Abandoned mine pits, dewatering, Silver Lake	Marginal	Lake Superior	Forbes	57	32

Table 6 (continued). Site Selection Screening Summary

Site ID	General Description				Site Attributes					Water Supply			HVTL POI	Proximity to Class I Areas (miles)	
	Size (Acres)	Site Control	Planned/Existing Land Use	Residential Proximity	Physical Features	Site Access		NWI Wetlands	Construct-ability	Potential Source(s)	Adequacy	Water-shed		VNP	BWCA
						Road	Rail								
11	<704	**Not obtainable, within Environmental Setting Boundary of mining company and boundary of iron formation.**	**Residential and planned future mining**	**High**	Waste rock	Good	CN: Good BN: None	**27.6**	**Likely infeasible**	Various mine dewatering, WWTPs	Marginal	Lake Superior	Forbes	58	33
12	850	**Portion is not obtainable**	Previous ancillary mining use	Moderate	Waste rock	Good	**CN: Poor BN: None**	**68.1**	**Likely infeasible**	Sherman and Frasier mine pits, Iron World	Uncertain	Lake Superior	Forbes	58	39
13	785	Potentially obtainable	Previous ancillary mining use	Moderate	Waste rock	Good	**CN: None BN: None Inacces-sible by unit coal trains**	**32.8**	**Potentially infeasible**	N/A	N/A	Lake Superior	Forbes	59	42
14	860	**Likely not obtainable**	**Site of planned race track**	Moderate	Wetland	Good	CN: Good BN: Poor	**35.4**	Feasible, but close to Iron Formation	Abandoned mine pits	Adequate	Lake Superior	Forbes	61	43
15	1,727	Obtainable	Zoned industrial; no current or planned land use	Low to Moderate	Wooded	Good	CN: Good BN: Good	10.7	Feasible	Canisteo, Hill Annex, Lind pits and Prairie River	Abundant	Upper Missis-sippi	Black-berry	75	61
16	N/A	**Not obtainable, industrial owner not willing to commit to terms to allow Excelsior to co-locate an IGCC facility.**	Details of site are proprietary and/or confidential.												
17	N/A	**Not obtainable, industrial owner not willing to commit to terms to allow Excelsior to co-locate an IGCC facility.**	Details of site are proprietary and/or confidential.												

Table 7. Initial Dismissal of Sites During the Screening Process

Site No.	Site Name	Rationale for Dismissal
1	Clinton Township South	Water unavailable in required quantities; development constrained because of inadequate site size, existing land owners, forcing expansion into areas where relatively high wetland impacts would occur.
2	Clinton Township East	Residential development has occurred on the western part of the site; the eastern part of the site is completely within the environmental setting boundary*for Eveleth Taconite making it unlikely that the Project could be obtained and developed there; potential for high wetland impacts and marginal water availability.
3	Clinton Township West	Plant footprint and associated facilities would require displacement of numerous residences and closure of a County recreation area; the site would not readily accommodate the size and shape of the footprint and associated facilities; marginal water availability.
4	Clinton Township North	High proportion of wetland areas; site is small and mostly located within the environmental setting boundary* for Eveleth Taconite making it unlikely that the Project could be obtained and developed there; marginal water availability.
5	Manganika Lake	Western part of the site is being developed for lake homes; wetland impacts would be significant for both the plant footprint and rail loop, which would encircle Manganika Lake; marginal water availability; and too close to residential developments in Mountain Iron.
6	West Aurora	Water unlikely to be available in required quantities; site cannot accommodate plant footprint and associated facilities while also avoiding large wetlands, waste rock piles, and close proximity to dense residential development.
7	Hoyt Lakes West	Site is partly located within the Mesabi Iron Range iron formation and may conflict with expanded mining operations; State school trust mineral rights cannot be encumbered. Present property owner has refused to consider sale of land to Excelsior.
8	West Two Rivers Res.	Property considered unobtainable because of its location in environmental setting boundary* of U.S. Steel Co.; reservoir and all its surrounding land owned by one industrial entity unwilling to provide access; water availability inadequate without appropriation from that reservoir.
10	Mountain Iron	Site is partly located within the Mesabi Iron Range iron formation and planned for expanded mining operations and also within environmental setting boundary* making it unlikely that the Project could be obtained and developed there; nearby residential development is relatively dense; marginal water availability.
11	Leonidas	Constructability concerns[51]; wetland impacts; marginal water availability; site is within the environmental setting boundary* for Eveleth Taconite making it unlikely that the Project could be obtained and developed there.
12	Buhl	Constructability concerns; pervasive wetland impacts; poor rail access.
13	West Chisholm	Grade required to reach site is not suitable for rail access by unit coal trains.
14	Hibbing Industrial Park	Site was committed by its owner, Iron Range Resources, to the development of a race track at the time of Excelsior's site selection process, therefore unobtainable; site is constrained by Iron Formation to north, residential developments to south, and U.S. 169 to west. Expansion of area to east would impact wetlands and mineral extraction.
16	Minntac Industrial Site	The industrial owner of the site was ultimately unwilling to commit to terms to allow Excelsior to co-locate the IGCC Power Station.
17	United Taconite Industrial Site	The industrial owner of the site was ultimately unwilling to commit to terms to allow Excelsior to co-locate the IGCC Power Station.

[51] Significant portions of property are devoted to "mine dumps," that is, large piles of rocks of mixed size. Construction is difficult due to the inability to ascertain whether or not one has reached bedrock upon which to build foundations. See "Existing Industrial Facilities" under the section entitled "Step Two."

* Detailed investigations of site No. 10 indicated that serious ownership issues were associated with being located in the environmental setting boundary (formerly known as the mine permit boundary) of a company conducting active iron mining operations. Environmental setting boundaries established for such companies were seen thereafter as areas that should be avoided given the ultimate difficulty of obtaining site control. The East Range site was an exception as it was within Cliffs Erie's environmental setting boundary. However, there was no active mining or mining-related land use plans for that site, as evidenced by Excelsior's ability to secure an option. agreement. Excelsior's experience indicated that this was not typical, and that those areas are generally very difficult to obtain.

4. Step Four: Final Evaluation of Practicable Alternatives & Hibbing Industrial Park

In identifying its preferred site for purposes of satisfying the obligation under Minnesota Rule 7849.5220, subpart 1.C, Excelsior analyzed the two practicable alternatives identified above and the Hibbing Industrial Park, even though the Industrial Park site was not available for development.[52] Excelsior quantitatively ranked the three sites using its site selection criteria and the personal knowledge, judgment, and experience of Excelsior's staff who had significant experience in siting large power plants and transmission facilities. The results of these evaluations and rankings were as follows:

1. West Range (Preferred Site)
2. Hibbing Industrial Park
3. East Range (Alternate Site)

The methodology consisted of aggregating the site evaluation criteria into the following eight categories:

- Licensability (whether and under what circumstances a site could be expected to be permitted considering all regulatory requirements, including such key permits as air, NPDES, water appropriation, etc.)
- Water Supply (quantity of water available and ease with which it could be obtained)
- Local community support (general support within the nearby community)
- Industrial Synergies (proximity to nearby industrial facilities with the potential capability of creating some synergy with MEP-I and MEP-II), and
- Transmission/Gas Supply (proximity of site to potential points of interconnection with the regional grid/gas supply lines)
- Local community support (general support within the nearby community)
- Dual Rail (capability to accommodate two rail suppliers providing service from their own track)
- Site Attributes (physical characteristics of site including topographical relief, wetland areas).
- Plant Expansion (capability of accommodating two phases of development)

To assist its siting analysis through use of a "quantifiable" (versus experience/judgmental) mechanism, Excelsior employees with various backgrounds and experience (environment, engineering, development, law, marketing, senior management, and operations) produced a pairwise comparison of the above eight categories. Each person compared each category to each of the other categories to establish the relative weights that each category would be given in the final site ranking analysis. The number of times a specific criterion was identified as being the

[52] Excelsior also included three currently impracticable alternatives in its analysis (the two industrial sites and the Mountain Iron site [Site No. 10]). The results of the six-site analysis are provided in Excelsior's Environmental Supplement at Section 1.13.1.3.

most important in any pairwise comparison was totaled and divided by the total number of possibilities to establish such relative weights. Table 8 shows the weights assigned to each of the criterion.

Table 8. Weights Assigned to Site Evaluation Criteria By Excelsior Employees

Criterion	Relative Weight (%)
Licensability	20
Water Supply	19
Industrial Synergies	13
Transmission/Gas Supply	11
Local community support	10
Site Attributes	10
Dual Rail	9
Plant Expansion	8
Total	100

Each of the three sites identified in Table 9 was assigned (by each employee participating in the ranking process) a score on a scale of 1 to 100 for each criterion. The resulting scores were weighted by the factors provided in Table 8 and are provided in Table 9.

Table 9. Final Site Ranking by Excelsior Employees: Weighted Totals

Criterion	Site No. 15 (West Range Site)	Site No. 14 (Hibbing Ind. Park)	Site No. 9 (East Range Site)
Licensability	118	105	99
Water Supply	106	95	89
Industrial Synergies	12	38	49
Transmission/Gas Supply	57	54	43
Local community support	54	49	57
Site Attributes	55	52	52
Dual Rail	54	45	37
Plant Expansion	46	38	39
Total	**502**	**476**	**465**

Following the site ranking and evaluation, Excelsior proceeded to make its final selection of preferred and alternate sites. Two critical factors considered at this stage were site selection rank and the ability to obtain timely site control. The West Range Site ranked highest for these two factors and was selected as Excelsior's preferred large electric power generating plant site for the following principal reasons:

- It received the highest ranking score in Excelsior's quantitative analysis.
- It lies outside the Lake Superior Basin watershed, thereby facilitating permitting and licensing.
- Plant make-up water is readily available from the Canisteo Mine Pit ("CMP") and Hill-Annex Mine Pit Complex. Continually rising water levels in these abandoned pits posed a significant concern for local communities and the MDNR, respectively, and use of water from such pits provided a solution to such concerns. Alternative sources of water were also available to the site and in likely quantities to supply any shortfall that could be encountered in supplying the Mesaba One and Mesaba Two developments via mine pit waters alone.
- The site is fairly remote, with only a small number of residential property owners potentially impacted, most of whom use the property on only a seasonal basis.
- The site and much of the land surrounding it had been zoned for industrial development by regional governmental bodies.
- The site is located in close proximity to adequately sized natural gas pipelines, existing HVTL corridors, and has the capability of being serviced by two rail providers.
- Excelsior was able to obtain an option to purchase the site, thereby providing immediate site control.
- Preliminary contacts with Itasca County, city officials from nearby communities, and the Itasca Development Council indicated broad support for the site and the project.

The Hibbing Industrial Park site was originally considered as the alternative site because of the following advantages:

- The location is in an area that local communities had identified and set aside for industrial development. IRR and St. Louis County both played important roles in assembling a land package of some 850 acres, with additional acreage appearing to be available. Impacts on local residences were deemed manageable and local communities appeared supportive. Additionally, a new Central Range water treatment facility has been proposed for the area.
- Adequate make up water appeared to exist in local mine pits.
- Although the site is located within the Lake Superior Basin watershed, it appeared that the City of Hibbing's POTW may be of sufficient size to handle discharges and potentially qualify for a variance from the rigid standards imposed on discharges of mercury by regulations implementing the Great Lakes Initiative.
- The site is located in relatively close proximity to two rail service providers, existing transmission line corridors, and a large industrial facility.

The Hibbing Industrial Park site was under the control of the IRR, but at the time that Excelsior finalized its site selection process in August of 2005, it was not reasonably obtainable by Excelsior for development of the Project due to conflicting development plans and commitments for a race track at the site. These were formalized in a Memorandum of Understanding ("MOU") between the Office of the Commissioner of the Iron Range Resources and Rehabilitation (i.e., the IRR), the County of St. Louis, the Cities of Hibbing and Chisholm, and the Town of Balkan that established their intention to support, through both pro-rata financial assistance and subsidized property lease or transfer, the development of a multi-venue motor sports complex at the Hibbing Industrial Park. The document provided for the execution of a Development Agreement and Financing Plan at any time through September 4, 2006, a date that was subsequently extended by an additional year. The language of the MOU suggested the great

importance that numerous governmental entities attached to this site and development, several of which possess important oversight capacities relevant to site development as noted in the following commitment:

> "Each Party by executing this Agreement agrees and commits to work diligently and in good faith with the other Parties subscribed below to affect the Project and its associated documentation in an efficient and expeditious manner."

While Excelsior was allowed to conduct some preliminary site investigatory work, it was unable to obtain any rights to utilize the site within the timeframe in which Excelsior conducted its site selection process. The extended MOU expired more than two years after Excelsior made its final selection. Over the two intervening years, project development considerations and regulatory processes, including moving through the Minnesota Power Plant Siting Act process, have rendered this selection irrevocable. Requiring Excelsior to completely restart its project development process after two years to consider a previously unavailable site would cause logistical problems that would completely frustrate the Project's purposes and would establish an untenable precedent[53]. Therefore, a site would have to have been reasonably obtainable in August 2005 in order to be considered available to accomplish the Project's purpose and need.

Therefore, the East Range Site was viewed as the best alternate site to evaluate under the Minnesota Power Plant Siting Act process. The rationale for utilizing the East Range Site as the alternate to the West Range Site included the following:

- IRR has secured through negotiation in the LTV bankruptcy proceeding (LTV was the original landowner of property now occupied by Cliffs-Erie ("CE")) an option to acquire land on LTV property near East Range. In a June 15, 2004 letter to U.S. Secretary of Energy Spencer Abraham, the Commissioner of IRR indicated that the agency would convey its option to Excelsior in support of the Mesaba Energy Project.
- Adequate make-up water appeared to exist in local mine pits and other surface waters (Colby Lake and Whitewater Reservoir) in amounts sufficient to support Phase I and Phase II facilities.
- The closest residential neighbors were more than 0.5 miles from the site.
- The site provided ready access to infrastructure needed to support plant operations.

The East Range Site was considered to be less suitable than the West Range Site for the following reasons:

- The generator outlet HVTL facilities required are longer, the n-1 contingency dictating the use of two separate corridors, and more line losses occur over the increased distance.
- The site is within the Lake Superior Basin watershed and subject to regulations implementing the Great Lakes Initiative.
- The Hoyt Lakes POTW would require an expansion to accommodate discharges of cooling tower blowdown.
- Only one rail service provider appeared to be feasible, and the potential use of a rail-connected Lake Superior port appeared costly and uncertain from an engineering perspective.
- The site was closer to Class I areas, thereby creating the potential for increased adverse impacts on air quality related values, including a potential increase in visibility impacts.

[53] If a project proponent was required to revisit sites that had become available after it had concluded its environmental review process, the site consideration process would never be completed.

Figures 1-29

See accompanying narrative in Exhibit I

Exhibit 1: Narrative for Figures

Narrative for Figures 1-23

Figure 1: An overview of the TTRA showing the area within which Excelsior's search for practicable alternatives for siting Mesaba One and Mesaba Two was focused. The cross hatched region generally represented areas within the TTRA where access to sufficient water supplies were available, where access to existing rail tracks and HVTL corridors were feasible, and where impacts to wetlands could be minimized.

Figure 1A: An overview map of the TTRA showing the general location of the area shown in Figures 2 through 23. This figure also identifies areas within the TTRA that have been designated "environmental setting boundaries" for various mining operations.

Figure 2: The western-most portion of the TTRA, in the vicinity of La Prairie and Coleraine, MN, is highly residential and generally unsuitable for siting a large power plant. Only one location appeared to have some potential for low wetland impacts, but the plat map revealed that no large blocks of land were available there, and the close proximity to resort homes on Trout Lake pose insurmountable issues precluding further consideration of the site.

Figure 3: To the east, the next portion of the TTRA, between Coleraine and Pengilly, MN, contains a number of promising-looking sites, but only the preferred West Range site is worthy of further consideration. To the west of that site, the unfavorable topography and the difficulty of routing rail access around the Canisteo Mine Pit eliminates that area from consideration. The area to the east of the preferred West Range site is owned and proposed for use by another industrial entity. The region south of US-169 is covered with lakes and wetlands, and the three areas identified are of insufficient size to site a power plant without having significant wetland impacts.

Figure 4: The portion of the TTRA between Pengilly, MN and Keewatin, MN is much like the previous region. The area north of US-169 is owned and proposed for use by another industrial entity. The region south of US-169 is covered with lakes and wetlands, and is also owned and used by other industrial entities.

Figure 5: The portion of the TTRA between Keewatin, MN and Hibbing, MN is much like the previous region. Nearly the entire area is owned and used by other industrial entities.

Figure 6: The portion of the TTRA just south of Hibbing, MN is dominated by wetlands. The only area that appears to have less wetland is residential and lacks large blocks of available land, making it unsuitable for siting a power plant.

Figure 7: The portion of the TTRA in the vicinity of Chisholm, MN and Buhl, MN contains three of the alternative sites identified in the site selection process. Aside from those areas, the Iron Formation precludes development in much of the region. The area northeast of Chisholm

appears promising, but GIS software does not reflect that the nearby rail line has since been removed, rendering that location beyond all the three mile rail line buffers.

Figure 8: The portion of the TTRA between Kinney, MN and Virginia, MN contains two of the alternative sites identified in the site selection process. Aside from those areas, the Iron Formation precludes development in much of the region. Otherwise, the region north of Virginia is largely controlled and used by industrial entities, but the availability of water is unlikely to be sufficient anyway. The plat map reveals that the area southeast of Kinney contains no large blocks of land suitable for siting a power plant.

Figure 9: The portion of the TTRA between Virginia, MN and Biwabik, MN is dominated by the Iron Formation. Otherwise, the area just west of Gilbert is controlled and used by an industrial entity. East of Gilbert, water availability to the north of the Iron Formation is insufficient for siting a power plant, and the region south of the Iron Formation is dominated by wetlands and residential developments, leaving no areas suitable for power plant siting.

Figure 10: The portion of the TTRA between Biwabik, MN and Hoyt Lakes, MN contains three of the alternative sites identified in the site selection process, including the alternative East Range site. Aside from these sites, the region is dominated by the Iron Formation, residential development, and wetlands that preclude any other sites from being considered. East of Hoyt Lakes, water availability is insufficient for siting a power plant.

Figure 11: The portion of the TTRA in the vicinity of Eveleth and Leonidas, MN contains five of the alternative sites identified in the site selection process. Outside of these locations, the region is dominated by the Iron Formation, residential development and wetlands, which preclude any other sites from being considered for siting a power plant.

Figure 12: The portion of the TTRA in the vicinity of Forbes, MN contains one of the alternative sites identified in the site selection process. Aside from this location, the region is dominated by wetlands and residential development, which preclude other sites from being considered for siting a power plant. The plat map revealed that the area southwest of Forbes and southeast of the St. Louis River contained no large blocks of available land.

Figures 13-18: The large southern portion of the TTRA along the DMIR and DWP rail lines contains vast amounts of wetlands, while generally lacking sufficient water availability for siting a power plant. The few areas with less wetland area lack large blocks of available land.

Figure 19: The southern-most portion of the TTRA in the vicinity of Brookston, MN is dominated by wetlands and residential development. South of the St. Louis River, the Fon du Lac Reservation would complicate power plant siting beyond the issues cited above. The area north of the confluence of the St. Louis and Cloquet rivers would result in significant wetland impacts, due to rail access and because aesthetic considerations would force some setback from the river.

Figure 20: The southwestern-most portion of the TTRA to the west of Brookston, MN contains significant residential development and no large blocks of available land suitable for siting a power plant.

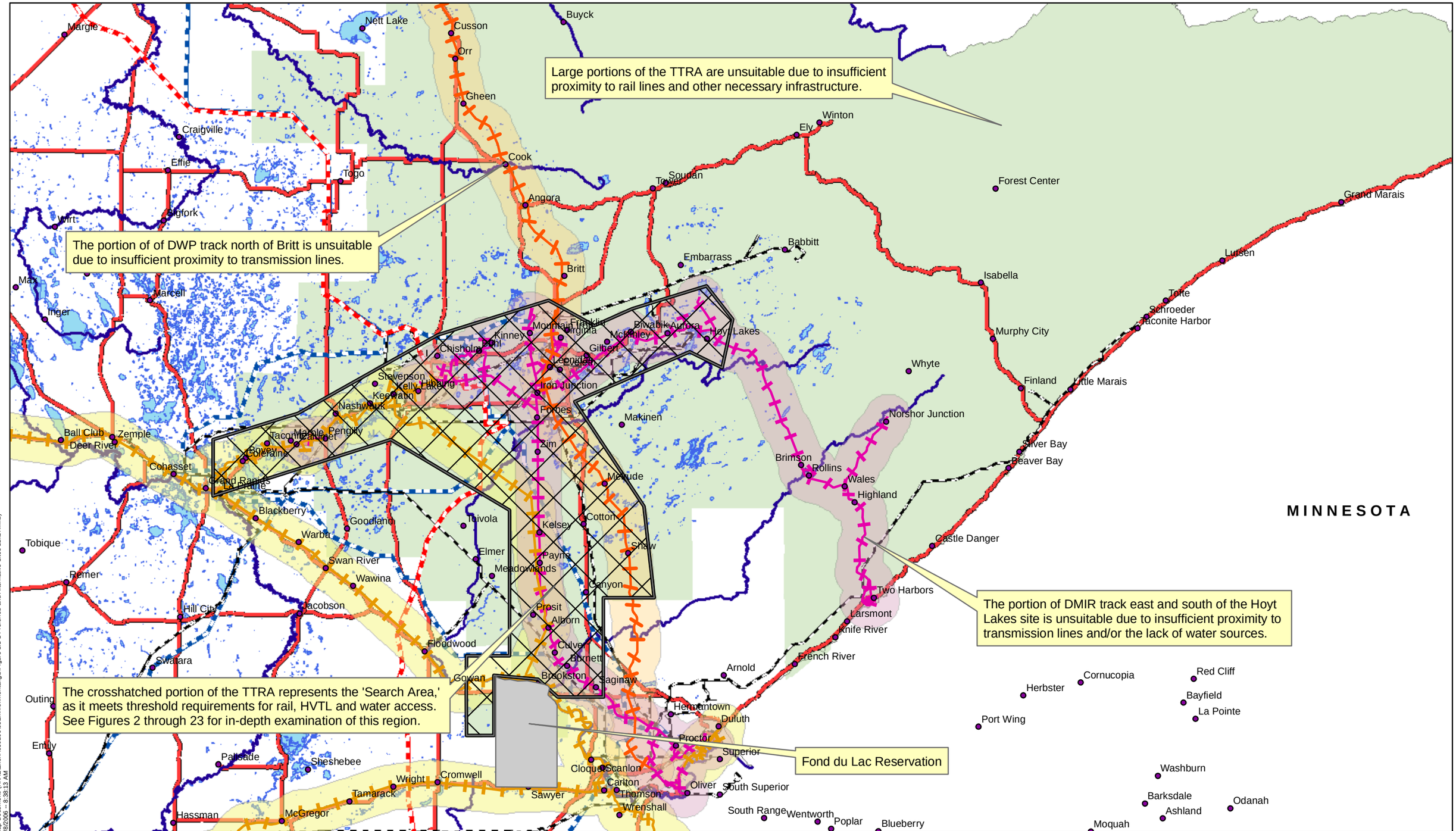
Figure 21: The small portion of the TTRA near Swan River, MN contains significant wetlands, residential development and no large blocks of available land suitable for siting a power plant.

Figure 22: The portion of the TTRA along the BNSF rail near Casco, MN is dominated by wetlands. The two areas with less wetland are either controlled by another industrial entity or lack large blocks of available land.

Figure 23: The portion of the TTRA east of Hibbing and south of Buhl, MN contains two of the alternative sites identified in the site selection process. Aside from these locations, the region is dominated by residential development and wetlands, and sufficient water availability is unlikely.

Narrative for Figures 24-29

Figures 24 through 29 illustrate how Excelsior screened alternative site locations for wetland impacts using the IGCC Power Station footprint and National Wetland Inventory maps. The results of this screening analysis are presented in Table 5. The methodology used in the screening analysis is presented in the text immediately following that table.



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Taconite Tax Relief Area

January 2007

Legend

- Cities
- Highways
- Rivers
- TTRA
- BNSF Rail
- DMIR Rail
- DWP Rail
- HVTL_230_kV
- HVTL_115_kV
- HVTL_345_kV
- HVTL_500_kV
- Buffer of BNSF
- Buffer of DMIR
- Buffer of DWP
- Lakes

Source: ESRI, Excelsior Energy, and SEH.
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Figure 1: Overview of TTRA Site Selection

UTM Zone 15 Meters
NAD83

N W E S

0 9 Miles

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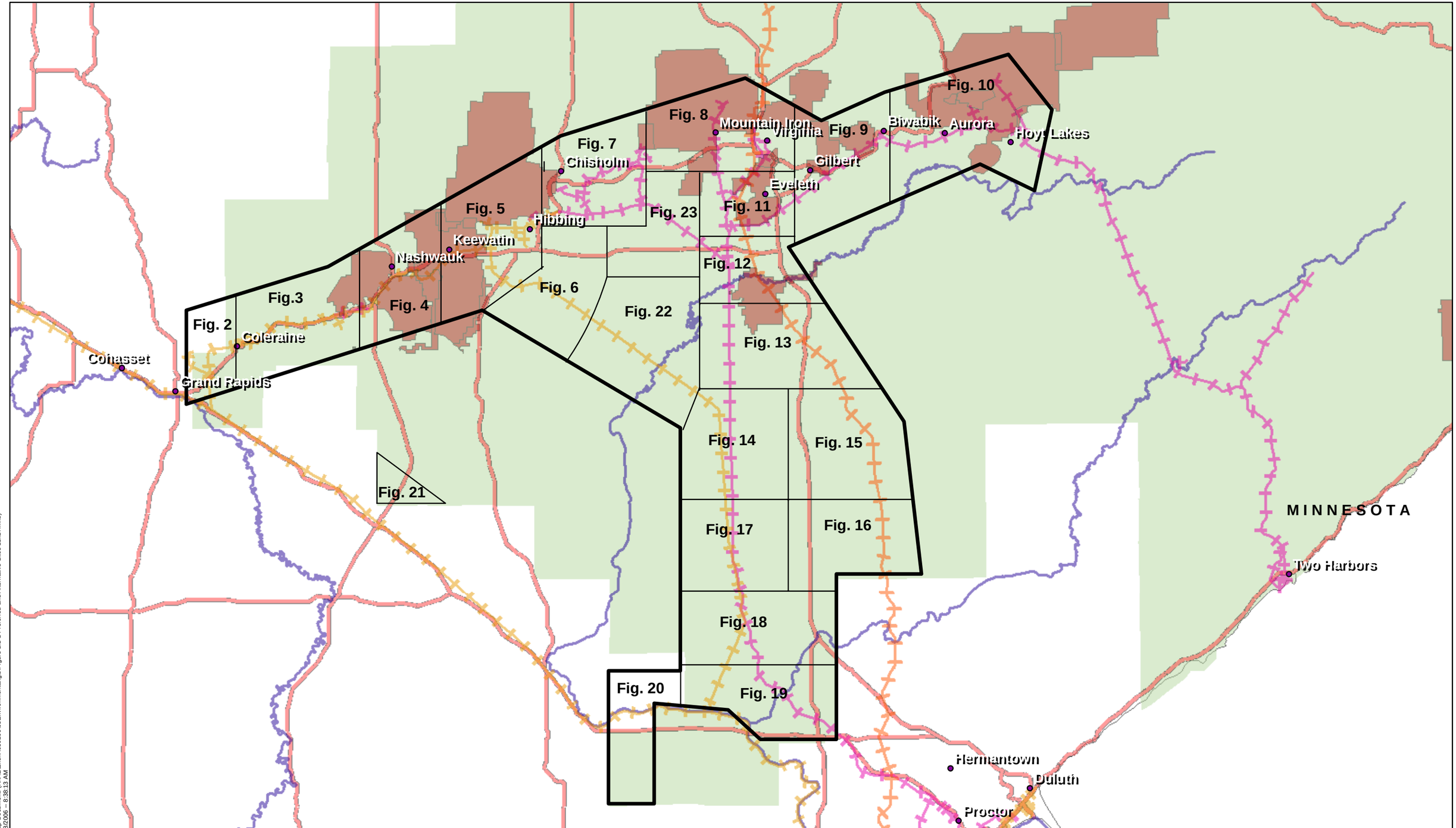

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- DMIR Rail
- DWP Rail
- Mine Environmental Setting Boundaries

Appendix F

Source: ESRI, Excelsior Energy, and SEH.
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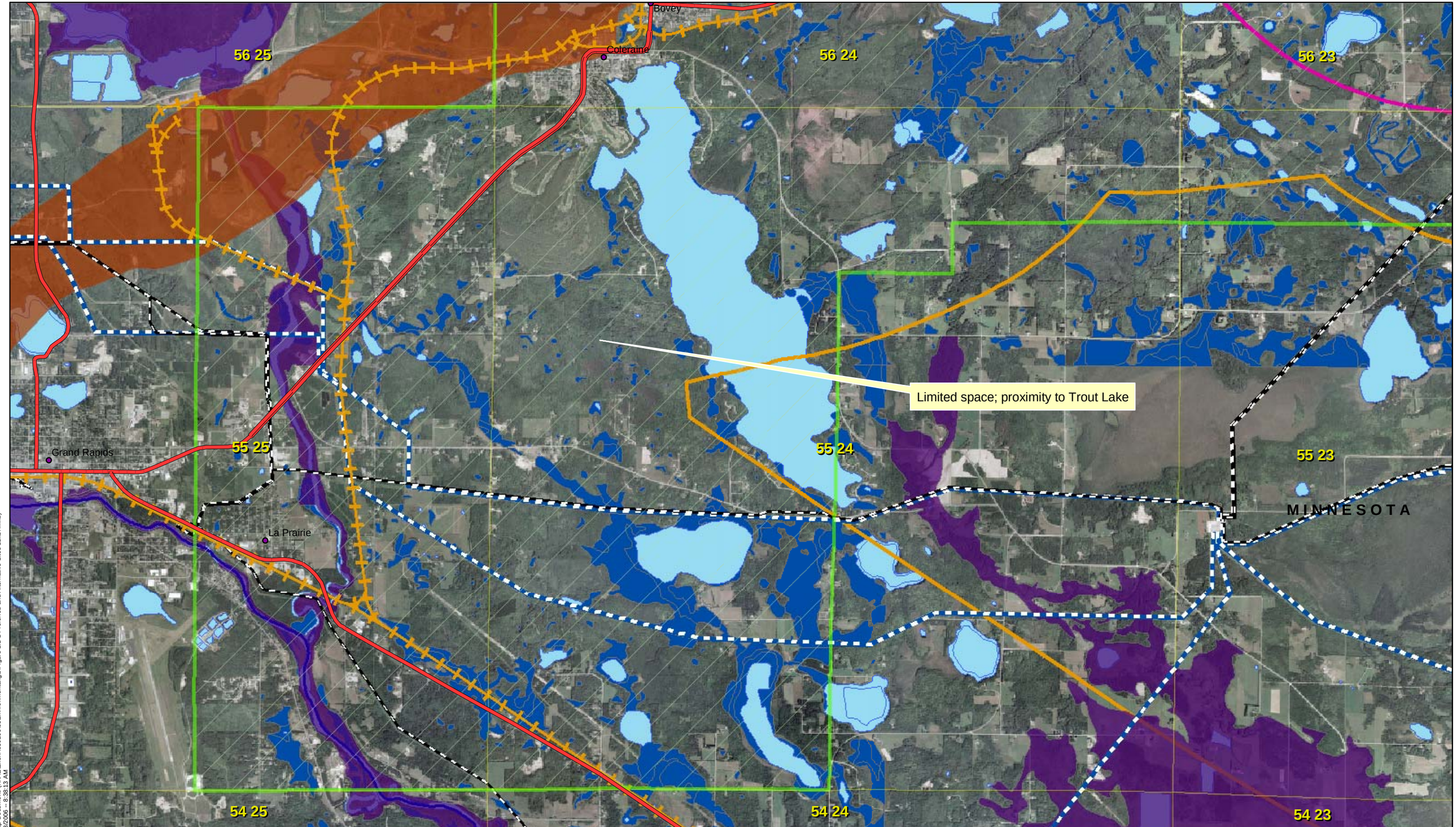
Figure 1A: Figure Key for Site Selection Process

UTM Zone 15 Meters
NAD83

N W E S

0 9 Miles



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- Buffer of DMIR
- Buffer of DWP
- Floodplains
- Iron Formation
- Lakes
- Wetlands

Source: ESRI, Excelsior Energy, and SEH.
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Figure 2:
TTRA Site Selection

UTM Zone 15 Meters
NAD83

N W E S

0 1 Miles

Property controlled by an industrial entity

Preferred West Range Site

Unfavorable topgography and rail access around Canisteo Pit

Realignment of US-169 will leave insufficient space for site and rail

No large blocks of land

Insufficient space given unfavorable rail alignment and proximity to towns, lakes and developments.

Marble

Taconite

Calumet

Pengilly

Bovey

Coleraine

MINNESOTA

56 25

56 24

56 23

56 22

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Figure 3:
TTRA Site Selection

UTM Zone 15 Meters
NAD83

N W E S

0 1 Miles

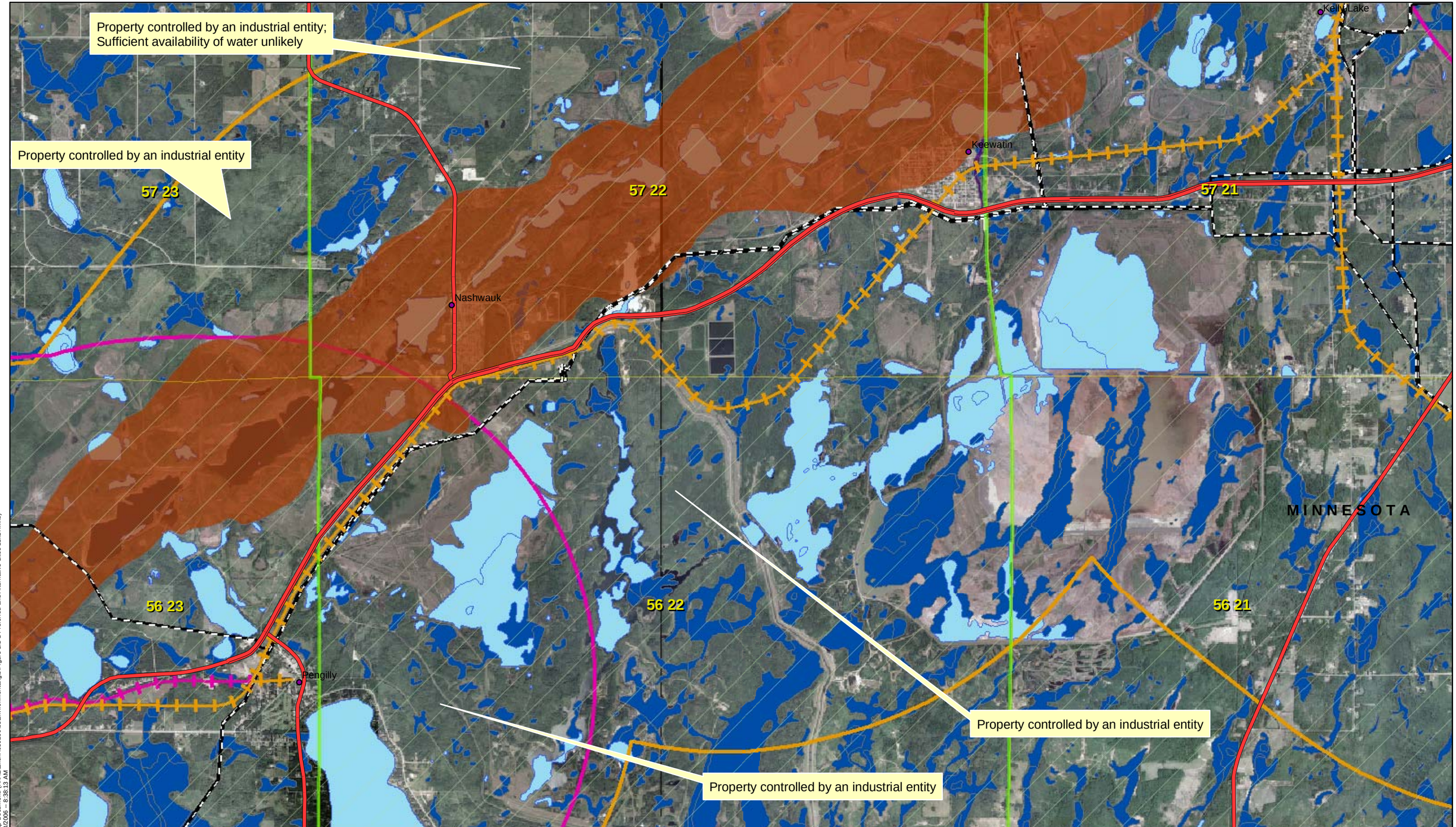

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Figure 4: TTRA Site Selection

UTM Zone 15 Meters
NAD83

N W E S

0 1 Miles

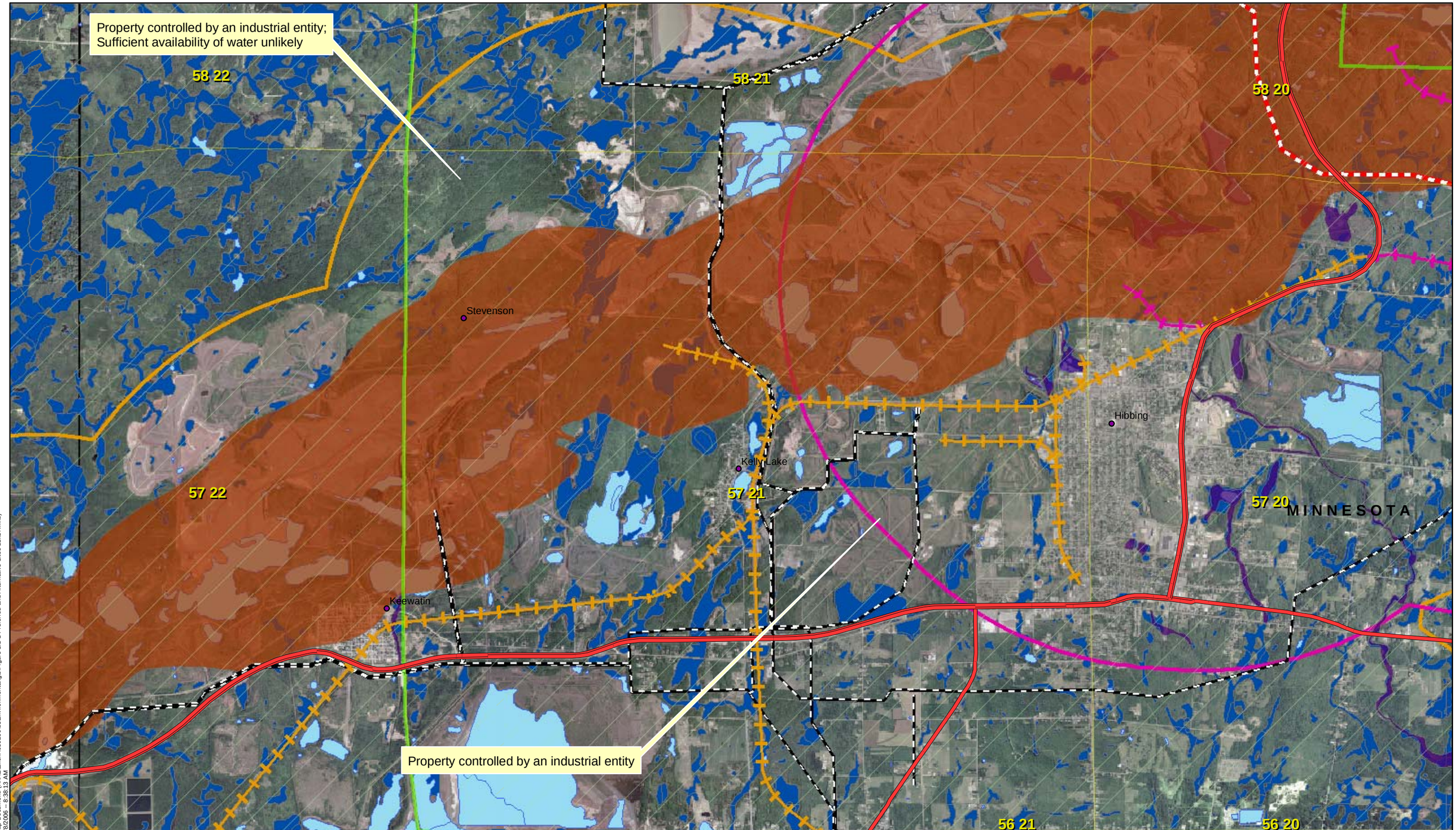

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Figure 5: TTRA Site Selection

UTM Zone 15 Meters
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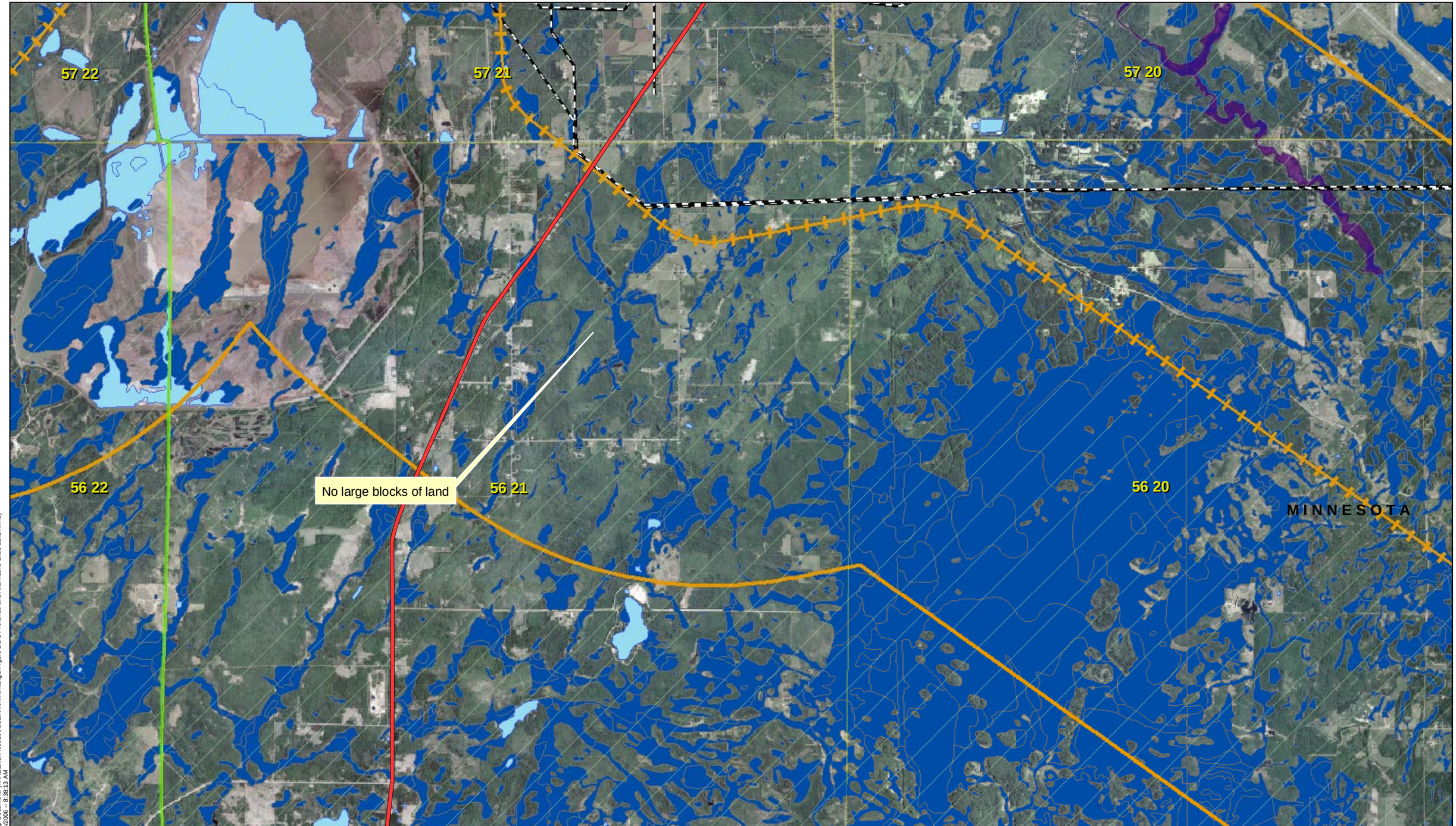

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- Lakes
- Wetlands

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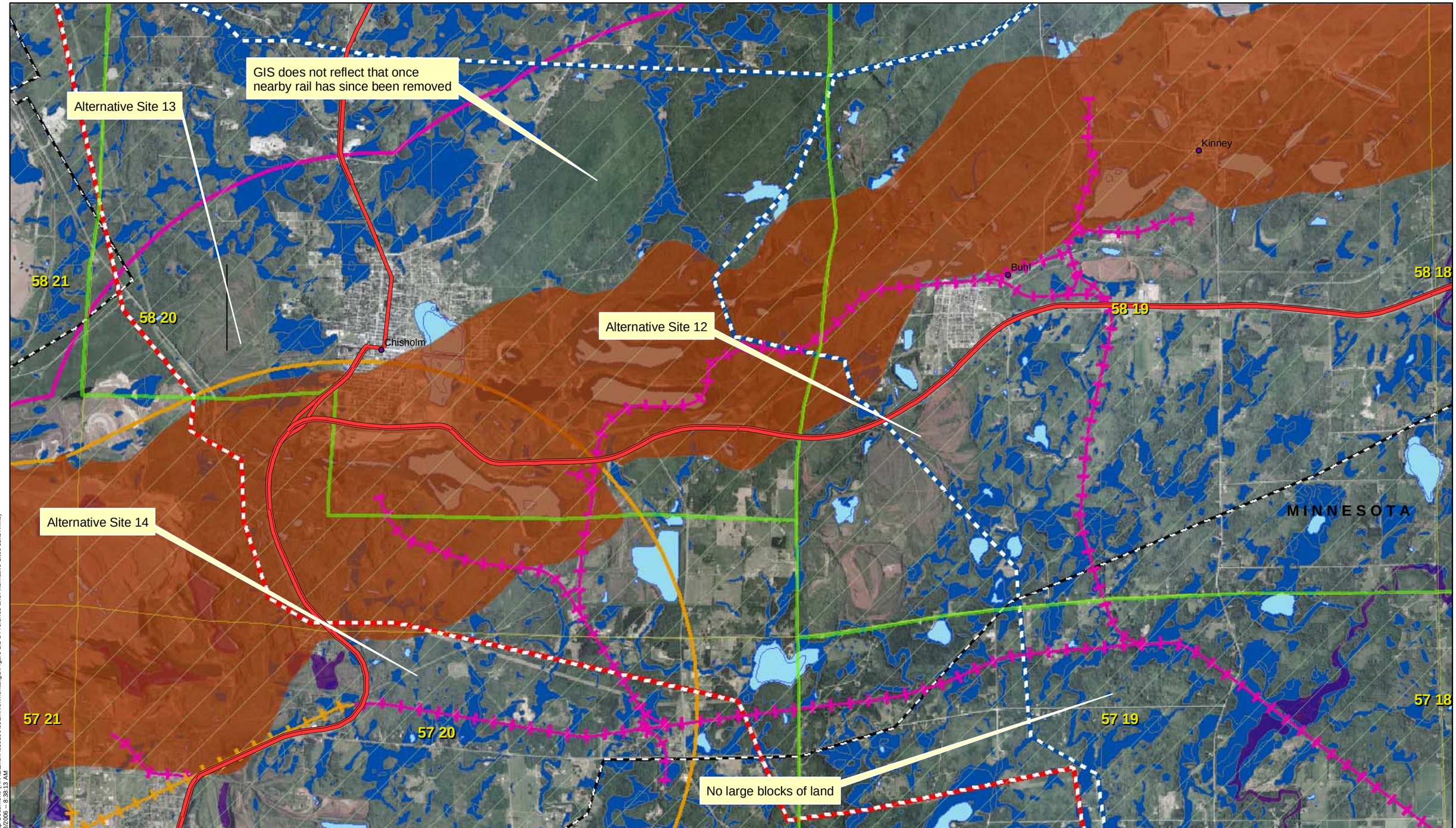
Figure 6:
TTRA Site Selection

UTM Zone 15 Meters
NAD83

N W E S

0 1 Miles



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Taconite Tax Relief Area

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- Buffer of BNSF
- Buffer of DMIR
- Buffer of DWP
- Floodplains
- Iron Formation
- Lakes
- Wetlands

Source: ESRI, Excelsior Energy, and SEH.
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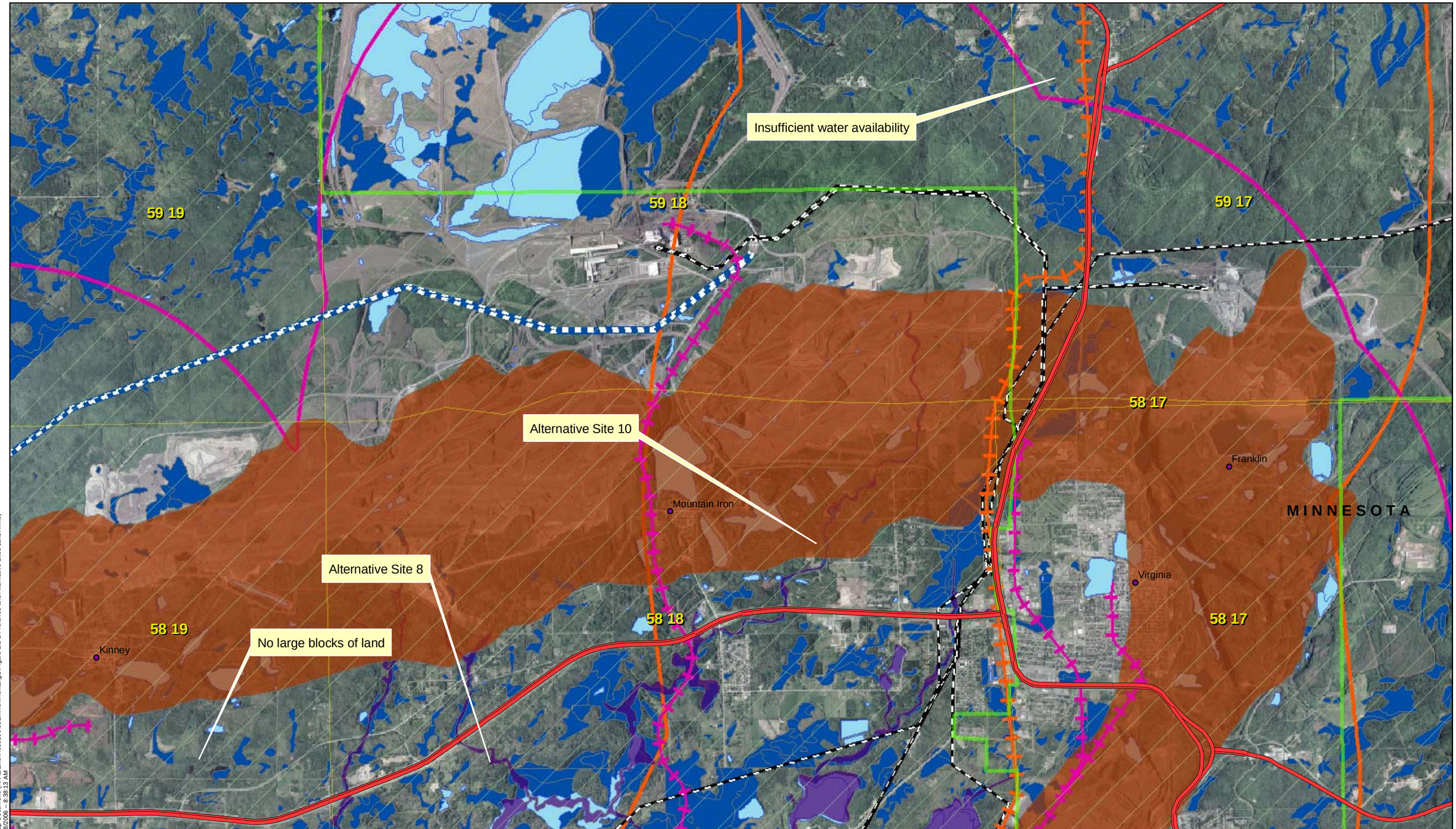
Figure 7: TTRA Site Selection

UTM Zone 15 Meters
NAD83

N W E S

0 1 Miles



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Taconite Tax Relief Area

January 2007

Legend

- Cities
- Highways
- Rivers
- TTRA
- BNSF Rail
- DMIR Rail
- DWP Rail
- HVTL_230_kV
- HVTL_115_kV
- HVTL_345_kV
- HVTL_500_kV
- Buffer of BNSF
- Buffer of DMIR
- Buffer of DWP
- Floodplains
- Iron Formation
- Lakes
- Wetlands

Source: ESRI, Excelsior Energy, and SEH.
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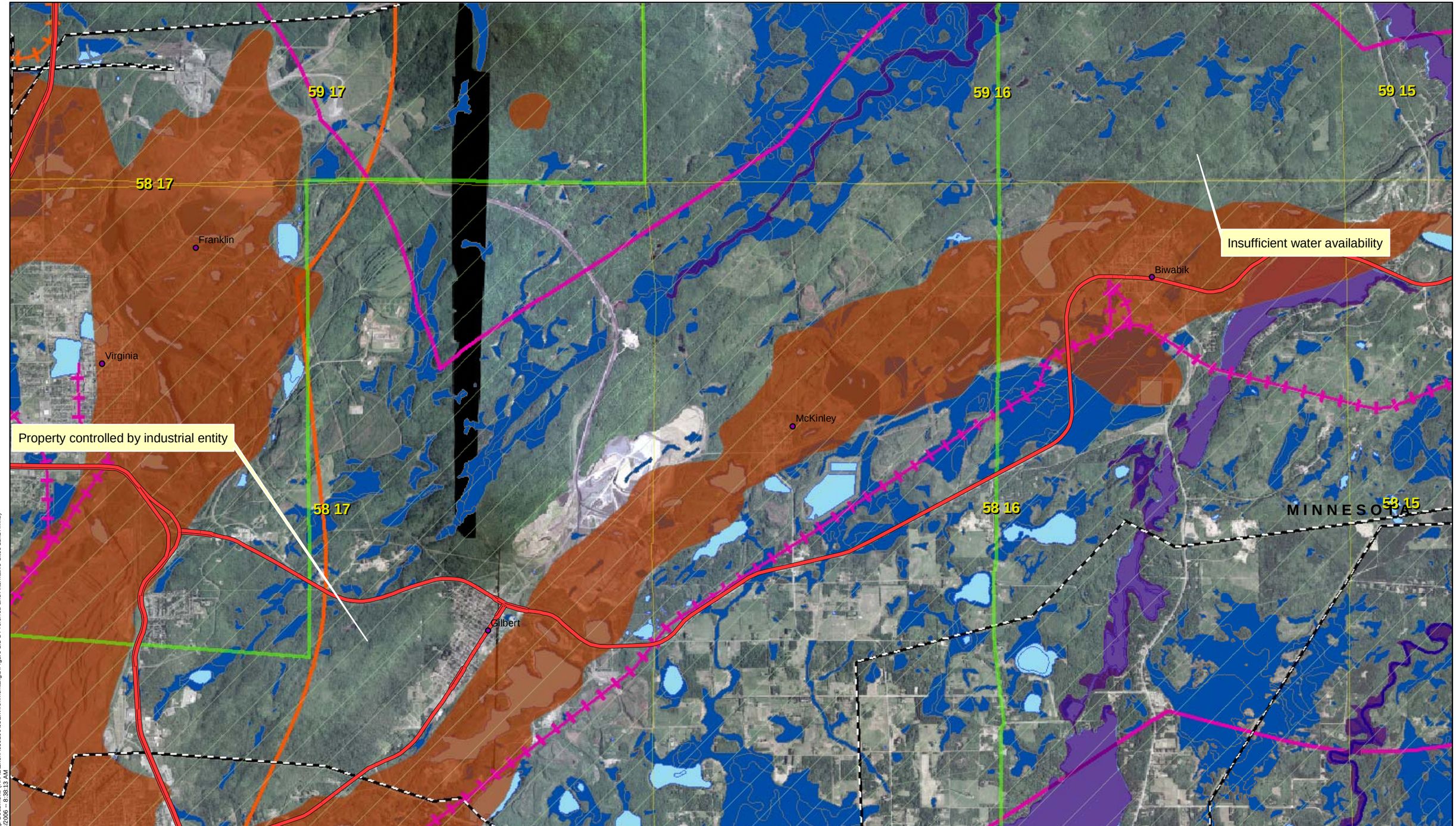
Figure 8: TTRA Site Selection

UTM Zone 15 Meters
NAD83

N W E S

0 1 Miles



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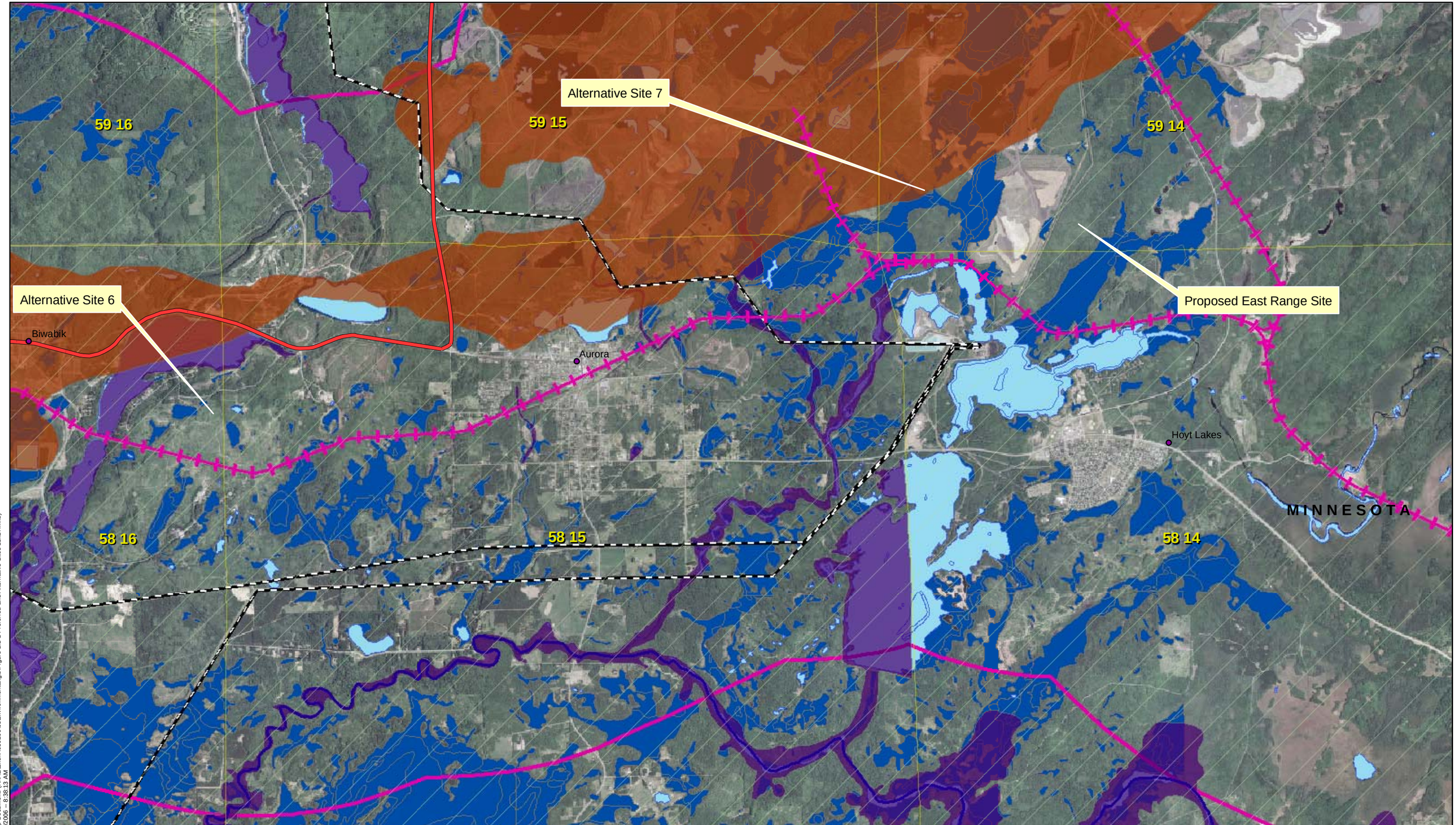
Source: ESRI, Excelsior Energy, and SEH.
© 2006 SEH

Figure 9: TTRA Site Selection

UTM Zone 15 Meters
NAD83

N W E S

0 1 Miles



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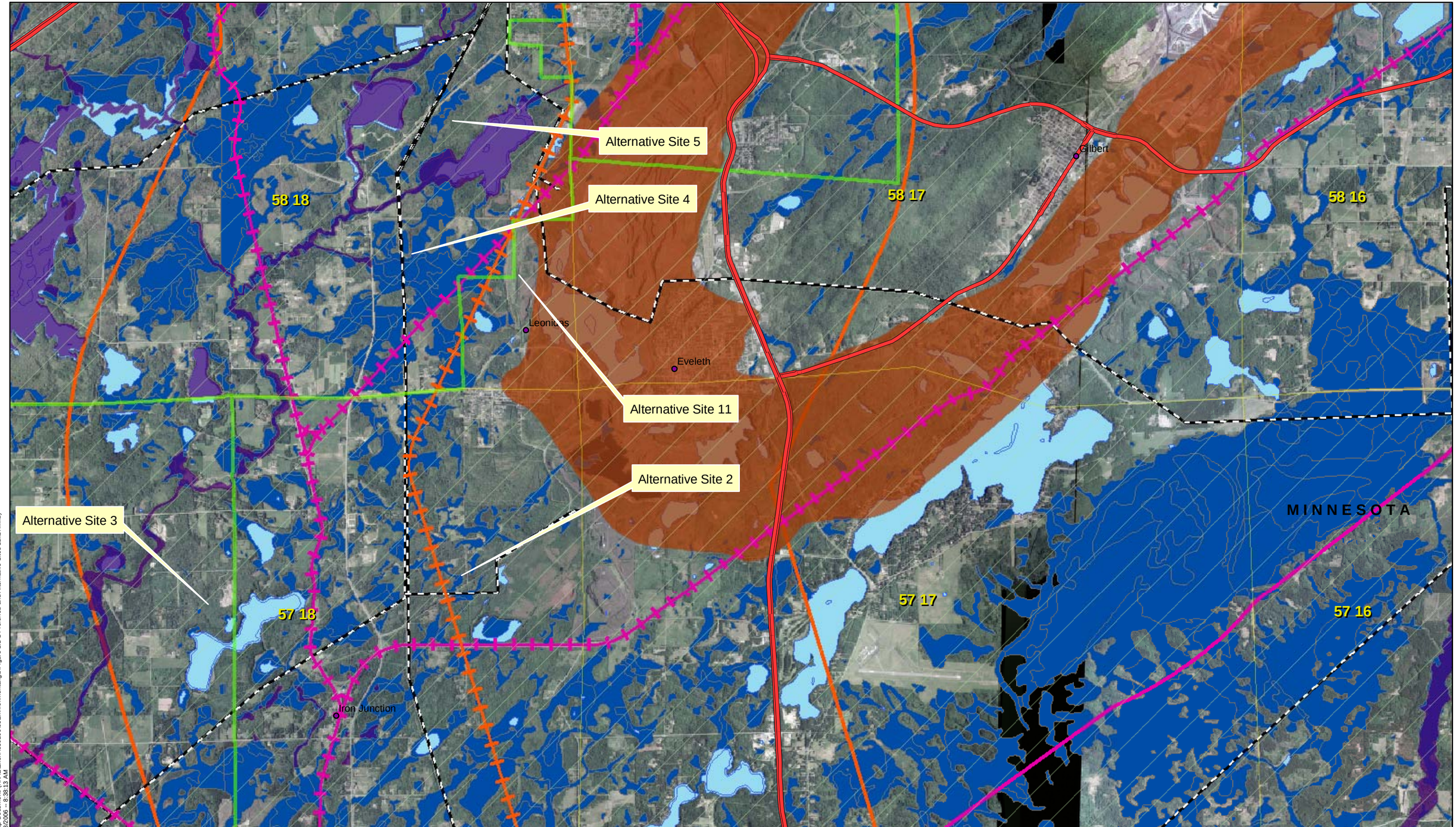
Source: ESRI, Excelsior Energy, and SEH.
© 2006 SEH

Figure 10: TTRA Site Selection

UTM Zone 15 Meters
NAD83

N W E S

0 1 Miles



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Source: ESRI, Excelsior Energy, and SEH.
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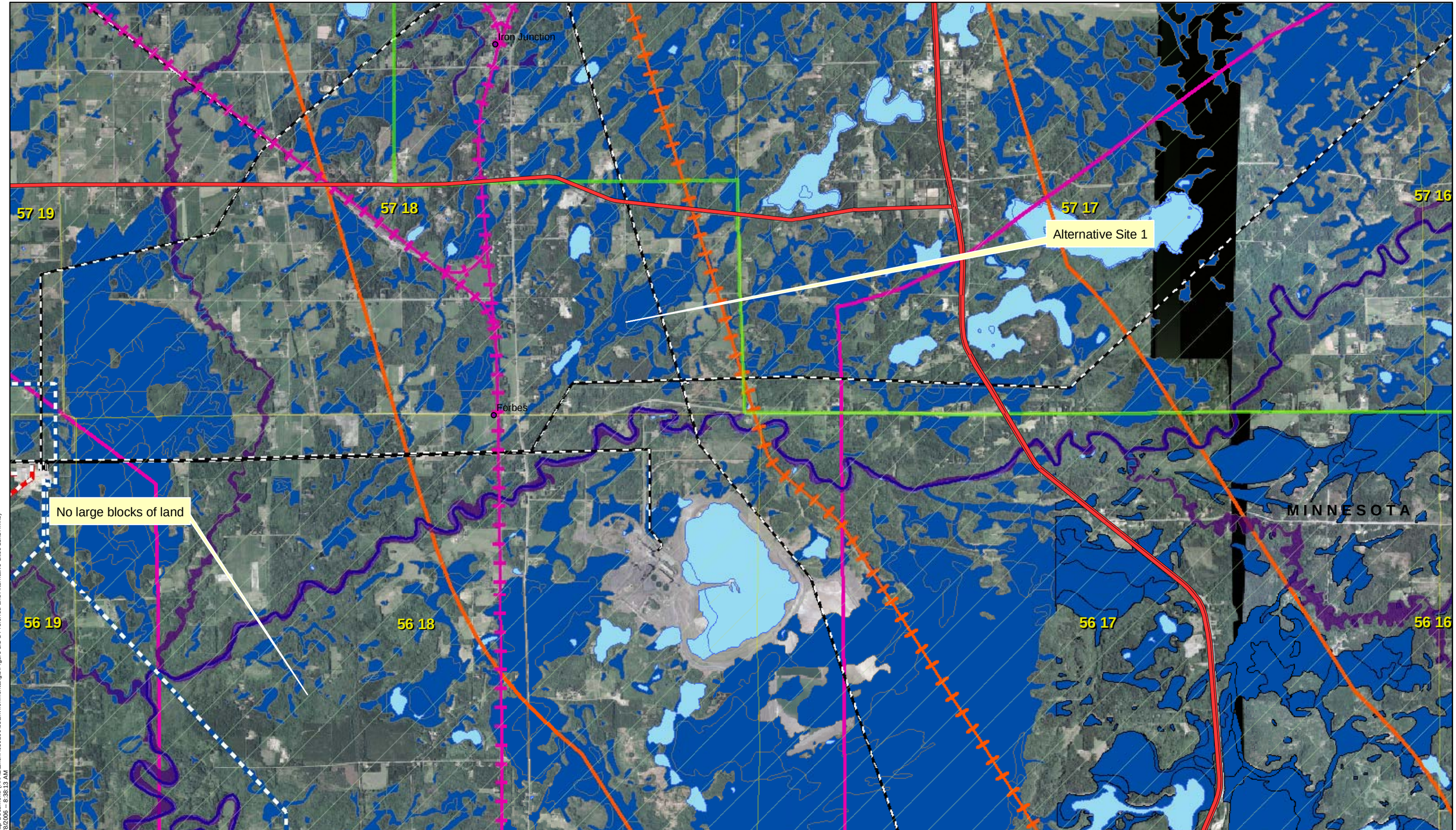
Figure 11: TTRA Site Selection

UTM Zone 15 Meters
NAD83

N W E S

0 1 Miles



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Source: ESRI, Excelsior Energy, and SEH.
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Figure 12: TTRA Site Selection

UTM Zone 15 Meters
NAD83

N W E S

0 1 Miles

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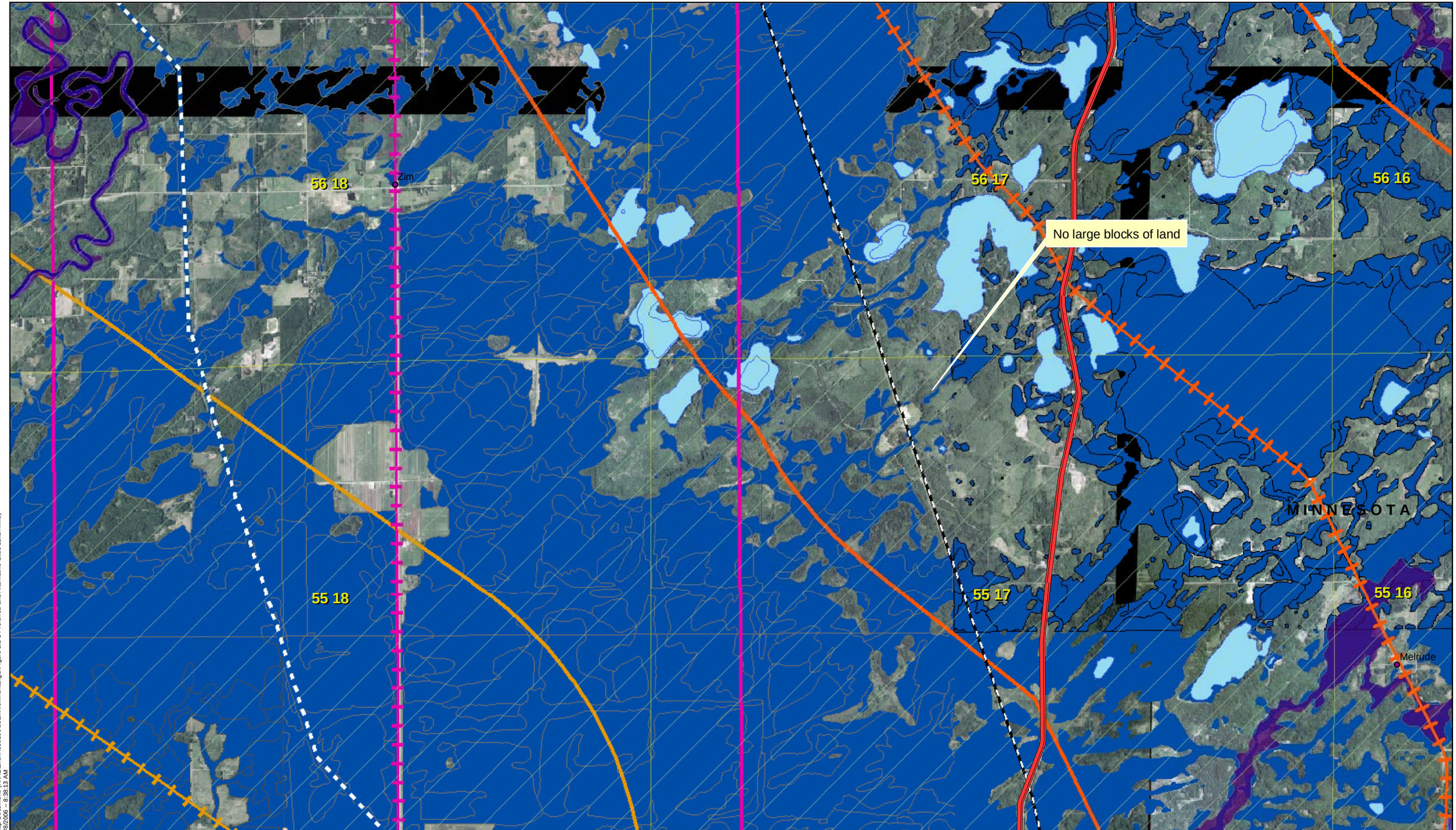

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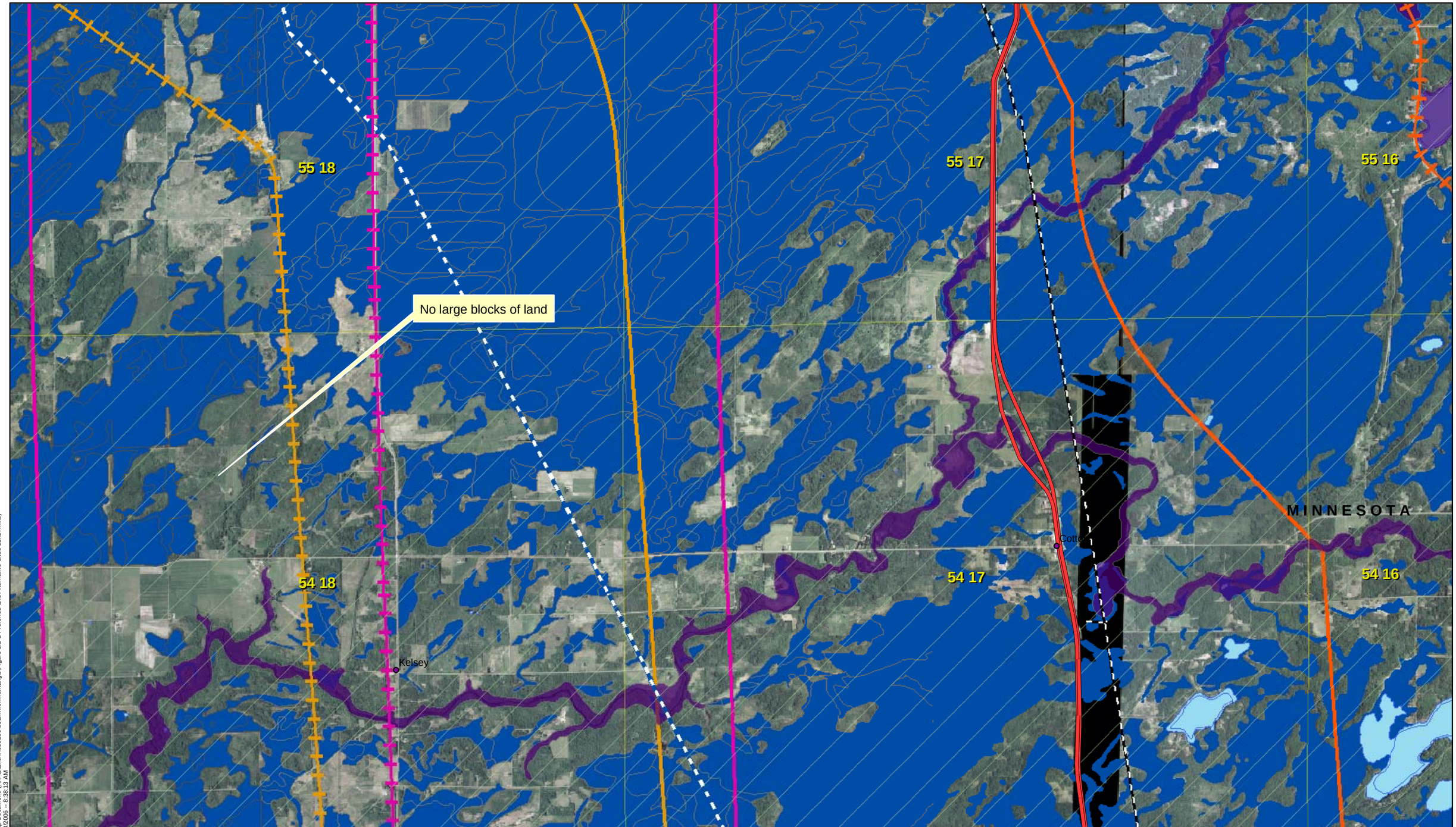
Figure 13: TTRA Site Selection

UTM Zone 15 Meters
NAD83

N W E S

0 1 Miles



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Source: ESRI, Excelsior Energy, and SEH.
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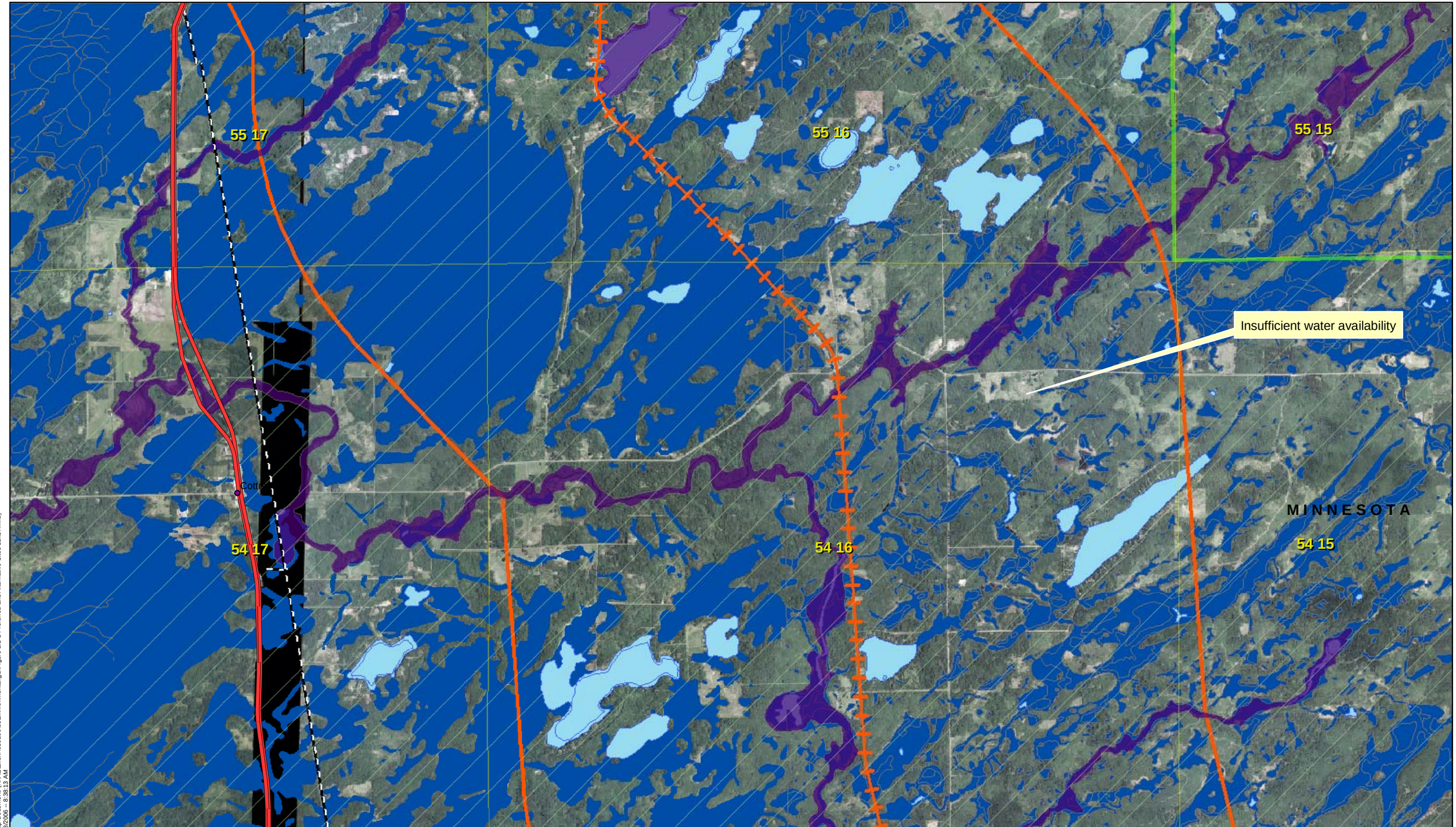
Figure 14: TTRA Site Selection

UTM Zone 15 Meters
NAD83

N W E S

0 1 Miles



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Source: ESRI, Excelsior Energy, and SEH.
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Figure 15: TTRA Site Selection

UTM Zone 15 Meters
NAD83

N W E S

0 1 Miles

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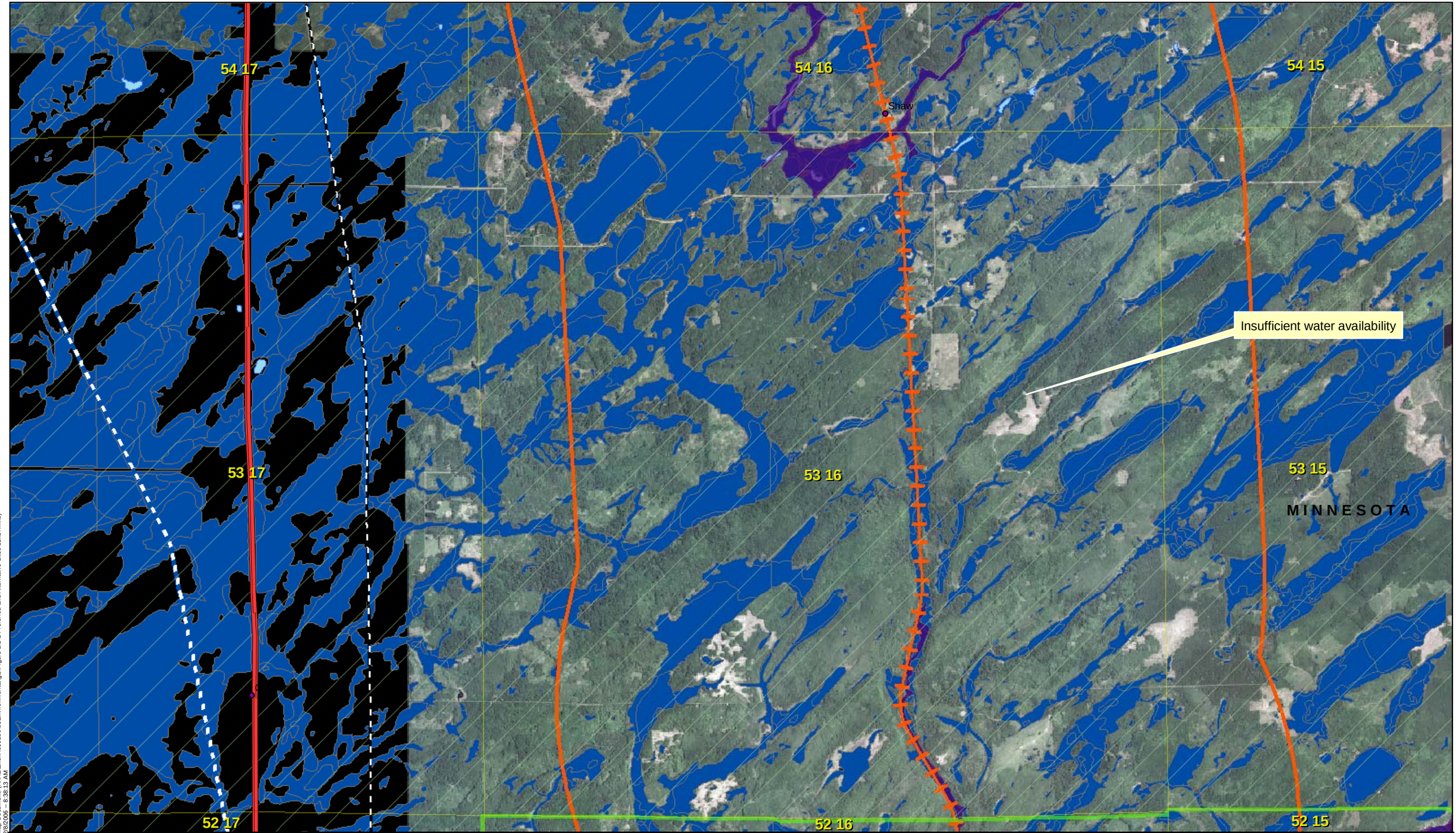

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Figure 16: TTRA Site Selection

UTM Zone 15 Meters
NAD83

N W E S

0 1 Miles

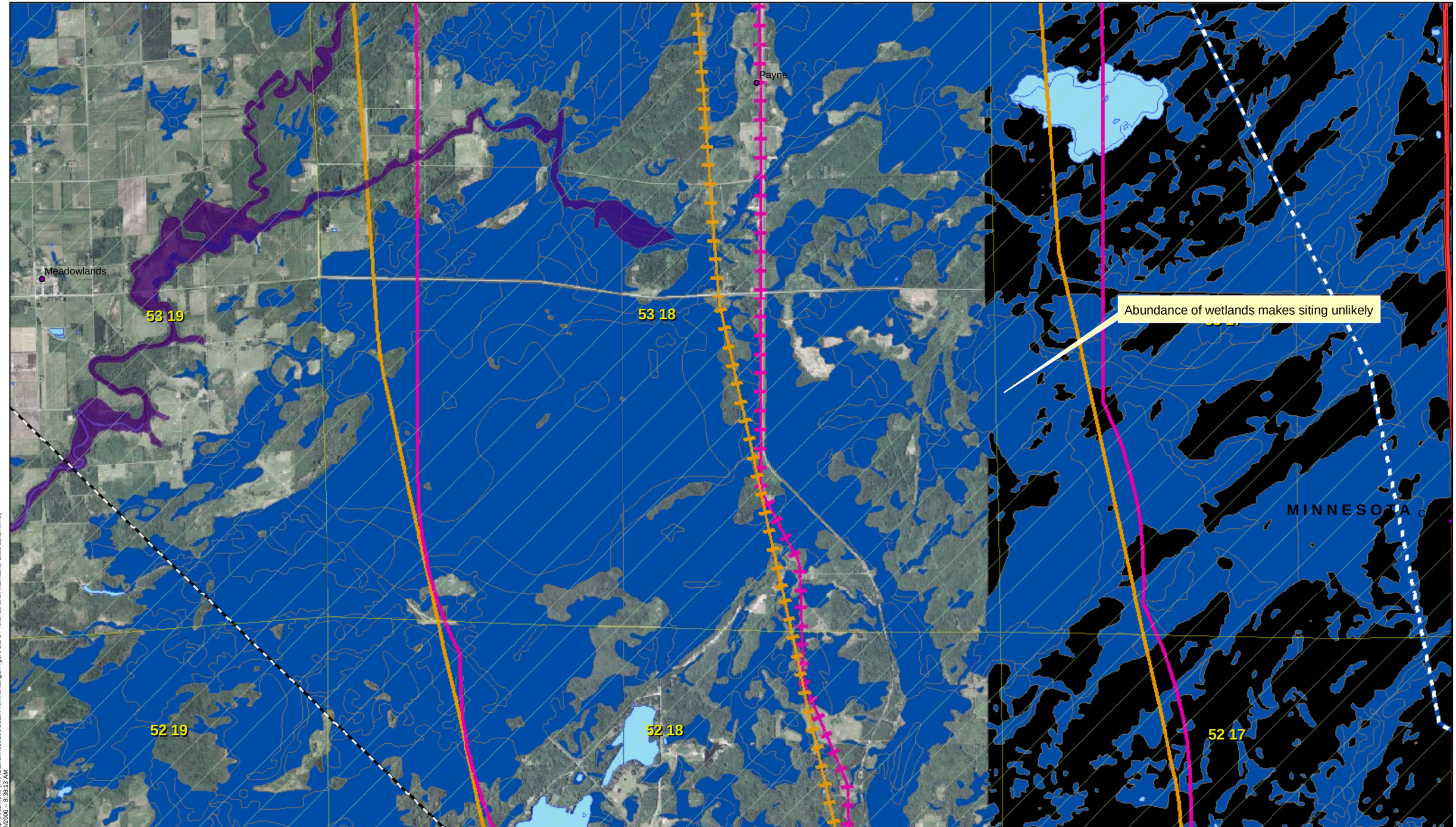

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Figure 17: TTRA Site Selection

UTM Zone 15 Meters
NAD83

N W E S

0 1 Miles