APPENDIX E

IRON RANGE – ST. LOUIS COUNTY – ARROWHEAD 345 KV TRANSMISSION LINE PROJECT

ENVIRONMENTAL ASSESSMENT

IRON RANGE – ST. LOUIS COUNTY – ARROWHEAD 345 kV TRANSMISSION PROJECT

Minnesota Power and American Transmission Company LLC

Docket Nos. E015/CN-25-111 and E015/TL-25-112

ENVIRONMENTAL ASSESSMENT

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LIST OF ABBREVIATIONS AND ACRONYMS

AIMP	Agricultural Impact Mitigation Plan
Application	Combined Certificate of Need and Route Permit Application
AMA	Aquatic Management Area
APLIC	Avian Powerline Interaction Committee
AQI	Air Quality Index
ARMER	Allied Radio Matrix for Emergency Response
ATV	All-Terrain Vehicle
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best management practice
CFR	Code of Federal Regulations
CN	Certificate of Need
CO	Carbon monoxide
CO_2e	Carbon dioxide equivalent
Commission	Minnesota Public Utilities Commission
CH_4	Methane
CWI	County Well Index
dBA	A-weighted decibel
Dkey	Determination Key
dn	Day/Night
DPA	Deer Permit Area
DWSMA	Drinking Water Supply Management Area
E. coli	*Escherichia coli*
EA	Environmental Assessment
EF	Electric field
ELF	Extremely low frequency
EMF	Electric and magnetic field
EPA	Environmental Protection Agency
EQB	Environmental Quality Board
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Association
G	Gauss
Hg-F	Mercury in fish tissue
Hg-W	Mercury in water column
IBA	Important Bird Area
IMD	Implantable medical devices
IPaC	Information for Planning and Consultation
Itasca County Plan	Itasca County Comprehensive Land Use Plan

kV	Kilovolt
LAWCON	Land and Water Conservation
LGU	Local Government Unit
mA rms	milliAmperes root mean square
MBS	Minnesota Biological Survey
MBTA	Migratory Bird Treaty Act
MCE	Minnesota Conservation Explorer
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MF	Magnetic field
mG	Milligauss
MGS	Minnesota Geological Survey
MnDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MNSHIP	Minnesota State Historic Inventory Portal
MPCA	Minnesota Pollution Control Agency
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAC	Noise Area Classification
NESC	National Electrical Safety Code
NIEHS	National Institute of Environmental Health Sciences
NLCD	National Land Cover Database
NO_x	Nitrogen oxides
NO_2	Nitrogen dioxide
NPC	Native Plant Communities
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRP	Northland Reliability Project
NWI	National Wetlands Inventory
OSA	Office of the State Archaeologist
$PM_{2.5}$	Fine particulate matter equal to or less than 2.5 microns in diameter
PM_{10}	Particulate matter equal to or less than 10 microns in diameter
ppb	Parts per billion
ROI	Region of influence
SBS	Sites of Biodiversity Significance
SDS	State Disposal System
SF_6	Sulfur hexafluoride
SHPO	Minnesota State Historic Preservation Office

SNA	Scientific and Natural Area
SO_2	Sulfur dioxide
SSURGO	Soil Survey Geographic Database
St. Louis County Plan	St. Louis County Comprehensive Land Use Plan
Suckley's	Suckley's Cuckoo Bumble Bee
SWPPP	Stormwater Pollution Prevention Plan
TSS	Total suspended solids
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
VOC	Volatile organic compound
VMP	Vegetation Management Plan
WCA	Wetland Conservation Act
WMA	Wildlife Management Area

1.0 ENVIRONMENTAL ASSESSMENT

The Environmental Assessment ("EA") is required by Minn. Stat. § 216I.07, subd. 3(a) to be provided with the Application ("Application") for the Iron Range – St. Louis County – Arrowhead 345 kilovolt ("kV") Transmission Line Project (the "Project"). The EA contains information regarding the Project's human and environmental impacts and addresses mitigating measures for identified impacts. Unless specifically identified otherwise, the discussion herein refers to potential impacts that could occur from the construction and operation of the Project, including both the transmission line and the substation expansions.

Should the Commission issue a Route Permit, the Applicants will comply with the Standard Route Permit Conditions as provided in the Draft Route Permit (*see* Attachment 1) and Special Conditions that will be the result of the record developed during the proceedings.

1.1 DEFINITIONS

Minnesota Public Utilities Commission ("Commission") guidance recommends that applicants describe the methodology for characterizing potential impacts.[1] This EA incorporates descriptions from recent environmental documents prepared by the Commission's Energy Infrastructure Permitting ("EIP") group.

A potential impact is the anticipated change to an existing condition caused either directly or indirectly by the construction and operation of a proposed project. Potential impacts can be positive or negative and short- or long-term. Impacts vary in duration and size, by resource, and across locations. In certain circumstances, potential impacts can accumulate incrementally meaning that impacts from the project would be in addition to on-the-ground impacts already occurring.

Direct impacts are caused by the proposed action and occur at the same time and place. An indirect impact is caused by the proposed action but is further removed in distance or occurs later in time. This EA considers direct and indirect impacts that are reasonably foreseeable, which means a reasonable person would anticipate or predict the impact. Cumulative potential effects are the result of the incremental impacts of the proposed action in addition to other projects in the environmentally relevant area.

To provide appropriate context, the following terms and concepts are used to describe and analyze potential impacts:

Duration – Impacts vary in length of time. Short-term impacts are generally associated with construction but might extend into the early operation phase of the Project. Long-term impacts are associated with the operation of the Project. Permanent impacts extend beyond Project decommissioning and reclamation.

Size – Impacts vary in size. To the extent possible, potential impacts are described quantitatively, for example, the number of impacted acres or the percentage of affected individuals in a population.

[1] Minnesota Public Utilities. 2025. Draft Application Guidance for Large Energy Infrastructure Facilities in Minnesota. Available at https://puc.eip.mn.gov/sites/default/files/2025-06/DRAFT-LEI_Guidance_Draft_06-25-2025.pdf. Last accessed November 2025 .

Uniqueness – Resources are different. Common resources occur frequently, while uncommon resources are not ordinarily encountered.

Location - Impacts are location dependent. For example, common resources in one location might be uncommon in another.

The context of an impact – in combination with its anticipated on-the-ground effect – is used to determine an impact intensity level, which can range from highly beneficial to highly harmful.

Impact intensity levels are described using a qualitative scale, which is explained below. These terms are not intended as value judgments, but rather as a means to ensure common understanding among readers and to compare potential impacts between alternatives.

Negligible impacts do not alter an existing resource condition or function and are generally not noticeable to an average observer. These short-term impacts affect common resources.

Minimal impacts do not considerably alter an existing resource condition or function. Minimal impacts might, for some resources and at some locations, be noticeable to an average observer. These impacts generally affect common resources over the short- or long-term.

Moderate impacts alter an existing resource condition or function and are generally noticeable to the average observer. Impacts might be spread out over a large area making them difficult to observe, but can be estimated by modeling. Moderate impacts might be long-term or permanent to common resources, but generally short- to long-term to uncommon resources.

Significant impacts alter an existing resource condition or function to the extent that the resource is impaired or cannot function. Significant impacts are likely noticeable or predictable to the average observer. Impacts might be spread out over a large area making them difficult to observe, but can be estimated by modeling. Significant impacts can be of any duration and affect common or uncommon resources.

Also discussed are opportunities to avoid and minimize impacts, which can include:

- Avoiding impacts altogether by not undertaking a certain project or parts of a project;
- Minimizing impacts by limiting the degree of magnitude of a project;
- Reducing or eliminating impacts over time by preservation and maintenance operations during the life of the project; or
- Reducing or avoiding impacts by implementing pollution prevention measures.

In the event that impacts cannot be minimized and/or avoided, mitigation opportunities are also discussed. Mitigation means:

- Rectifying impacts by repairing, rehabilitating, re-creating, or restoring the affected environment; or
- Compensating for impacts by replacing or providing substitute resources or environments.

Some impacts can be avoided or minimized; some might be unavoidable but can be minimized; others might be unavoidable and unable to be minimized, but can be corrected. The level at which an impact can be mitigated might change the impact intensity level.

1.2 REGIONS OF INFLUENCE

Potential impacts on human and environmental resources are analyzed within specific geographic areas called regions of influence ("ROI"). The ROI is the geographic area where the Project might exert some influence and is used as the basis for assessing potential impacts. ROIs vary by resource. As necessary, potential impacts and mitigation measures beyond the identified ROI are discussed to provide appropriate context. Also, direct impacts within the ROI might cause indirect impacts outside the ROI. ROIs used within this EA are resource specific or associated with the:

- Proposed Right-of-Way (generally 150 feet wide);
- Proposed Route (ranges from 500 feet on either side of the existing transmission line centerline for a minimum total width of 1,000 feet, up to 1.25 miles);
- Project Area (1 mile on either side of the existing transmission line centerline); and
- Itasca and St. Louis Counties.

Table 1 summarizes the ROIs used by resource type.

Table 1. Region of Influence by Resource Type

Resource Type	Element	Region of Influence
Human Settlement	Proximity to Residences	Right-of-Way
	Noise	Resource Specific – 1,600 feet on either side of the alignment
	Aesthetics	Resource Specific – Viewshed[a]
	Socioeconomics and Environmental Justice/Cultural Values	Itasca and St. Louis Counties
	Recreation/Public Services and Transportation	Itasca and St. Louis Counties
Public Health and Safety	Electric and Magnetic Fields	Right-of-Way
Land Use/Zoning	Zoning/Land Use	Project Area
Land-Based Economies	Agriculture	Itasca and St. Louis counties
	Forestry/Mining	Right-of-Way
	Tourism	Project Area
Archaeological and Historic Resources	Archaeological and Historic Resources	Resource Specific
Natural Environment	Air Quality/Climate Change and Resilience/Greenhouse Gas Emissions	Itasca and St. Louis counties
	Groundwater/Impaired Waters/Wildlife	Project Area
	Stormwater/Vegetation	Right-of-Way
	Lakes, Rivers, Streams, and Public Waters/Floodplains/Wetlands/Invasive Species Management	Proposed Route
	Rare and Unique Natural Resources Rare Plant Communities State-Listed Species Threatened and Endangered Federally Listed Species	Resource Specific – Dependent on the species lifecycle, mobility, and migration patterns
Physiographic Features	Topography/Geology/Soils	Right-of-Way

[a] Viewshed is defined as the geographical area that can be seen along the Project Route that accounts for terrain, vegetation, and man-made structures that may block the line of sight.

2.0 ENVIRONMENTAL SETTING

The Proposed Route[2] crosses Itasca and St. Louis Counties, Minnesota. The Proposed Route is within the Laurentian Mixed Forest Province as defined by the Ecological Classification System of Minnesota and more specifically within the North Shore Highlands, Tamarack Lowlands, and St. Louis Moraines Subsections. Pre-European settlement vegetation consisted of aspen-birch forest, white pine-red pine forest, mixed hardwood-pine forest, and conifer bogs and swamps in the North Shore Highlands.[3]

The environmental setting of the Proposed Route consists of open space, deciduous forest, and hydrologic features such as lakes, streams, rivers, and wetlands. The Proposed Route generally moves from the northwest to the southeast with elevations ranging from approximately 1,241 to 1,397 feet above mean sea level.[4] The greatest variability in elevations occurs near the eastern and western ends of the Proposed Route and are generally associated with waterbodies, with less variability in the central area of the Proposed Route. Major physiographic features, jurisdictional boundaries, and environmental resources found in or adjacent to the Proposed Route are described in this EA.

Typical land use within and adjacent to the Proposed Route consists of low density and rural residential property, open and public lands, agricultural land, forest land, and commercial property. The nearest cities are Grand Rapids, Floodwood, Proctor, Hermantown, and Duluth. The most important land uses by revenue are forestry, agriculture, and tourism. Tourism is common where there are concentrations of recreational trails, parks, and lakes.

The Proposed Route is located along existing high-voltage transmission line rights-of-way for at least 95 percent of the Proposed Route (*see* Maps 1 and 2). The Project consists of three primary segments:

> **Segment 1** – Approximately 32.7 miles of new single circuit 345 kV line on double circuit capable structures, to be built along existing high-voltage transmission line rights-of-way owned by Minnesota Power from the existing Minnesota Power Iron Range 500 kV/345 kV/230 kV Substation in Itasca County ("Iron Range Substation") to north of the St. Louis River in St. Louis County.
>
> **Segment 2** – Replace approximately 33.3 miles of existing 230 kV line with new double circuit 345 kV structures and 345 kV conductor from north of the St. Louis River in St. Louis County to Minnesota Power's St. Louis County 345 kV/230 kV Substation in Solway Township ("St. Louis County Substation"), utilizing and limiting the expansion of the existing high-voltage transmission line rights-of-way owned by Minnesota Power. Although both circuits will be designed for and capable of 345 kV operation, one circuit in this segment will be operated at 345 kV and the other circuit will continue to be operated at 230 kV.
>
> **Segment 3** – Approximately 1.5 miles of new double circuit 345 kV transmission line that is co-located for 50 percent of its length. This line will be jointly owned by Minnesota Power and American Transmission Company from Minnesota Power's St. Louis County

[2] The Proposed Route is comprised of three segments discussed in detail below.
[3] "North Shore Highlands Subsection," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/ecs/212Lb/index.html. Last accessed August 2025.
[4] "MnTOPO," Minnesota Department of Natural Resources. Available at https://mntopo.dnr.state.mn.us/. Last accessed August 2025.

Substation in Solway Township to the existing ATC Arrowhead 345 kV/230 kV Substation in Hermantown ("ATC Arrowhead Substation").

This EA includes environmental analysis of the Proposed Route and, where applicable, the Proposed Right-of-Way and Proposed Alignment. Potential impact calculations and direct (permanent and temporary) impacts presented are based upon the Proposed Route, Proposed Right-of-Way, and/or Proposed Alignment using typical and assumed design and construction practices. More information on how anticipated impacts were calculated is provided in each subsection below. Several terms are used throughout this EA and applicable definitions are provided below:

Proposed Route – The Proposed Route ranges from 500 feet on either side of the existing transmission line centerline for a minimum total width of 1,000 feet, up to 1.25 miles. Where the Proposed Route encounters constraints, the Applicants are requesting additional route width. The greater route width is requested to allow for flexibility to minimize impacts on resources and to work with landowners. These areas are shown on Maps 1-12 and discussed in detail in Section 2.1 of the Application.

Proposed Alignment – The Proposed Alignment for the Project is where the Applicants, based on information available at the time of filing this Application, intend to place the transmission line and structures within the Proposed Route. The Proposed Alignment for the Project can be found on the maps contained in Map 1 to this EA and Appendix G of the Application, Detailed Map.

Proposed Right-of-Way – The Proposed Right-of-Way for the Project is located within the Proposed Route. The Proposed Right-of-Way extends approximately 75 feet on either side of the Proposed Alignment. In Segment 1, the Proposed Right-of-Way will overlap with existing transmission line rights-of-way up to 30 feet, where practicable. In Segment 2, Applicants anticipate minimally expanding the existing transmission line right-of-way width, up to 20 feet. In Segment 3, the Right-of-Way will overlap with existing transmission lines for at least half of the length. More information on the Proposed Right-of-Way can be found in Section 6.1 of the Application and on the maps contained in Map 1 to this EA and Appendix G of the Application, Detailed Map.

The Project will also include the following improvements:

- Modification of the Iron Range Substation to accommodate one additional 345 kV line entrance and associated high-voltage equipment. An expansion of the Iron Range Substation, including 500 kV/345 kV transformers and 345 kV equipment, is currently under construction as part of the Northland Reliability Project (Docket Nos. E015,ET2/CN-22-416 and E015,ET2/TL-22-415) and will require further modification and equipment additions to accommodate the Project.

- Expansion of the St. Louis County Substation to accommodate three additional 345 kV line entrances and associated high-voltage equipment. The St. Louis County Substation is currently under construction as part of Minnesota Power's HVDC Modernization Project (Docket Nos. E015/CN-22-607 and E015/TL-22-611) and will require an expansion to accommodate the Project.

- Expansion of the ATC Arrowhead Substation to accommodate two additional 345 kV line entrances and associated high-voltage equipment.

2.1 HUMAN SETTLEMENT

2.1.1 Proximity of Project to Residences

2.1.1.1 Resources Within the Proposed Route

The Applicants reviewed the "USA Structures" database, maintained by Federal Emergency Management Association ("FEMA") data and aerial imagery,[5] and determined residential and non-residential buildings are located within the Proposed Route. Specifically, there are 274 buildings located within the Proposed Route. Of those buildings, 81 are residential and 193 are non-residential. There are 337 buildings within 1,000 feet of the Proposed Alignment. Of those buildings, 98 are residential and 239 are non-residential (*see* Table 2). The residential properties are generally low-density and rural in nature, often consisting of a home accompanied by one or more non-residential buildings. The Applicants will field verified the Project's proximity to all buildings along the Proposed Route in Fall 2025.

The Project has been designed to comply with National Electrical Safety Code ("NESC") standards, including clearance to buildings to allow for the safe operation of the proposed transmission line. The Proposed Route provides sufficient design flexibility and distances from existing buildings and structures for a transmission line design that achieves the requisite clearances (*see* Appendix G of the application for maps).

Table 2. Proximity to Residences and Non-Residential Buildings Within 1,000 Feet of the Proposed Alignment

Building Distance from Proposed Alignment (feet)	Number and Type of Building	
	Residential	Non-Residential
0 - 75	0	2
76-150	1	3
151-300	14	27
301-500	16	27
205-1000	67	180
TOTAL	98	239

2.1.1.2 Potential Impacts/Displacement

The ROI for proximity to residences is the Proposed Right-of-Way. There are two buildings within the Proposed Right-of-Way, and both are non-residential features, located north of the St. Louis River (*see* Appendix G of the Application, Page 8 of 16). No displacement of residential or non-residential buildings will occur during the construction or operation of the Project; therefore, impacts are anticipated to be negligible.

[5] "USA Structures," Federal Emergency Management Agency Geospatial Resource Center. Available at https://gis-fema.hub.arcgis.com/pages/usa-structures. Last accessed August 2025. St. Louis County, Minnesota (2023). Aerial imagery. St. Louis County GIS; Itasca County, Minnesota (2023). Aerial imagery. Itasca County GIS.

During the routing process, the Applicants will collaborate with landowners to accommodate alignment adjustments and structure placements during final design, to the extent practicable. All property or easement acquisitions will be carried out in accordance with applicable regulations.

2.1.1.3 Potential Mitigation

No displacement of residential or non-residential buildings will occur during the construction; therefore, impacts are anticipated to be minimal and mitigation is not anticipated.

2.1.2 Audible Sound

2.1.2.1 Resources Within the Proposed Route

Human hearing is not equally sensitive to all frequencies of sound. Thus, the most noticeable frequencies of sound are given more "weight" in most measurement schemes. The A-weighted scale corresponds to the sensitivity range for human hearing. Sound levels capable of being heard by humans are measured in dBA, which is the A-weighted sound level recorded in units of decibels. Noise can be defined as any undesired sound.

A Guide to Noise Control in Minnesota, published by the Minnesota Pollution Control Agency ("MPCA"), indicates that a sound level change of one dBA is not noticeable. A three dBA change is considered the "threshold of perception" or the lowest change in sound level that is generally perceptible to human hearing. A five dBA change in sound level is a noticeable change. A 10 dBA change in sound level is perceived as a doubling of loudness, while a 20 dBA change is considered a dramatic change in loudness (four times as loud). Point source sound drops 6 dBA every time distance doubles.[6] For example, a 50 dBA sound at 50 feet is perceived as a 44 dBA sound at 100 feet.

Table 3 shows noise levels associated with common, everyday sources.

[6] Minnesota Pollution Control Agency, *A Guide to Noise Control in Minnesota* (2015). Available at https://www.pca.state.mn.us/sites/default/files/p-gen6-01.pdf. Last accessed September 2025.

Table 3. Common Sound Sources and Levels[7]

Sound Pressure Level (dBA)	Source
110	Rock band at 5 meters
100	Jet flyover at 300 meters
90	Gas lawnmower at 1 meter
80	Food blender at 1 meter
70	Vacuum cleaner at 3 meters
60	Normal speech at 1 meter
50	Quiet urban daytime
40	Library, quiet urban nighttime
30	Bedroom at night
20	Quiet rural nighttime
10	Broadcast recording studio
0	Threshold of hearing

Established daytime and nighttime noise standards per Minn. R. 7030.0040 by Noise Area Classifications ("NAC") are provided in Table 4 and are considered public health standards. The standards are expressed as limiting levels of dBA within a one-hour period; L_{50} is the dBA not to be exceeded over 50 percent of the time (30 minutes) within an hour, while L_{10} is not to be exceeded over 10 percent of the time (6 minutes) within the hour. The total sum of noise at a specific time and location cannot exceed the standards.

Table 4. MPCA Noise Limits by Noise Area Classification (dBA)[8]

Applicable Noise Area Classification	Description	Daytime (7a – 10p)		Nighttime (10p – 7a)	
		L_{50}	L_{10}	L_{50}	L_{10}
1	Residential	60	65	50	55
2	Commercial	65	70	65	70
3	Industrial, Agricultural	75	80	75	80
Note: This table identifies the classifications potentially relevant to this Project.					

NACs are not dictated by local zoning. Instead, NACs are based on the land use activities at the location of the receiver and determine the noise standards applicable to that land use activity. NACs are listed in the MPCA noise regulations to distinguish the categories. Residential areas, churches, educational and health services, and similar types of land use activities are included in

[7] *Id*.
[8] Minn. R. 7030.0040, Subp. 2. Noise Standards (Office of the Revisor of Statutes, 2003). Available at https://www.revisor.mn.gov/rules/7030.0040/. Last accessed September 2025.

NAC 1; commercial-type land use activities are included in NAC 2; and industrial-type land use activities are included in NAC 3.

St. Louis County, Itasca County, and their respective townships and municipalities do not have noise-related regulations or ordinances.

Noise-sensitive receptors near the Proposed Route include nearby residences, as summarized in Table 5. None of these receptors are schools, nursing or boarding homes, churches, hospitals, or childcare centers. The Proposed Right-of-Way is approximately 73 feet from the nearest residence, the Iron Range Substation is approximately 1,836 feet from the nearest residence, and St. Louis County substation is approximately 1,757 feet from the nearest residence, and the Arrowhead substation is approximately 1,741 feet from the nearest residence.

Table 5. Noise-Sensitive Receptors Near the Proposed Alignment

Distance in Feet	0 to 50	50 to 100	100 to 200	200 to 400	400 to 800	800 to 1,600
Total Count	0	0	7	17	43	128
Note: Receptors were identified in an analysis area of 1,600 feet.						

2.1.2.2 Sound Related to the Transmission Line

The existing transmission lines can generate a small amount of sound energy from the corona effect. The corona effect happens when a small electrical discharge caused by the localized electric field ("EF") near energized components and conductors ionizes the surrounding air molecules. Corona is the physical manifestation of energy loss and can transform discharged energy into very small amounts of sound, radio noise, heat, and chemical reactions of the air components. Several factors, including conductor voltage, shape and diameter, and surface irregularities such as scratches, nicks, dust, or water drops can affect a conductor's electrical surface gradient and its corona performance.

Sound from a transmission line occurs during certain weather conditions. In foggy, damp, or rainy weather, transmission lines can create a crackling sound due to the small amount of electricity ionizing the moist air near the wires. The worst-case scenario is when the transmission line is exposed to heavy rain conditions (that is, 1 inch per hour). During heavy rain, the background noise level of the rain is usually greater than the noise from the transmission line. As a result, people do not normally hear noise from a transmission line during heavy rain.

Corona noise for transmission lines that range from 370 kV to 750 kV line (larger than the proposed 345 kV line and thus more conservative) has a calculated range of 43.9 dBA to 49.3 dBA.[9] Expected corona noise levels at various distances were developed by using the 150-foot noise level as a reference and accounting for a 3dBA reduction in noise from a line source with every doubling of distance. Table 6 shows the corona sound levels (dBA) for a 550 kV transmission line at various distances.

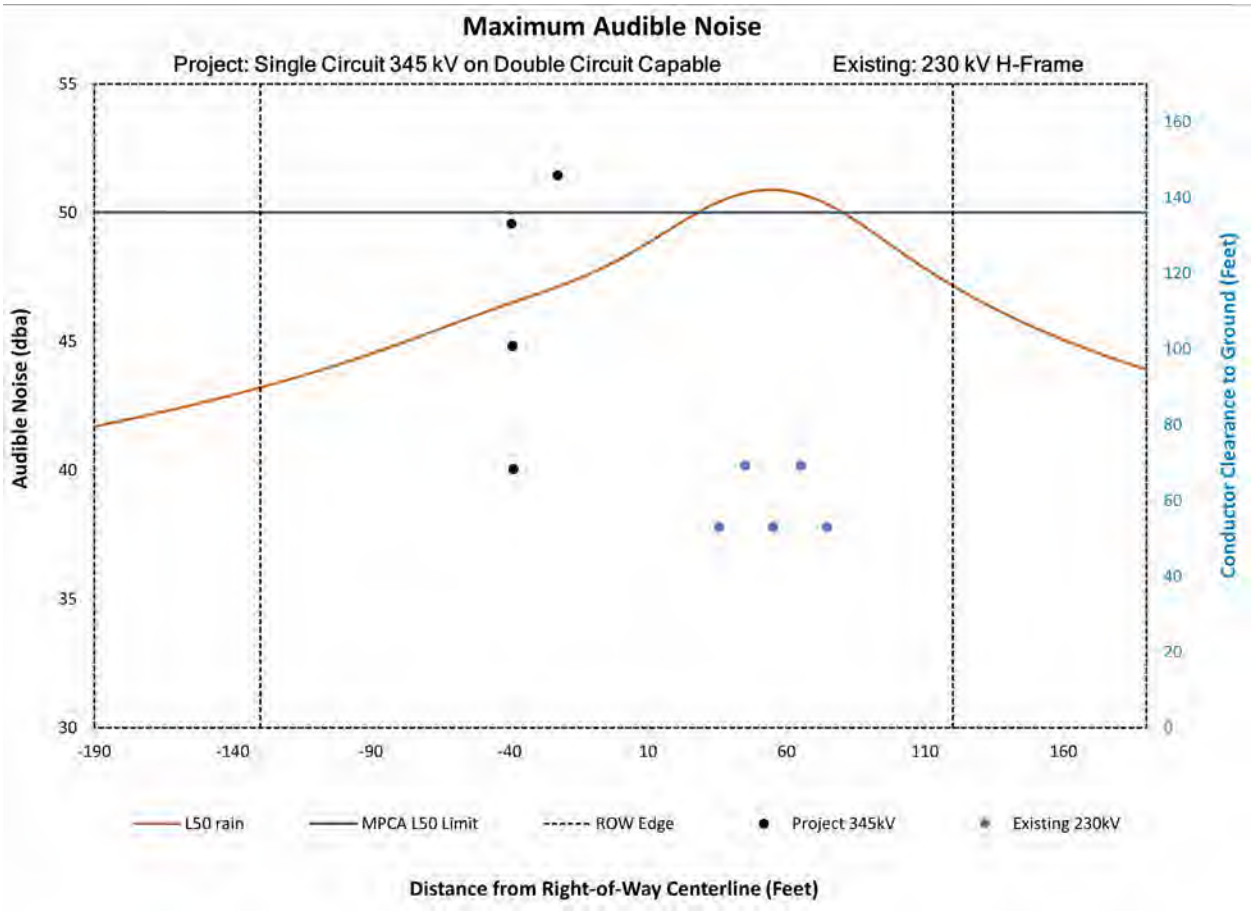
[9] Great River Energy and Minnesota Power, *Combined Certificate of Need and Route Permit Application for the Northland Reliability Project.* Minnesota Public Utilities Commission Docket No. E015, ET2/CN-22-416; E015, ET2/TL-22-415 (August 4, 2023).

Table 6. 550 kV Transmission Line Noise Levels in Heavy Rain, Maximum Expected L_{50} (dBA)

150 feet (Reference Distance)	100 feet	500 feet	1,000 feet	2,000 feet
40.3	42.1	35.3	32.3	29.3

The Proposed Route is in a rural area. The ambient noise level in the area is about 40 dBA, day/night ("dn") average sound level L_{dn}.[10] As shown on Figures 1, 2, and 3, the noise contribution due to corona effects will result in a peak audible noise level of 50.9 dBA for Segment 1 (new single circuit 345 kV line adjacent to the existing 230 kV transmission line), 41.8 dBA for Segment 2 (new double circuit 345 kV line with one circuit operating at 230 kV), and 45.2 dBA for Segment 3 (new double circuit 345 kV). For all segments, the audible noise contribution due to corona effects will dissipate as the distance from the Proposed Alignment increases.

Figure 1. Segment 1 Audible Sound Compared to Distance from the Project



[10] Federal Highway Administration (June 1, 2018) Techniques for Reviewing Noise Analyses and Associated Noise Reports, Figure 1-1. Available at https://www.fhwa.dot.gov/environment/noise/resources/reviewing_noise_analysis/.

Figure 2. Segment 2 Audible Sound Compared to Distance from the Project

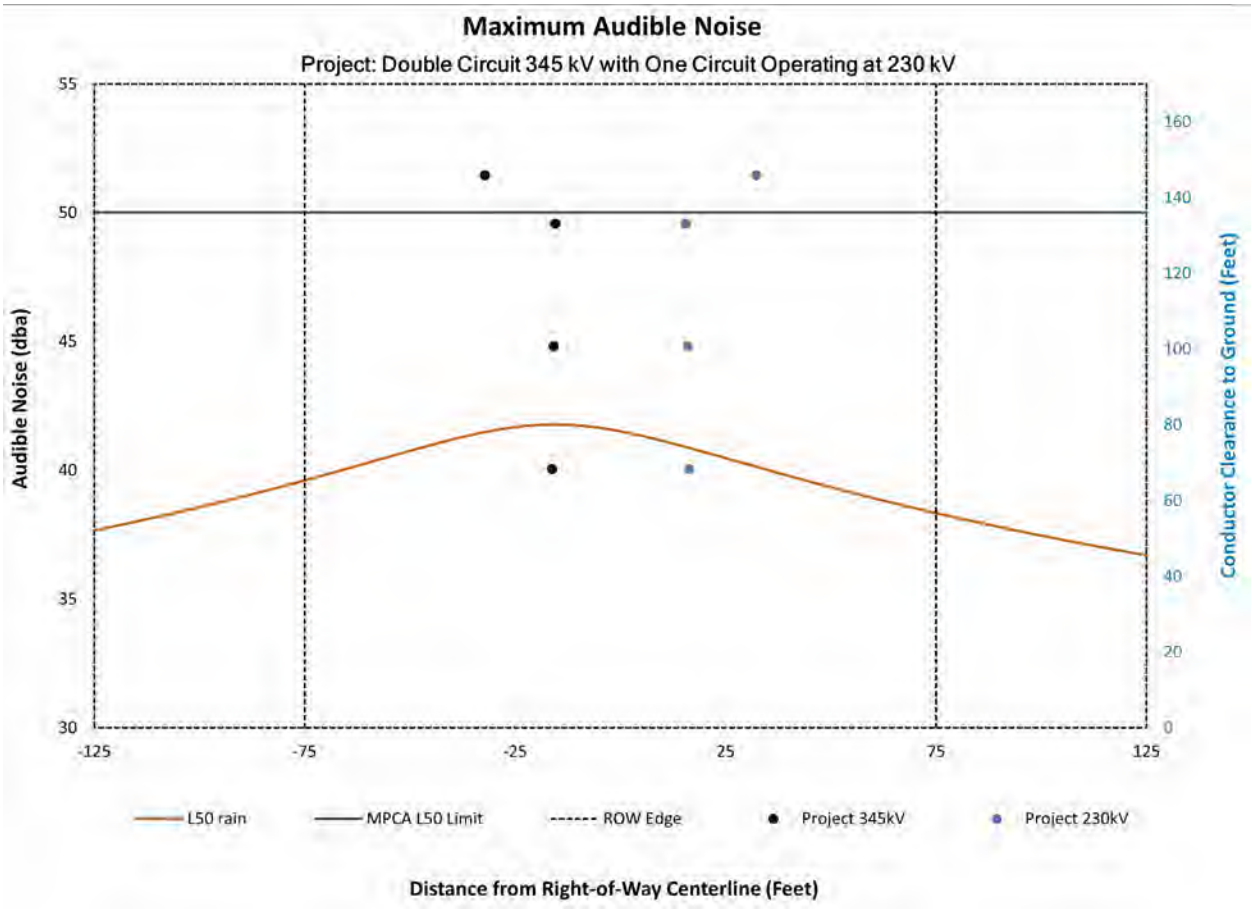
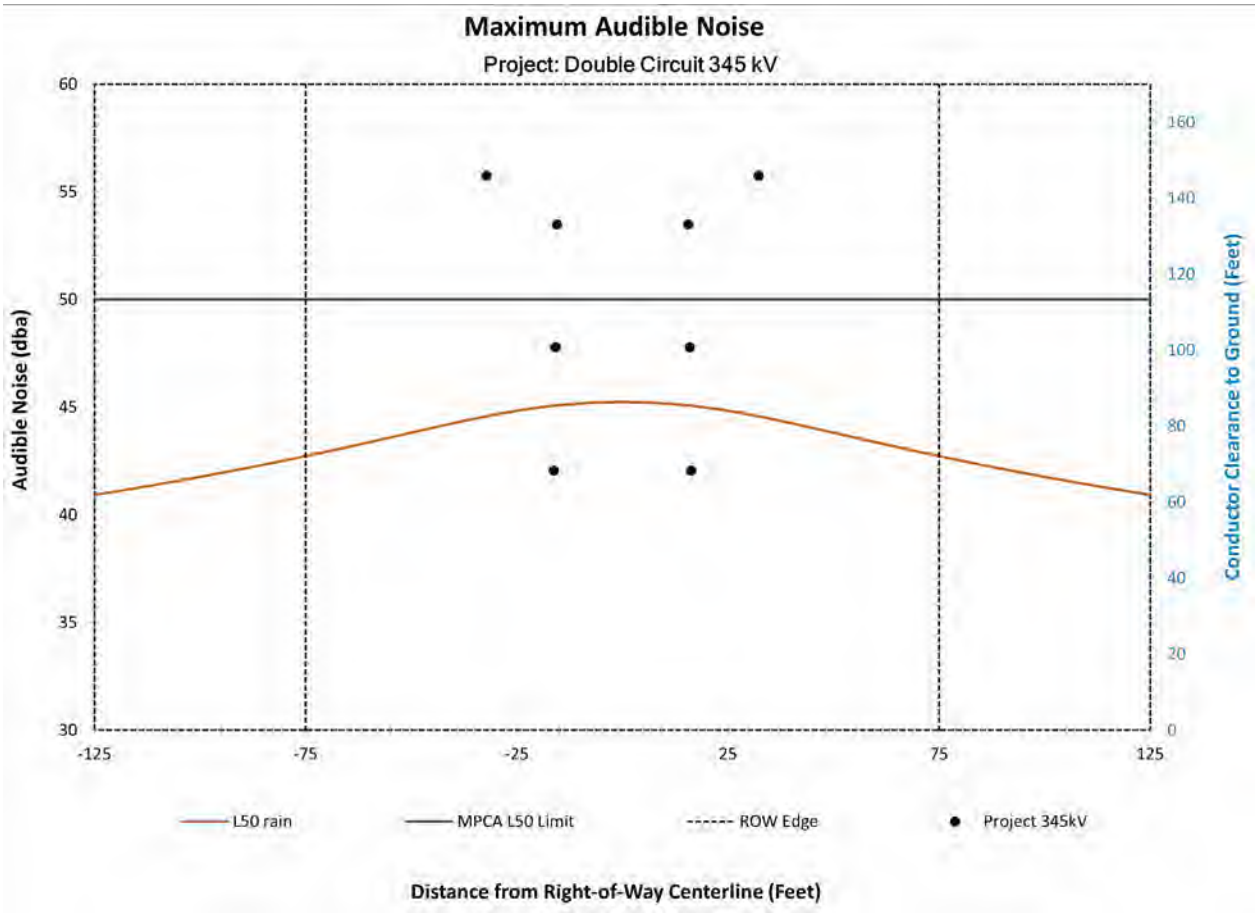


Figure 3. Segment 3 Audible Sound Compared to Distance from the Project



2.1.2.3 Noise Related to the Substation

As presented in Table 4, the most stringent applicable MPCA noise standard for Class 1 Property is the L_{50} daytime and nighttime standards equivalent to 60 dBA and 50 dBA, respectively. Households, including farmhouses, are considered Class 1 property in Minn. R. 7030.0050. NAC. Agricultural land is considered Class 3 which corresponds to the Iron Range, St. Louis County, and ATC Arrowhead Substation sites. The Class 3 daytime and nighttime standard is 75 dBA for both time periods.

The primary sources of sound from the modified substations will be the existing transformers. No transformers will be added to any substation as part of the Project. The nearest residence to a substation is located approximately 344 feet away (Iron Range Substation).

2.1.2.4 Potential Impacts

The ROI for sound is resource-specific and includes that area within 1,600 feet of the Proposed Route. Construction-related impacts are expected to be short term and minimal. Operational impacts are anticipated to be of a small size, long-term, and not impact unique resources. Because the Project is not expected to increase background noise levels, potential impacts will be negligible.

Sound associated with construction of the transmission line will be localized and temporary. Crews will work from pole location to pole location. Crews will return to a location during the different phases of construction: clearing and grading, material delivery, auguring foundations holes, setting structures, and stringing conductors. As such, crews will be present at any given location for a few days but will not be present along the entire Proposed Right-of-Way at any given period. Noise would dissipate at a single location as construction crews progress along the project route. Construction will occur in phases, and each phase will occur within a few days to a couple of weeks, so noise impacts are expected to be minimal. Helicopters may also be used to string wire once each structure is erected. Helicopters are the loudest noise expected from construction, but also one of the most temporary sources as they travel frequently between structures and staging yards relative to other construction equipment. The most time-consuming portion of stringing a line is clipping the new circuit to the structure, which would require the helicopter to hover for several minutes.

Construction sound is expected to occur during daytime hours as the result of heavy equipment operation and increased vehicle traffic associated with the transport of construction personnel and materials to and from the work area. Construction activities will be performed with standard heavy equipment such as backhoes, cranes, boom trucks, and assorted small vehicles, with trucks having the highest noise levels. Truck noise levels will be approximately 88 dBA at 50 feet during operation,[11] with two trucks having a combined noise level of 91 dBA. Upon completion of construction activities, sound associated with construction equipment will cease.

Heavy equipment will also be equipped, as required by local ordinances, with sound attenuation devices such as mufflers to minimize the daytime noise levels. To minimize noise impacts, work will generally be limited to weekdays between 7 a.m. and 9 p.m. Occasionally, there might be construction outside these hours or on a weekend if the Applicants must work around customer schedules or line outages, or if the schedule has been significantly impacted due to delays or other factors. The Applicants will work with stakeholders in the event construction becomes necessary outside of these hours.

Construction noise associated with heavy equipment can range between 80 and 90 dBA at full power 50 feet from the source. 90 dBA at 50 feet is perceived as a 72 dBA at 400 feet and 60 dBA at 1,600 feet[12].

Noise impacts during construction are anticipated to vary between minimal to significant depending on the activity, duration, and equipment being used. Construction noise impacts will be temporary, localized, limited to daytime hours, and intermittent.

For Segments 1, 2, and 3, operational noise levels from the transmission lines will be below the 50 dBA NAC1 limit along the Applicants' Proposed Right-of-Way. Noise levels from the Project Substations will reach 50 dBA before the boundary of the Applicants' Proposed Right-of-Way and will be well below applicable noise standards at the nearest residence. As such, appreciable operational noise impacts, including noise associated with vegetation management, are not

[11] U.S. Federal Highway Administration, *Construction Noise Handbook*. No. DOT-VNTSC-FHWA-06-02; FHWA-HEP-06-015 (2006). Available at https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook00.cfm. Last accessed September 2025.

[12] Federal Highway Administration. Construction Noise Handbook, Chapter 9: Construction Equipment Noise Levels and Ranges. Available at https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm. Last accessed September 2025.

anticipated because of the Project. Further, proper design and construction of the transmission line in accordance with industry standards will help to ensure that noise impacts are not problematic.

2.1.2.5 Potential Mitigation

Operational noise levels are expected to be below the state noise limits and minimal; therefore, the Project is not anticipated to contribute to an exceedance of noise standards, and no mitigation is proposed.

2.1.3 Aesthetics

2.1.3.1 Resources Within the Proposed Route

This section has historically focused on the potential for impacts on the visual landscape in and adjacent to a project; however, based on recent Commission guidance, aesthetics is now understood to be "the relationship between sensory experiences—such as sight, sound, smell, taste, touch—and the enjoyment of distinctive physical and cultural characteristics of an environment."[13] This assessment evaluates how people near the Project may see and experience changes to the viewshed.

Viewsheds include both natural and human-made features, and how people experience them can vary based on their sensitivity to visual changes. Exposure refers to how often and how long a view is seen, the number of viewers, and the specific viewing location. Additional factors—such as time of day—can also influence how a change to the viewshed is perceived aesthetically.

Because aesthetic impacts are subjective, individuals may perceive changes to the landscape from a proposed infrastructure project differently. Viewers with high sensitivity are often engaged in recreational activities, traveling for enjoyment, or viewing the landscape from their homes or designated scenic areas. In contrast, low viewer sensitivity is typically linked to individuals who are passing through the area or focused on work-related tasks.

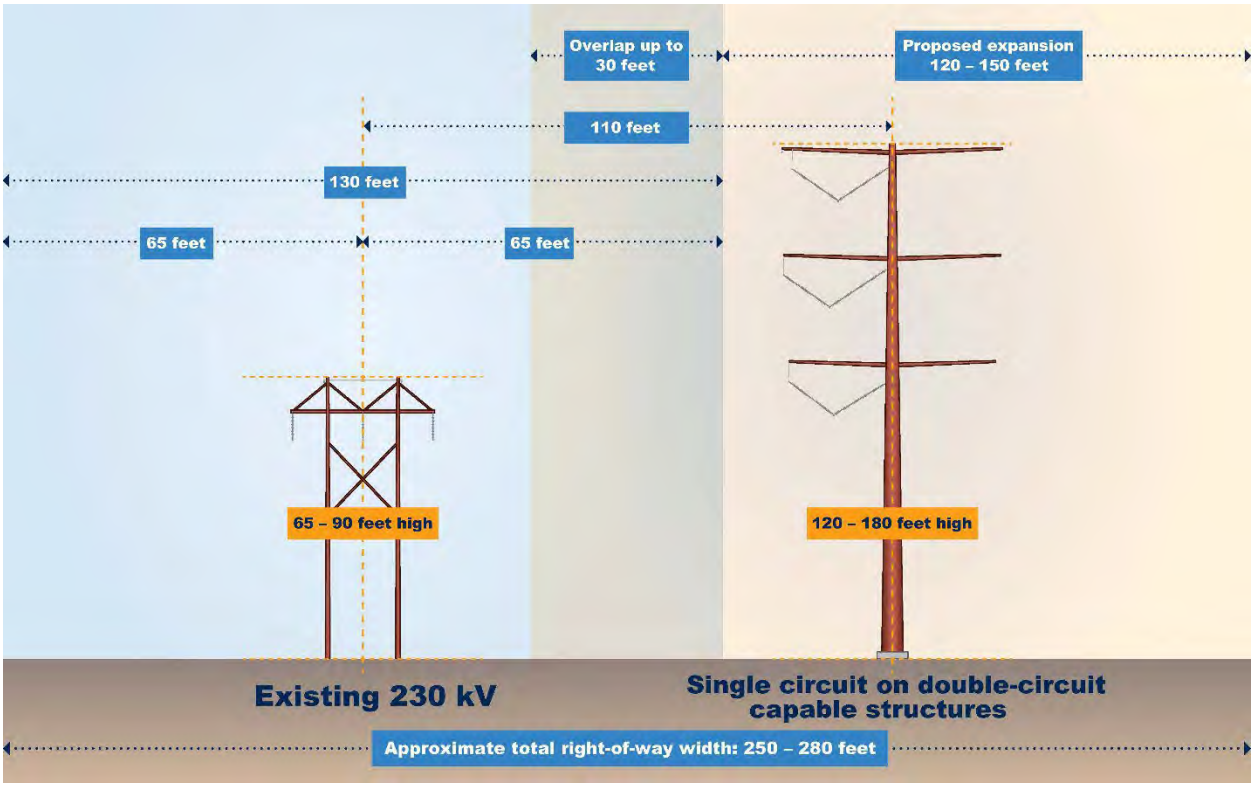
Land use along the Proposed Route primarily consists of open and public lands, forestlands, wetlands, and rural residences. Refer to Section 2.3.2 (Land use), Section 2.1.6 (Recreation), Section 2.6.4 (Water Resources), and Section 2.1.1 (Proximity of Project to Residences) for additional information. Existing transmission lines are largely part of the viewshed along the Proposed Route. In total, the Project is located along existing high-voltage transmission line rights-of-way for approximately 66 of 68 miles, or 97 percent, of its total length.

Segment 1 will consist of approximately 32.7 miles of new single circuit 345 kV line on double circuit capable structures, to be built along existing high-voltage transmission line rights-of-way owned by Minnesota Power from the existing Iron Range Substation in Itasca County to north of the St. Louis River in St. Louis County Specifically, the Proposed Route is co-located with the Northland Reliability Project ("NRP") line and Minnesota Power's existing 230 kV 98 Line along this segment. Existing structures range from 65 to 90 feet in height along Segment 1.

[13] Minnesota Public Utilities Commission, *Draft Application Guidance for Large Energy Infrastructure Facilities in Minnesota* (April 2025), 24. Available at https://puc.eip.mn.gov/sites/default/files/2025-06/DRAFT-LEI_Guidance_Draft_06-25-2025.pdf.

Segment 2 will replace approximately 33.3 miles of existing 230 kV line with new double circuit 345 kV structures from north of the St. Louis River in St. Louis County to the Minnesota Power St. Louis County Substation in Solway Township, utilizing and limiting the expansion of existing high-voltage transmission line rights-of-way owned by Minnesota Power. One circuit in this segment will be operated at 345 kV and the other circuit will continue to be operated at 230 kV. The new Project structures will have the new 345 kV conductors on one side, and the conductors of the existing 230 kV line will be on the other side of the Project structures. The Proposed Route also co-locates in some areas with Minnesota Power's existing 9 Line and DC Line and connects to the St. Louis County Substation along this segment. Existing structures range in height from 65 to 90 feet along Segment 2 (*see* Figure 4).

Figure 4. Typical Right-of-Way Construction for the Project



Segment 3 consists of approximately 1.5 miles of new double circuit 345 kV transmission line that will be jointly owned by Minnesota Power and American Transmission Company from the Minnesota Power St. Louis County Substation in Solway Township to the existing ATC Arrowhead Substation in Hermantown.

2.1.3.2 Potential Impacts

The ROI for aesthetics is the viewshed. Visual impacts are inherently subjective and will vary based on how individuals, whether residents or travelers, perceive the landscape. Transmission and distribution lines are a familiar feature in rural residential settings and are generally considered compatible with the surrounding rural aesthetic. Existing transmission lines are currently visible throughout much of the Proposed Route.

To minimize impacts on residents (*see* Section 2.1.1) and recreational resources (*see* Section 2.1.6), the Proposed Alignment has been sited alongside several existing transmission lines for 97 percent of its length. By aligning with similar existing infrastructure, the visual impacts on nearby residences and recreational resources are expected to remain largely consistent with current conditions. No areas of high scenic integrity and significance at points along the Proposed Route were identified by the public and agency officials during public outreach.

Tree clearing and other construction activities within the Proposed Right-of-Way will be visible along the Proposed Route during the construction phase. Additional clearing outside of the designated Proposed Right-of-Way may also be required at conductor pulling and tensioning sites. Approximately 323 acres of forested land (deciduous, evergreen, mixed forest, and woody wetlands) will be cleared for new right-of-way (*see* Section 2.4.2). Once completed, the new transmission lines will remain a permanent feature visible to observers in the surrounding area. When combined, expanded transmission line corridors and tree clearing can result in more noticeable and lasting visual changes, especially in previously undisturbed areas.

To help reduce potential visual impacts, the Applicants have proposed a route and alignment that generally parallel existing rights-of-way where practicable. However, in certain areas along the Proposed Route, the Proposed Route width is expanded, and the Proposed Alignment has been adjusted away from the existing transmission corridor to provide greater flexibility and reduce some visual impacts on nearby residences (*see* Section 5.2.3.1.2 of the Application). Visual impacts are expected to be more pronounced along greenfield segments, where no existing infrastructure is present and where houses and other structures are located near the existing transmission lines; however, visual effects are anticipated to diminish with increasing distance from the Proposed Right-of-Way. In addition, at road (*see* Section 2.1.7), waterbody (*see* Section 2.6.4), and other recreational (*see* Section 2.1.6) crossings, visibility of the line may be heightened due to open views, though these effects are generally localized.

2.1.3.2.1 Segment 1

More than 87 percent of the Proposed Route along Segment 1 will be along existing high-voltage transmission line rights-of-way, which have been in place since 1977. As a result, nearby residents are likely accustomed to the visual presence of transmission lines and any new visual effects from the addition of the taller Project structures will be minimal, due to the incremental change. The new transmission line will be approximately 55 to 90 feet taller than the existing infrastructure and will include larger insulators. The spans between structures can reach a distance of up to approximately 1,000 feet and will require fewer structures than the existing line. While the presence of current transmission lines helps to minimize contrast, the taller transmission structures and the presence of a second transmission line adjacent to the existing line may still be perceived as visually disruptive by some viewers.

The Proposed Route and Proposed Alignment have been modified to reduce visual impacts where the Proposed Route and Proposed Alignment cross Great River Energy's existing 500 kV high-voltage transmission line (*see* Appendix G of the Application, Page 6). The Proposed Alignment realigns the existing 98 Line, which moves the transmission line further away from existing residences within the Proposed Route. The closest residence is located over 600 feet west of the Proposed Alignment, and the surrounding viewshed is heavily wooded. As a result, views of the transmission infrastructure from this location are expected to be limited or partially screened by existing vegetation, reducing potential aesthetic impacts. Since the Project has the greatest potential to deviate from existing infrastructure in this location, the Proposed Route width is wider to provide greater flexibility in design and the final alignment.

2.1.3.2.2 Segment 2

More than 95 percent of the Project along Segment 2 will replace the existing 230 kV high-voltage transmission line, which has been in place since 1977; therefore, nearby residences have co-existed in the presence of transmission lines and any new visual effects from the taller structures will be minimal due to the incremental change. The new transmission line structures will be approximately 55 to 90 feet taller than the existing infrastructure and will include larger insulators. The spans between structures can reach a distance of up to 1,000 feet and will require fewer structures than the existing line, while the existing right-of-way will be expanded by approximately 20 feet to accommodate the new, taller structures. While new taller structures may alter the viewshed, replacing existing structures typically results in less noticeable change.

2.1.3.2.3 Segment 3

The Proposed Alignment between Minnesota Power's St. Louis Substation and ATC's Arrowhead Substation (*see* Appendix G of the Application, Page 16) was designed to reduce visual impacts on nearby residents. The Proposed Alignment is co-located with existing or proposed transmission line rights-of-way for approximately 0.43 mile, and as a result, views of the transmission infrastructure are expected to be similar, limited, or partially screened by existing vegetation, reducing potential aesthetic impacts. The Proposed Alignment also crosses West Rocky Run at a 90-degree angle and would be co-located within the existing 81 Line (*see* Appendix G of the Application, Page 16), both of which are preferred by the MnDNR[14] and reduce visual impacts. Although West Rocky Run is a Minnesota Public Water and a designated trout stream, the stretch of the stream is adjacent to land owned by Minnesota Power and, therefore, recreational use of the stream is limited.

2.1.3.2.1 Substations

The modifications of the substations to accommodate additional entrances were designed to reduce visual impacts. The substations are existing, or will be existing, at the time of construction and the expansions will be consistent with the current use and visual aesthetic and will not be materially different than the existing features.

2.1.3.2.2 Entire Project

Transmission lines can have lasting impacts on the appearance of the landscape and the viewshed during operations. However, careful design, routing, and mitigation measures are expected to minimize aesthetic impacts, ensuring that any alterations are limited, localized, and compatible with the surrounding environment. The Project is located in an area with significant screening from mature forests and will be located along existing high-voltage transmission line rights-of-way for approximately 97 percent of its length; therefore, impacts are anticipated to be moderate.

2.1.3.3 Potential Mitigation

The Applicants will work with landowners along all three segments to identify concerns related to Project aesthetics. Potential mitigation measures include:

[14] Personal communication with Jessica Parsons, MnDNR; August 7, 2025

- Locating structures, right-of-way, and other disturbed areas in locations that reflect landowner input to reduce visual impacts.

- Taking care to preserve the natural landscape. Both construction and operation activities will be conducted to avoid unnecessary disturbance, scarring, or damage to the surrounding environment.

- Providing compensation for the removal of trees and vegetation, as negotiated through the easement process.

Where feasible, structures will be located as far as possible from water and wetland crossings, in accordance with structure design limits and applicable regulations.

Commission route permits require that permittees consider landowner input pertaining to visual input when placing structures, minimize tree removal and prevent unnecessary disturbance to the natural environment, and avoid placing infrastructure near homesteads and farmsteads, among other requirements.

2.1.4 Socioeconomics Impacts and Environmental Justice

2.1.4.1 Resources Within the Proposed Route

2.1.4.1.1 Socioeconomics

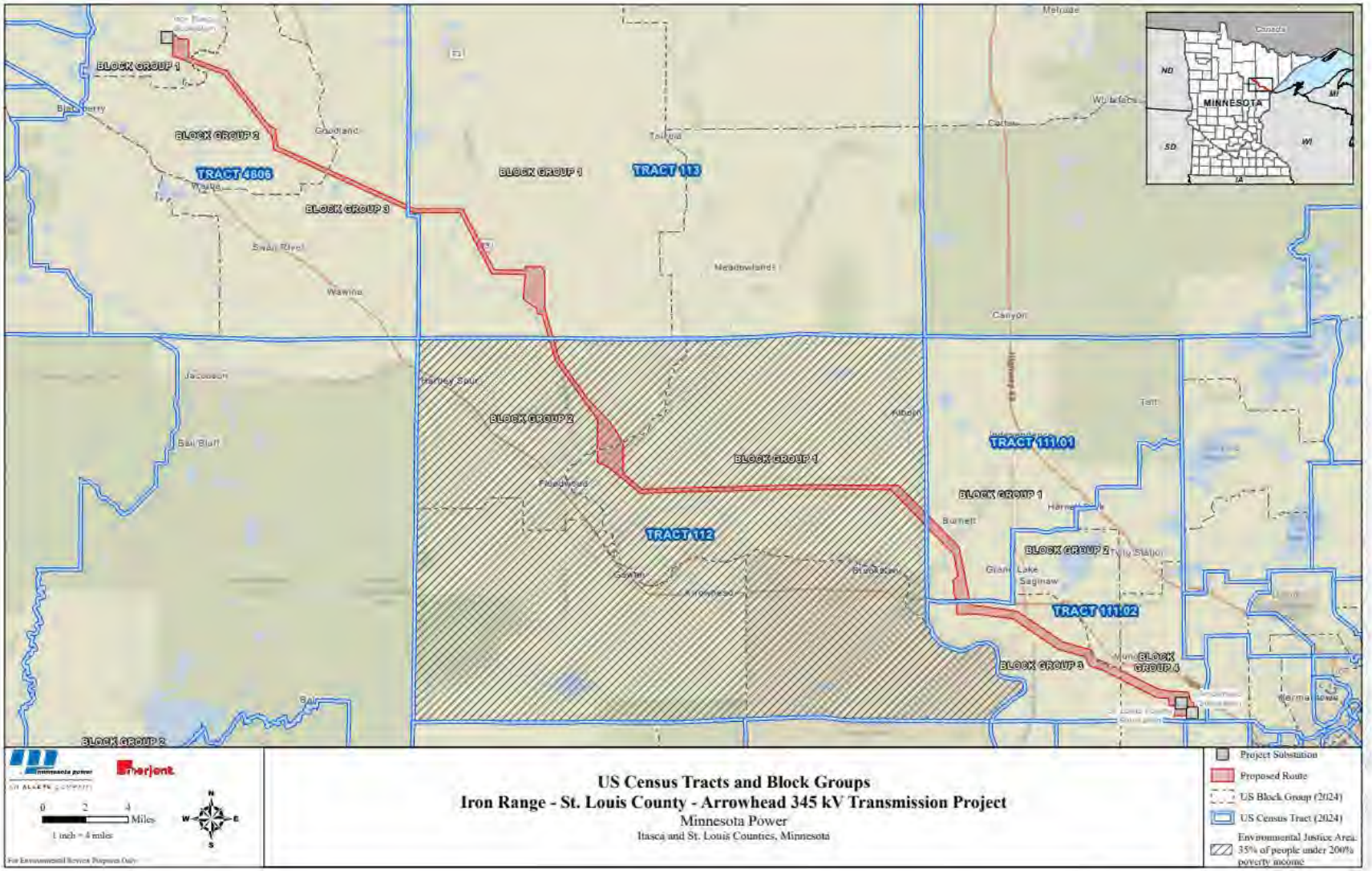
The Proposed Route is located in Itasca and St. Louis Counties, Minnesota (*see* Figure 5). Population data is provided at the state, county, and census tract levels for the purpose of comparing the demographics along the Proposed Route to a larger area. Information for this section was retrieved from the U.S. Census Bureau's 2020 Decennial Census, 2010 Decennial Census Data, U.S. Census QuickFacts, and the 2023 American Community Survey 5-Year Estimates.

This discussion does not address every socioeconomic measure but instead analyzes the most applicable statistics related to the demographic and economic characteristics of the population along the Proposed Route. The socioeconomic characteristics along the Proposed Route, including population, race, housing, income, and poverty, provide the demographic and economic context within which potential impacts of the construction and operation of the Project will be assessed.

<u>Population and Race</u>

The Proposed Route goes through two townships in Itasca County and nine townships and one city in St. Louis County, Minnesota (*see* Figure 5). Population and race characteristics of these geographies are included in Table 7.

Figure 5. US Census Tracts and Block Groups Crossed by the Project



Minnesota's population grew by 7.1 percent between 2010 and 2020. The population of Itasca County remained stable, showing a slight population decline overall. Within Itasca County, Feeley Township's population remained stable with a slightly younger median age than the county average, while Goodland Township grew modestly but has a notably older population. Both townships remain more rural and with lower minority populations than the state overall.

St. Louis County also experienced essentially no change in total population, but the localities along the Proposed Route show contrasting trends. The city of Hermantown stands out with strong growth, high density, a younger median age, and a minority population slightly above the county average. Arrowhead Township also grew rapidly, while Brevator, Cedar Valley, Elmer, Floodwood, and Van Buren Townships declined in population, often coupled with aging populations and very low minority population percentages. Other townships such as Culver, Industrial, and Solway posted small gains in population, though Solway's higher density and younger age profile distinguish it from its more rural peers.

Detailed information about race and ethnicity can be found in Table 7.

Table 7. Population and Race Characteristics Data for Proposed Route[15]

State / County / Locality	Population, 2020	Population, 2010	Population Change (%)[a]	Population Density (persons per square mile)	Median Age	Total Minority (%)[b]
Minnesota	5,706,494	5,303,925	+7.1	71.7	38.6	23.3
Itasca County	45,014	45,058	-0.1	16.9	46.9	11.1
Feeley Township	307	306	+0.3	9.7	44.3	7.1
Goodland Township	473	466	+1.5	6.8	56	11.6
St. Louis County	200,231	200,226	0.0	32.0	41.3	10.1

[15] U.S. Census Bureau, "2020 Decennial Census. Total Population – DEC Demographic and Housing Characteristics." Table P1. Available at https://data.census.gov/table/DECENNIALDHC2020.P1?q=population&g=040XX00US27_050XX00US27061,27137_1400000US27061480600,27137011102,27137011200,27137011300. Last accessed July 2025. U.S. Census Bureau, "2010 Decennial Census. Total Population – DEC Demographic and Housing Characteristics." Table P1. Available at https://data.census.gov/table/DECENNIALSF12010.P1?q=population&g=040XX00US27_050XX00US27061,27137_1400000US27061480600,27137011102,27137011200,27137011300. Last accessed July 2025.U.S. Census Bureau, "2024 QuickFacts." Available at https://www.census.gov/quickfacts/fact/table/stlouiscountyminnesota,itascacountyminnesota,MN,US/PST045224. Last accessed June 2025. U.S. Census Bureau, "2023 ACS Demographic and Housing Estimates – 5-Year Estimates Data Profiles." Table DP05. Available at https://data.census.gov/table/ACSDP5Y2023.DP05?q=DP05:+ACS+Demographic+and+Housing+Estimates&g=040XX00US27_050XX00US27061,27137_1400000US27061480600,27137011102,27137011200,27137011300. Last accessed June 2025. U.S. Census Bureau, "2023 ACS Hispanic or Latino Origin by Race – 5-Year Estimates Data Profiles." Table B03002. Available at https://data.census.gov/table/ACSDT5Y2023.B03002?q=B03002:+Hispanic+or+Latino+Origin+by+Race&g=040XX00US27_050XX00US27061,27137_1400000US27061480600,27137011102,27137011200,27137011300_1500000US270614806001,270614806002,270614806003,271370111022,271370111023,271370111024,271370112001,271370112002,271370113001,271370113003. Last accessed June 2025.

State / County / Locality	Population, 2020	Population, 2010	Population Change (%)[a]	Population Density (persons per square mile)	Median Age	Total Minority (%)[b]
Arrowhead Township	298	223	+33.6	4.2	39.5	18.1
Brevator Township	1,214	1,269	-4.3	34.0	42.4	27.5
Cedar Valley Township	187	195	-4.1	2.7	50.5	5.5
Culver Township	303	294	+3.1	8.6	51.2	9.8
Elmer Township	132	151	-12.6	3.8	30.9	0.0
Floodwood Township	247	280	-11.8	7.0	56.5	3.9
City of Hermantown	10,221	9,414	+8.6	297.3	37.8	11.4
Industrial Township	812	800	+1.5	22.5	46.7	5.6
Solway Township	2,016	1,944	+3.7	56.5	43	7.2
Van Buren Township	164	189	-13.2	4.6	46.3	0.0

[a] Percent population change is based on Population Census April 1, 2020, as compared to Population Census April 1, 2010.

[b] Total minority percentage equals the total population minus the percentage of white alone, not Hispanic or Latino.

Housing

The housing characteristics including total households, average household size, total housing units, occupied housing units, and vacant housing units in Minnesota, Itasca and St. Louis counties, and the localities crossed by the Proposed Route are detailed in Table 8 below.

The vacancy rate of housing units in Minnesota is at a healthy 9.4 percent; however, vacancy rates along the Proposed Route highlight differences. In Itasca County, the vacancy rate is significantly higher at 27.7 percent, reflecting a large share of unused housing units. Feeley and Goodland Townships mirror this trend, with particularly high vacancy rates (30.5 percent and 44.6 percent respectively). Notably, Goodland also has an unusually low average household size of 1.3, well below county and state averages.

In St. Louis County, the vacancy rate is lower at 17.0 percent, though the rate in the localities in the county along the Proposed Route vary. Hermantown stands out with very low vacancy rate (3.5 percent) and relatively larger household sizes, consistent with its suburban growth. By contrast, Elmer Township has more than half of its housing units vacant, and Van Buren, Cedar Valley, and Arrowhead also show high vacancy rates. Brevator and Solway Townships demonstrate healthier housing patterns, with lower vacancy rates. Rental vacancy is negligible across most townships, though Brevator (9.5 percent) and Arrowhead (18.2 percent) show notable exceptions.

Table 8. Housing Characteristics Data for Proposed Route[16]

State / County / Locality	Total Households	Average Household Size	Total Housing Units	Vacant Housing Units (%)	Rental Vacancy Rate
Minnesota	2,282,967	2.4	2,519,538	9.4	5.1
Itasca County	18,510	2.4	25,589	27.7	4.7
Feeley Township	121	2.6	174	30.5	0.0
Goodland Township	224	1.3	404	44.6	0.0
St. Louis County	86,264	2.2	103,924	17.0	5.4
Arrowhead Township	51	2.5	70	27.1	18.2
Brevator Township	397	2.8	422	5.9	9.5
Cedar Valley Township	70	2.6	101	30.7	0.0
Culver Township	121	2.1	151	19.9	0.0
Elmer Township	48	2.5	98	51.0	NA
Floodwood Township	80	2.2	105	23.8	0.0
City of Hermantown	3,741	2.6	3,878	3.5	0.0
Industrial Township	288	2.3	354	18.6	0.0
Solway Township	725	2.7	808	10.3	0.0
Van Buren Township	53	2.6	80	33.8	0.0

[16] U.S. Census Bureau, "2023 ACS Households and Families – 5-Year Estimates Data Profiles." Table S1101. Available at https://data.census.gov/table/ACSST5Y2023.S1101?q=Household+Size+and+Type&g=040XX00US27_050XX00US27061,27137_1400000US27061480600,27137011102,27137011200,27137011300. Last accessed June 2025. U.S. Census Bureau. "2023 ACS Selected Housing Characteristics – 5-Year Estimates Data Profiles." Table DP04. Available at https://data.census.gov/table/ACSDP5Y2023.DP04?q=Household+Size+and+Type&g=040XX00US27_050XX00US27061,27137_1400000US27061480600,27137011102,27137011200,27137011300. Last accessed June 2025.

Income and Poverty

Table 9 provides the income and poverty data for the counties and localities along the Proposed Route.

Data for the state of Minnesota shows relatively high incomes, a low unemployment rate, and a poverty rate just under 10 percent. In comparison, Itasca County has lower per capita and household incomes, higher unemployment, and more people living in poverty. Within the county, Feeley Township reports higher household incomes than the county average but a much higher poverty rate, while Goodland has a higher per capita income than the county and relatively low poverty rate, though its median household income trails the county.

St. Louis County shows mixed outcomes. Overall, its per capita and median household incomes are lower than the state average, unemployment is somewhat higher, and poverty rates are higher. Local data reveal sharp contrasts: Hermantown and Solway Township stand out with high per capita and household incomes, very low unemployment, and low poverty rates. Cedar Valley Township also reports strong household incomes and low poverty. In contrast, Arrowhead Township shows one of the lowest per capita incomes in the localities along the Proposed Route and the highest poverty level (40 percent), despite relatively strong household income. Brevator, Culver, and Industrial Townships report higher unemployment and higher poverty rates compared to the county average.

Table 9. Income and Poverty Data for Proposed Route[17]

State / County / Locality	Per Capita Income ($)	Median Household Income ($)	Unemployment Rate (population over 16 years) (%)	Persons Living Below Poverty Level (%)
Minnesota	46,975	87,556	3.9	9.2
Itasca County	36,315	66,380	5.8	12.7
Feeley Township	38,303	83,750	1.5	17.7
Goodland Township	47,286	64,722	0.9	8.6
St. Louis County	39,778	69,455	4.5	13.4
Arrowhead Township	20,399	90,313	6.8	40.0
Brevator Township	33,832	79,625	8.1	16.7
Cedar Valley Township	42,128	95,000	2.5	1.1
Culver Township	41,611	68,750	2.6	15.7
Elmer Township	31,601	73,625	0.0	3.4
Floodwood Township	40,501	81,250	6.8	10.1
City of Hermantown	51,177	92,026	1.8	5.1
Industrial Township	35,663	66,875	11.0	12.4
Solway Township	40,340	106,250	0.0	4.0
Van Buren Township	34,965	74,583	1.8	3.0

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[17] U.S. Census Bureau, "2023 ACS Selected Economic Characteristics – 5-Year Estimates Data Profiles." Table DP03. Available at https://data.census.gov/table/ACSDP5Y2023.DP03?q=DP03:+Selected+Economic+Characteristics&g=040XX00US27_050XX00US27061,27137_1400000US27061480600,27137011102,27137011200,27137011300. Last accessed June 2025.

poverty rate, while Goodland has a higher per capita income than the county and relatively low poverty rate, though its median household income trails the county.

St. Louis County shows mixed outcomes. Overall, its per capita and median household incomes are lower than the state average, unemployment is somewhat higher, and poverty rates are higher. Local data reveal sharp contrasts: Hermantown and Solway Township stand out with high per capita and household incomes, very low unemployment, and low poverty rates. Cedar Valley Township also reports strong household incomes and low poverty. In contrast, Arrowhead Township shows one of the lowest per capita incomes in the localities along the Proposed Route and the highest poverty level (40 percent), despite relatively strong household income. Brevator, Culver, and Industrial Townships report higher unemployment and higher poverty rates compared to the county average.

The industries data for counties and localities crossed by the Project area is summarized in Table 10.

The top industry group in the counties and the majority of the localities crossed by the Proposed Route is educational services and healthcare and social assistance (the census reports these two North American Industry Classification System codes (62-63) together; for the purposes of this table and text they are lumped together and considered together whenever discussing industry categories based on census data). Other top industries in the geographies crossed by the Proposed Route include manufacturing; retail trade; arts, entertainment and recreation, and accommodation and food services; construction; and professional, scientific, and management, and administrative and waste management services.

Table 10. Industry Categories for Proposed Route[18]

State / County / Locality	Agriculture, forestry, fishing and hunting, and mining (%)	Construction (%)	Manufacturing (%)	Wholesale trade (%)	Retail trade (%)	Transportation and warehousing, and utilities (%)	Information (%)	Finance and insurance, and real estate and rental and leasing (%)	Professional, scientific, and management, and administrative and waste management services (%)	Educational services, and health care and social assistance (%)	Arts, entertainment, and recreation, and accommodation and food services (%)	Other services, except public administration (%)	Public administration (%)
Minnesota	2.1	6.3	13.5	2.6	10.6	4.9	1.4	7.2	10.5	25.6	7.3	4.3	3.7
Itasca County	3.9	8.9	9.2	1.5	14.0	6.2	1.2	4.3	5.1	27.5	7.8	4.4	6.1
Feeley Township	7.5	9.0	12.0	0.0	21.8	5.3	0.0	2.3	3.8	19.5	9.8	6.0	3.0
Goodland Township	5.8	22.6	3.1	3.5	15.9	3.5	0.0	8.4	6.2	16.4	5.8	7.1	1.8
St. Louis County	3.3	6.8	7.7	1.9	11.7	5.6	1.3	5.2	7.5	29.3	10.2	4.8	4.8
Arrowhead Township	7.5	9.0	12.0	0.0	21.8	5.3	0.0	2.3	3.8	19.5	9.8	6.0	3.0
Brevator Township	5.8	22.6	3.1	3.5	15.9	3.5	0.0	8.4	6.2	16.4	5.8	7.1	1.8
Cedar Valley Township	0.0	18.8	4.3	2.9	11.6	7.2	0.0	2.9	0.0	18.8	5.8	13.0	14.5
Culver Township	3.1	7.6	12.1	0.0	9.3	10.9	0.4	6.2	4.1	25.5	9.9	2.9	8.0
Elmer Township	3.8	15.	7.6	0.0	2.5	5.1	0.0	0.0	0.0	24.1	1.3	16.5	24.1
Floodwood Township	2.7	25.7	2.7	5.3	10.6	10.6	0.0	0.0	5.3	26.5	0.9	3.5	6.2
City of Hermantown	10.0	10.0	0.0	0.0	0.0	22.5	0.0	0.0	10.0	32.5	7.5	0.0	7.5
Industrial Township	8.8	19.1	8.8	1.5	11.8	8.8	0.0	4.4	0.0	22.1	1.5	4.4	8.8
Solway Township	1.2	5.3	6.5	2.1	11.9	7.2	0.2	4.2	5.2	34.2	10.8	3.8	7.3
Van Buren Township	2.1	9.9	9.5	0.0	9.9	12.3	3.9	3.5	7.7	27.8	7.4	3.9	2.1

2.1.4.2 Environmental Justice

Environmental justice refers to the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. In general, the evaluation of environmental justice circumstances is intended to ensure all people benefit from

equal levels of environmental protection and have the same opportunities to participate in decisions that may affect their environment or health.[19]

Minority and/or low-income communities are often concentrated in small geographical areas within the larger geographically and/or economically defined population. Minority communities and low-income communities may constitute a very small percentage of the total population and/or geographical area; therefore, this analysis was completed at the census tract and block group geographic level.

An environmental justice review for the Project was completed using the methodology outlined in Minn. Stat. § 216B.1691, subd. 1(e) (rev. 2023) that defines areas with environmental justice concerns in Minnesota:

> (e) "Environmental justice area" means an area in Minnesota that, based on the most recent data published by the U.S. Census Bureau, meets one or more of the following criteria:
>
> (1) 40 percent or more of the area's total population is nonwhite;
>
> (2) 35 percent or more of households in the area have an income that is at or below 200 percent of the federal poverty level;
>
> (3) 40 percent or more of residents over the age of five have limited English proficiency; or
>
> (4) the area is located within Indian country, as defined in United State Code, title 18, section 1151.

The Proposed Route crosses Census Tracts 4806, 111.01, 111.02, 112, and 113 in Itasca and St. Louis counties. Table 11 includes data on population, total minority, population at or below 200 percent of federal poverty level, and limited English proficiency of residents over the age of five. The most recently available data was used for analysis: U.S. Census QuickFacts, 2020 Decennial Census Data, and 2023 U.S. Census American Community Survey 5-Year Estimate File #B03002, File #C16002, and File #S1701.

[18] U.S. Census Bureau, "2023 Selected Economic Characteristics – 5-Year Estimates Data Profiles." Table DP03. Available at https://data.census.gov/table/ACSDP5Y2023.DP03?q=DP03:+Selected+Economic+Characteristics&g=040XX00US27_050XX00US27061,27137_1400000US27061480600,27137011102,27137011200,27137011300. Last accessed June 2025.

[19] Minnesota Pollution Control Agency, *Environmental Justice Framework* (May 2022). Available at https://www.pca.state.mn.us/sites/default/files/p-gen5-05.pdf. Last accessed July 2025.

Table 11. Environmental Justice Data for Proposed Route[20]

State / County / Census Tract	2020 Population	Total Minority (%)[a]	Population at or Below 200 Percent of Federal Poverty Level (%)	Limited English-Speaking Household (%)
Minnesota	5,706,494	23.3	22.1	2.2
Itasca County	45,014	11.1	29.5	0.1
Census Tract 4806	2,783	9.9	23.6	0.0
St. Louis County	200,231	10.1	29.4	0.5
Census Tract 111.01	1,493	6.1	20.1	0.0
Census Tract 111.02	5,580	9.8	16.3	0.0
Census Tract 112	3,187	20.6	35.5	0.3
Census Tract 113	2,103	4.9	23.3	0.0

[a] Total minority percentage equals the total population minus the percentage of white alone, not Hispanic or Latino.

The Proposed Route does not cross Indian country, as defined in United State Code, title 18, section 1151. As shown in Table 11, the Proposed Route crosses one census tract (Census Tract 112) with over 35 percent of the population at or below 200 percent of the federal poverty line, therefore it has been identified as an environmental justice community as defined by Minn. Stat. § 216B.1691, subd. 1(e).[21] No other areas along the Proposed Route are considered environmental justice areas per Minn. Stat. § 216B.1691, subd. 1(e).

Per the MPCA's EJ mapping tool, the identified environmental justice area (Census Tract 112) has an air pollution score of 0.02 which is in the lowest 10 percent of air pollution scores in the state. Additionally, there are no pollutants above the health benchmark which means the level of

[20] U.S. Census Bureau, "2020 Decennial Census. Total Population – DEC Demographic and Housing Characteristics." Table P1. Available at https://data.census.gov/table/DECENNIALDHC2020.P1?q=population&g=040XX00US27_050XX00US27061,27137_1400000US27061480600,27137011102,27137011200,27137011300. Last accessed July 2025. U.S. Census Bureau, "2023 ACS Hispanic or Latino Origin by Race – 5-Year Estimates Data Profiles." Table B03002. Available at https://data.census.gov/table/ACSDT5Y2023.B03002?q=B03002:+Hispanic+or+Latino+Origin+by+Race&g=040XX00US27_050XX00US27061,27137_1400000US27061480600,27137011102,27137011200,27137011300_1500000US270614806001,270614806002,270614806003,271370111022,271370111023,271370111024,271370112001,271370112002,271370113001,271370113003. Last accessed June 2025. U.S. Census Bureau, "2023 ACS Poverty Status in the Past 12 Months – 5-Year Estimates Data Profiles." Table S1701. Available at https://data.census.gov/table/ACSST5Y2023.S1701?q=S1701:+Poverty+Status+in+the+Past+12+Months&g=040XX00US27_050XX00US27061,27137_1400000US27061480600,27137011102,27137011200,27137011300. Last accessed July 2025. U.S. Census Bureau, "2023 ACS Household Language by Household Limited English Speaking – 5-Year Estimates Data Profiles." Table C16002. Available at https://data.census.gov/table/ACSDT5Y2023.C16002?q=C16002:+Household+Language+by+Household+Limited+English+Speaking+Status&g=040XX00US27_050XX00US27061,27137_1400000US27061480600,27137011102,27137011200,27137011300. Last accessed June 2025.

[21] Minnesota Statutes 216B.1691 Renewable Energy Objectives (Office of the Revisor of Statutes, 2024). Available at https://www.revisor.mn.gov/statutes/cite/216B.1691. Last accessed July 2025.

air pollution is unlikely to result in health effects in sensitive populations after a lifetime of exposure.

An environmental justice review was also conducted per the U.S. Environmental Protection Agency's ("EPA") *Promising Practices for EJ Methodologies in NEPA Reviews* guidance.[22] Per the EPA guidance, minority populations are groups that include Black or African American, American Indian or Alaska Native, Native Hawaiian/Pacific Islander, and Hispanic individuals. Following the Promising Practices guidance, the Proposed Route was reviewed using the 50 percent and meaningfully greater analyses to identify minority populations. Using this methodology, a minority population is identified when either: the aggregate minority population of the block group in the affected area exceeds 50 percent or the aggregate minority population percentage in the block group affected is 10 percent higher than the aggregate minority population percentage in the county.

Additionally, following the Promising Practices low-income threshold criteria methodology a low-income population is identified when the percent of low-income population (*i.e*., households below poverty level) in the identified block group is equal to or greater than that of the county.

The Proposed Route crosses Census Tract 4806, Block Groups 1, 2, and 3; Census Tract 111.01, Block Group 1; Census Tract 111.02, Block Groups 2, 3, and 4; Census Tract 112, Block Groups 1 and 2; and Census Tract 113, Block Group 1. Itasca and St. Louis Counties were used as reference populations for the respective census block groups per EPA's Promising Practice guidance and minority and low-income identification methodologies.

Of the Block Groups crossed by the Proposed Route, Census Tract 4806, Block Group 3 and Census Tract 111.02, Block Group 4 have the highest minority percentages, and Census Tract 113, Block Group 1 has the lowest minority percentage. The block group with the highest percentage of low-income households is Census Tract 112, Block Group 1. The block group with the lowest percentage of low-income households in Census Tract 113, Block Group 1. Table 12 includes race and ethnicity and low-income population data. The most recently available data was used for analysis: 2023 U.S. Census American Community Survey 5-Year Estimate File #B03002 and File #B17017.

[22] U.S. Environmental Protection Agency, "Promising Practices for EJ Methodologies in NEPA Reviews" (2016). Available at https://www.epa.gov/sites/default/files/2016-08/documents/nepa_promising_practices_document_2016.pdf. Last accessed July 2025.

Table 12. Minority Population by Race and Ethnicity and Low-Income Populations for Proposed Route[23]

State / County / Census Tract	White Alone, Not Hispanic or Latino (%)	Black or African American Alone (%)	American Indian or Alaska Native Alone (%)	Asian Alone (%)	Native Hawaiian/Pacific Islander Alone (%)	Some Other Race Alone (%)	Two or More Races (%)	Hispanic or Latino (%)	Total Minority (%)[a]	Low-Income Households (%)
Minnesota	76.7	6.7	0.7	5.0	0.0	0.4	4.1	6.2	23.3	9.4
Itasca County	88.9	0.7	2.6	0.3	0.1	0.4	5.7	1.5	11.1	12.9
Census Tract 4806, Block Group 1	89.3	0.0	0.0	0.7	0.7	2.1	7.3	0.0	10.7	6.9
Census Tract 4806, Block Group 2	92.4	2.2	0.2	0.0	0.0	0.0	4.5	0.7	7.6	9.7
Census Tract 4806, Block Group 3	87.5	0.0	3.3	0.0	0.0	0.0	7.1	2.1	12.5	10.3
St. Louis County	89.9	1.6	1.6	1.0	0.0	0.3	3.7	1.9	10.1	14.2
Census Tract 111.01, Block Group 1	93.9	0.0	1.4	0.0	0.0	0.0	4.2	0.5	6.1	13.7

[23] U.S. Census Bureau, "ACS Hispanic or Latino Origin by Race – 5-Year Estimates Data Profiles." Table B03002. Available at https://data.census.gov/table/ACSDT5Y2023.B03002?q=B03002:+Hispanic+or+Latino+Origin+by+Race&g=040XX00US27_050XX00US27061,27137_1400000US27061480600,27137011102,27137011200,27137011300_1500000US270614806001,270614806002,270614806003,271370111022,271370111023,271370111024,271370112001,271370112002,271370113001,271370113003. Last accessed June 2025. U.S Census Bureau, "ACS 5-Year Estimates Detailed Tables." Table B17017.Available at https://data.census.gov/table/ACSDT5Y2023.B17017?q=B17017:+Poverty+Status+in+the+Past+12+Months+by+Household+Type+by+Age+of+Householder&g=040XX00US27_050XX00US27061,27137_1400000US27061480600,27137011102,27137011200,27137011300_1500000US270614806001,270614806002,270614806003,271370111022,271370111023,271370111024,271370112001,271370112002,271370113001,271370113003. Last accessed July 2025.

State / County / Census Tract	White Alone, Not Hispanic or Latino (%)	Black or African American Alone (%)	American Indian or Alaska Native Alone (%)	Asian Alone (%)	Native Hawaiian/Pacific Islander Alone (%)	Some Other Race Alone (%)	Two or More Races (%)	Hispanic or Latino (%)	Total Minority (%)[a]	Low-Income Households (%)
Census Tract 111.02, Block Group 2	91.4	0.0	0.0	6.7	0.0	0.0	0.2	1.7	8.6	5.3
Census Tract 111.02, Block Group 3	92.6	0.2	2.3	0.2	0.0	0.5	3.7	0.5	7.4	5.7
Census Tract 111.02, Block Group 4	87.5	0.0	0.6	0.5	0.0	5.2	4.4	1.8	12.5	5.6
Census Tract 112, Block Group 1	92.0	0.1	1.9	0.0	0.0	0.0	2.3	3.7	8.0	14.4
Census Tract 112, Block Group 2	92.6	1.0	0.1	0.0	0.0	2.1	3.6	0.5	7.4	13.6
Census Tract 113, Block Group 1	98.1	1.0	0.2	0.0	0.0	0.0	0.4	0.4	1.9	3.2

[a] Total minority percentage equals the total population minus the percentage of white alone, not Hispanic or Latino.

As shown in Table 12, the Proposed Route crosses one census block group (Census Tract 112, Block Group 1) identified as an environmental justice community based on EPA's methodology since the block group has a higher percent of low-income households than St. Louis County. No other areas along the Proposed Route are considered environmental justice areas per EPA's methodology.

2.1.4.2.1 Potential Impacts

The ROI for socioeconomics and environmental justice is Itasca and St. Louis Counties. Most potential impacts are expected to be positive but minimal and negative impacts are anticipated to be negligible. Impacts will be short- and long-term and of small size.

Socioeconomics

During construction there might be short-term positive impacts on the nearby communities. Potential increases in local revenue could occur for businesses such as hotels, grocery stores, gas stations, and restaurants to support utility personnel and contractors.

General skilled labor is expected to be available in Itasca County, St. Louis County, or the greater Minnesota area to serve the Project's basic infrastructure. Specialized labor will be required for certain aspects of the Project. It may be necessary to import specialized labor from other areas of Minnesota or neighboring states. The relatively short construction duration often precludes special training of local or regional labor, and much of the workforce needed to construct a transmission facility must be comprised of Minnesota licensed electricians because much of the assembly and wiring work for transmission installations is considered electrical work under the Minnesota State Electrical Code.

The Applicants will issue a Request for Proposal to contractors to construct the Project. The Applicants will include preferences for contractor bids that use local construction craft employees to the greatest extent feasible in accordance with the Project's budget, timeline, industry standards and requirements, and corporate safety policies. The Applicants preference is to use local union labor to the extent possible or pay prevailing wages. Exceptions will be made for specialty work where necessary.

Effects on temporary or permanent housing are anticipated to be negligible. During construction, out-of-town laborers will likely use short-term lodging facilities nearby. The operations and maintenance of the facility will require approximately two to four long-term personnel. The Project anticipates that sufficient temporary lodging and permanent housing will be available within the Project area, to accommodate construction laborers and long-term personnel.

The Project will provide benefits to the townships in the form of property tax revenue as detailed in Table 13.

Table 13. Property Tax Allocation of Project

Taxing District	Property Tax Total [a]
Itasca County	
Feeley	$392,823
Goodland	$868,346
Little Sand Lake (Unorganized Territory)	$556,886
St. Louis County	
Arrowhead	$692,082
Brevator	$783,621
Cedar Valley	$1,389,631
Culver	$772,952
Elmer	$131,256
Floodwood	$858,879
Hermantown	$ 65,443
Industrial	$ 497,784
Solway	$ 922,063
Van Buren	$ 784,636
T Line Total	**$8,716,402**
Itasca County	
Iron Range	
St. Louis County	$344,450
St. Louis County	$1,877,686
Substation Expansion Total	**$2,222,136**
Project Total	**$10,938,538**

[a] Property tax numbers are based on projected final Project costs and 2025 milage rates. Final numbers are subject to change.

Environmental Justice

Environmental justice areas were identified within the ROI. Specifically, using the EPA guidance, Census Tract 112, Block Group 1 was identified as a low-income environmental justice area. Using the Minnesota guidance, Census Tract 112 was identified as a low-income environmental justice area. Environmental impacts from all resource areas assessed in this Application were evaluated.

Potential impacts to visual resources are inherently subjective and will vary based on how individuals, whether residents or travelers, perceive the landscape. Transmission and distribution lines are a familiar feature in rural residential settings and are generally considered compatible with the surrounding rural aesthetic. Existing transmission lines are currently visible throughout much of the Proposed Route. Potential impacts to aesthetics are discussed fully in section 2.1.3.2.

Potential impacts on recreational resources would occur similarly along the Project route and are not anticipated to be disproportionately high and adverse impacts on environmental justice areas.

Impacts on recreational resources as a result of the Project are expected to be short-term and minimal. Temporary disruptions may occur during construction due to activities such as tree clearing, transportation of large equipment, and dust and noise from heavy equipment. These activities could affect recreational users, particularly those engaged in hunting, trail use, the snowmobile trail, and wildlife observation, as well as nearby wildlife and habitats that support recreation. Potential impacts to recreational resources are discussed fully in section 2.1.6.2. Potential impacts on recreational resources would occur similarly along the Project route and are not anticipated to be disproportionately high and adverse impacts on environmental justice areas.

The Project will result in some permanent impacts on forested lands, as trees and vegetation will be cleared within the Proposed Right-of-Way. Impacts on forested areas cleared for construction outside of the Proposed Right-of-Way and permanent access roads will be minimal and temporary, as those areas would be allowed to revegetate naturally. Potential impacts to forestry resources are discussed fully in Section 2.4.2.2. Potential impacts on forestry resources would occur similarly along the Project route and are not anticipated to be disproportionately high and adverse impacts on environmental justice areas.

Impacts on air quality during construction are expected to be short-term, of a small size, and not affect a unique resource. No impacts to air quality are anticipated due to the operation of the transmission line or substations. Potential impacts related to air quality are discussed fully in Section 2.6.1.2. Potential impacts on air quality resources would occur similarly along the Project route and are not anticipated to be disproportionately high and adverse impacts on environmental justice areas.

2.1.4.2.2 Potential Mitigation

No negative impacts to socioeconomics are anticipated due to construction or operation of the Project; therefore, no mitigation is required.

To mitigate impacts to visual and forestry resources, the Applicants are proposing to co-locate with existing HVTL. This will, to the extent possible minimize tree clearing and visual impacts to the environmental justice area. Additionally, Segment 2, which starts just north of the St. Louis River crossing will be double circuited with the existing line and will only require an additional 20-foot ROW which will further minimize impacts to visual and forestry resources in the environmental justice area.

As described above, the Project is not anticipated to result in adverse impacts on recreation and air quality and the Project is anticipated to result in positive socioeconomic benefits. As a result, the Project is not anticipated to have disproportionately high and adverse impacts on environmental justice areas, and no additional mitigation is proposed.

2.1.5 Cultural Values

Cultural values can be described as shared community beliefs or attitudes that define what is collectively important to the group. These values provide a framework for both individual and communal thought and action. The highly visible, industrial look and feel of utility projects can erode the rural feeling that is part of a resident's sense of place. Infrastructure projects believed inconsistent with cultural values can deteriorate community character. Those found consistent

with these values can strengthen it. Projects can invoke varying reactions and can, at times, weaken community unity.

2.1.5.1 Resources Within the Proposed Route

Cultural values reflect the core principles and beliefs that foster identity, continuity, and unity within communities. The Proposed Route crosses areas within Itasca and St. Louis counties, regions with deep cultural and historical significance to Indigenous communities, the ancestors of European settlers, and more recent arrivals to the area.

Several contemporary Tribal Nations maintain historic and ongoing ties to lands in and around the Proposed Route, including the Bois Forte Band of Chippewa, Leech Lake Band of Ojibwe, and the Mille Lacs Band of Ojibwe. These Tribes have longstanding relationships with the natural landscape that continue to support cultural, spiritual, and subsistence practices today.

Historically, the region was also settled by European immigrants, particularly those of German, Norwegian, Swedish, and Irish descent, who shaped local communities through farming, forestry, and mining.

The Proposed Route crosses lands ceded by the Ojibwe under the Treaties of 1837 and 1855, which remain significant due to the treaty-reserved rights to hunt, fish, and gather on those lands. These rights are central to the cultural identity and traditions of the Ojibwe people and continue to influence land and resource use in the region.

Cultural values can be informed by the recreational pursuits of residents and by geographical features Itasca County is home to a variety of natural areas, scenic routes, and recreational opportunities. These include the 47-mile Edge of the Wilderness Scenic Byway, Scenic State Park, the Chippewa National Forest, the Lost Forty old-growth pine forest, and the Tioga Recreation Area. The county also includes part of the Leech Lake Band of Ojibwe Reservation and a large portion of the Chippewa National Forest. At the northern edge of the county, near the City of Effie, is the Deer Creek Indian Reservation of the Bois Forte Band of Chippewa. Cultural and historical attractions in the area include the Judy Garland Museum, the Reif Performing Arts Center, and the Children's Discovery Museum. Key industries in Itasca County include health care, retail, and forestry.

St. Louis County is also known for its natural areas and outdoor recreation. It includes parts of the Superior National Forest and the Boundary Waters Canoe Area Wilderness, popular for canoeing, camping, and hiking. Other well-known spots include Lake Vermilion-Soudan Underground Mine State Park, Bear Head Lake State Park, and many lakes, forests, and trails. St. Louis County is also home to Tribal lands, including the Bois Forte Band of Chippewa near Nett Lake and the Fond du Lac Band of Lake Superior Chippewa near Cloquet. Duluth, a major Minnesota city with museums, theaters, and events, is also located in this county, as is a portion of the Iron Range, known for its mining history. Key industries in the county include Lake Superior shipping, health care, mining, tourism, education, and forestry.

2.1.5.2 Potential Impacts

The ROI for cultural values is Itasca and St. Louis Counties. Construction activities may temporarily limit hunting in certain areas, which could affect traditional practices and community connections to the land. These impacts are expected to be short-term and localized, and normal hunting access would resume following construction. The Applicants continue to actively engage

members of the public, including Tribal communities, and will work with stakeholders to avoid or minimize potential impacts to the extent possible. Impacts are anticipated to be minimal; therefore, no mitigation is proposed.

The Project has been designed to be generally compatible with local comprehensive land use plans (*see* Section 2.3.2), reflecting consideration for community cultural values and supporting preservation of the character and heritage of the area. Once constructed and operational, transmission lines can alter landscapes that are culturally or historically significant, affecting how people experience these areas. However, transmission lines are largely passive infrastructure that generally do not restrict access, interfere with daily activities, or prevent cultural practices from occurring in most areas. The Applicants will maintain the surrounding landscape, including vegetation to the extent possible.

2.1.5.3 Potential Mitigation

Operations of the Project are not expected to affect contemporary cultural values. Accordingly, no mitigation is proposed.

2.1.6 Recreation

2.1.6.1 Resources Within the Proposed Route

Numerous public recreational resources are located within the vicinity of the Proposed Route (*see* Map 3 of this EA; Appendix G of the Application, pages 1-16). Recreational activities commonly enjoyed along the Proposed Route include hunting, trapping, biking, boating, fishing, hiking, snowmobiling, all-terrain vehicle ("ATV") riding, cross-country skiing, and camping. Several rivers, streams, and lakes lie within or adjacent to the Proposed Route (*see* Section 2.6.4.2), providing fish and game habitats and supporting activities such as fishing and boating. Trout streams are located within the vicinity of the Proposed Route and are used for recreational purposes; they are discussed in detail in Section 2.6.4.2.3.

While the Proposed Route does not cross any national forests, state or national parks, public water access sites, Wildlife Management Areas ("WMAs"), Scientific and Natural Areas ("SNAs"), or wildlife refuges, it does intersect the following recreational and management areas:

- The Riverlands State Forest,[24] located in St. Louis County, offers several recreation opportunities, including dispersed camping, canoe campsites, and state water trails.[25] The Proposed Route, Proposed Right-of-Way, and Proposed Alignment cross the Riverlands State Forest, but will be co-located with existing high-voltage transmission lines, which would generally result in an additional 20 feet of right-of-way and largely building within the existing 130-foot right-of-way along Segment 2, thus minimizing impacts to the extent possible (*see* Appendix G of the Application; page 8).

- The Proposed Route, Proposed Right-of-Way, and Proposed Alignment also cross other MnDNR-administered forest land (public land), some of which is associated with

[24] In 1997, Minnesota Power conveyed the lands to the DNR to be managed for public use. The Minnesota Legislature established the lands as the Riverlands State Forest in 2021. Source: "Riverlands State Forest: Forest Information," Minnesota Department of Natural Resources, State Forests. Available at https://www.dnr.state.mn.us/state_forests/forest.html?id=sft00065#information. Last accessed August 2025.
[25] "Riverlands State Forest," Minnesota Department of Natural Resources, State Forests. Available at https://www.dnr.state.mn.us/state_forests/forest.html?id=sft00065#homepage. Last accessed August 2025.

deer management areas, provided by the MnDNR, that are open to limited public recreation but are not part of a specifically named state forest (*see* Section 2.4.2; Appendix G of the Application; page 1).

- The Proposed Route, Proposed Right-of-Way, and Proposed Alignment cross the Saginaw Grade/Lumberjack Multi-use Trail. The Saginaw Grade/Lumberjack Multi-use Trail is on an abandoned railroad grade that starts in Spafford Park in Cloquet and travels north 10 miles before stopping short of the historic Saginaw area in St. Louis County (see Appendix G of the Application; page 14). This trail is maintained by the Twig Area Trail Riders ATV Club.[26] Additionally, the Proposed Route, Proposed Right-of-Way, and Proposed Alignment cross the state-designated Cloquet River Trail[27] and St. Louis River Trail,[28] both of which are known for fishing, paddling and rapids.

- The Proposed Route crosses a Sand Creek Aquatic Management Area ("AMA")[29] easement near the Iron Range Substation (*see* Appendix G of the Application; page 1) and a White Pine River AMA easement near Munger, Minnesota (*see* Appendix G of the Application; page 14). Similarly, an easement associated with the Bruce Creek AMA intersects the Proposed Route, Proposed Right-of-Way, and Proposed Alignment (*see* Appendix G of the Application; pages 2 and 3). These AMA easements allow access for fishing.

- The Proposed Route, Proposed Right-of-Way, and Proposed Alignment cross the following snowmobile trails: Cloquet Trails, Itasca Trail #1 – Greenway, Floodwood/Meadowlands Trails, and Alborn Trails (*see* Appendix G of the Application; pages, 13 and 14, 2 and 3, 5, 6, 8, and 9, and 9, 10, and 100 respectively). These trails traverse forests, wetlands, and other scenic landscapes. They connect and form a larger regional network providing access to hundreds of miles of trails. Many of these snowmobile trails are also used for other recreational activities like hiking, biking, and horseback riding during the non-winter months, maximizing their use and benefit to the community.

- The Proposed Route, Proposed Right-of-Way, and Proposed Alignment cross sites of biodiversity significance (*see* Section 2.6.8). The biodiversity found in native plant communities and functional landscapes can be a key part of what makes them desirable recreational spaces. Natural environments like forests and wetlands are valued for activities such as hiking and birdwatching, which provide mental and physical health benefits.

2.1.6.2 Potential Impacts

The ROI for recreation resources is the Project Area. Impacts on recreational resources as a result of the Project are expected to be short-term and minimal. Temporary disruptions may occur during construction due to activities such as tree clearing, transportation of large equipment, and

[26] "OHV Trail Detail: Saginaw Grace/Lumberjack Multi-use Trail," Minnesota Department of Natural Resources, Recreation. Available at https://www.dnr.state.mn.us/ohv/trail_detail.html?id=99. Last accessed August 2025.
[27] "Cloquet River State Water Trail," Minnesota Department of Natural Resources, State water trails. Available at https://www.dnr.state.mn.us/watertrails/cloquetriver/index.html. Last accessed August 2025.
[28] "St. Louis River State Water Trail," Minnesota Department of Natural Resources, State water trails. Available at https://www.dnr.state.mn.us/watertrails/stlouisriver/index.html. Last accessed August 2025.
[29] "Sand Creek AMA," Minnesota Department of Natural Resources, Aquatic management areas (AMA). Available at https://www.dnr.state.mn.us/amas/detail_report.html?id=AMA00061. Last accessed August 2025.

dust and noise from heavy equipment. These activities could affect recreational users, particularly those engaged in hunting, trail use, the snowmobile trail, and wildlife observation, as well as nearby wildlife and habitats that support recreation. Refer to Section 2.6 for more detail on potential effects to local flora and fauna. Recreational users may also experience temporary construction-related noise disturbances if present during construction and they may experience long-term impacts due to additional vegetation clearing. For additional details, refer to Section 2.1.2.

Construction activities may pose safety risks for trail users, such as when equipment crosses trails or when wires are strung across them. In such cases, signage and short-term closures may be required. The Applicants will make every effort to avoid or minimize trail closures wherever practicable. Measures to address temporary impacts on public land access during construction will include advance notification to the public and land managers, temporary signage and closures where necessary, scheduling work to avoid peak recreational seasons where practicable, and restoration of disturbed access points and trails following construction. The Applicants will coordinate with the MnDNR and local governments to ensure that construction closures do not result in significant impacts on recreational resources.

New aesthetic impacts may result from the additional transmission line right-of-way located within state forests and public lands, at trail and AMA crossings, and on other recreation lands (*see* Section 2.1.3). The Project has been designed to avoid and minimize impacts by using or paralleling existing infrastructure for up to 97 percent of the Proposed Route. Additionally, the Project will largely occupy existing transmission right-of-way, requiring minimal additional right-of-way for the new transmission line.

In summary, construction may result in temporary restrictions on access to public lands, which could limit recreational opportunities such as hunting, fishing, and trapping during certain periods. However, these effects are expected to be short-term and localized. Once operational, the Project is not anticipated to restrict access to public lands or interfere with recreational activities.

2.1.6.3 Potential Mitigation

Given the presence of existing transmission infrastructure in the area, any lasting aesthetic or visual impacts on recreation resources are expected to be minimal (refer to Section 2.1.3); the Applicants will work with the local trail organizations to mitigate impacts to trail users.

2.1.7 Public Services and Transportation

2.1.7.1 Resources Within the Proposed Route

The Project is in a principally agricultural and rural residential area, with areas of deciduous forests and peat bogs. Private landowners near the Proposed Route have their own private wells and septic systems. Residents access other utility services by various providers, including electricity, waste collection, natural gas/propane, television, and telephone.

2.1.7.1.1 Communications

Local internet is provided by Aaniin, Arrowhead Communications Corporation, CenturyLink, Consolidated Communications, Fidium, CTC Telcom, Frontier, Mediacom, Midcontinent Communications, Paul Bunyan Communications, SCI Broadband, Spectrum, Tekstar

Communications, and Zito Media, which is a mix of cable fiber and Digital Subscriber Lines.[30] Satellite internet is available from companies such as Starlink and mobile telephone companies also provide internet service. Local telephone is provided by QWEST Corporation, Citizens Telecom Co. MN, Frontier Citizens Com.-MN.[31] A variety of mobile telephone companies provide service in the area.

2.1.7.1.2 Transportation

Roads in the Project Area include a U.S. highway, state highways, and township roads. The Proposed Poute will parallel or intersect with the roads listed in Table 14. MN-33 and US-2 experience the highest annual average daily traffic. The Project will use larger arterial roads and private access roads to deliver new structures, conductors, and construction equipment to the Proposed Right-of-Way during construction.

Table 14. Highways or Roads Crossed by the Proposed Route

Route Abbr.	Street Name	Sequence #	Volume	Year	Ownership
MN 65	MN-65	2068	1274	2023	State Highway Agency
MN 33	MN-33	4885	4704	2021	State Highway Agency
US 2	U.S. Highway 2	4899	3994	2023	State Highway Agency
MN 73	MN-73	6764	679	2023	State Highway Agency
CSAH 31	Alborn Brookston Rd	21111	272	2023	County Highway Agency
CSAH 8	Duluth Saint Vincent Rd	21118	97	2023	County Highway Agency
CSAH 29	-	21125	330	2019	County Highway Agency
CR 732	Parantala Rd	21126	75	2019	County Highway Agency
CSAH 133	-	21138	296	2023	County Highway Agency
CR 189	Eagle Rd	21142	35	2011	County Highway Agency
CR 186	N Savanna Rd	21143	55	2011	County Highway Agency
CSAH 133	Wawina Rd	21144	191	2023	County Highway Agency
CSAH 56	Morris Thomas Rd	21165	948	2023	County Highway Agency
CR 223	Munger Shaw Rd	21169	305	2020	County Highway Agency
CSAH 98	Canosia Rd	21172	1479	2023	County Highway Agency
CSAH 6	Maple Grove Rd	21173	390	2019	County Highway Agency
CSAH 8	5th Ave	21664	521	2023	County Highway Agency

[30] Minnesota Employment and Economic Development Office of Broadband Development, *Minnesota Broadband Providers by County, October 31, 2023*. Available at https://mn.gov/deed/assets/providers-county_tcm1045-190762.pdf. Last accessed August 2025.
[31] "Minnesota Telephone Exchange Boundaries, March 2025," Minnesota Department of Commerce. Available at https://minnesota.maps.arcgis.com/apps/OnePane/basicviewer/index.html?appid=a61fe43236994d43b097d439befb8e70. Last accessed August 2025.

Route Abbr.	Street Name	Sequence #	Volume	Year	Ownership
CSAH 56	Morris Thomas Rd	21915	1168	2023	County Highway Agency
CR 866	Lamb Rd	60053	55	2019	County Highway Agency
CR 171	Benson Rd	60068	60	2015	County Highway Agency
CR 192	Stremel Rd	60072	17	2023	County Highway Agency
CR 191	Adams Rd	60088	6	2023	County Highway Agency
CR 508	Cedar Valley Rd	60091	10	2015	County Highway Agency
CR 183	Van Horn Rd	60116	30	2015	County Highway Agency
CSAH 113	Old Highway 33	60175	110	2019	County Highway Agency
CR 880	Leiste Rd	60177	85	2015	County Highway Agency
CR 846	Hermantown Rd	60178	42	2023	County Highway Agency
CR 889	Solway Rd	61278	30	2015	County Highway Agency
CR 425	Pancake Lake Rd	67874	30	2018	Township Highway Agency
CR 846	Hermantown Rd	72326	65	2023	County Highway Agency
T 144	Jerry Rd	76508	45	2022	Township Highway Agency
1037	UT-1037	Not available			County Agency Highway
1061	T-1061	Not available			Township Highway Agency
46	T-46	Not available			Township Highway Agency
-	Short Cut Rd	Not available			Township Highway Agency
-	Ridge Rd	Not available			Township Highway Agency
-	Hill Rd	Not available			Township Highway Agency
-	Gaus Rd	Not available			Township Highway Agency
-	Peterson Rd	Not available			Township Highway Agency

Three public airports and six private airports are within 10 miles of the Proposed Route (see Table 15). The closest airport is 1.25 miles south of the Proposed Route, which does not cross any Airport Influence Areas.

Table 15. Airports Within 10 Miles of the Proposed Route

Location ID	County	City	Facility Name	Use	Owner
'GPZ	Itasca	Grand Rapids	Grand Rapids/Itasca County-Gordon Newstrom Field	Public	Grand Rapids/Itasca County
'COQ	Carlton	Cloquet	Cloquet Carlton County	Public	Carlton County
'MY94	Carlton	Cloquet	Country Haven	Private	Dale Burgess
'DLH	St. Louis	Duluth	Duluth International	Public	City of Duluth, MN
'MN48	St. Louis	Duluth	St. Luke's Hospital	Private	St. Luke's Hospital
'MN33	St. Louis	Duluth	St. Mary's Hospital	Private	St. Mary's Medical Center
'MY13	St. Louis	Saginaw	Swan Field	Private	Robert & Sharon Swan
'MN92	St. Louis	Proctor	Lennartson	Private	Robert D. Lennartson
'MN52	Itasca	Hibbing	Gospel Ranch	Private	A. G. Bogen Company

In addition, the Proposed Route includes portions of three railroads, owned by Duluth, Missabe and Iron Range Railway; Duluth, Winnipeg and Pacific Railway; and Burlington Northern Santa Fe Railway.[32] However, the Proposed Alignment only crosses two railroads.

2.1.7.1.3 Utilities

The Proposed Route parallels existing high-voltage transmission lines, including a 115 kV transmission line, a 250 kV transmission line, and a 230 kV transmission line, all owned by Minnesota Power.[33] At some crossing locations of existing transmission lines, the Project proposes to modify the crossing configuration of existing lines to improve crossing angles for the Proposed Alignment, while in other areas, existing transmission lines will be rebuilt to double circuit with the Project. Existing distribution lines are present throughout the Proposed Route. No changes to distribution lines are anticipated.

No natural gas transmission pipelines are located within the Proposed Route; however, natural gas distribution lines are likely present within the Proposed Route.

The Proposed Route is located in primarily rural areas, and it is likely that any rural residences are serviced by a septic system, well, and on-site propane tank.

2.1.7.1.4 Emergency Services

If emergency personnel were needed at the Project, multiple agencies would likely respond, depending on the situation and location along the Project. These could include local fire

[32] "Minnesota Rail Viewer Application ("MnRail")," Minnesota Department of Transportation. Available at https://arcg.is/1W4XXv0. Last accessed September 2025.
[33] "U.S. Energy Atlas - Electricity Energy Infrastructure and Resources," U.S. Energy Information Administration. Available at https://atlas.eia.gov/apps/895faaf79d744f2ab3b72f8bd5778e68/explore. Last accessed September 2025.

departments, local police departments, county sheriff's office, and regional hospital ambulances. Itasca County has an emergency manager that coordinates an emergency management plan for the county,[34] as does St. Louis County.[35] The Applicants contractor will develop a plan that identifies specific responders once a route has been determined.

There are 11 towers that are part of the Allied Radio Matrix for Emergency Response ("ARMER") in Itasca County[36] and more than 20 towers in St. Louis County that are in various stages (on air, construction, initial engineering review, etc.).[37] There are 21 ARMER towers within 10 miles of the Proposed Route. These ARMER towers are a part of Minnesota's Statewide Communication Interoperability Plan, which aims to improve communication for emergency responders. The ARMER radio system operates by line of sight, sending and receiving signals with other ARMER towers. For the system to operate effectively, multiple towers are needed to produce a solid blanket of coverage. The system can be interrupted if tall objects are proposed within the line-of-sight, typically at or near the top of a tower over 150 feet tall.

2.1.7.2 Potential Impacts

The ROI for public services and transportation is the Itasca and St. Louis Counties. During construction, short-term and intermittent impacts may occur to public services and transportation; however, these impacts are expected to be minimal. No significant operational impacts are anticipated. The Project is not expected to change the existing condition or functionality of public services or transportation networks.

2.1.7.2.1 Communications

The Project is not expected to interfere with local communications; therefore, impacts are anticipated to be negligible. *See* Section 2.1.7.1 for a discussion about electronic interference.

2.1.7.2.2 Transportation

According to Title 14 of the Code of Federal Regulations ("CFR") Part 77, anyone planning to construct a structure near an airport must notify the Federal Aviation Administration ("FAA"). The Applicants used the FAA's Pre-Screening Tool to assess whether formal notice is necessary before construction. Based on the project's location, elevation, and maximum structure height of up to 180 feet, the Proposed Project does not exceed the FAA's Notice Criteria. The Proposed Route is anticipated to parallel existing transmission lines when feasible. The Applicants will continue to coordinate with the FAA and therefore impacts are not anticipated.

During construction, the Applicants will primarily travel along the Proposed Right-of-Way, but access from adjacent roadways will be necessary. Minimal (i.e., temporary and infrequent) traffic disruptions may occur due to equipment and material deliveries, as well as worker transportation.

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[34] "Multi-Hazard Mitigation Plan," Itasca County Minnesota. Available at https://www.co.itasca.mn.us/839/Multi-Hazard-Mitigation-Plan. Last accessed September 2025.
[35] St. Louis County Minnesota and University of Minnesota Duluth. *Multi-Hazard Mitigation Plan: St. Louis County, Minnesota, 2020*. Available at https://www.stlouiscountymn.gov/Portals/0/Library/Dept/Sheriff/St.%20Louis%20County%20Multi-Hazard%20Mitigation%20Plan%202020.pdf?ver=2020-05-18-125037-697. Last accessed August 2025.
[36] "Itasca County (MN)," The RadioReference Wiki. Available at https://wiki.radioreference.com/index.php/Itasca_County_(MN). Last accessed September 2025.
[37] "St. Louis County (MN) Trunking Information," The RadioReference Wiki. Available at https://wiki.radioreference.com/index.php/St._Louis_County_(MN)_Trunking_Information. Last accessed September 2025.

Conductors and shield wires will be strung across roads with minimal traffic impact. Typically, this involves carrying a pulling rope across the roadway and pulling it overhead with a crane. Temporary structures may be installed inside or outside of the road right-of-way to ensure adequate clearance for pulling lines, shield wire, or conductors. Where the transmission line intersects county and township roads, all required licenses will be obtained and fully complied with.

A brief closure of U.S. Highway 2 will be required during conductor stringing. The Applicants or their contractors will coordinate with MnDOT through its Utility Accommodation Permit process and adhere to all permit conditions. Any closures or detours are expected to be short in duration, from a few minutes to several hours. Access along township or county roads is expected to remain unchanged throughout construction, and no long-term impacts to U.S. Highway 2 or other roads are anticipated.

When appropriate, pilot vehicles will accompany heavy equipment to ensure safe transport. Traffic control measures, such as barriers and warning devices, will be used as needed. All safety requirements will be met to maintain the smooth flow of traffic. Construction activities will be managed to minimize disruption and inconvenience to the public. The Applicants or their contractors will coordinate the delivery of heavy equipment with the relevant road authorities to prevent congestion and reduce the risk of hazardous situations along local roads.

To minimize even minimal (short-term and infrequent) traffic impacts, the Applicants will coordinate with all affected road authorities. Whenever possible, deliveries of large materials and equipment will be scheduled to avoid peak traffic periods.

The Applicants will notify road authorities of any roads to be used during construction and are responsible for promptly repairing any damage to private roads resulting from construction activities. Impacts from operation and maintenance would be minimal.

2.1.7.2.3 Utilities

The design and operating process of transmission lines requires specific standards and mitigation outlined in North American Electric Reliability Corporation, Federal Energy Regulatory Commission, and NESC requirements and guidance, which aid in the compatibility of new construction with existing utilities. While the Applicants will minimize disruptions to electrical service, existing transmission lines and substations may be temporarily taken out of service during construction of the Project. This construction work will be coordinated to avoid electric service outages and associated impacts. All existing utilities will be identified and marked prior to construction with help from the Gopher State One Call utility locate service.

During civil survey activities, existing utilities and site features (such as septic systems and wells) will be identified. The Project will be designed to meet or exceed all required clearances based on the location of these features, and pole placements will avoid existing utilities. Impacts on public services are anticipated to be negligible during construction and operation.

2.1.7.2.4 Emergency Services

Construction of the Project is expected to have short-term, minimal impacts on emergency services. Operational impacts are anticipated to be negligible. Construction of the Project could impact emergency services by interfering with the ability to respond to an emergency. The Applicants will prioritize emergency response over construction to the greatest extent possible.

As such, construction of the project is not expected to affect emergency services. There will a short closure of U.S. Highway 2. Any closure and associated detour will be coordinated with emergency responders.

Communication by emergency responders relying on the ARMER system of towers should not be affected by the proposed Project because: 1) the nearest tower is approximately 3.5 miles away from the proposed transmission line thereby reducing the likelihood of a transmission line tower blocking communications between an emergency responder's communication device and an ARMER tower; and 2) frequencies emitted from the ARMER towers are not the same as those that could be emitted by a live wire thereby reducing the likelihood of electrical interference. Because impacts on emergency services during construction or operation are expected to be minimal.

2.1.7.3 Potential Mitigation

2.1.7.3.1 Communications

The Project is not expected to interfere with local communications; therefore, impacts are anticipated to be negligible and mitigation is not anticipated. *See* Section 2.1.7.1 for a discussion about electronic interference.

2.1.7.3.1 Transportation

Impacts to transportation services due to operation and maintenance would be minimal; therefore, no mitigation is proposed.

2.1.7.3.1 Utilities

Impacts on public services are anticipated to be negligible during construction and operation; therefore, no mitigation measures are proposed.

2.1.7.3.1 Emergency Services

Impacts on emergency services during construction or operation are expected to be minimal, no mitigation is proposed.

2.2 PUBLIC HEALTH AND SAFETY

2.2.1 Health and Safety in the Proposed Route

Public health and safety will be a priority during the construction, operation, and maintenance of the Project. Safety concerns related to construction may include slow movement of construction equipment on public roads, construction equipment crossing public roads and trails, conductor stringing across public roads and near public areas, and land clearing operations. Public health and safety concerns related to operation include outages, fires, and electrocution.

2.2.2 Potential Impacts

No effects to public health and safety are anticipated as a result of the Project. Proper safeguards would be implemented for construction, operation, and maintenance of the proposed 345 kV transmission lines. The Project will be designed in compliance with state, NESC, and Minnesota

Power standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials, and right-of-way widths. Construction crews and/or contract crews will comply with state and NESC standards regarding installation of facilities and standard construction practices. Applicants' established safety procedures, as well as industry safety procedures, will be followed during and after installation of the transmission lines. During active construction, safety measures will be implemented to protect residents and trail users including, but not limited to, signage where active construction is occurring, flaggers at road and railroad crossings, and barriers around active construction zones. When crossing roads or railroads during stringing operations, guard structures will be used to eliminate traffic delays and provide safeguards for the public. Spotters will be employed during active construction activities (*e.g.*, clearing and stringing) that span or are adjacent to trails. Additionally, Applicants will meet and maintain contact with trail advocacy groups (snowmobile, ATV, bicycle, etc.) to make trail users aware of construction and safety guidelines.

The proposed high-voltage transmission line will be equipped with switching devices (circuit breakers and relays located in the substations where the transmission lines terminate). These devices are intended to make, carry, and break line currents under normal conditions and in specified abnormal conditions such as a short circuit or fault. The circuit breakers stop the specified current and can protect other equipment and the extended power system from damaging currents and more extensive outages; however, any electrical facility which becomes isolated by operation of circuit breakers should not be considered de-energized or safe. Downed power lines and other damaged electrical equipment should always be assumed to be energized and dangerous.

2.2.3 Potential Mitigation

The Applicants will implement the minimization and avoidance measures described above; therefore, no mitigation is proposed.

2.2.4 Electric and Magnetic Fields

Electric and magnetic fields ("EMF") refers to the extremely low frequency ("ELF") decoupled EFs and magnetic fields ("MFs") that are present around any electrical device or conductor and can occur indoors or outdoors. EFs are the result of electric charge, or voltage, on a conductor. The intensity of an EF is related to the magnitude of the voltage on the conductor. MFs are the result of the flow of electricity, or current, traveling through a conductor. The intensity of an MF is related to the magnitude of the current flow through the conductor. EMF is a naturally occurring phenomenon. It is also found in association with transmission lines, local distribution lines, substation transformers, household electrical wiring, and common household appliances.

2.2.4.1 Electric Fields

Voltage on a wire produces an EF in the area surrounding the wire. The voltage on the conductors of a transmission line generates an EF extending from the energized conductors. The intensity of transmission line EFs is measured in kilovolts per meter ("kV/m"), and the magnitude of the EF rapidly decreases with distance from the transmission line conductors. The presence of trees, buildings, or other solid structures in the path of the field can also significantly reduce the magnitude of the EF. Because the magnitude of the voltage on a transmission line is near-constant, the magnitude of the EF will be near-constant for the proposed transmission line, regardless of the power flowing on the line (ideally within ±5 percent of nominal).

There is no codified limit in state or federal law for transmission line EF exposures. However, the Minnesota Environmental Quality Board ("EQB") developed an informal standard for a maximum EF limit of 8 kV/m at 1 meter (3.28 feet) above ground, and the Commission has adopted this standard. The Applicants calculated the approximate EF for the Project's transmission configuration and have estimated the peak magnitude of EF density to be approximately 7.34 kV/m at 1 meter above ground for Segment 1 using a single circuit on double-circuit capable structure configuration (*see* Table 16). The peak magnitude of EF density is approximately 6.47 kV/m at 1 meter above ground for Segment 2 using a double structure configuration with one circuit operating at 345 kV and one circuit operating at 230 kV (Table 17). The peak magnitude of EF density is approximately 6.08 kV/m at 1 meter above ground for Segment 3 using the double circuit 345 kV structure configuration (*see* Table 18). These estimates are below the EQB standard. These EF calculations are summarized in Table 16 through Table 18, which document the approximate max electric field at one meter above ground for each Segment structure configuration from one edge of the right of way, through the centerline, to the other edge of the right-of-way. Figures 6 through 8 below show the EF fields for each Segment structure configuration graphically.

Table 16. Distance to Proposed Alignment – EF (feet) and EF Magnitude (kV/m) – Segment 1

Project: Single Circuit 345 kV on Double Circuit Capable Existing: 230 kV H-Frame												
Distance from Centerline (ft)	**-190**	**-150**	**-100**	**-50**	**Max (-39)**	**-25**	**0**	**25**	**50**	**100**	**150**	**190**
Electric Field Strength (kV/m)	0.19	0.21	0.36	6.22	7.34	5.37	0.8	3.27	2.68	1.83	0.16	0.04

Table 17. Distance to Proposed Alignment – EF (feet) and EF Magnitude (kV/m) – Segment 2

Project: Double Circuit 345 kV with One Circuit Operating at 230 kV												
Distance from Centerline (ft)	**-125**	**-100**	**-75**	**-50**	**-25**	**Max (-18)**	**0**	**25**	**50**	**75**	**100**	**125**
Electric Field Strength (kV/m)	0.13	0.18	0.53	2.02	5.97	6.47	3.54	3.52	1.26	0.39	0.15	0.06

Table 18. Distance to Proposed Alignment – EF (feet) and EF Magnitude (kV/m) – Segment 3

Project: Double Circuit 345 kV												
Distance from Centerline (ft)	**-125**	**-100**	**-75**	**-50**	**-25**	**Max (-18)**	**0**	**25**	**50**	**75**	**100**	**125**
Electric Field Strength (kV/m)	0.10	0.19	0.55	1.97	5.69	6.08	3.8	5.69	1.97	0.55	0.19	0.10

Figure 6. Single Circuit 345 kV Line Structure with ABC Vertical Phasing Parallel with Existing 230 kV H-Frame (Segment 1)

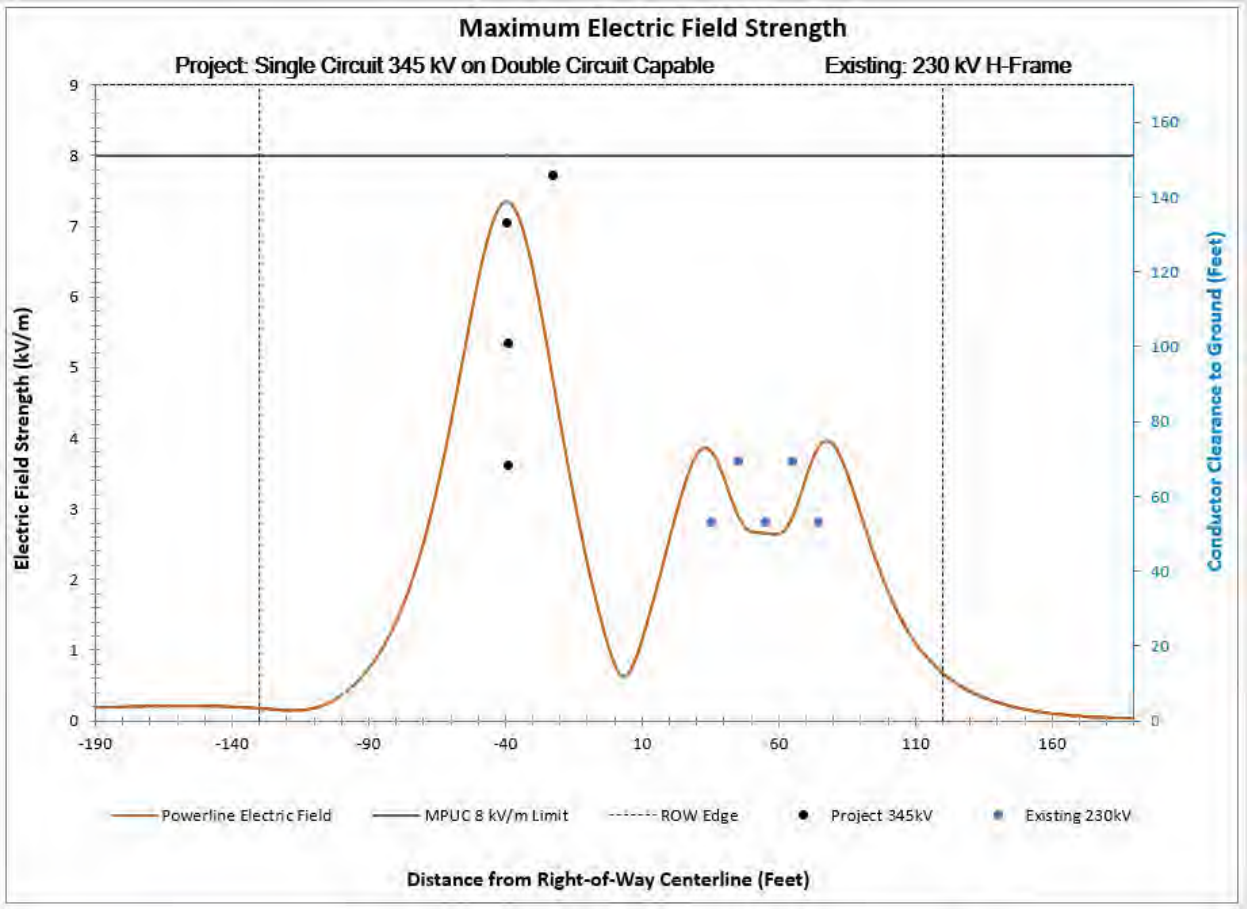


Figure 7. Double Circuit 345 kV Configuration with One Circuit Operating at 230 kV (Segment 2)

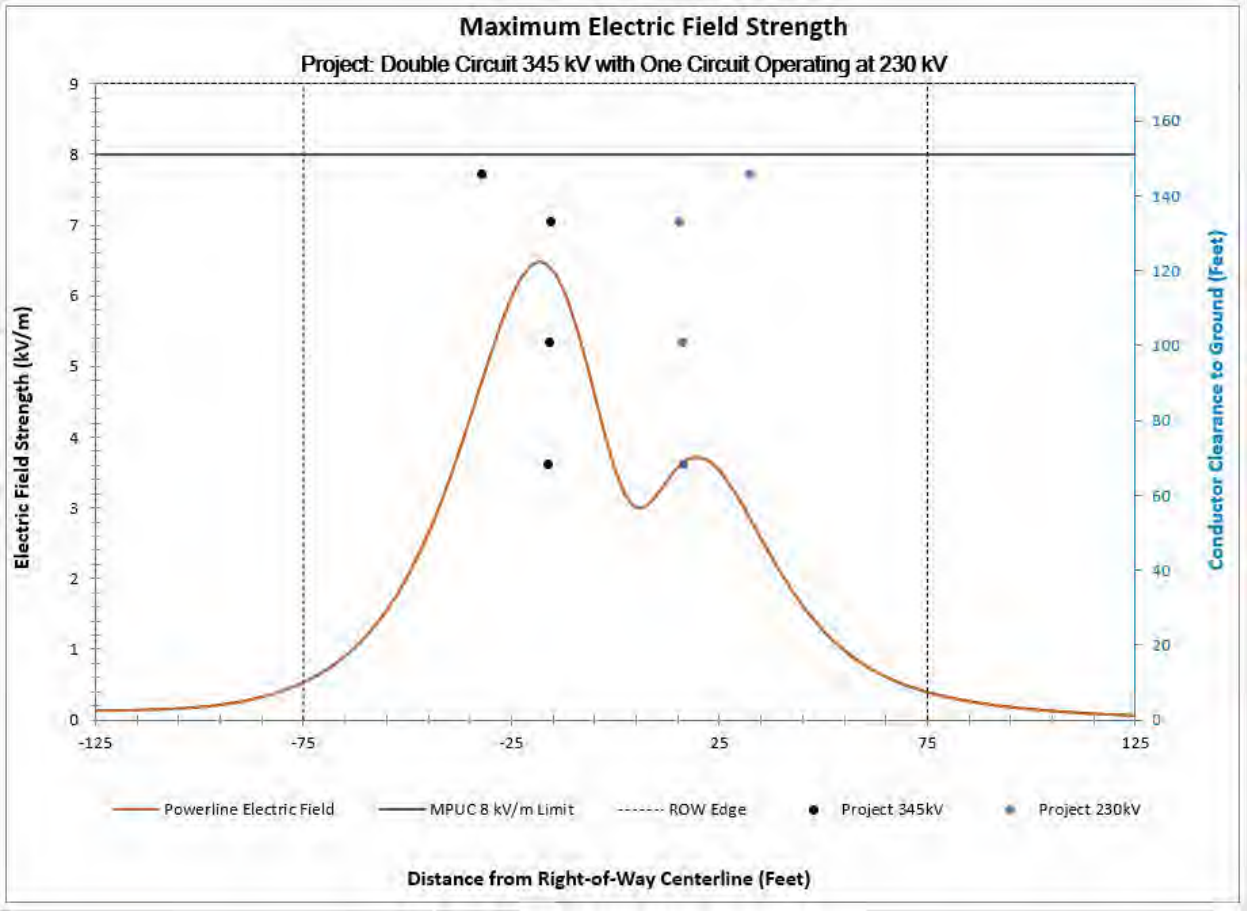
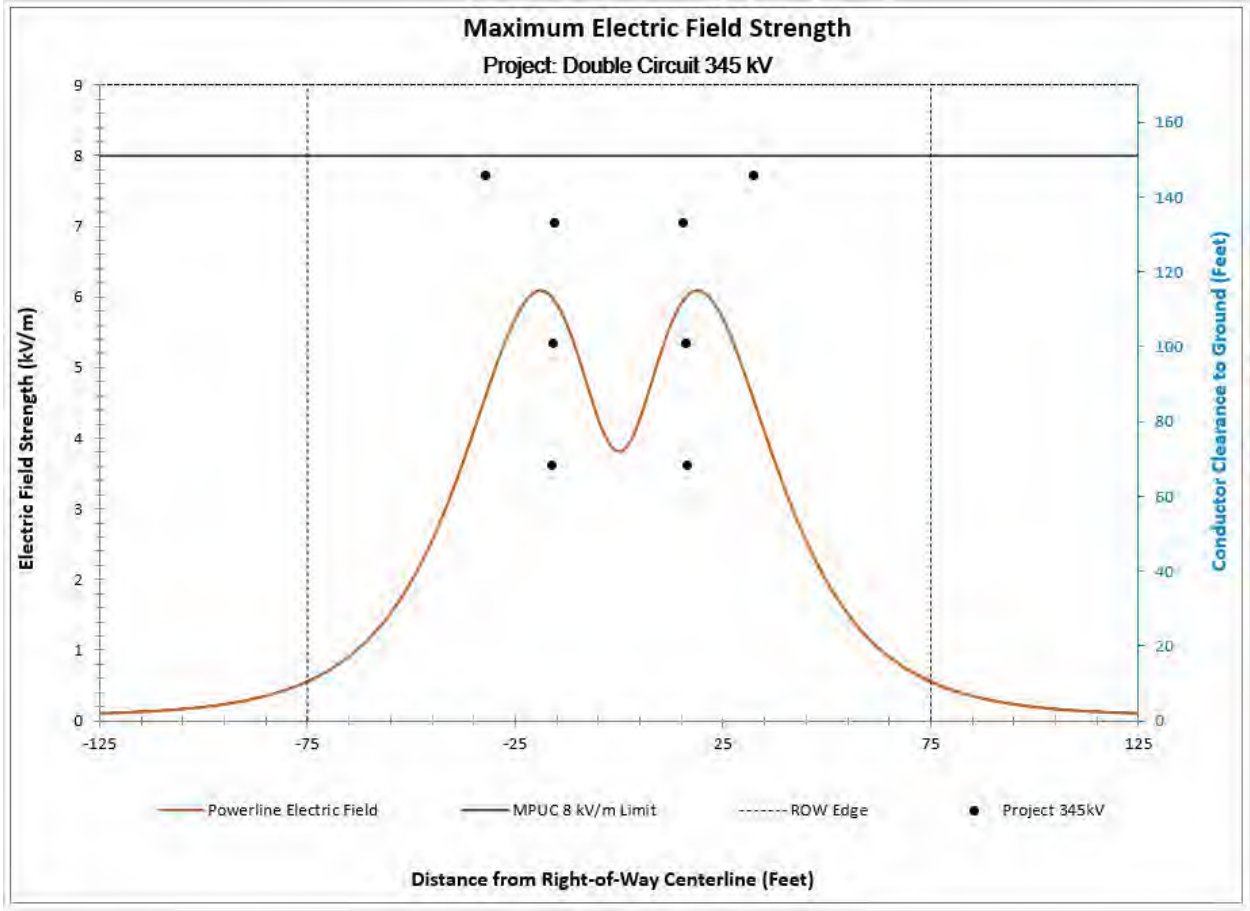


Figure 8. Double Circuit 345 kV Configuration (Segment 3)



2.2.4.2 Magnetic Fields

Electrical current passing through any conductive material, including a wire, produces a magnetic field in the area around the wire. The current flowing through the conductors of a transmission line generates an MF that, in similar fashion to the EF, extends outward from the energized conductors. The intensity of the MF associated with a transmission line is proportional to the amount of current flowing through the line's conductors, and the magnitude of the MF rapidly decreases with the distance from the conductors. Unlike EFs, MFs are not significantly affected by the presence of trees, buildings, or other solid structures nearby. The value of the MF density is expressed in the unit of gauss ("G") or milligauss ("mG").

There are no federal or Minnesota exposure standards for MFs. The EQB and the Commission have recognized state standards from Florida (a 150-mG limit) and New York (a 200-mG limit). Both state standards are to be considered at the edge of the right-of-way. Studies of the health effects from MFs conclude that the evidence of health risk is weak.[38] The general standard is one of avoidance where practicable.

[38] National Institute of Environmental Health Sciences, National Institutes of Health, *Electric and Magnetic Fields Associated with the Use of Electric Power: Questions and Answers.* Available at

MF levels associated with some common electric appliances are provided in Table 19.

Table 19. Median Magnetic Fields of Common Electric Appliances (mG)[39]

Appliance	Distance From Source		
	6 inches	1 foot	2 feet
Hair Dryer	300	1	--
Electric Shaver	100	20	--
Can Opener	600	150	20
Electric Range	30	8	2
Television	NA	7	2
Portable Heater	100	20	4
Vacuum Cleaner	300	60	10
Copy Machine	90	20	7
Computer/PC with Color Monitor	14	5	2

Tables 20, 21, and 22 summarize the MFs calculated for the proposed Transmission Line configurations for Segment 1 (*see* Table 20), Segment 2 (*see* Table 21), and Segment 3 (*see* Table 22). The MF calculations are also shown graphically for Segment 1 in Figure 9, Segment 2 in Figure 10, and Segment 3 in Figure 11.

Table 20. Calculated Magnetic Fields (mG) for Proposed Design – Segment 1

Project: Single Circuit 345 kV on Double Circuit Capable **Existing: 230 kV H-Frame**												
Distance from Centerline (ft)	**-190**	**-150**	**-100**	**-50**	**Max (-39)**	**-25**	**0**	**25**	**50**	**100**	**150**	**190**
Magnetic Field Strength (mG)	39.2	64.5	145.7	418.9	463.9	418.7	290.7	284.0	309.7	116.6	42.5	26.2

https://www.niehs.nih.gov/sites/default/files/health/materials/electric_and_magnetic_fields_associated_with_the_use_of_electric_power_questions_and_answers_english_508.pdf. Access August 2025.

[39] National Institute of Environmental Health Sciences, National Institutes of Health, *Electric and Magnetic Fields Associated with the Use of Electric Power: Questions and Answers.* Available at https://www.niehs.nih.gov/sites/default/files/health/materials/electric_and_magnetic_fields_associated_with_the_use_of_electric_power_questions_and_answers_english_508.pdf. Access August 2025.

Table 21. Calculated Magnetic Fields (mG) for Proposed Design – Segment 2

Project: Double Circuit 345 kV with One Circuit Operating at 230 kV												
Distance from Centerline (ft)	**-125**	**-100**	**-75**	**-50**	**-25**	**Max (-13)**	**0**	**25**	**50**	**75**	**100**	**125**
Magnetic Field Strength (mG)	53.0	80.0	130.1	231.1	408.5	452.3	405.7	211.5	90.8	48.6	31.1	22.2

Table 22. Calculated Magnetic Fields (mG) for Proposed Design – Segment 3

Project: Double Circuit 345 kV											
Distance from Centerline (ft)	**-125**	**-100**	**-75**	**-50**	**-25**	**Max (0)**	**25**	**50**	**75**	**100**	**125**
Magnetic Field Strength (mG)	30.0	50.5	92.4	186.3	387.7	517.8	387.7	186.3	92.4	50.5	30.2

Figure 9. Graphic Representation of Calculated Magnetic Fields (mG) for Proposed Design, Single Circuit 345 kV on Double Circuit Capable Structures Parallel to Existing 230 kV H-Frame – Segment 1

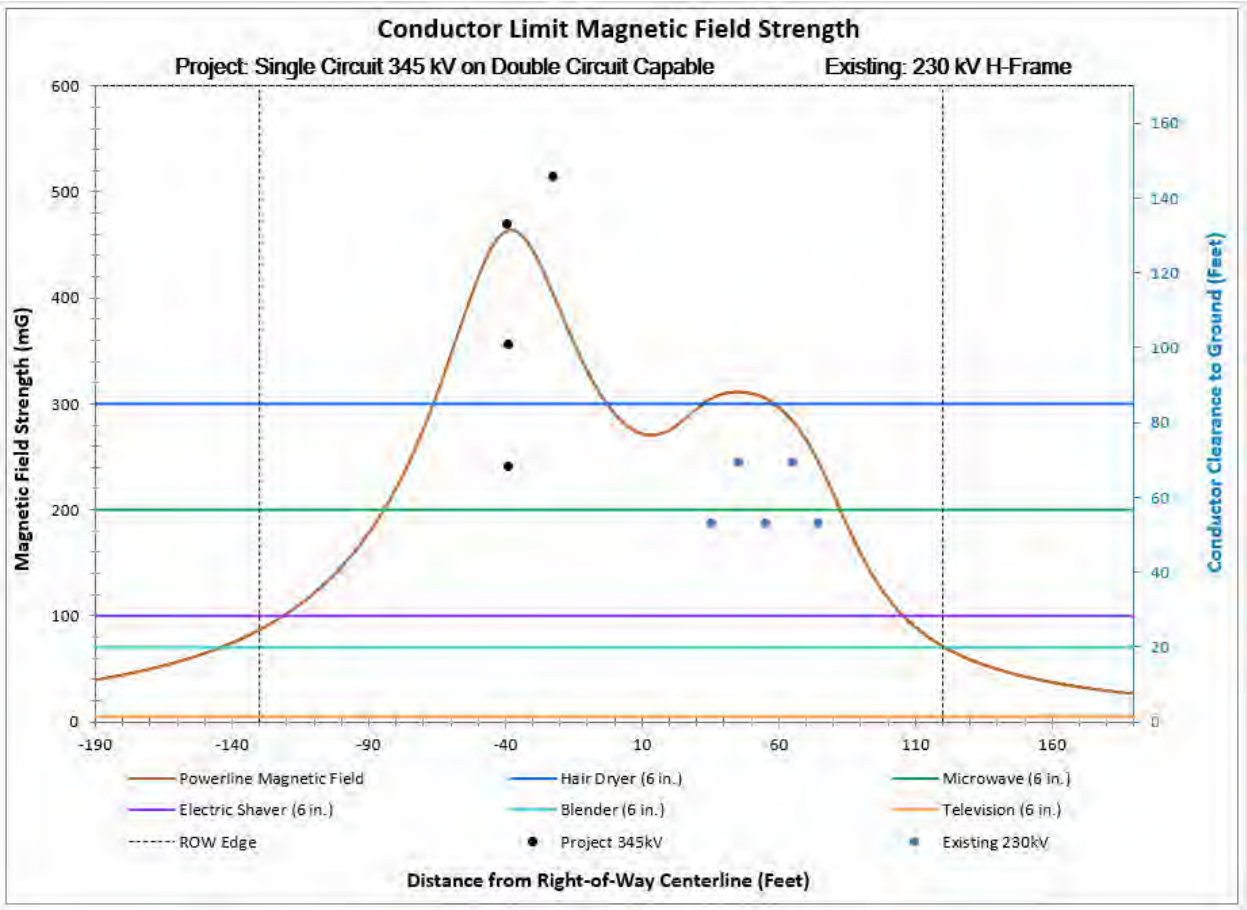


Figure 10. Graphic Representation of Calculated Magnetic Fields (mG) for Proposed Design, Double Circuit 345 kV with One Circuit Operating at 230 kV – Segment 2

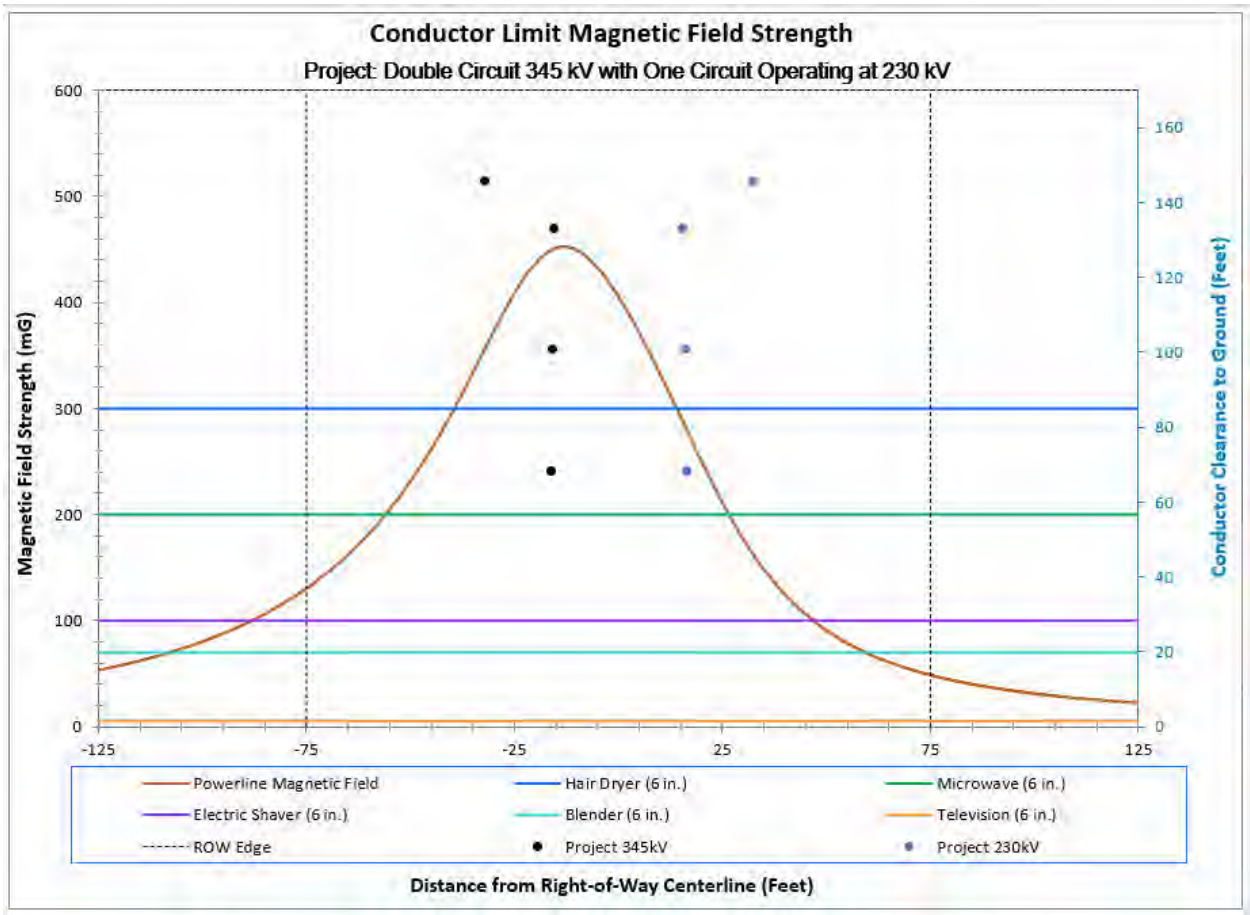
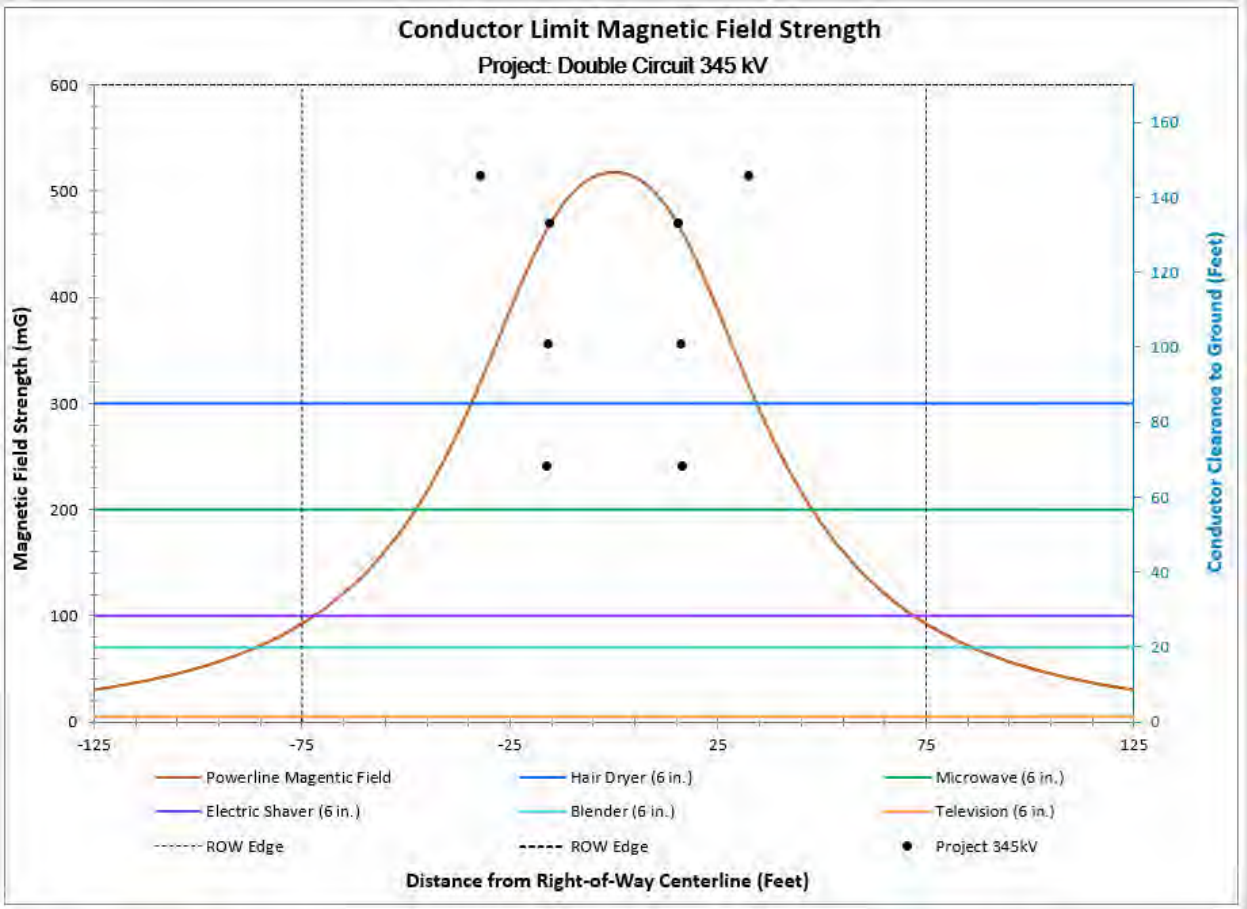


Figure 11. Graphic Representation of Calculated Magnetic Fields (mG) for Proposed Design, Double Circuit 345 kV – Segment 3



The actual power flow on a transmission line could vary throughout the day, depending on electricity demand; as such, the actual MF level could also vary widely from hour to hour. The typical intensity of the MF associated with the proposed transmission line is expected to be well below the above calculated MFs, as those studies are based on expected peak loading.

2.2.4.2.1 Implantable Medical Devices

High intensity EMF can have adverse impacts on the operation of implantable medical devices ("IMDs") such as pacemakers and defibrillators. While research has shown that the MFs associated with high-voltage transmission lines do not reach levels at which they could cause interference with such devices, it is possible that the EFs associated with some high-voltage transmission lines could reach levels high enough to induce sufficient body currents to cause interference.

Interference with IMDs can occur if the EF intensity is high enough to induce sufficient body currents to cause interaction. Generally, the response depends on the make and model of the device in addition to the individual's height, build and physical orientation with respect to the EF. Pacemaker manufacturers such as Medtronic and Guidant have indicated that modern "bipolar" cardiac devices are considerably less susceptible to interactions with EFs than older "unipolar" designs. However, research conducted in 2005 concluded that the risk of interference to unipolar

cardiac devices from high-voltage power lines in everyday life is small.[40] In 2007, Minnesota Power and Xcel Energy conducted studies with Medtronic to evaluate the impact of EFs associated with existing 115 kV, 230 kV, 345 kV, and 500 kV transmission on implantable medical devices. The analysis was based on real life public exposure levels under actual transmission lines in Minnesota; no adverse interaction with pacemakers or IMDs occurred. The analysis concluded that, although interaction may be possible in unique situations, device interaction due to typical public exposure would be rare.

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

2.2.4.2.2 Neutral-to-Earth Voltage

Neutral-to-earth voltage or "stray voltage" is a condition that can occur on the electric service entrances to structures from distribution lines. More precisely, stray voltage is a voltage that exists between the neutral wire of the service entrance and grounded objects in buildings such as barns and milking parlors.

Transmission lines (like the Project) do not, by themselves, create stray voltage because they do not connect to businesses and residences. Transmission lines can, however, induce a current on a distribution circuit that is parallel and immediately under the transmission line. If a landowner has stray voltage concerns on their property, the Applicants suggest they contact their electric service provider to discuss the situation with technical staff, including the possibility of an on-site investigation.

2.2.4.2.3 Induced Voltage

When an EF reaches a nearby conductive object, such as a vehicle or a metal fence, it can induce a voltage on the object. The magnitude of this voltage is dependent on many factors, including the object's electrical capacity, shape, size, orientation and location, resistance with respect to ground, and the weather conditions. Transmission lines can also induce stray voltage on a distribution circuit that is parallel and immediately under the transmission line.

The main concern with induced voltage is the current that would flow through a person to the ground should a person touch the object. To ensure the safety of people in the proximity of high-voltage transmission lines, the NESC requires that any discharge be less than five milliAmperes root mean square ("mA rms"). The Applicants would ensure that any fixed conductive object in close proximity or parallel to the Project, such as a fence or other permanent conductive fixture, would be grounded so any discharge would be less than the 5 mA rms NESC limit.

2.2.4.3 Potential Impacts

The ROI for electric and magnetic fields is the Proposed Right-of-Way.

[40]A. Scholten, S. Joosten, and J. Silny, "Unipolar Cardiac Pacemakers in Electromagnetic Fields of High Voltage Overhead Lines," *Journal of Medical Engineering and Technology,* 29 (2005), 170-175. Available at https://pubmed.ncbi.nlm.nih.gov/16012068/. Last accessed August 2025.

Significant research has been performed since the 1970s to determine whether exposure to power frequency magnetic fields causes biological responses and health effects. Reviews of this research by public health agencies such as the U.S. National Cancer Institute, the U.S. National Institute of Environmental Health Sciences, and the World Health Organization do not show that exposure to electric power EMF causes or contributes to adverse health effects. For instance, in 2016, the U.S. National Cancer Institute concluded that:

> Numerous epidemiologic studies and comprehensive reviews of the scientific literature have evaluated possible associations between exposure to non-ionizing EMFs and risk of cancer in children (12-14). (Magnetic fields are the component of non-ionizing EMFs that are usually studied in relation to their possible health effects.) Most of the research has focused on leukemia and brain tumors, the two most common cancers in children. Studies have examined associations of these cancers with living near power lines, with magnetic fields in the home, and with exposure of parents to high levels of magnetic fields in the workplace. No consistent evidence for an association between any source of non-ionizing EMF and cancer has been found.[41]

Minnesota, Wisconsin, and California have also all performed literature reviews or research to examine this issue. In 2002, Minnesota formed an Interagency Working Group to evaluate EMF research and develop policy recommendations to protect the public health from any potential problems arising from EMF effects associated with high-voltage transmission lines. The Working Group included staff from a number of state agencies and published its findings in *A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options.* The Working Group summarized its findings as follows:

> Research on the health effect of EMF has been carried out since the 1970s. Epidemiological studies have mixed results—some have shown no statistically significant association between exposure to EMF and health effects, some have shown a weak association. More recently, laboratory studies have failed to show such an association, or to establish a biological mechanism for how magnetic fields may cause cancer. A number of scientific panels convened by national and international health agencies and the United States Congress have reviewed the research carried out to date. Most concluded that there is insufficient evidence to prove an association between EMF and health effects; however, many of them also concluded that there is insufficient evidence to prove that EMF exposure is safe.[42]

Based on findings such as those of the Working Group and U.S. National Cancer Institute, the Commission has consistently found that "there is insufficient evidence to demonstrate a causal relationship between EMF exposure and any adverse human health effects."[43]

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[41] "Electromagnetic Fields and Cancer," updated Jan. 3, 2019, National Cancer Institute. Available at https://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/electromagnetic-fields-fact-sheet.

[42] Minnesota State Interagency Working Group on EMF Issues, *A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options* (Minnesota Department of Health, 2002). Available at https://apps.commerce.state.mn.us/eera/web/project-file?legacyPath=/opt/documents/EMF%20White%20Paper%20-%20MN%20Workgroup%20Sep%202002.pdf.

[43] *In the Matter of the Application for a HVTL Route Permit for the Tower Transmission Line Project*, Docket No. ET-2, E015/TL-06-1624, Findings of Fact, Conclusions of Law and Order Issuing a Route Permit to Minnesota Power and Great River Energy for the Tower Transmission Line Project and Associated Facilities (August 1, 2007); see also In the

The potential impacts of electric fields include interference with the operation of pacemakers and Implantable Cardioverter/Defibrillators ("ICDs"). Interference with implanted cardiac devices can occur if the electric field intensity is high enough to induce sufficient body currents to cause interaction. Generally, the response depends on the make and model of the device in addition to the individual's height, build and physical orientation with respect to the electric field. Pacemaker manufacturers such as Medtronic and Guidant have indicated that modern cardiac devices are considerably less susceptible to interactions with electric fields than older "unipolar" designs. A 2005 study concludes that the risk of interference inhibition of unipolar cardiac pacemakers from high-voltage power lines in everyday life is small.[44] In 2007, Minnesota Power and Xcel Energy conducted studies with Medtronic to evaluate the impact of the electric fields associated with existing 115 kV, 230 kV, 345 kV, and 500 kV transmission on implantable medical devices. The analysis was based on real life public exposure levels under actual transmission lines in Minnesota; no adverse interaction with pacemakers or ICDs occurred. The analysis concluded that, although interaction may be possible in unique situations, device interaction due to typical public exposure would be rare. In the unlikely event a pacemaker is impacted, the effect is typically temporary asynchronous pacing. The pacemaker would return to its normal operation when the person moves away from the source of the interference.

Impacts on public health and safety are anticipated to be negligible. The Project will be designed in compliance with local, state, NESC, and Minnesota Power's standards including clearance to ground, crossing utilities, or buildings, strength of materials, and right-of-way widths. The proposed Substation will be equipped with protective breakers and relays, which are designed to de-energize the transmission line when needed. The proposed Substation will be protected by locked gates and barbed-wire-topped fencing. Signage attached to the fence will list the owner, provide a telephone contact number, and warn about electrical hazards within the substation.

2.2.4.4 Potential Mitigation

The Applicants will ensure that safety requirements are met during construction and operation of the facilities. Additionally, when crossing roads or railroads during stringing operations, guard structures will be utilized to eliminate traffic delays and provide safeguards for the public. With implementation of these safeguards and protective measures, no additional mitigation is proposed.

Matter of the Route Permit Application by Great River Energy and Xcel Energy for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota, Docket No. ET-2/TL-08-1474, Order Issuing Route Permit (Sept. 14, 2010); OAH Docket No. 7-2500-20283-2, ALJ Findings of Fact, Conclusions and Recommendation at Finding 216 (April 22, 2010 and amended April 30, 2010) ("there is no demonstrated impact on human health and safety that is not adequately addressed by the existing State standards for exposure"); *In the Matter of the Application of Xcel Energy for a Route Permit for the Lake Yankton to Marshall Transmission Line Project in Lyon County*, Docket No. E002/TL-07-1407, Findings of Fact, Conclusions of Law and Order Issuing a Route Permit to Xcel Energy for the Lake Yankton to Marshall Transmission Project at 7-8 (Aug. 29, 2008).

[44] A. Scholten, S. Joosten, and J. Silny, "Unipolar Cardiac Pacemakers in Electromagnetic Fields of High Voltage Overhead Lines," *Journal of Medical Engineering and Technology,* 29 (2005), 170-175. Available at https://pubmed.ncbi.nlm.nih.gov/16012068/. Last accessed August 2025.

2.3 LAND USE AND ZONING

2.3.1 Resource Analysis of the Proposed Route

2.3.1.1 Zoning

The Proposed Route crosses (from west to east) Itasca County and St. Louis County. Based on publicly available zoning data and each county's zoning ordinance, the Proposed Route primarily crosses areas zoned as "Farm Residential" and "Public Land" in Itasca County and "Forest Agricultural Management" and "Multiple Use" zoning districts with some areas zoned "Residential" and "Sensitive Areas" in St. Louis County. The eastern end of the Proposed Route crosses into the city limits of the City of Hermantown, in an area zoned S-1, Rural-Suburban.[45] The Proposed Route crosses two townships in Itasca County and nine townships in St. Louis County (see Map 4). Zoning in all townships crossed in St. Louis County is governed by the county zoning ordinance. In Itasca County, Goodland Township has its own local zoning code and the Proposed Route crosses land zoned as Agricultural.

The Proposed Route also crosses county-managed shoreland overlay districts within each county along the Proposed Route. The history of Minnesota's Shoreland Management Program dates back to 1969 with the passage of the Shoreland Management Act. Minimum development standards - such as structure setbacks, height limits, impervious surface limits, lot requirements, vegetation removal and land alteration requirements - are established in state rules (Minnesota Rules, part 6120.2500 - 6120.3900) and administered through local ordinances.[46] Shorelands are defined as the area within 1,000 feet from the ordinary high water level of a lake, pond or flowage; and 300 feet from the ordinary high water level of a river or stream, or the landward extent of a floodplain designated by ordinance on a river or stream, whichever is greater.

Pursuant to Minn. Stat. § 216I.18, subd. 1, the issuance of a Route Permit for large energy infrastructure facility purposes is the sole site approval required to be obtained. The Route Permit supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government.

Article 14 of the Itasca County Zoning Ordinance, effective May 1, 2024, regulates "towers" and indicates that it "shall be unlawful for any person, firm, or corporation to erect, to place any tower, wireless telecommunication facility, or wind energy conservation system greater than 35 feet in height without first receiving the appropriate permits from Itasca County."[47] Section 14.5.3 of the Itasca County Zoning Ordinance provides exceptions to the county permitting process for towers that are associated with utility transmission lines regulated by the Commission.

In St. Louis County, the Proposed Route goes through the following zoning districts: commercial, forest agricultural management, multiple use, non-jurisdiction area, residential, sensitive areas, and shoreland multiple use. According to Section 5.6, Land Use Districts, in St. Louis County

[45] City of Hermantown, Minnesota, *Official Zoning Map* (2016). Available at https://hermantownmn.com/wp-content/uploads/2020/01/Zoning2016_website_map.pdf. Last accessed September 2025.
[46] "Shoreland Management History and Purpose," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/waters/watermgmt_section/shoreland/history.html. Last accessed September 2025
[47] Itasca County, Minnesota, *Zoning Ordinance – Itasca County* (May 1, 2024). Available at https://www.co.itasca.mn.us/DocumentCenter/View/10123/Itasca-County-Zoning-Ordinance-512024. Last accessed September 2025.

Zoning Ordinance Number 62, electrical lines (Utility Facilities – Class I) appear to be allowed with no permit required in all zoning districts crossed.[48]

2.3.2 Land Use

Land use is a term used to describe the human use of land; it represents the economic and cultural activities (e.g., agricultural, residential, industrial, mining, and recreational uses) that are practiced at a given place.[49] The primary land uses within the Proposed Route include Forest/Forestry, Agriculture (Hay/Pasture), and Developed Residential/Commercial.

Land management is fundamentally linked to land use because the rights to manage and control the land often shape the motivations, goals, and constraints which influence how the land is used. The Project crosses a mix of public and private land; however, the Project primarily crosses private land (approximately 66.2 percent; see Table 23). Public lands crossed by the Proposed Route, Proposed Right-of-Way, and Proposed Alignment, include land parcels administered by the MnDNR Forestry Division and Trails and Waterways Division. Additionally, the Proposed Route, Proposed Right-of-Way, and Proposed Alignment cross MnDNR Fisheries (*e.g.*, AMA) and Forestry easement interests that are managed, not owned, by the MnDNR. Map 5 shows the public land ownership within and near the Proposed Route. No tribal or federal lands are crossed by the Project.

Table 23. Land Ownership Crossed by Proposed Route

Type of Land Ownership	Acres	Percentage
Tribal	0	0
Federal	0	0
State	995.4	7.5
County	489.6	3.7
Private	8,779.1	66.1
Tax Forfeited	2,977.7	22.4

The following further describes the MnDNR public lands crossed by the Project:

- The Proposed Route, Proposed Right-of-Way, and Proposed Alignment cross 10 parcels and 5 parcels, respectively, of Riverlands State Forest (see Section 2.4.2). The Proposed Route, Proposed Right-of-Way, and Proposed Alignment also crosses 44, 30, and 29 parcels, respectively, of other MnDNR-administered forestry land, some of which are associated with deer management areas, that are open to limited public recreation but are not part of a specifically named state forest (see Sections 2.4.2 and 2.1.6). The Proposed Route, Proposed Right-of-Way, and Proposed Alignment also

[48] St. Louis County, Minnesota, *St. Louis County Zoning Ordinance* (2025), 62. Available at https://www.stlouiscountymn.gov/Portals/0/Library/Dept/Auditor/County-Board/Ordinance%2062%20Zoning.pdf?ver=PMApAmKAcSLPGdgtivxqDQ%3D%3D. Last accessed August 2025.
[49] "What are the trends in land use and their effects on human health and the environment?" U.S. Environmental Protection Agency. Available at https://www.epa.gov/report-environment/land-use. Last accessed September 2025.

cross MnDNR forestry easements, including those associated with Forest for the Future.[50]

- The Proposed Route, Proposed Right-of-Way, and Proposed Alignment cross the Saginaw Grade/Lumberjack Multiuse Trail of which four parcels and two parcels, respectively, are MnDNR-owned land. This trail is maintained by the Twig Area Trail Riders ATV Club. Additionally, the Proposed Route, Proposed Right-of-Way, and Proposed Alignment cross the Cloquet River Trail and St. Louis River Trail. Additional information on these trails is included in Section 2.1.6.

- The Proposed Route crosses a Sand Creek AMA easement near the Iron Range Substation and a White Pine River AMA easement near Munger, Minnesota. Similarly, an easement associated with the Bruce Creek AMA intersects the Proposed Route, Proposed Right-of-Way, and Proposed Alignment. These AMA easements are managed by the MnDNR and allow access for fishing (see Section 2.1.6).

In addition to fee land ownership, the Proposed Route includes several types of easements on state and tax forfeited land. Table 24 lists easements crossed by type and by acres within the Proposed Route. This includes Land and Water Conservation ("LAWCON") land, which is more akin to an encumbrance on land than an easement. The Applicants are working with the MnDNR to confirm this list.

LAWCON was established by Congress in 1964 to safeguard natural areas, water resources and cultural heritage, and to provide recreation opportunities in the form of parks, protected forests, and wildlife areas. Pursuant to Section 6(f)(3) of the Land and Water Conservation Fund Act, lands acquired for public outdoor recreation shall not be wholly or partly converted to other than public outdoor recreation uses without the approval of the National Park Service ("NPS"). LAWCON Section 6(f) stipulates that any land developed or improved with LAWCON funds cannot be converted to other than outdoor recreational use unless replacement land of at least equal fair market value and seasonably equivalent usefulness is provided. The MnDNR administers this process on behalf of the State of Minnesota. It is the responsibility of the State, as primary grant recipient, to ensure compliance with all terms and conditions of the grant agreement and requirements set forth in LAWCON Fund State Assistance Program, Federal Financial Assistance Manual, Volume 69.

Table 24. Easements Within the Proposed Route

Easement / Encumbrance	Acres
Federal easements on state land	0
Federal easements on private land	0
State easements on private land	462.1
State easements on tax forfeited land	84.6
LAWCON on state land	942.0

[50] "Minnesota Forest Legacy Program," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/forestlegacy/index.html. Last accessed September 2025.

To help ensure compatibility with land use, many counties develop comprehensive land use plans. These documents establish a long-term vision, goals, and policies for how land will be used, developed, and preserved within the county's jurisdiction. Both Itasca and St. Louis County have comprehensive land use plans (*see* Table 25). Goodland Township also has a Township Master Plan.[51]

Table 25. Applicable Land Use Plans in the Project Area

County / Township	Plan	Year
Itasca	Itasca County Comprehensive Land Use Plan	2013
St. Louis	Comprehensive Land Use Plan	2019
Goodland Township	Township Master Plan	2010

In 1998-1999, Itasca County developed its Comprehensive Land Use Plan[52] ("Itasca County Plan") to guide land use activities over the next 20 years. The Itasca County Plan set goals to direct the future growth and development of the County in the following areas: cooperation, measurability, natural resources, housing and settlement patterns, agriculture, commercial and industrial development, recreation, and transportation. The Itasca County Plan was last updated in 2013. The Project supports the goals set forth in the Itasca County Plan by maintaining public infrastructure that promotes economic development, remains in a state of good repair, and minimizes negative impacts on natural resources. Overall, the plan aims to balance objectives related to transportation, health, recreation, and economic growth.

St. Louis County's Comprehensive Land Use Plan ("St. Louis County Plan") was adopted in 2019[53] and "establishes a long-term vision for managing land use where the county maintains zoning jurisdiction." The St. Louis County Plan recognizes that utilities "are essential for economic growth and development."

2.3.2.1 Potential Impacts

The ROI for land use and zoning is the Proposed Route. Potential impacts are expected to be long term but negligible. Because the Project will be located along existing high-voltage transmission lines, and because the area near the St. Louis County and Arrowhead Substations is a major regional hub for electric transmission infrastructure, the Project is not expected to alter current and future land use. Short-term, localized changes to land use might occur during construction, which will be mitigated through restoration and compensatory payments to landowners. There will be permanent structures within the Proposed Route; however, the Applicants are not anticipating long-term impacts on land use since the new structures will have minimal interference with continued agricultural practices along the Proposed Route. The Applicants will coordinate the placement of the structures with landowners to the extent practicable.

[51] Goodland Township, Minnesota, *Township Master Plan* (2010). Available at https://goodlandtownship.org/ordinances.html. Last accessed September 2025.
[52] Itasca County, Minnesota, *Land Use Plan* (2013). Available at https://www.co.itasca.mn.us/DocumentCenter/View/5500/Itasca-County-Comprehensive-Land-Use-Plan. Last accessed September 2025.
[53] St. Louis County, Minnesota, *St. Louis County Comprehensive Land Use Plan* (2019). Available at https://www.stlouiscountymn.gov/LinkClick.aspx?fileticket=0tKnMHi0fGY%3d&tabid=57&portalid=0&mid=1011. Last accessed August 2025.

Additionally, the Applicants will coordinate with the MnDNR and other land managing agencies to obtain the applicable licenses and/or leases for all state and county/local public crossings (including easements) based on the final transmission line design.

2.3.2.2 Potential Mitigation

The substation expansions will be located on land already owned by the Applicants. The Project will not significantly impact land use or county zoning; therefore, mitigation is not anticipated.

2.4 LAND-BASED ECONOMIES

2.4.1 Agriculture

2.4.1.1 Resources Within the Proposed Route

According to the 2022 U.S. Department of Agriculture ("USDA") Census of Agriculture, Itasca County has 424 individual farms covering approximately 96,375 acres (about 6 percent of the county), with an average farm size of 227 acres. Approximately $13.8 million was generated from crop and livestock sales in 2022,[54] sales were primarily grains, "other crops and hay," and cattle. Based on the 2022 USDA Census of Agriculture, St. Louis County has 821 individual farms with an average farm size of 197 acres and covering approximately 162,061 acres (about 4 percent) of the county. Approximately $29 million was generated from crop and livestock sales in 2022,[55] primarily including "other crops and hay," nursery or greenhouse crops, cattle, and milk from cows.

According to National Land Cover Database ("NLCD") data, the Proposed Route includes about 64 acres of cultivated cropland and 509 acres of pasture/hay lands, and the Proposed Right-of-Way includes approximately 8.4 acres of cultivated cropland and 59.6 acres of pasture/hay lands. Soils designated as prime farmland are present in the Proposed Right-of-Way, as discussed in Section 2.7.3. According to the Minnesota Department of Agriculture ("MDA") Organic Farm Directory,[56] no registered organic producers are within the Proposed Route. Also, based on a search of the MDA Minnesota Apiary Registry[57] and landowner information provided during Project open houses, two apiaries are within 1 mile of the Proposed Route, one of which is approximately 140 feet north of the Proposed Alignment. Both apiary owners will be notified of the Project, and the Applicants will work directly with the landowners as outlined below.

2.4.1.2 Potential Impacts

The ROI for agriculture is Itasca and St. Louis Counties. Construction activities will temporarily use cropland within the Proposed Right-of-Way, which could result in a delay or loss of crop production. The Project could affect prime farmland as discussed in Section 2.7.3.1. With the exception of land that will be used for permanent structures, other areas in the Proposed Right-

[54] U.S. Department of Agriculture, *2022 Census of Agriculture County Profile: Itasca County, Minnesota*. Available at https://www.nass.usda.gov/Publications/AgCensus/2022/Online_Resources/County_Profiles/Minnesota/cp27061.pdf. Last accessed June 2025.
[55] U.S. Department of Agriculture, *2022 Census of Agriculture County Profile: St. Louis County, Minnesota.* Available at https://www.nass.usda.gov/Publications/AgCensus/2022/Online_Resources/County_Profiles/Minnesota/cp27137.pdf. Last accessed June 2025.
[56] Minnesota Department of Agriculture, *Directory of Minnesota Organic Farms* (2025). Available at https://www.mda.state.mn.us/organic-farm-directory-county#S%20-%20U. Last accessed June 2025.
[57] "BeeCheck," Minnesota Department of Agriculture. Available at https://mn.beecheck.org/map. Last accessed June 2025.

of-Way will continue to be used for pasture and crops, so long as the agricultural practice does not interfere with the operation of the transmission line.

During construction, the proposed transmission structure locations will need to be accessed to install the structures and again to string conductors. Equipment used during construction will include backhoes, cranes, boom trucks, and assorted small vehicles. Operation of this equipment on adjoining farm fields can cause rutting and soil compaction, particularly during springtime and otherwise wet conditions. In the event drain tile is present in the project area, it may be impacted during construction and structure installation. Agricultural land could be temporarily taken out of production during construction; however, farming would resume after restoration is complete. Only structure locations (and associated guy wires, if present) would be precluded from future farming activities. These impacts could cause crop losses.

Based on a review of aerial photos and desktop information, the Proposed Alignment will not cross the edge of center-pivot irrigated fields. However, if center-pivot irrigated fields are identified during land acquisition, the Applicants will work with the landowner to minimize impacts.

The Applicants will work with landowners once a final route and alignment are permitted, to the extent practicable, to coordinate the need for any early harvest of crops that may be necessary. Applicants will work with landowners to minimize impacts on agricultural activities and will compensate the landowner for any crop damage or losses. Areas disturbed during construction will be repaired and restored to pre-construction conditions as required so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate crop production or natural revegetation, provide for proper drainage, and prevent erosion.

Specific avoidance and minimization measures to be implemented include:

- The Applicants will work with landowners to review structure placement and minimize agricultural interference, when possible (i.e., locating transmission line on the edge of property).

- Easements will be obtained through negotiations with each landowner affected by the Project. Restoration or compensation will subsequently be made for reasonable crop or other property damage that occurs during construction or maintenance, as negotiated.

- When feasible, local roads will be used for moving equipment and installing structures. Where local roads cannot be used, the Proposed Right-of-Way will be used to the greatest extent possible, including for access to the route. Contractors will limit movement on the Proposed Right-of-Way to minimize damage to grazing land or property. If movement outside of the Proposed Right-of-Way is necessary, permission will be obtained, and any damage will be paid to the landowner.

- Prior to construction, the Applicants will work with landowners to identify drain tile locations. If a drain tile is impacted during construction, the Applicants will work with landowners to repair damages.

- Construction will be scheduled when agricultural activities are minimally affected, to the extent possible, or the landowner will be compensated accordingly.

- Ruts that may impact agricultural operations will be leveled, filled, and graded or otherwise eliminated in an approved manner; alternatively, compensation will be provided if the landowner desires. Soils will also be de-compacted so impacts on crop yields are minimized. The land and facilities will be restored as nearly as practicable to their original conditions.

- Fences, gates, and similar improvements that are removed or damaged will be repaired or replaced in accordance with landowner specifications.

- The Commission's route permits typically require notice to registered apiaries within 3 miles in advance of any herbicide treatment, and the Applicants would comply with any similar permit conditions for this Project. In addition, the Applicants will work with known apiary owners in order to avoid impacts to the maximum extent feasible.

For temporary storage or laydown yards, the Applicants will work with the respective owner(s) to lease the space. Following construction, the Applicants will contact landowners to determine if they are satisfied with clean-up measures and if any other damage might have occurred. If damage has occurred to crops, fences, or property, the Applicants will repair the damage or compensate the landowner. In some cases, an outside contractor may be hired to restore the damaged property as near as possible to its original condition.

As required by Commission route permits, the Applicants will implement erosion and sediment control measures, only use approved pesticides, take reasonable precautions to prevent the spread of invasive species and noxious weeds, repair any damaged drain tiles, and restore the Proposed Right-of-Way.

Operation of the Project is anticipated to have a negligible impact on agriculture beyond the placement of permanent structures. The Applicants will conduct annual inspections of the line; inspectors will contact landowners prior to conducting ground inspections, ensure that identified gates are closed, and limit impacts on crops. In the unlikely event crop damage occurs during operations, the Applicants would work with the landowners and repair damage or compensate the landowners as needed.

2.4.1.3 Potential Mitigation

The Applicants will work with the MDA to develop and Agricultural Impact Mitigation Plan ("AIMP") to document the treatment and mitigation measures for agricultural land. The AIMP will be provided to the PUC under a separate filing.

2.4.2 Forestry

2.4.2.1 Resources Within the Proposed Route

The Proposed Route and Proposed Right-of-Way cross one MnDNR state forest, the Riverlands State Forest, as shown on Map 3. The Proposed Route and Proposed Right-of-Way also cross Other State Forested Lands, which are state forests open for limited public recreation but are not associated with a specific-named state forest. The Other State Forest Lands are managed for timber production and are a source of commercial timber products throughout the Proposed Route. State forests additionally provide opportunities for recreation (*see* Section 2.1.6). Private commercial timberland, which is owned by Blandin Paper Company, is present within the Proposed Route and Right-of-Way. State and commercial forested areas within the Proposed

Route are summarized in Table 26 below and are shown on Map 3. Additionally, some relatively large areas of trees associated with residences are present along the Proposed Route. The Applicants will also identify if any forested areas associated with windbreaks are present in the Proposed Right-of-Way. Within forested areas on private property, private timber harvest or firewood collection might occur.

Table 26. Lands Managed for Forestry Resources Within the Proposed Route and Proposed Right-of-Way

Forestry Resources	Proposed Route (Acres)	Proposed Right-of-Way (Acres)
Private Commercial Forest Lands	445.73	62.16
Riverlands State Forest	183.24	9.46
Other State Forest Lands	759.5	115.69
TOTAL	1,388.47	187.31

2.4.2.2 Potential Impacts

The ROI for forested lands is the Proposed Right-of-Way. The Project will result in some permanent impacts on forested lands, as trees and vegetation will be cleared within the Proposed Right-of-Way. Approximately 15% of the Proposed Right-of-Way consists of managed land for forestry and as provided in Table 26 consists of private forest land and state forests. These impacts will be limited to the new right-of-way needed where co-location with existing high-voltage infrastructure occurs, because the Project will occupy some of the already maintained right-of-way. In areas of co-location, tree clearing will be limited to the incremental expansion of this right-of-way. The Applicants will work with the MnDNR to minimize impacts on adjacent forest resources on state lands. Commercial forestry and private landowners will be compensated for loss of timber resulting from clearing the Proposed Right-of-Way; additionally, the Applicants will continue to engage with Blandin Paper Company, the commercial forestry operator, where their land intersects the Proposed Route. Landowners will be given the option of keeping any trees (*i.e*., timber, branches, or shreds) removed within the easement area on their property. The Project could result in a short-term, small positive impact for those landowners wanting to keep cleared trees for personal use. Construction staging areas will be determined at a later date. Impacts on forested areas cleared for construction outside of the Proposed Right-of-Way and permanent access roads will be minimal and temporary, as those areas would be allowed to revegetate naturally. The Project is anticipated to have negligible impacts on forestry-based economies during operation because the Project will be co-located within an existing line.

2.4.2.3 Potential Mitigation

Since the Project is expected to have negligible impacts on forestry-based economies; mitigation is not anticipated.

2.4.3 Tourism

2.4.3.1 Resources Within the Proposed Route

Tourism is related to activities that bring visitors to an area, resulting in revenue being generated for the local economy. The Proposed Route crosses a wide variety of recreational trails, state

forest land, waterbodies, and the Feely Deer Management Area (*see* Section 2.1.6). These could all be considered tourist destinations for outdoor recreational opportunities such as hunting, trapping, biking, boating, fishing, hiking, snowmobiling, ATV riding, cross-country skiing, and camping. Tourism can also result from activities such as fairs and other community events such as the annual Itasca County Fair, Central St. Louis County Fair, Southwest St. Louis County Fair, Grand Rapids Farmers' Market, and Floodwood Catfish Days. Tourism can also result from seasonal events such as community 4th of July celebrations, fall leaf viewing, pumpkin patch and apple orchards, and skiing.

In 2023, tourism activities resulted in approximately $1.1 billion total spending (both direct and indirect) in St. Louis County, and $208 million total spending in Itasca County.[58] Spending associated with tourism activities primarily consists of lodging (including hotel, short-term rental, and second home), food and beverage, recreation, ground and air transportation, and retail spending, with lodging being the largest percentage of tourism dollars in both St. Louis and Itasca Counties.

The Itasca Economic Development Corporation's tourism website indicates that the county provides more than 450 acres of mountain biking opportunities, a Forest History Center, the Judy Garland Museum, Children's Discovery Museum, a thriving arts community, and night life.[59] The county is also home to the "Lost 40," an SNA that contains pine trees between 300 and 400 years old and attracts visitors from across the state.[60] The county is also home to the Edge of Wilderness Scenic Byway and the Chippewa National Forest.

The Itasca County Fairground hosts a number of events, including the Itasca County Fair that brings in a large number of visitors during the five-day event. The fair features horse shows, music, carnival rides, demo derbies and other competition.[61]

St. Louis County is a major destination for recreation in the state of Minnesota, which is significantly tied to tourism as people travel from all over the country to visit. The county is home to a portion of the North Shore, Lake Superior, Voyagers National Park, and the Boundary Waters Canoe Area Wilderness. Additional attractions for tourists include the Willard Munger State Trail, state parks, mountain bike courses, and the Superior Hiking Trail. Tourism in the county brings investment in real estate, lodging, and retail services.[62] The City of Duluth is visited by 6.7 million people annually and tourism is one of the city's largest industries, providing over $780 million in annual impact.[63]

[58] Explore Minnesota, *Visitor Spending, 2023.* Available at https://mn.gov/tourism-industry/assets/Minnesota%20County%20Tables%20-%202023_tcm1135-660871.pdf. Last accessed August 2025.
[59] "Itasca County Area: Tourism," Itasca County Economic Development Corporation. Available at https://www.itascadv.org/itasca-county-area/tourism. Last accessed September 2025.
[60] "Lost 40 SNA," Explore Minnesota. Available at https://www.exploreminnesota.com/profile/lost-40-sna/5508. Last accessed September 2025.
[61] "Fairgrounds Park and Trailhead Campground," Itasca County, Minnesota. Available at https://www.co.itasca.mn.us/284/Fairgrounds-Park-and-Campground. Last accessed September 2025.
[62] St. Louis County, Minnesota, *St. Louis County Comprehensive Land Use Plan – Recreation and Tourism* (January 22, 2019). Available at https://apps.stlouiscountymn.gov/compplan/recreation-tourism/index.html. Last accessed September 2025.
[63] "Planning Your Visit," Duluth Area Chamber of Commerce. Available at https://duluthchamber.com/resources/visitors/#:~:text=Planning%20Your%20Visit%3F,and%20success%20in%20local%20tourism. Last accessed September 2025.

2.4.3.2 Potential Impacts

The ROI for tourism is the Project Area. The Proposed Route is in proximity to or includes tourism resources (*see* Map 3); as such, active construction may result in temporary access restrictions to these areas. However, these effects are expected to be short-term and localized, and these incremental impacts are not expected to be noticeable to the average tourist. Refer to Section 2.1.6.2 for mitigation measures proposed to be implemented in recreational areas. Additionally, during active construction tourists or other users of the recreational areas may hear temporary construction noise and have impacts on visual aesthetics. Refer to Section 2.1.2 for information related to noise impacts and Section 2.1.3 for aesthetic impacts.

2.4.3.3 Potential Mitigation

Overall, impacts on tourism are anticipated to be minimal; therefore, no mitigation is proposed.

2.4.4 Mining

2.4.4.1 Resources Within the Proposed Route

Minnesota is the largest producer of iron ore and taconite in the United States. Taconite mining occurs in the Mesabi Iron Range in northeastern Minnesota, where iron ore is also being recovered from old iron mining waste (or tailings). Additionally, aggregate mining (such as sand, gravel, and crushed stone) occurs in nearly every county in Minnesota.[64]

Based on MnDOT's Aggregate Source Information System, the Proposed Route crosses three known gravel pits; of those, one gravel pit is located within the Proposed Right-of-Way. Additionally, based on the MnDNR's Aggregate Resource Mapping Program, which maps aggregate resources such as sand and gravel, the Proposed Route crosses many potential aggregate areas. However, all the MnDNR Aggregate areas are classified as "Nonsignificant" except for one area within the Proposed Right-of-Way classified as "Significant, high," which overlaps with the above described MnDOT gravel pit. Based on available information, an existing transmission line right-of-way crosses the gravel pit; however, the MnDNR data notes there may still be material within the extent of the parcel. Refer to Appendix G of the Application for known gravel pits and "significant" potential aggregate areas. Lastly, the Proposed Route crosses three MnDNR issued peat leases; however, all three peat leases are historic and have been terminated. One active MnDNR peat lease is adjacent to, but not crossed by, the Proposed Route. No MnDNR active mineral leases[65] or United States Geological Survey Active Mine or Mineral Plants are within the Proposed Route.

2.4.4.2 Potential Impacts

The ROI for mining is the Proposed Right-of-Way. The Project is not expected to inhibit ongoing mining activities. During construction, potential impacts could occur to gravel pits within the Proposed Right-of-Way. However, at the known gravel pit crossing, the alignment would be co-located with an existing transmission line right-of-way. Impacts will be minimal and may include temporarily suspending mining and excavation activities to ensure safe wire stringing.

[64] "Mining and Mineral Resources of Minnesota," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/lands_minerals/mining.html. Last accessed September 2025.
[65] "State Mineral Leases," Minnesota Geospatial Commons. Available at https://gisdata.mn.gov/dataset/plan-state-minleases. Last accessed August 2025.

2.4.4.3 Potential Mitigation

The Applicants will work closely with gravel pit owners to minimize impacts, and mitigation is not anticipated.

2.5 ARCHAEOLOGICAL AND HISTORIC RESOURCES

Review of the Minnesota Office of the State Archaeologist ("OSA") Portal and the Minnesota State Historic Inventory Portal ("MNSHIP") identified 10 historic architectural structures, 4 recorded archaeological sites, and 4 reported historic cemeteries within 1 mile of the Proposed Route. Of these previously identified cultural resources, 10 historic architectural structures, 2 recorded archaeological sites, and 1 reported historic cemetery intersect the Proposed Route. Three small previous cultural surveys intersect the Proposed Route, but the majority of the Proposed Route has not been previously surveyed. The Applicants have completed a Phase I Cultural Resources review for the Proposed Route and it has been submitted to the Minnesota State Historic Preservation Office ("SHPO"). The Applicants will conduct surveys, in accordance with SHPO guidelines in 2026 and will continue to coordinate with SHPO throughout the Project.

2.5.1 Historic Architectural Structures

2.5.1.1 Resources Within 1 Mile of the Proposed Route

Review of MNSHIP identified 10 historic architectural structures within 1 mile of the Proposed Route (*see* Table 27). Two of these structures (XX-RRD-CNR001 and XX-RRD-DMR-008) have been determined to be eligible for listing on the National Register of Historic Places ("NRHP"). The remaining structures are unevaluated or have been determined not eligible.

Table 27. Previously Recorded Architectural Structures That Intersect the Project

Structure Number	Structure Name	Historic Function/Use	Address	NRHP Eligibility
SL-CDV-00005	Bridge 92241	Transportation/ Road-related (Vehicular)	1.1 MI E OF JCT TH 73 (carries CR 189 over Joula Creek)	Unevaluated
SL-CDV-00010	Bridge 6739	Transportation/ Road-related (Vehicular)	MN 73 over Vaara Creek	Unevaluated
XX-ROD-00165	Trunk Highway 33	Transportation/ Road-related (Vehicular)	Carlton to St. Louis Counties	Not Eligible
XX-ROD-00176	Trunk Highway 2	Transportation/ Road-related (Vehicular)	From the Wisconsin state line in Duluth to the North Dakota state line in East Grand Forks	Not Eligible
XX-ROD-00179	Trunk Highway 65	Transportation/ Road-related (Vehicular)	Transportation/ Road-related (Vehicular)	Not Eligible

Structure Number	Structure Name	Historic Function/Use	Address	NRHP Eligibility
XX-RRD-CNR001	Duluth Winnipeg and Pacific Railway Company/ Canadian National Railway	Transportation/ Rail-related	Rainier to Duluth	Eligible
XX-RRD-DMR008	Duluth Missabe and Northern Railway Company/Duluth Missabe and Iron Range Railway Company: Main Line	Transportation/ Rail-related	Railroad right-of-way from S 27th Avenue W in Duluth to Mountain Iron	Eligible
XX-RRD-DMR021	Duluth Missabe and Northern Railway Company/Duluth Missabe and Iron Range Railroad Company: Stony Brook Branch Line	Transportation/ Rail-related	The former railroad right-of-way between Culver on the DM&N Main Line and Brookston	Not Eligible
XX-RRD-GNR019	Duluth Mississippi River and Northern Railroad Company/Eastern Railway Company/ Great Northern Railway Company	Transportation/ Rail-related	Between Jacobson, at the confluence of the Swan and Mississippi Rivers, and Hibbing in Itasca and St. Louis Counties.	Not Eligible
XX-RRD-GNR021	Eastern Railway Company/Great Northern Railway Company: Brookston to Kelly Lake	Transportation/ Rail-related	Located between Brookston and the Kelly Lake railroad yard, west of Hibbing in St. Louis County	Not Eligible

2.5.1.2 Potential Impacts

The ROI for historic architectural structures is the Proposed Route plus an industry standard 0.5-mile buffer for potential visual effects. Based on the scope of the Project, potential impacts to historic architectural structures include visual impacts that may have an effect on any above ground historic structures.

2.5.1.3 Potential Mitigation

The Applicants will consult with SHPO and, if necessary, identify potential mitigation measures.

2.5.2 Archaeological Sites

2.5.2.1 Resource Analysis of the Proposed Route

According to the OSA Portal, there are two recorded archaeological sites that intersect the Proposed Route. These sites consist of a historic artifact scatter (21SL1274) and the reported location of a ghost town (21SLat). The location of 21SLat has not been confirmed by a professional archaeologist. Both sites remain unevaluated for listing on the NRHP.

Table 28. Previously Recorded Archaeological Sites in the Study Area

Site Number	Site Name	Context/Type	Township	Range	Section(s)	NRHP Eligibility
21SL1274	None	Historic Domestic	50N	15W	31	Unevaluated
21SLat	Brevator	Ghost Town	51N	17W	18	Unevaluated

2.5.2.2 Potential Impacts

The ROI for archaeological sites is the Project Area. Potential impacts to archaeological sites include any ground disturbance caused by Project construction. Based on the results of the Phase I archaeological survey, the Applicants will conduct field investigations to determine if the sites can be avoided by the Proposed Right-of-Way and Proposed Alignment. If avoidance is not possible, the sites may be investigated to determine the potential to be eligible for listing on the NRHP. If field investigations are proposed, the Applicants will consult with SHPO to determine proper field survey protocols.

2.5.2.3 Potential Mitigation

The Applicants will consult with SHPO and, if necessary, identify potential mitigation measures including evaluation and possible data recovery.

2.5.3 Historic Cemeteries

2.5.3.1 Resource Analysis of the Proposed Route

Review of the historic cemeteries recorded on the OSA Portal identified four historic cemeteries located within 1 mile of the Proposed Route and one historic cemetery within the Proposed Route. Review of topographic maps and aerial photography allowed the Applicants to identify the precise location of the Forest Hill Cemetery as outside of the Proposed Route.

2.5.3.2 Potential Impacts

The ROI for historic cemeteries is the Project Area. Potential impacts to historic cemeteries include any ground disturbance within areas with known or suspected human burials. Review of the historic and modern aerial photographs, and topographic maps did not identify any cemeteries within the Project Area. Furthermore, one historic cemetery that was initially identified as potentially being within the Proposed Route was identified as being outside of the Proposed Route. As a result, impacts to historic cemeteries are expected to be negligible and no mitigation is proposed.

All prehistoric and historic cemeteries are protected by the Minnesota Private Cemeteries Act (Minn. Stat. § 307.08); therefore, should unknown cemeteries be identified during a Phase I archaeological survey or during construction, the Applicants will avoid them. avoidance is possible.

2.5.3.3 Potential Mitigation

The Applicants will avoid impacts to cemeteries; therefore, no mitigation is proposed. The Applicants will also have an unanticipated discoveries plan in place to provide guidelines for any human skeletal remains or evidence of burials identified during construction.

2.6 NATURAL ENVIRONMENT

2.6.1 Air Quality

2.6.1.1 Resources Within the Proposed Route

2.6.1.1.1 Criteria Pollutants

The Clean Air Act (42 United States Code § 7401 *et seq*. as amended in 1977 and 1990) is the principal federal statute governing air pollution. Under the Clean Air Act, the EPA set National Ambient Air Quality Standards ("NAAQS") for six "criteria" pollutants considered harmful to public health and the environment: carbon monoxide ("CO"), ozone, nitrogen dioxide ("NO_2"), sulfur dioxide ("SO_2"), lead, particulate matter equal to or less than 10 microns in diameter ("PM_{10}"), and fine particulate matter equal to or less than 2.5 microns in diameter ("$PM_{2.5}$"). The NAAQS include primary standards that are designed to protect human health and secondary standards that are intended to protect public welfare, including visibility and damage to crops and vegetation.

The EPA and state agencies operate a system of air quality monitoring stations. Data from these monitoring stations are compared to the NAAQS to categorize the air quality of a particular area. Regions of the country that do not meet the NAAQS are designated as "nonattainment" areas. Some areas of the country do not have extensive air quality monitoring networks and are considered "unclassifiable." Unclassifiable regions are presumed to be in attainment with the NAAQS. St. Louis County is in attainment with all NAAQS, but Itasca County is designated as unclassifiable with all NAAQS.

The MPCA MNRISKS model was used to evaluate the air quality near the Proposed Route. For Itasca County, the Project Route is near Census Tract 4806 – Block Group 1, Block Group 2, and Block Group 3. For St. Louis County, the census tracts and block groups near the Project Route are as follows: Census Tract 111.01 – Block Group 1; Census Tract 111.02 – Block Group 2, Block Group 3, and Block Group 4; Census Tract 112 – Block Group 1 and Block Group 2; and Census Tract 113 - Block Group 1. Table 29 shows the air quality score for the census tracts and blocks in Itasca County and St. Louis County.

Table 29. Project Route – Air Quality Scores

Census Tract – Block Group	Air Quality Score[1]
Itasca County	
CT 4806 – BG 1	0.10
CT 4806 – BG 2	0.08
CT 4806 – BG 3	0.08
St. Louis County	
CT 111.01 – BG 1	0.03
CT 111.02 – BG 2	0.03
CT 111.02 – BG 3	0.04
CT 111.02 – BG 4	0.06
CT 112 – BG 1	0.10
CT 112 – BG2	0.08
CT 113 – BG 1	0.06

[1] "Understanding Environmental Justice in Minnesota: Air Pollution Score," Minnesota Pollution Control Agency. Available at https://experience.arcgis.com/experience/bff19459422443d0816b632be0c25228/page/Page?views=Air-pollution-score. Last accessed August 2025.

Note: CT – Census Tract; BG – Block Group

The air quality scores in the Proposed Route are in the lower 10 percentile of air scores in Minnesota; the air quality is better than 90 percent of the state. Additionally, air scores are below health benchmarks. A health benchmark is "an amount of air pollution that is unlikely to result in health effects in sensitive populations after a lifetime of exposure."

The Air Quality Index ("AQI") is a measure that is used to communicate with the public about the quality of the air and how it might affect a person's health. In 2023, Ely's monitoring station, which includes St. Louis County, reported 282 "good" AQIs, 81 "moderate" AQIs, and 2 "unhealthy for sensitive groups" AQIs. Leech Lake's monitoring station, which includes Itasca County, reported 260 "good" AQIs, 94 "moderate" AQIs, and 5 "unhealthy for sensitive groups" AQIs.[66] The majority of AQI days not receiving a rating of "good" resulted from elevated levels of $PM_{2.5}$. "In Minnesota, higher AQIs in the summer are increasingly attributed to smoke from the Canadian wildfires and those in the northern Rockies."[67] This trend is expected to continue.

Corona can produce ozone and oxides of nitrogen ("NO_x") in the air surrounding the conductor. Ozone is a very reactive form of oxygen molecule that readily combines with other elements and compounds in the atmosphere, making it relatively short lived. Ozone forms naturally in the lower atmosphere from lightning discharges and from reactions between solar ultraviolet radiation and air pollutants such as hydrocarbons from auto emissions. The natural production rate of ozone is directly proportional to temperature and sunlight, and inversely proportional to humidity. Thus, the

[66] "Annual AQI Days," Minnesota Pollution Control Agency. Available at https://data.pca.state.mn.us/views/Minnesotaairqualityindex/AQIExternal?%3Aembed=y&%3AisGuestRedirectFromVizportal=y. Last accessed August 2025.
[67] "Understanding the Air Quality Index (AQI)," Minnesota Pollution Control Agency. Available at https://www.pca.state.mn.us/air-water-land-climate/understanding-the-air-quality-index-aqi. Last accessed August 2025.

conditions that are most likely to cause corona formation on a 345 kV transmission line—humid, rainy, or foggy conditions—actually inhibit the production of ozone.

2.6.1.2 Potential Impacts

The ROI for air quality is Itasca and St. Louis Counties. Potential impacts during construction are expected to be short-term, of a small size, and not affect a unique resource. Temporary and localized air quality impacts caused by construction vehicle emissions and fugitive dust from clearing and construction are expected to occur. Exhaust emissions from diesel equipment will vary by construction activity but will be minimal and temporary. The magnitude of emissions is influenced heavily by weather conditions and the specific construction activity taking place. Exhaust emissions will be minimized by keeping vehicles and equipment in good working order, not running equipment unless necessary, and minimizing the number of driving trips. Appropriate dust control measures will be implemented, including but not limited to:

- Reduced speed limits on unpaved roads, and use of water or other non-chloride-containing dust suppressants.
- Water application to the Proposed Right-of-Way or substation sites if wind erosion occurs during dry weather;
- Street sweeping where soils are tracked onto paved roads; and
- If soil is wet during construction activities, vehicle tracking of soil from work areas (that could dry and become sources of fugitive dust emissions) will be minimized by using wooden or plastic matting at access points.
- Disturbed areas will be restored to their original condition to the maximum extent practicable, which will indirectly mitigate impacts to air quality by reducing the potential for soil erosion.

At the completion of construction activities, all construction-related air impacts would cease and be negligible.

2.6.1.2.1 Emissions Related to Construction

During construction of the transmission line and expansion to the St. Louis County Substation and Arrowhead Substation, temporary air emissions will occur from the operation of construction equipment, vehicular traffic, and soil disturbance. Fugitive dust emissions will occur from vehicle traffic on temporary access roads and soil disturbance from construction. Construction activities will be performed with standard heavy equipment such as backhoes, cranes, boom trucks, and assorted small vehicles. The Applicants anticipate beginning to expand the substations and construct the transmission line in spring 2029, with an in-service date by 2032.

Table 30 summarizes the estimated potential emissions of criteria pollutants from construction activities for the Project. Construction emissions are based on typical counts of diesel-fueled construction equipment, expected hours of operation, and estimated vehicle miles traveled. Detailed construction emission calculations for the transmission line and substations are provided as Appendix T of the Application.

Table 30. Construction Emission of Criteria Pollutants (tons)

Description	NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$
Off-Road Engine Emissions	12.30	2.98	0.88	0.01	0.48	0.48
Unpaved Roads	--	--	--	--	1.89	0.19
Earthmoving	--	--	--	--	2.07	0.22
TOTAL	12.30	2.98	0.88	0.01	4.45	.089

NO_X Nitrogen oxides
CO Carbon monoxide
VOC Volatile organic compound
SO_2 Sulfur dioxide
PM_{10} Particulate matter equal to or less than 10 microns in diameter
$PM_{2.5}$ Fine particulate matter equal to or less than 2.5 microns in diameter

2.6.1.2.2 Emissions Related to Operation

There will be minimal operational emissions from the Project substations. Corona effects may occur from transmission lines when the electric field causes breakdown or ionization of air within a few centimeters of the conductor. Corona usually occurs when an impurity, such as a nick or a water droplet, is present on the conductor. The ionization of the air can produce minor amounts of ozone and oxides of nitrogen.[68]

As discussed above, the EPA has set NAAQS for both ozone and one oxide of nitrogen, NO2. The NAAQS for ozone is 0.070 ppm on an eight-hour averaging period. The NAAQS for NO2 is 100 ppb on a one-hour averaging period and 53 ppb on an annual averaging period. The operation of the transmission lines will not produce a concentration of either ozone or NO2 that would exceed these thresholds.

2.6.1.3 Potential Mitigation

No impacts to air quality are anticipated due to the operation of the transmission line or substations; therefore, no mitigation is required.

2.6.2 Climate Change and Resilience

2.6.2.1 Resource Analysis of the Proposed Route

Climate change is the change in global or regional climate patterns over time. Changes in average precipitation or temperature over years or decades may indicate climate change. Generally, Minnesota's climate already is changing and will continue to do so. Noticeable effects in the future include warmer periods during winter and at night, increased precipitation, heavier downpours, increased summer heat, and the potential for longer dry spells.[69]

The State of Minnesota is taking significant action to reduce the amount of greenhouse gas emissions produced in the state. As of 2022, Minnesota has experienced a 14 percent reduction

[68] US. Department of Energy, Bonneville Power Administration. 1989. Available at https://la-dwh.com/wp-content/uploads/2018/02/8.2.4.6.1.5.4_BPA-1989breton.pdf.
[69] "Climate Trends," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/climate/climate_change_info/climate-trends.html. Last accessed August 2025.

in greenhouse gas emissions across all sectors based on 2005 levels.[70] While emissions caused by electrical generation decreased by 50 percent, greenhouse gas emissions from agriculture, residential, commercial, and industrial sources increased. Transportation is now the highest emitting source of greenhouse gas emissions in Minnesota.[71]

The Applicants reviewed climate trends for St. Louis County and Itasca County using the MnDNR Minnesota Climate Trends website. From 1985 to 2025, St. Louis County and Itasca County experienced an increase in overall temperature of 0.27 degree and 0.31 degree Fahrenheit per decade, respectively. During this same period, the average low temperature increased 0.35 degree and 0.38 degree Fahrenheit per decade for St. Louis County and Itasca County, respectively. Precipitation has increased by 0.22 inch and 0.12 inch per decade for St. Louis County and Itasca County, respectively.[72] The overall drought severity index shows a trend of 0.18, per decade, for both counties. This is based on the Palmer Drought Severity Index, which is an index that generally corresponds to moisture excess or deficit. A positive number represents moisture excess, so 0.18 per decade corresponds with less severe drought over time.

2.6.2.1.1 Climate Mapping for Resilience and Adaptation Tool

The Climate Mapping for Resilience and Adaptation Tool[73] estimates the occurrence of extreme heat, drought, and flooding hazards into the 2090s. To provide conservative estimates, the "higher emissions" category was used. Estimates are associated with an increase or decrease from the baseline period of 1976 to 2005.

Heat

According to climate projections for 2015-2044 in the Climate Mapping for Resilience and Adaptation Tool, the number of annual days in St. Louis County with a maximum temperature above 90, 95, and 100 degrees Fahrenheit could increase by 6.4 days, 1.6 days, and 0.2 day, respectively. The number of annual days in Itasca County with a maximum temperature above 90, 95, and 100 degrees Fahrenheit could increase by 8.2 days, 2.0 days, and 0.2 day, respectively. Cooling degree days, a measure associated with the demand for energy to cool buildings, might increase from 231.6 to 519.4 days between years 2015 and 2044, showing an increase in demand for electricity in Itasca County. During the same time period, cooling degree days for St. Louis County might also increase, from 201.2 to 405.1 days. These projections have been modeled by the Climate Mapping for Resilience and Adaptation Tool and consider atmospheric trends in the Project area; the projections are not a reflection of effects of the Project but are, instead, projected changes in temperature that should be considered when the Project is designed.

[70] Minnesota Pollution Control Agency and Department of Commerce, *Greenhouse Gas Emissions in Minnesota 2005-2022: Biennial Inventory Report Tracking the State's Greenhouse Gas Emissions Contributing to Climate Change.* Report to Legislature (January 2025). Available at https://www.pca.state.mn.us/sites/default/files/lraq-3sy25.pdf. Last accessed August 2025.
[71] "Minnesota Greenhouse Gas Inventory. GHG Emissions and Sequestration from 2005 to 2022, by Sector." Minnesota Pollution Control Agency. Available at https://data.pca.state.mn.us/views/Greenhousegasemissionsdata/Emissionsbysector2005-2022?%3Aembed=y&%3AisGuestRedirectFromVizportal=y. Last accessed August 2025.
[72] "Minnesota Climate Trends," Minnesota Department of Natural Resources. Available at https://arcgis.dnr.state.mn.us/ewr/climatetrends. Last accessed August 2025.
[73] "Climate Mapping for Resilience and Adaptation Assessment Tool." Available at https://livingatlas.arcgis.com/assessment-tool/explore/details. Last accessed August 2025.

Drought and Flooding

According to climate projections for 2015-2044 in the Climate Mapping for Resilience and Adaptation Tool, average annual precipitation could increase by 1.2 inches in St. Louis County and increase by 1.0 inch in Itasca County. No significant change in the number of days per year with or without precipitation or the maximum number of consecutive dry days is predicted between 2025 and 2044. Additionally, while total precipitation could increase, that increase is not expected to significantly change the number of consecutive wet days or the number of days with greater than 1, 2, or 3 inches of total precipitation. Given this increase in precipitation, metrics related to wildfire potential remain steady. These projections have been modeled by the Climate Mapping for Resilience and Adaptation Tool and consider atmospheric trends in the Project area; the projections are not a reflection of effects of the Project but are, instead, projected changes in precipitation that should be considered when the Project is designed.

2.6.2.2 Potential Impacts

The ROI for climate change and resilience is Itasca and St. Louis Counties. Potential impacts are anticipated to be short-term, of a small size, with water resources, and an affected unique resource. The Proposed Route is located within a mapped floodplain; however, minimal to no increased risks associated with flooding are anticipated. Section 2.6.4.2.4 – Floodplains – has more detail regarding the mapped floodplains crossed by the Proposed Route.

Transmission lines and substations are designed with extreme weather in mind, mitigating potential effects from the chance of increased number and intensity of severe storms. The transmission line will be a durable, weather resistant line, and the new substation structures will be built to withstand severe weather conditions. Wildfire risks are not anticipated to increase over future conditions.

The Climate Mapping for Resilience and Adaptation Tool shows that more electricity will be needed to cool homes. The Project helps to maintain the resiliency of the electrical grid in St. Louis County and Itasca County, protecting customers from extreme heat events. This impact will be moderate, long-term, and positive.

The Applicants are actively assessing risks to the reliable operation of its transmission system from the potential impacts of climate change and are working on opportunities to mitigate those risks. Resiliency and extreme weather are fundamental considerations in the justification, development, and design of new transmission in recent years, including the Project and other recent transmission projects.[74]

2.6.2.3 Potential Mitigation

The Applicants will implement the avoidance and minimization efforts described above; therefore, no mitigation is proposed.

[74] See Sections 2.1.4, 3.2.2, 3.4.6, 3.5.2, and 3.5.3; *In the Matter of the Application of Minnesota Power and Great River Energy for the Northland Reliability Project*, Docket Nos. E015,ET2/CN-22-416 and E015,ET2/TL-22-415, APPLICATION (Aug. 4, 2023); *In the Matter of the Application of Minnesota Power for the HVDC Modernization Project*, Docket Nos. E015/CN-22-607 and E015/TL-22-611, APPLICATION (June 1, 2023).

2.6.3 Greenhouse Gas Emissions from Construction and Operation

2.6.3.1 Emissions Related to Construction

Construction of the transmission line and substation modifications will result in temporary minor greenhouse gas emissions from fuel combustion in construction equipment, commuter vehicles, and delivery trucks. Table 31 summarizes the estimated potential emissions of greenhouse gas from construction activities for the Project. Emissions are based on typical counts of diesel-fueled construction equipment, expected hours of operation, and estimated vehicle miles traveled. Detailed greenhouse gas emission calculations for the transmission line and substations are provided as Appendix T of the Application. At the completion of construction activities, all construction-related greenhouse gas emissions would cease.

Additionally, construction of the Project will result in permanent conversion of some forested areas to unforested areas. This land use change will alter the impacted area's ability to serve as a carbon sink. Impacts from land use change were calculated using the climate calculator prepared by the Minnesota Environmental Quality Board.[75]

Table 31. Preliminary Estimate of Greenhouse Gas Emissions[76]

Description	CO_2 (Short Tons)	CH_4 (Short Tons)	N_2O (Short Tons)	CO_2e (Short Tons)
Off-Road Engine Emissions	551.17	0.02	0.00	552.98
Commuters and Delivery Vehicles	118.75	0.00	0.00	118.75
Land Use Change	604.80	--	--	604.80
TOTAL	**1,274.72**	**0.02**	**0.00**	**1,276.53**

CO_2 carbon dioxide
CH_4 methane; 1 short ton CH_4 = 28 short tons CO_2e
N_2O nitrous oxide; 1 short ton N_2O = 265 short tons CO_2e
CO_2e carbon dioxide equivalent

2.6.3.2 Emissions Related to Operation

Greenhouse gas emissions associated with operation of the Project include vehicle and equipment emissions related to inspections and maintenance activities. Vegetation clearing is expected to occur every 5 to 7 years. Maintenance activities will occur as necessary but are not expected to be needed on a regular basis. Sulfur hexafluoride ("SF_6"), a greenhouse gas, is used as an insulating material in substation breakers. Under normal operations, the SF_6 remains contained in the breakers and is not released into the atmosphere.

[75] Minnesota Environmental Quality Board. 2025. Climate Calculator. Available at https://engage.eqb.state.mn.us/ghgcalculator. Last accessed December 2025.
[76] 40 CFR 1 § 98, Table A-1—Global Warming Potentials, 100-Year Time Horizon, updated 2025. Available at https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98#Table-A-1-to-Subpart-A-of-Part-98. Last accessed September 2025.

2.6.3.3 Potential Impacts

The ROI for greenhouse gas emissions is Itasca and St. Louis Counties. Minnesota's Greenhouse Gas Inventory[77] shows emissions within Minnesota totaled 126,140,738 metric tons (139,046,363 short tons) of CO_2e in 2022 and the preliminary estimate of Project greenhouse gas emissions is 1,276.53 short tons of CO_2. Currently, there are no Minnesota-specific thresholds of significance for determining impacts of GHG emissions from an individual project on global climate change. In the absence of such a threshold, Minnesota Rule 4410.4300, Subp. 15, Part B, establishes a mandatory category requiring preparation of an EAW for stationary source facilities generating 100,000 tons of GHGs per year. The purpose of an EAW is to assess whether a proposed project has the potential to result in significant environmental effects, which aids in determining whether an Environmental Impact Statement is needed. Regarding GHG emissions, state regulations establish 100,000 tons per year as the threshold to prepare an EAW to aid in determining if potential significant environmental effects might exist. A reasonable conclusion is that a project with GHG emissions below 100,000 tons per year does not have the potential to result in significant GHG effects.

The Applicants will mitigate vehicle emissions by ensuring its construction contractor keeps equipment in good working order and limits vehicle idling.

Direct impacts from operation of the project are limited to inspection and maintenance activities, which will be minimal, intermittent and short term. The Applicants will monitor the SF_6 gas levels in the breakers as part of routine monitoring of substation equipment. Should a loss of SF_6 be detected, the SF_6 is extracted to a separate tank to allow the breaker to be repaired. Any gas collected from decommissioned breakers is shipped offsite for recycling. Indirect impacts are associated with consumption of the electricity provided by the transmission line.

2.6.3.4 Potential Mitigation

The Applicants will implement the avoidance and minimization efforts described above; therefore, no mitigation is proposed.

2.6.4 Water Resources

2.6.4.1 Groundwater

The MnDNR divides Minnesota into six groundwater provinces based on bedrock and glacial geology. The Proposed Route is located within the central Province where surficial and buried sand and gravel aquafers are common, but the underlying bedrock are typically limited aquifers.[78] The depth to the water table for much of the Proposed Route is less than 10 feet; however, there are areas in the western and eastern portions of the Proposed Route where the depth to the water

[77] "Minnesota Greenhouse Gas Inventory: Minnesota's Greenhouse Gas Emissions and Statutory Goals, 2005 – 2022," Minnesota Pollution Control Agency. Available at https://data.pca.state.mn.us/views/Greenhousegasemissionsdata/TotalGHGemissionsgoals?%3Aembed=y&%3AisGuestRedirectFromVizportal=y. Last accessed August 2025.

[78] Minnesota Department of Natural Resources, "Minnesota Groundwater Provinces 2021." Available at https://files.dnr.state.mn.us/waters/groundwater_section/mapping/provinces/2021-provinces.pdf. Last accessed August 2025.

table is 50 feet or greater.[79] A review of the Minnesota Department of Health ("MDH"), Minnesota Well Index[80] identified multiple private wells mapped within the Proposed Route but no municipal water supply wells. No MDH wellhead protection areas[81] or EPA sole source aquifers[82] are located within the Proposed Route. Additionally, the Applicants did not identify any springs within the Proposed Route (Section 2.7.2).

Drinking Water Supply Management Areas ("DWSMAs") include wellhead protection areas and are managed under a wellhead protection plan, usually by a city. Based on information available through the MDH, the Proposed Route does not intersect a DWSMA.[83]

The County Well Index ("CWI") is a database that contains subsurface information for over 533,000 water wells in Minnesota. The CWI is maintained by the Minnesota Geological Survey ("MGS") in partnership with the MDH. The data are derived from well contractor logs of geologic materials encountered during drilling and later interpreted by geologists at the MGS.[84]

The CWI indicates that there are 64 verified wells and 6 unverified wells located within 200 feet of the Proposed Route, and of those wells, 6 wells are located within 200 feet of the Proposed Alignment. The wells are identified in Table 32.

Table 32. CWI Wells Within 200 Feet of the Proposed Route

Unique ID	Verified / Unverified	Surface Elevation[a]	Static Water Level Elevation[a]	Static Water Level[b] (Depth to Water)	Status	Use
682612	Verified	1431	1284	147	Active	Domestic
105411	Verified	1356	1284	72	Active	Domestic
530582	Verified	1356	1286	70	Active	Domestic
751462	Verified	1336	1286	50	Active	Domestic
279487	Verified	1318	1284.2	33.8	Unknown	Industrial
279488	Verified	1318	1284.7	33.3	Unknown	Observation
279489	Verified	1321	1284.1	36.9	Unknown	Observation
703755	Verified	1315	1273	42	Active	Industrial

[79] Minnesota Geospatial Commons. "Water-Table Elevation and Depth to Water Table." Minnesota Hydrogeological Atlas series HG-03 (2016). Available at https://gisdata.mn.gov/dataset/geos-hydrogeology-atlas-hg03. Last accessed August 2025.
[80] "Minnesota Well Index," Minnesota Department of Health. Available at https://mnwellindex.web.health.state.mn.us/#. Last accessed September 2025.
[81] "Source Water Protection Web Map Viewer," Minnesota Department of Health. Available at https://experience.arcgis.com/experience/14825b159b2e4dc686736d98e39ebce7. Last accessed August 2025.
[82] "Sole Source Aquifers," U.S. Environmental Protection Agency. Available at https://experience.arcgis.com/experience/1bfab371d71e4b868fc9ae7df62a16fe. Last accessed August 2025.
[83] "Source Water Protection Web Map Viewer." Available at https://experience.arcgis.com/experience/14825b159b2e4dc686736d98e39ebce7. Last accessed August 2025.
[84] "Minnesota Well Index." Available at https://mnwellindex.web.health.state.mn.us/#. Last accessed September 2025.

Unique ID	Verified / Unverified	Surface Elevation[a]	Static Water Level Elevation[a]	Static Water Level[b] (Depth to Water)	Status	Use
697006	Verified	1315	1276	39	Active	Industrial
786235	Verified	1336	1251	85	Active	Domestic
251883	Verified	1321	1283.2	37.8	Active	Industrial
251882	Verified	1318	1291.4	26.6	Active	Industrial
143009	Verified	1321	1282	39	Active	Domestic
160987	Verified	1303	1277	26	Active	Domestic
513605	Verified	1321	1301	20	Active	Domestic
743182	Verified	1319	1304	15	Active	Domestic
114975	Verified	1327	1267	60	Active	Domestic
114877	Verified	1345	1310	35	Active	Domestic
717423	Verified	1320	1301	19	Active	Domestic
494403*	Verified	1321	1306	15	Active	Domestic
612034*	Verified	1319	1301	18	Active	Domestic
433458	Verified	1326	1306	20	Active	Domestic
701662	Verified	1357	1339	18	Active	Domestic
111677	Verified	1364	1328	36	Active	Domestic
469159	Verified	1368	1338	30	Active	Domestic
697457	Verified	1355	1330	25	Active	Domestic
822653	Verified	1361	1331	30	Active	Domestic
164625	Verified	1365	1351	14	Active	Domestic
755816	Verified	1355	1323	32	Active	Domestic
164612	Verified	1352	1345	7	Active	Domestic
164611	Verified	1352	1344	8	Active	Domestic
739090	Verified	1358	1327	31	Active	Domestic
688576	Verified	1358	1348	10	Active	Domestic
695349	Verified	1360	1345	15	Active	Domestic
617917	Verified	1356	1346	10	Active	Domestic
764537	Verified	1362	1312	50	Active	Domestic
583758	Verified	1367	1327	40	Active	Domestic
112288	Verified	1353	1319	34	Active	Domestic

Unique ID	Verified / Unverified	Surface Elevation[a]	Static Water Level Elevation[a]	Static Water Level[b] (Depth to Water)	Status	Use
141111	Verified	1332	1329	3	Active	Domestic
793006	Verified	1330	1318	12	Active	Domestic
479209	Verified	1363	1313	50	Active	Domestic
813098	Verified	1331	1325	6	Active	Domestic
625670	Verified	1359	1314	45	Active	Domestic
835715	Verified	1342	1322	20	Active	Domestic
746189	Verified	1347	1283	64	Active	Domestic
469911	Verified	1338	1323	15	Active	Domestic
746199*	Verified	1349	1305	44	Active	Public supply
445593	Verified	1363	1327	36	Active	Domestic
827653	Verified	1332	1307	25	Active	Domestic
461226	Verified	1273	1252	21	Active	Domestic
613990	Verified	1291	Unknown	Unknown	Active	Domestic
144403	Verified	1334	1294	40	Active	Domestic
140854	Verified	1334	1294	40	Active	Domestic
882815	Verified	1340	Unknown	Unknown	Unknown	Unknown
813971	Verified	1331	Unknown	Unknown	Active	Domestic
650139	Verified	1310	1300	10	Active	Domestic
765608	Verified	1319	1296	23	Active	Domestic
604578	Verified	1327	1274	53	Active	Domestic
708851	Verified	1337	1319	18	Active	Domestic
668961	Verified	1323	1280.8	42.2	Active	Domestic
140389	Verified	1348	1298	50	Active	Domestic
802666	Verified	1265	1244	21	Active	Domestic
629788	Verified	1254	1246	8	Active	Domestic
740053	Verified	1259	1258	1	Active	Domestic
874803	Unverified	Unknown	Unknown	Unknown	Active	Domestic
172055*	Unverified	Unknown	Unknown	Unknown	Active	Domestic
141171	Unverified	Unknown	Unknown	Unknown	Active	Domestic

Unique ID	Verified / Unverified	Surface Elevation[a]	Static Water Level Elevation[a]	Static Water Level[b] (Depth to Water)	Status	Use
798474	Unverified	Unknown	Unknown	Unknown	Active	Domestic
1000029482*	Unverified	Unknown	Unknown	Unknown	Unknown	Unknown
1000029493*	Unverified	Unknown	Unknown	Unknown	Unknown	Unknown

[a] Feet above mean sea level

[b] Feet below ground surface

* Well is located within 200 feet of the Proposed Alignment

2.6.4.1.1 Potential Impacts

The ROI for groundwater is the Project Area. The Applicants anticipate minimal impacts to groundwater as a result of the Project. Structure foundations will generally range from 30 feet to 50 feet in depth and will be comprised of steel reinforced concrete, which is non-hazardous. Any effects on water tables would be negligible. The Applicants will conduct geotechnical investigations to help identify areas with shallow depth to groundwater, which may require specialty foundation designs.

The Applicants will stage all equipment over 200 feet from known well locations. If a spill occurs, Emergency Response Plans will be followed (*see* Section 2.1.7). A contact list of well owners will be prepared and provided to the MDH prior to construction.

Impacts to surface waters can lead to indirect impacts to groundwater. For example, construction activities can directly or indirectly lead to increased turbidity of surface waters through sedimentation. These contaminated surface waters might then flow to groundwater. Contamination is not limited to sediment, as any surface water pollutant, such as oil, can reach groundwater. Surface water impacts are discussed more in the Surface Water section of this EA.

Finally, the transmission lines will be located a sufficient distance from existing wells to allow safe and legal access for maintenance, service, or sealing with a drill rig, or provide accommodation to well owners. This accommodation could include relocation of the well to provide similar chemistry and supply to the owner and properly abandoning the impacted well. The Applicants will continue to work with landowners to identify any springs or wells near the Project Alignment that may not be included in publicly accessible data.

It is possible that pole installation or substation site preparation will encounter groundwater. Excavations may therefore require construction dewatering. A water use permit from the MDNR is required for all uses withdrawing more than 10,000 gallons of water per day or 1 million gallons per year. The Applicants do not expect to exceed this permitting threshold; however, if higher groundwater levels are expected to occur, the Applicants will obtain coverage under the MDNR's Temporary Projects General Permit No 1997-0005, which authorizes temporary water appropriation for construction dewatering. Regardless, any effects on water tables would be localized and short term and would not result in significant impacts to hydrologic resources.

2.6.4.1.1 Potential Mitigation

Impacts on groundwater are anticipated to be minimal; therefore, no mitigation is proposed.

2.6.4.2 Surface Water

Surface water features located within the Proposed Route include wetlands, lakes, rivers, and floodplains. These features perform several important functions including water supply, flood attenuation, groundwater recharge, water quality protection, and wildlife habitat. The Proposed Route lies within the Mississippi River – Grand Rapids (HUC 07010103), St. Louis River (HUC 04010201), and Cloquet River (HUC 04010202) watersheds in northeast Minnesota.

2.6.4.2.1 Stormwater

Runoff from rain events and snowmelt can transport sediment and pollutants to both surface and groundwater. Construction activities involving vegetation removal and earth disturbance can increase the risk of stormwater runoff and associated impacts. Stormwater management is regulated by the MPCA "to limit stormwater runoff and reduce pollution from stormwater"[85] under the National Pollutant Discharge Elimination System ("NPDES") and State Disposal System ("SDS") permits.

Potential Impacts

The ROI for stormwater is the Proposed Right-of-Way. Impacts on stormwater from the Project are expected to be minimal and the Applicants will implement the conditions associated with the permits described below.

The Applicants will seek coverage under the MPCA's Construction Stormwater General Permit (MNR100001). A Stormwater Pollution Prevention Plan ("SWPPP") will be prepared for the Project. This plan will outline best management practices ("BMPs") to reduce erosion and sedimentation during construction. The Applicants will implement both temporary and permanent erosion control measures. These erosion and sediment control devices will be regularly inspected, maintained, repaired, and replaced as needed, in accordance with the MPCA General Permit and the construction SWPPP.

To protect water resources, no fueling, vehicle maintenance, or herbicide application will occur within 100 feet of streams, ditches, or other waterways. Construction materials such as fuels, lubricants, paints, and solvents will be stored away from waterbodies in compliance with regulations. Any spills or leaks will be cleaned up immediately, and any leaking equipment will be removed for repair.

In areas near impaired waters, the Project will follow the additional BMPs required by Section 23.1 of Permit MNR100001, which outlines specific protections for special and impaired waters (*see* Section 2.6.4.2.2).

[85] "Stormwater Permits," Minnesota Pollution Control Agency. Available at https://www.pca.state.mn.us/business-with-us/stormwater-permits. Last accessed August 2025.

Potential Mitigation

Impacts on stormwater from the Project are expected to be minimal; therefore, no additional mitigation is proposed, except those conditions associated with the required permits.

2.6.4.2.2 Impaired Waters

Under Section 303(d) of the Federal Clean Water Act, the MPCA assesses all waters of the state and creates a list every 2 years of streams and lakes that are not meeting their designated uses because of various impairments. The listings are based on water quality monitoring of lakes and major streams and are used to set pollutant reduction goals needed to restore waters to the extent that they meet water quality standards for designated uses, which are referred to as total maximum daily loads. The list, known as the 303(d) list, is based on violations of water quality standards. These waters are described as "impaired." In Minnesota, the MPCA has jurisdiction over determining 303(d) waters, but the EPA approves the 303(d) list. The 303(d) list was approved by the EPA in April 2024.[86]

The Proposed Route contains six streams identified as impaired waters. The Proposed Alignment crosses six impaired streams (St. Louis River, Pine River, Floodwood River, Vaara Creek, Cloquet River and West Rocky Run, also referred to as Rocky Run).[87] No impaired lakes were mapped within the Proposed Route. Impaired waters crossed by the Proposed Alignment are shown on Map 6. Stream impairments for these six streams include mercury in fish tissue, mercury in water column, total suspended solids, fish bioassessments, benthic macroinvertebrate bioassessments, and *Escherichia coli* ("*E. coli*"). Table 33 summarizes the waterway impairment and provides a status of an approved plan.

Table 33. Summary of Impaired Waters

Waterway	Impairment	Affected Use	Plan Status
St. Louis River	Hg-F / TSS	Aquatic Consumption / Aquatic Life	Need for Hg-F / TSS
White Pine River	*E. coli*	Aquatic Recreation	Approved for *E. coli*
Floodwood River	*E. coli* / Hg-W	Aquatic Consumption / Aquatic Recreation	Needed for *E. coli* / Hg-W
Vaara Creek	Fishes Bio / Invert Bio	Aquatic Life	Need for Fishes Bio / Invert Bio
Cloquet River	Hg-F / Hg-W	Aquatic Consumption	Needed for Hg-F / Hg-W
West Rocky Run	*E. coli*	Aquatic Recreation	Approved for *E. coli*

Hg-F Mercury in fish tissue
Hg-W Mercury in water column
TSS Total Suspended Solids
Bio Fish Bioassessments
Invert Bio Aquatic Macroinvertebrate Bioassessments

[86] "Minnesota's 2024 Impaired Waters List," Minnesota Pollution Control Agency. Available at https://www.pca.state.mn.us/air-water-land-climate/minnesotas-impaired-waters-list. Last accessed August 2025.
[87] "Impaired Streams, Minnesota, 2024," Minnesota Pollution Control Agency. Available at https://resources.gisdata.mn.gov/pub/gdrs/data/pub/us_mn_state_pca/env_impaired_water_2024/metadata/impaired_2024_streams.html. Last accessed August 2025.

Potential Impacts

The ROI for impaired waters is the Project Area. The Project will be designed to place new transmission structures outside of surface waters and the transmission lines will span the waters; therefore, impacts are anticipated to be minimal. No proposed Project activities are likely to exacerbate the existing impairments for *E. coli* or mercury. Construction of the Project could result in temporary erosion of soils and increased potential for sedimentation to surface waters. The implementation of an approved erosion and sediment pollutant control plan and SWPPP through the NPDES and SDS permit process (as well as the Clean Water Act permit conditions, if needed) will result in abatement measures that will prevent or minimize surface water impacts (i.e. stormwater runoff) that could affect water quality. As a result, the effects of Project construction upon water quality are expected to be minimal with the implementation of BMPs and compliance with state and federal permit conditions and will not exacerbate total suspended solids ("TSS").

Associated features such as laydown areas and access roads will be located adjacent to surface waters only when necessary to construct the Project. Erosion and sedimentation prevention BMPs will be used to preserve vegetated riparian buffers and minimize impacts on water quality. In areas near impaired waters, the Project will be constructed in accordance with NPDES permit conditions (*see* Section 23.1 of MNR100001), which defines additional BMP requirements for discharges to impaired waters. BMPs include immediate stabilization of exposed soil areas within a timely manner (seven calendar days) after the construction activity in that portion of the site temporarily or permanently ceases and incorporate temporary sediment basins for common drainage locations that serve an area with five or more acres disturbed at one time. In order to protect water quality within the ROI, the BMPs identified for each impaired waterway are required for those areas of the Project draining to a discharge point on the Project that is within one mile (aerial radius measurement) of impaired water and flows to that impaired water.

Additionally, no fueling or maintenance of vehicles or application of herbicides would occur within 100 feet of streams, ditches, and waterways to protect against the introduction of these materials into surface or groundwater systems. Materials such as fuels, lubricants, paints, and solvents required for construction would be stored away from surface water resources according to appropriate regulatory standards. Any spills or leaks would be cleaned up immediately and leaking equipment removed from the area for proper maintenance.

Potential Mitigation

No Project activities have the potential to exacerbate the identified impairment conditions in the impaired waters identified along the Proposed Alignment. Nevertheless, the Project will use prescribed and industry standard BMPs to control erosion and prevent sedimentation to surface waters; therefore, impacts on impaired waters are anticipated to be minimal and no mitigation is proposed.

2.6.4.2.3 Lakes, Rivers, and Streams

Lakes, rivers, and streams are present within the Proposed Route. The Proposed Alignment will cross approximately 32 waterways (including four perennial drainage ditches; *see* Table 35), however, one unnamed stream (ID S-002-032-004 to Floodwood) is crossed three times and Joula Creek is crossed twice. Although the streams are crossed by the Proposed Alignment, all waterways will be spanned and no structures will be placed in the waterways (*see* Map 6).

A total of 13 lakes/ponds are located within the Proposed Route; however, only one is crossed by the Proposed Alignment. Table 34 summarizes the number, classification, and designation of lakes/ponds within the Proposed Route. Lakes, rivers, and streams within the Proposed Route are shown on Map 6.

Table 34. Summary of Lakes/Ponds Within the Proposed Route and Proposed Alignment

Waterbody	Classification	Area (acres) in Proposed Route	Proposed Alignment	Mn Public Waters Designation	Impaired
Unnamed	Lake or Pond	0.7	N/A	No	No
Unnamed	Lake or Pond	0.19	N/A	No	No
Unnamed	Lake or Pond	0.61	N/A	No	No
Unnamed	Lake or Pond	0.97	N/A	No	No
Unnamed	Lake or Pond	0.98	N/A	No	No
Unnamed	Lake or Pond	3.41	N/A	No	No
Unnamed	Lake or Pond	4.2	N/A	No	No
Andy Lake	Lake	0.59	N/A	Yes	No
Unnamed	Lake or Pond	1.24	N/A	No	No
Unnamed	Lake or Pond	2.61	N/A	No	No
Unnamed	Lake or Pond	2.13	N/A	No	No
Unnamed	Lake or Pond	1.53	N/A	No	No
Unnamed	Lake or Pond	0.26	Segment 3	No	No

Public Waters

Rivers and Streams

Public waters are wetlands, water basins, and watercourses of significant recreational or natural resource value in Minnesota as defined by Minn. Stat. § 103G.005. The MnDNR has regulatory jurisdiction over these waters, which are identified on the MnDNR Public Waters Inventory maps. Public waters are illustrated on Map 6.

The Proposed Route includes 23 MnDNR public waters, which includes six rivers (West Branch Floodwood, Floodwood, St. Louis River, Cloquet River, White Pine River and Artichoke River) and 2 jurisdictional ditches (S-002-034-006 and S-002-034-009).

The Proposed Alignment crosses 23 public waters, which includes six rivers (West Branch Floodwood, Floodwood, St. Louis River, Cloquet River, White Pine River and Artichoke River), and two jurisdictional ditches (S-002-034-006 and S-002-034-009). Joula Creek is crossed at two locations. Additionally, unnamed stream S-002-032-004 is crossed by the Proposed Alignment three times. All public waters will be spanned.

Table 35. Summary of Waterway Crossings for the Proposed Alignment by Impairment, Public Water Classification, Trout Stream Designation and Stream Type

Identification	Water Feature/ Waterway	Segment	Impaired	Public Water	Designated Trout Stream	Stream Type
MAJ-12386	Unnamed Stream	Segment 1	No	No	No	Perennial
S-002-032-007	Floodwood River, West Branch	Segment 1	No	Yes	No	Perennial
S-002-032-007-003-002	Unnamed Stream	Segment 1	No	No	Yes	Intermittent
M-128-003-002	Unnamed Stream	Segment 1	No	Yes	No	Intermittent
M-128-003	Bruce Creek	Segment 1	No	Yes	No	Perennial
M-128-010	Sand Creek	Segment 1	No	Yes	Yes	Perennial
S-002-016	Cloquet River	Segment 2	Yes	Yes	No	Perennial
S-002-014	White Pine River	Segment 2	Yes	Yes	Yes	Perennial
S-002-014-002-002	Unnamed Stream	Segment 2	No	Yes	No	Perennial
S-002-014-002-004	Johnson Creek	Segment 2	No	Yes	Yes	Perennial
S-002-010-002	Hay Creek/ drainage ditch	Segment 2	No	No	No	Perennial
S-002-010-002-004	Drainage Ditch	Segment 2	No	No	No	Perennial
S-002-014-002	Dutch Slough	Segment 2	No	Yes	Yes	Unknown
S-002-014-002-003	Unnamed Stream/Railroad Creek	Segment 2	No	Yes	Yes	Perennial
S-002-014-004	Unnamed Stream	Segment 2	No	No	Yes	Perennial
S-002-016-000.5	Unnamed Stream	Segment 2	No	No	No	Perennial
S-002-029-003-001	Unnamed Stream	Segment 2	No	No	No	Intermittent
S-002-032-005	Joula Creek	Segment 1	No	Yes	No	Perennial

Identification	Water Feature/ Waterway	Segment	Impaired	Public Water	Designated Trout Stream	Stream Type
S-002-032-005	Joula Creek	Segment 1	No	Yes	No	Perennial
S-002-032-004	Unnamed Stream	Segment 1	No	Yes	No	Perennial
S-002-032-004.8	Unnamed Stream	Segment 1	No	No	No	Perennial
S-002-032	Floodwood River	Segment 1	Yes	Yes	No	Perennial
S-002-032-006	Vaara Creek	Segment 1	Yes	Yes	No	Perennial
S-002-032-008	Unnamed Stream	Segment 1	No	No	No	Perennial
S-002-034-009	Drainage Ditch	Segment 2	No	No	No	Perennial
S-002-034-006	Drainage Ditch	Segment 2	No	No	No	Perennial
S-002-018	Artichoke River	Segment 2	No	Yes	No	Perennial
S-002-010-003	West Rocky Run	Segment 3	Yes	Yes	Yes	Perennial
S-002	St. Louis River	Segment 2	Yes	Yes	No	Perennial
MAJ-14361A	Unnamed Stream	Segment 2	No	No	No	Perennial

Basins

The Proposed Route crosses two public water basins (Andy Lake and a public water wetland). Approximately 1.1 acres of Andy Lake is within the Proposed Route and approximately 28 acres of the public water wetland is within the Proposed Route. Additional information regarding wetlands is included in Section 2.6.4.2.5 - Wetlands.

The Proposed Alignment avoids Andy Lake and spans the public water wetland for approximately 1,149 linear feet.

Trout Streams

In addition to public waters, certain surface waters in Minnesota are designated by statute (Minn. R. 6264.0050) as trout streams. Trout streams in Minnesota are designated as such in order to protect and foster the propagation of trout. The Proposed Route includes nine designated trout streams.

Eight streams crossed by the Proposed Alignment are designated trout streams and identified in Table 35. Trout streams are shown on Map 6. The Applicants will continue to work with the MnDNR to minimize and avoid impacts to the trout streams to the extent practicable.

Potential Impacts

The ROI for lakes, rivers, and streams is the Project Area. Measures will be implemented throughout the Project to avoid and minimize direct impacts on lakes, rivers and streams, including public waters and trout streams, and to maintain and protect water quality. As a result, impacts on surface water resources will be minimal as the condition and function of the resource will not be considerably altered by the proposed Project. By design, a majority of the Project is co-located (approximately 97 percent) with existing transmission lines, which avoids disturbing undeveloped areas. The Applicants will design the spans to place structures outside of lakes, rivers, and streams.

Applicants will also implement BMPs as described in the Project's SWPPP prior to, during, and following construction to reduce the potential for sediment to reach surface waters, including public waters and trout streams, and to maintain water quality. Materials such as fuels, lubricants, paints, and solvents required for construction would be stored away from surface water resources according to appropriate regulatory standards. Any spills or leaks would be cleaned up immediately and leaking equipment removed from the area for proper maintenance in accordance with the approved SWPPP.

Although most surface water resources will be avoided, construction of the Project may require temporary bridges across some waterways, including public waters. Equipment bridges will be designed to meet the requirements of the MnDNR and other applicable permitting authorities, including the U.S. Army Corps of Engineers to meet requirements of Section 404 and Section 10 where applicable. Installed bridges will be removed as soon as possible during final restoration once the bridge is no longer required to complete and monitor restoration activities. Impacts associated with temporary bridges are anticipated to be negligible.

Through the license approval process, the Applicants and the MnDNR will determine the appropriate stipulations for public water crossings, which may include in-water work exclusion dates and clearing setbacks. In locations where clearing activities may take place near public waters, a stream bank buffer may be established or hand clearing techniques may be used to minimize impacts on soils and existing vegetation. Rootstock of woody vegetation will remain in place to avoid impacts on soils and allow existing vegetation to regrow more quickly.

The Applicants will span the designated trout streams and will work with the MnDNR to avoid impacts by following in-water exclusion dates. Through the NPDES permitting process the Project will be required to comply with Section 23.1 of MNR100001, which includes designated trout streams within the definition of special waters. Several BMPs are required conditions of the permit and include items such as redundant perimeter controls, the stabilization of exposed soils immediately upon completion of work, and establishment of a 100-foot buffer would be implemented to minimize erosion near MnDNR designated trout streams. Due to a number of factors, such as maintenance considerations, heat dissipation, and much higher costs, placing 345-kV electrical transmission lines underground is typically impractical and not being considered for the Project.

The Applicants will develop a Vegetation Management Plan ("VMP") (*see* Appendix M of the Application)

Potential Mitigation

The Project will use prescribed and industry standard BMPs and follow the VMP (Appendix M of the Application) to minimize impacts to public waters and trout streams; therefore, impacts on impaired waters are anticipated to be minimal and no mitigation is proposed.

2.6.4.2.4 Floodplains

FEMA defines floodplain very broadly as "any area of land susceptible to being inundated by floodwaters from any source." This is typically the area outside the channel or banks of a waterbody.[88] The floodplain includes a floodway, which is defined as the land immediately adjoining the river channel that is the natural conduit for flood waters. A floodplain, when allowed to function naturally, helps to slow stormwater runoff, improve water quality, and encompasses some of our most critical habitat and ecosystems. FEMA delineates floodplains and determines flood risks in areas susceptible to flooding for the country.[89] FEMA designates floodplain areas based on the likelihood of a flood occurring in that area every year. These areas include the 100-year floodplain, which has a 1 percent chance of flooding each year, and the 500-year floodplain, which has a 0.2 percent chance of flooding each year.[90]

The MnDNR oversees the administration of the state floodplain management program by promoting land use development to promote the health and safety of the public, minimize loss of life, and reduce economic losses caused by flood damages. In addition, the MnDNR oversees the national flood insurance program for the state of Minnesota. Work in floodplains is regulated at the local level.

FEMA data for Itasca County is incomplete. The Proposed Route intersects Areas of Undetermined Flood Hazard, which means there a flood hazard exists but has not been analyzed or determined due to a lack of a detailed flood hazard analysis. This hazard is not a 100-year or 500-year floodplain; however, the Areas of Undetermined Flood Hazard are shown on Map 7.

The Proposed Route and Proposed Alignment in St. Louis County includes FEMA 100-year floodplains associated with 10 named streams, 4 unnamed streams, and 2 floodplain areas not associated with a stream. These floodplains are associated with West Rocky Run, St. Louis River, Artichoke River, Joula Creek, Vaara Creek, Hay Creek, White Pine River, Johnson Creek, Dutch Slough, and Cloquet River and unnamed streams S-002-014-004 to White Pine River, S-002-016-000.5 to Cloquet River, S-002-032-004 to Floodwood River, and S-002-032-004.8 to Floodwood River. The area of FEMA 100-year floodplain (Zone A) within the Proposed Route includes approximately 1,095 acres and the Proposed Alignment crosses approximately 3.6 miles of floodplains (*see* Map 7). Crossings are summarized in Table 36.

The Iron Range substation is located in a flood zone D, which is undetermined. The other substations are not located within floodplains.

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[88] "Floodplain Regulations," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/waters/watermgmt_section/floodplain/regulations.html. Last accessed July 2025.
[89] "National Flood Hazard Layer Viewer," Federal Emergency Management Agency. Available at https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd. Last accessed August 2025.
[90] Minnesota Department of Natural Resources, *Floodplains and Floodplain Management* (Minnesota Department of Natural Resources, 2006). Available at https://files.dnr.state.mn.us/publications/waters/floodplain_basics.pdf. Last accessed August 2025.

Table 36. Crossings of FEMA 100-year Floodplains (Zone A) by the Proposed Alignment

Waterbody	Segment	Crossing (Miles)
West Rocky Run	3	0.06
White Pine River	2	0.17
Unnamed Tributary S-002-014-004 to White Pine River	2	0.16
Johnson Creek	2	0.11
Dutch Slough	2	0.02
Artichoke River	2	0.1
Saint Louis River	2	0.67
Cloquet River	2	0.08
Unnamed Tributary S-002-016-000.5 to Cloquet River	2	0.01
Joula Creek	1	0.08
Joula Creek	1	0.09
Vaara Creek	1	1.1
Unnamed Tributary S-002-032-004 to Floodwood River	1	0.82
Unnamed Tributary S-002-032-004.8 to Floodwood River	1	0.11
Note: FEMA 100-year floodplain data is not available for Itasca County.		

Potential Impacts

The ROI for floodplains is the Project Area. The Project may require transmission line structures to be placed within FEMA designated 100-year floodplain areas, though efforts will be made to span floodplains to the extent practicable. Temporary impacts during construction may result from access routes, structure work areas, and conductor pulling and tensioning sites. However, use of existing access roads will be incorporated, when possible, to minimize fill placement. Additionally, measures will be implemented to minimize the amount of temporary fill by reducing access road widths and workspace area to a minimum. Any encroachment would be designed to avoid impacts on floodplain function and offer the minimum obstruction to the flow of flood waters. Unavoidable placement of transmission line structures in floodplains is not anticipated to temporarily or permanently alter the flood storage capacity of the floodplain based on the minimal footprint of individual transmission line structures. Temporary impacts would be timed to occur outside of periods of seasonal flooding when practicable.

Potential Mitigation

Because floodplain function is not expected to be altered by the proposed Project, impacts on floodplains are expected to be negligible. As a result of floodplain avoidance and minimization measures during the design, no mitigation is anticipated.

2.6.4.2.5 Wetlands

Wetlands are important resources for flood abatement, wildlife habitat, and water quality. Wetlands that are hydrologically connected to the nation's navigable streams are protected under Section 404 of the federal Clean Water Act and most wetlands in Minnesota are protected under the state Wetland Conservation Act ("WCA"). The U.S. Fish and Wildlife Service ("USFWS") National Wetlands Inventory ("NWI") is a publicly available GIS database that provides information regarding the potential existence of wetlands. NWI data should be used as a reference only and may be inconsistent with wetland conditions on the ground.

Wetland types within the NWI data are classified using the Cowardin wetland and deepwater habitat classification system. The Cowardin classification system is hierarchical and defines habitats based on vegetative and sediment class along with water regime.

Based on NWI data, approximately 4,896 acres of wetlands may be present within the Proposed Route (*see* Map 8). Details on wetland types are included in Table 37.

Table 37. NWI Identified Wetlands Within the Proposed Route

Description	Acres
Freshwater Emergent Wetland	553.6
Freshwater Forested Wetland	1,173.45
Freshwater Forested/Emergent Wetland	33.52
Freshwater Forested/Shrub Wetland	913.76
Freshwater Pond	31.86
Freshwater Shrub Wetland	1,361.67
Freshwater Shrub/Emergent Wetland	768.1
Riverine	60.44
TOTAL	4,896.42

Potential Impacts

The Project Area represents the ROI for wetlands that could be affected by the construction and operation of the proposed Project. The Project may require transmission line structures to be placed within wetland areas, though efforts will be made to span wetlands to the extent practicable. Temporary impacts during construction may result from project associated features such as access routes, timber mats, structure work areas, and conductor pulling and tensioning sites. However, use of existing access roads will be incorporated, when possible, to minimize fill/timber mat placement. Additionally, measures will be implemented to minimize the amount of temporary fill by reducing access road widths and workspace area to a minimum. Any encroachment would be designed to avoid direct impacts on wetlands. Unavoidable placement of transmission line structures in wetlands is not anticipated to temporarily or permanently alter movement of surface or ground water based on the minimal footprint of individual transmission line structures. Additionally, implementation of an approved erosion and sedimentation control plan including temporary and permanent stormwater controls, prior to, during, and following

construction along the length of the Project will prevent sedimentation into adjacent wetland areas.

No wetland impacts are anticipated with the expansion of the Iron Range substation. The St. Louis County substation will impact wetlands; however, a final design is pending but the Applications will work with the MPCA and the USACE to.

Based on NWI data, approximately 460.25 acres of NWI wetlands are within the Proposed Right-of-Way (see Map 8) as shown in Table 38.

Table 38. NWI Identified Wetlands Within the Proposed Right-of-Way

Description	Acres
Freshwater Emergent Wetland	101.58
Freshwater Forested Wetland	59.71
Freshwater Forested/Emergent Wetland	0.07
Freshwater Forested/Shrub Wetland	33.98
Freshwater Pond	1.24
Freshwater Shrub Wetland	105.52
Freshwater Shrub/Emergent Wetland	154.97
Riverine	3.17
TOTAL	460.25

As a result of wetland avoidance and minimization measures during the design, construction, and operation of the proposed Project the impacts on wetlands are anticipated to be moderate.

Potential Mitigation

The Project will coordinate with the U.S. Army Corps of Engineers ("USACE") St. Paul Regulatory District and the USACE will consult with Local Government Units ("LGU") for the Minnesota WCA to determine appropriate wetland mitigation/wetland replacement for the Project's proposed impacts on wetlands.

The Applicants will restore wetland and water resource areas disturbed by construction activities to pre-construction conditions in accordance with the requirements of applicable state and federal permits or laws and landowner agreements. The Permittee shall meet the USACE, MDNR, BSWR, and local units of government wetland and water resource requirements.

2.6.5 Vegetation

2.6.5.1 Resources Within the Proposed Route

The Proposed Route is within the Laurentian Mixed Forest Province as defined by the Ecological Classification System of Minnesota and more specifically within the North Shore Highlands, Tamarack Lowlands, and St. Louis Moraines Subsections. Pre-European settlement vegetation consisted of aspen-birch forest, white pine-red pine forest, mixed hardwood-pine forest, and conifer bogs and swamps in the North Shore Highlands.[91] In the Tamarack Lowlands, vegetation was predominantly lowland conifers and hardwoods in the lowland areas with widespread sedge meadows, while the uplands mainly consisted of aspen-birch and upland conifer forest.[92] The St. Louis Moraines largely hosted white pine-red pine forest in steep areas, but more common on the outwash was aspen-birch forests, mixed hardwood-pine forests, and conifer swamps and bogs.[93] Today, all three subsections remain forested with forestry practices and recreation being the major land uses, although there are some areas within the Tamarack Lowlands that support agricultural practices. Many of the white pine-red pine forests have been logged and replaced by quaking aspen-paper birch stands.

Land cover within the Proposed Route was identified via a desktop analysis and is described in Table 39 and shown on Map 9.

[91] "North Shore Highlands Subsection," Minnesota Department of Natural Resources Ecological Classification System. Available at https://www.dnr.state.mn.us/ecs/212Lb/index.html. Last accessed August 2025.
[92] "Tamarack Lowlands Subsection," Minnesota Department of Natural Resources Ecological Classification System. Available at https://www.dnr.state.mn.us/ecs/212Nd/index.html. Last accessed August 2025,
[93] "St. Louis Moraines Subsection," Minnesota Department of Natural Resources Ecological Classification System. Available at https://www.dnr.state.mn.us/ecs/212Nb/index.html. Last accessed August 2025.

Table 39. NLCD Within Proposed Route and Proposed Right-of-Way (in acres)

Landcover Type	Proposed Route	Proposed Right-of-Way
Barren Land	0.93	0
Cultivated Cropland	58.7	8.4
Deciduous Forest	3312.3	228.3
Developed, High Intensity	18.5	0
Developed, Low Intensity	97.5	4.5
Developed, Medium Intensity	22.7	2.1
Developed, Open Space	179.8	12.5
Emergent Herbaceous Wetlands	722.4	103.3
Evergreen Forest	318.6	8.7
Hay/Pasture	497.9	59.6
Herbaceous	127.1	17.7
Mixed Forest	1043.7	86.1
Open Water	44.4	2.5
Shrub/Scrub	191.97	48.1
Woody Wetlands	6704.3	606.1
TOTAL	**13,340.80**	**1,187.5**

2.6.5.2 Potential Impacts

The ROI for vegetation is the Proposed Right-of-Way. Impacts on existing vegetation are anticipated to be moderate due to construction and operation of the proposed Project. Permanent impacts include the clearing of trees and shrubs within the Proposed Right-of-Way where these resources would not be allowed to revegetate to their previous heights and density due to transmission line operation and safety requirements. Temporary impacts to vegetation would occur in the form of using construction matting along access routes, transmission line structure work areas, removal of foundations on existing transmission line structures where the Project will replace existing lines, and conductor pulling and tensioning sites. The disturbance would be minimized by using the existing road system to the extent practicable, traveling within the Proposed Right-of-Way as appropriate, and not building new access roads unless necessary.

Generally, impacts to vegetation would be in the form of clearing, compacting, trampling, or otherwise disturbing vegetation of a variety of growth stages and heights.

After construction, the Project's workspace will be restored in accordance with the draft VMP (*see* Appendix M of the Application). Native species will be encouraged to grow and to naturally reestablish temporarily disturbed areas. Permanent seed mixes for the Project include native seed varieties commonly found and/or available from local seed distributors. The permanent seed

mixes are designed to augment the natural colonization of bare ground by local, native seed sources.

2.6.5.3 Potential Mitigation

The Applicants will restore the workspace in accordance with the VMP; therefore, additional mitigation is not anticipated.

Construction within the Proposed Route could lead to the introduction or spread of invasive species and noxious weeds, discussed in Section 2.6.7 Invasive Species Management. Avoidance, minimization, and mitigation measures of invasive species are also discussed within the section.

2.6.6 Wildlife

2.6.6.1 Resources Within the Proposed Route

The Proposed Route is located within MnDNR Nongame Wildlife – Northeast Region[94]. Wildlife species within vicinity of the Proposed Route include bald eagles, woodcock, ruffed grouse, wild turkeys, white-tailed deer, black bear, beaver, muskrat, river otter, grey wolf, rabbits, squirrels, red and gray fox, raccoon, migratory waterfowl (geese, ducks, trumpeter swans, herons, raptors), and various birds (meadowlarks, sparrows, thrushes, various woodpeckers, shore birds). Several of these species are likely to be present within the Proposed Route.

Aquatic species include gilt darter, pugnose shiner, northern longear sunfish, and Nipigon cisco. Amphibians and reptiles like the four-toed salamander, spotted salamander, Blanding's turtle, and wood turtle can also be found her

2.6.6.1.1 Sensitive or Managed Wildlife Habitat

The MnDNR manages state forests for wildlife habitat conservation, sustainable timber production, and public use. Forest management practices are designed to maintain diverse age classes and tree species, which provide habitat for a wide range of wildlife. The MnDNR also ensures public access for recreation such as hunting, hiking, and camping, while protecting natural resources through BMPs and long-term planning efforts. In 1997, Minnesota Power conveyed lands to MnDNR to manage for public use and in 2021, after years of public input that there should be more forests along shorelines to help protect water quality, Riverlands State Forest was established. Riverlands State Forest occurs in the Project area at two locations: south of Burnett, Minnesota and northeast of Floodwood, Minnesota and contains areas of old growth forests in the lower reaches of the Whiteface River. Many wildlife and plant species of concern inhabit Riverlands State Forest.[95] In addition to Riverlands State Forest, there are other tracts of forested land owned by the MnDNR that are not designated for public use that occur within the Proposed Route.

There are three AMAs that occur within the Proposed Route. These AMAs are Bruce Creek AMA, Sand Creek AMA, and White Pine River AMA. Only Bruce Creek AMA directly intersects the Proposed Right-of-Way. AMAs provide access for anglers and fisheries management, protect

[94] MnDNR. 2025. DNR Administrative Regions. Available at https://files.dnr.state.mn.us/aboutdnr/dnr_regions.pdf. Last accessed December 2025.
[95] "Riverlands State Forest," Minnesota Department of Natural Resources State Forests. Available at https://www.dnr.state.mn.us/state_forests/forest.html?id=sft00065#information. Last accessed August 2025.

critical shoreland habitat, and provide areas for education and research.[96] The Proposed Route occurs within four Deer Permit Areas ((“DPAs”); 178, 181, 182, and 679). DPAs are managed for deer and are sectioned by similar habitat, land uses, deer populations, and hunter distribution. In addition, the Proposed Route and Proposed Alignment cross one Feely Deer Management parcel.[97]

There are no other State WMAs, SNAs, state parks, state waterfowl feeding and resting areas, or state wildlife refuges that occur within the Proposed Route. Additionally, there are no federal forests, wildlife refuges, or waterfowl production areas within the Proposed Route.

Privately owned land occurs in over 75 percent of Minnesota and, depending on the management of the land, can provide essential habitats that support biodiversity, migration routes, and breeding grounds. Many rare or state threatened or endangered species rely on resources found on privately owned forests, grasslands, shorelines, shrublands, or wetlands for survival. As public land alone cannot adequately maintain Minnesota’s diverse flora and fauna, it is important through effective stewardship of private landowners to also maintain ecological health. An effective way of managing private land is through an easement. The Proposed Route includes no state funded conservation easements via the Reinvest in Minnesota program.[98] There are also no federally funded conservation easements via the Natural Resource Conservation Service (“NRCS”) or USFWS within the Proposed Route.[99]

2.6.6.1.2 Important Bird Areas

The National Audubon Society works to identify, monitor, and protect habitat for bird species throughout the United States, in part by designating sites as Important Bird Areas (“IBA”). IBAs are designated when they meet certain criteria, including providing habitat for at least one of the following:[100]

- Species of conservation concern (e.g., threatened and endangered species);
- Range-restricted species (species vulnerable because they are not widely distributed);
- Species that are vulnerable because their populations are concentrated in one general habitat type or biome; and/or
- Species, or groups of similar species (such as waterfowl or shorebirds), that are vulnerable because they occur at high densities due to their congregatory behavior.

[96] “Aquatic Management Areas,” Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/amas/index.html. Last accessed August 2025.
[97] “Feely Deer Management Area,” Minnesota Department of Natural Resources. Available at https://files.dnr.state.mn.us/forestry/planning/northern-mn-dift-lake/mdlp-dma-feely.pdf. Last accessed September 2025.
[98] “Reinvest in Minnesota Overview,” Minnesota Board of Water and Soil Resources. Available at https://bwsr.state.mn.us/reinvest-minnesota-overview. Last accessed August 2025.
[99] “Geospatial Resources,” Minnesota Board of Water and Soil Resources. Available at https://bwsr.state.mn.us/Geospatial_Resources. Last accessed August 2025. “NCED Planning Application,” National Conservation Easement Database. Available at https://site.tplgis.org/NCED/planningapp/. Last accessed August 2025.
[100] “Important Bird Areas,” Audubon Great Plains. Available at https://greatplains.audubon.org/conservation/important-bird-areas-0. Last accessed August 2025.

The National Audubon Society works to identify and implement conservation strategies within IBAs to minimize the effects of habitat loss on birds and, by extension, other species (NAS, 2022). One IBA, the Sax Zim Bog, intersects the Proposed Route and Proposed Alignment at the IBA's southwest-most corner east of Floodwood, Minnesota. The Sax Zim Bog is more than 300 square miles of black spruce and tamarack bogs, floodplain forests, sandy upland pine stands, rivers, lakes, farms, meadows, and towns. This area creates suitable habitat for those species of birds considered bog specialists, such as the great gray owl, black-backed woodpecker *(Picoides arcticus)*, boreal chickadee[101], Canada jay *(Perisoreus canadensis),* yellow-bellied flycatcher *(Empidonax flaviventris),* and Connecticut warbler *(Oporornis agilis).* Also found within the Sax Zim Bog are many grassland bird specialists. In addition to many species of birds occupying this area, Sax Zim Bog also provides suitable habitat to 600 species of moth, 430 species of plants, 117 species of ferns and mosses, 130 species of spiders, 87 species of dragonflies and damselflies, and 82 species of butterflies.[102]

2.6.6.2 Potential Impacts

The ROI for wildlife is the Project Area. Wildlife impacts are anticipated to be moderate. Impacts to aquatic wildlife are anticipated to be minimal since wetlands and waterbodies will be spanned to the extent practicable. Potential impacts to wildlife include habitat loss, fragmentation, edge effect, disturbance during critical life stages such as breeding and/or migration, noise and human activity, and altered hydrology or vegetation. Displacement of individuals is possible during the construction activities due to noise and physical harassment. Small species including small mammals, reptiles, and amphibians could be more affected by construction activities because of their inability to vacate a construction area, because of this, trampling and killing of small wildlife is possible.

Lighting and fencing associated with the substations will have a moderate impact on wildlife species. The Applicants will install shielded or downward facing lighting at their facilities to minimize impacts to wildlife, the night sky, and nearby residents. Raptors, waterfowl, and other bird species may be affected by the construction and placement of the transmission lines. Avian collisions (with or without electrocution) are a possibility after construction of the Project. Waterfowl are typically more susceptible to transmission line collision, especially if the transmission line is placed between wetlands and fields that serve as feeding areas, or between wetlands and open water, which serve as resting areas. The Project minimizes potential new impacts by predominantly paralleling existing transmission rights-of way and double circuiting with existing lines. In addition, where practicable the Applicants will consider the Avian Powerline Interaction Committee ("APLIC") recommendations to reduce electrocution and collisions.[103]

Other impact minimization efforts performed by the Applicants include siting the Proposed Alignment along existing high-voltage transmission lines, away from ecologically sensitive areas, scheduling construction activities outside of breeding windows, and restoring disturbed habitat. See Section 2.6.5 and the VMP (*see* Appendix M of the Application) for references of vegetation restoration that will provide cover and foraging opportunities for temporarily displaced wildlife such as small mammals, reptiles and amphibians, pollinators, and ground-nesting birds. The Proposed

[101] "About Sax-Zim Bog," Friends of Sax-Zim Bog. Available at https://saxzim.org/about-sax-zim-bog/. Last accessed August 2025.
[102] "About Sax-Zim Bog," Friends of Sax-Zim Bog. Available at https://saxzim.org/about-sax-zim-bog/. Last accessed August 2025.
[103] Avian Power Line Interaction Committee (APLIC), *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006.* Available at https://www.aplic.org/uploads/files/2643/SuggestedPractices2006(LR-2).pdf.

Alignment will cross the Sax Zim Bog, an IBA; however, impacts will be minimized because the existing right-of-way will be used to the extent possible and additional right-of-way is anticipated to be approximately 20 feet, thus reducing habitat fragmentation.

Long-term impacts that may occur due to the construction of the Project include ongoing vegetation management practices and infrastructure maintenance activities. Impacts include continued habitat alteration, anthropogenic disturbance, noise, invasive species, and disruption to wildlife movement or breeding. Avoidance and minimization measures that will be utilized to reduce these impacts include: targeted trimming or vegetation clearing; scheduling vegetation clearing outside of breeding, nesting, or migration windows; utilizing seasonal restrictions for other wildlife such as reptiles and amphibians; minimizing bare soils due to roads and utilizing designated access routes; cleaning equipment to prevent transit and spread of invasive species; targeting invasive species with mechanical or chemical removal; and restoring disturbed areas with a native seed mix.

2.6.6.3 Potential Mitigation

The Applicants propose to coordinate with the MnDNR on the appropriate locations of bird flight diverters to mark the section of proposed double circuit transmission line. If construction were to occur during the migratory bird nesting season, pre-construction nest surveys would be conducted. In addition, the Applicants will implement the avoidance and minimization measures described above; therefore, impacts are expected to be moderate and additional mitigation is not anticipated.

2.6.7 Invasive Species Management

The ROI for invasive species is the Proposed Route. Construction activities that could potentially lead to the introduction of invasive species include ground disturbance that leaves soil exposed for extended periods, introduction of topsoil contaminated with weed seeds, vehicles importing weed seed from a contaminated site to an uncontaminated site, and conversion of landscape type, particularly from forested to open settings. Terrestrial plant invasive and noxious species in Minnesota are regulated by the MDA,[104] and aquatic invasive and noxious species are regulated by the MnDNR.[105] The MnDNR also manages terrestrial plant invasive and noxious species on public lands and at public waters. The MnDNR maintains a geospatial dataset of terrestrial invasive and noxious species observations.[106] According to this dataset, wild parsnip (*Pastinaca sativa*) has been documented along the St. Louis River at Highway 29 northeast of Floodwood, Minnesota. No other invasive species have been recorded within the Proposed Route.

Implementation of the following BMPs during Project construction and restoration will be utilized to minimize the potential for the introduction or spread of terrestrial plant invasive and noxious species:

- Revegetating disturbed areas using weed-free seed mixes and using weed-free straw and hay for erosion control.

[104] "Minnesota Noxious Weed Law," Minnesota Department of Agriculture. Available at https://www.mda.state.mn.us/plants/pestmanagement/weedcontrol/fsmnwp. Last accessed August 2025.
[105] "Invasive Species in Minnesota," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/invasives/index.html. Last accessed August 2025.
[106] "Terrestrial Invasive Species Observations," Minnesota Geospatial Commons. Available at https://gisdata.mn.gov/dataset/env-invasive-terrestrial-obs. Last accessed August 2025.

- Removal of invasive species/noxious weeds via herbicide and manual means.

- Cleaning and inspecting construction vehicles to remove dirt, mud, plants, and debris from vehicles prior to arriving at and leaving construction sites.

The Project will also adhere to the draft VMP that incorporates these BMPs, as applicable/required. Activities will not be conducted within waterbodies; therefore, impacts are anticipated to be minimal and mitigation is not anticipated. The Applicants will also prepare an Invasive Species Prevention Plan.

2.6.8 Rare and Unique Natural Resources

2.6.8.1 Resources Within the Proposed Route

The Applicants reviewed available data on threatened and endangered species from the MnDNR and USFWS. Merjent, on behalf of the Applicants, submitted a formal Natural Heritage Review Request (2025-00541) on June 17, 2025, through the MnDNR's Minnesota Conservation Explorer ("MCE") system and a response was received on September 9, 2025.

In addition, Merjent reviewed the USFWS Information for Planning and Consultation ("IPaC") website[107] for a list of federally threatened and endangered species, proposed species, candidate species, and designated critical habitat that may be present within the Project Area.

Trout streams, a rare and unique natural resource are discussed in Section 2.6.4.2.3 of this EA.

2.6.8.1.1 Rare Plant Communities

There are no MnDNR SNAs crossed by the Proposed Route. The Proposed Route and Proposed Right-of-Way cross Minnesota Biological Survey ("MBS") SBS and Native Plant Communities ("NPCs") (see Table 40 and Table 41 and Map 10).

NPCs are groups of native plants not significantly altered by human activities or by introduced species. NPCs are classified into units which take into consideration the vegetation, hydrology, landforms, soils, and natural disturbance regimes.[108] NPC classifications are used throughout Minnesota for vegetation management, conservation, and land-use planning. The classification is based on plant species composition and was developed through field data collected from sample plots. The classification system is hierarchical with units described at levels ranging from landscape scale systems to local communities. NPCs that occur within the Proposed Route include wet cedar forests, wet meadows, and northern cedar swamps. NPCs are not legally protected and development within NPCs is not prohibited.

The MBS documents SBS that are ranked based on several factors, including the quality (e.g., size and condition) of NPC within the site, the presence and numbers of rare species populations, and the site's context within the landscape (e.g., whether the site is isolated in a landscape dominated by cropland or developed land, or whether it is contiguous with or close to other areas with intact NPCs). These sites are ranked by grouping and rated within each of the state's

[107] "Information for Planning and Consultation (IPaC) Tool," U.S. Fish and Wildlife Service. Available at https://ecos.fws.gov/ipac/. Last accessed August 2025.
[108] "Minnesota's Native Plant Communities," Minnesota Department of Natural Resources, Minnesota's Native Plant Communities. Available at https://www.dnr.state.mn.us/npc/index.html. Last accessed August 2025.

ecological classification system subsections.[109] There are four ranks of SBS: outstanding (having the best occurrences of the rarest species, NPCs, and most ecologically intact/functional landscape), high, moderate, and below. Within the Proposed Route, there is one outstanding SBS north of Pancake Lake, three SBS ranked as high, and seven SBS ranked as moderate. SBS are not legally protected and development within SBS is not prohibited.

[109] "MBS Site Biodiversity Significance Ranks," Minnesota Department of Natural Resources Minnesota Biological Survey. Available at https://www.dnr.state.mn.us/eco/mbs/biodiversity_guidelines.html. Last accessed August 2025.

Table 40. MBS SBS Within Proposed Route and Proposed Right-of-Way

Site Name	Ranking	Status	Acres Within Proposed Route	Acres Within Proposed Right-of-Way
Rosholt Swamp	High	Preliminary	39.32	-
Arlberg Bog	High	Preliminary	715.68	91.95
Toivola Swamp	High	Preliminary	383.17	48.32
Industrial Peatland	Moderate	Final	302.35	18.96
Brevator woods	Moderate	Final	87.69	-
Blackberry - Warba Peatlands	Moderate	Preliminary	538.93	59.60
Goodland Township Swamp	Moderate	Preliminary	161.10	22.34
McCarty River	Moderate	Preliminary	786.56	85.21
Floodwood Lake Wetlands	Moderate	Preliminary	343.05	47.97
Toivola Swamp - South	Moderate	Preliminary	623.79	35.94
Pancake Hardwoods and Swamp	Outstanding	Preliminary	378.70	48.99

Table 41: MBS NPCs Within Proposed Route and Proposed Right-of-Way

NPC Type	Proposed Route (Acres)	Proposed Right-of-Way (Acres)
FPn63 – Northern Cedar Swamp	32.14	3.67
FPn82 – Northern Rich Tamarack Swamp (Western Basin)	5.27	1.23
MHn35 – Northern Mesic Hardwood Forest	42.76	6.23
MHn44 – Northern Wet-Mesic Boreal Hardwood-Conifer Forest	61.30	5.72
MHn46 – Northern Wet-Mesic Hardwood Forest	2.00	-
WFn53 – Northern Wet Cedar Forest	45.63	9.38
WFn64 – Northern Very Wet Ash Swamp	0.10	-
WMn82 – Northern Wet Meadow/Carr	21.14	2.70

2.6.8.1.2 State-Listed Species

The Applicants' consultant, Merjent, submitted a request through the MnDNR's MCE system (MCE 2025-00541) and received a response from the MnDNR on September 8, 2025, which is summarized below. Several state-listed species have been documented within the vicinity of the Proposed Route (*see* Table 42). Species with a status of special concern are not legally protected by Minnesota's Endangered Species Statute.

Table 42. State Protected Species Within 1 Mile of the Proposed Route

Common Name	Scientific Name	State Status
Cuckoo Flower	*Cardamine pratensis*	Threatened
Goblin Fern	*Botrychium mormo*	Threatened
Pugnose Shiner	*Notropis anogenus*	Threatened
Narrow Triangle Moonwort	*Botrychium angustisegmentum*	Threatened
Lapland Buttercup	*Ranunculus lapponicus*	Special Concern
Trumpeter Swan	*Cygnus buccinator*	Special Concern
Montane Yellow-eyed Grass	*Xyris montana*	Special Concern
American Goshawk	*Accipiter atricapillus*	Special Concern
Barren Strawberry	*Waldsteinia fragarioides*	Special Concern
Black Sandshell	*Ligumia recta*	Special Concern
Creek heelsplitter	*Lasmigona compressa*	Special Concern

Cuckoo Flower

The cuckoo flower is an herbaceous perennial plant that grows in loose clumps up to 22 inches high. The flowers bloom from April to June and can be pale violet-pink or white with four petals. In North America, the species can be found growing in moist soils in partly to fully shaded areas, such as swamps, fields, meadows, grasslands, and ditches; however, in Minnesota, the species is most commonly found in boggy areas, or fens.[110]

Goblin Fern

The goblin fern is a small fern (three to four inches) that may never rise above the leaf litter, making surveying this species difficult. The species is yellowish-green and has a blunt terminal end holding the sporangia. Goblin ferns have only been found in portions of the Midwest, considered rare throughout its range. Most occurrences have been found in Minnesota, where the species has been found in humus-rich, mature mesic hardwood forests where the dominant stratum is *Acer saccharum* (sugar maple), *Thuja occidentalis* (northern white cedar), and *Tilia americana* (American basswood).[111]

Pugnose Shiner

The pugnose shiner is a small minnow (average 1.8 inches) with large eyes and a small terminal, oblique mouth. This species is similar in appearance to other shiner species; however, the oblique, vertical mouth is what separates them. The pugnose shiner is rare throughout its range; however, in Minnesota, the species has been found in glacial lakes and low gradient small-to-moderate sized streams with minimal currents. They are intolerant of turbidity and siltation, commonly caused by the removal of littoral vegetation. Habitat alteration has caused separation of the population. Minnesota is thought to be where this species is most abundant; however, additional losses of this species in Minnesota could have global impacts on this species.[112]

Narrow Triangle Moonwort

The narrow triangle moonwort is an easily identifiable *Botrychium* species to identify by its stalkless trochophore, three-branched sporophore, and the maroon-tinged stem. This plant usually produces one leaf a year; however, it takes at least seven years to produce a leaf that would emerge above ground. The northeastern quadrant of Minnesota serves as the western boundary of this species across its range. In Minnesota, specifically, narrow triangle moonwort can be found in moist, shady, mature northern hardwood forests that have an open understory

[110] "Rare Species Guide: *Cardamine pratensis*," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDBRA0K0Z0. Last accessed August 2025. "*Cardamine pratensis*," Missouri Botanical Garden Plant Finder. Available at https://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=278035. Last accessed August 2025.

[111] M.R. Penskar and P.J. Higman, *Special plant abstract for Botrychium mormo (goblin moonwort).* (Michigan Natural Features Inventory, 1996). Available at https://mnfi.anr.msu.edu/abstracts/botany/Botrychium_mormo.pdf. Last accessed August 2025. "Rare Species Guide: *Botrychium mormo*," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PPOPH010N0. Last accessed August 2025.

[112] "Rare Species Guide: *Miniellus anogenus*," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=AFCJB28080. Last accessed August 2025.

and sparse groundcover. Where one is found, there is a possibility of at least 50 or more individuals.[113]

Lapland Buttercup

The Lapland buttercup is an herbaceous perennial species, considered circumpolar, or more commonly found in the arctic. Minnesota, Wisconsin, Michigan, and Maine make up the southernmost part of this species range, where it is considered rare or endangered in all four states. This species grows only a few inches high and has a yellow flower with five to eight small petals. To avoid heat in its southernmost range, Lapland buttercup grows in rich forested northern swamps of Minnesota. This plant can spread at the root nodes of mossy substrates; therefore, it can commonly be found in areas blanketed with *Sphagnum* mosses or brown mosses.[114]

Trumpeter Swan

The trumpeter swan is a large, white bird with an all-black bill. The species can often be confused with the similarly appearing tundra swan; however, the tundra swan has a yellow mark on its bill directly in front of its eye. Additionally, if the two cannot be seen up close, they are distinguishable from one another by the trumpeter swan's loud trumpet-like call. The trumpeter swan became extirpated in Minnesota in the mid-1800s due to exploitative hunting. The reintroduction of the species began in the mid-1960s and has subsequently been successful in producing nesting pairs throughout Minnesota. During the breeding season (usually beginning in late April), the species will use small waterbodies with emergent vegetation, low disturbance, clean water, and muskrat houses or beaver lodges to use as platforms. The female will lay four to six eggs, alternating with the male to incubate them for up to five weeks. Post-hatch, the cygnets will stay in the nest for one to two days when they then leave to feed. Cygnets remain flightless for approximately 100 days with both parents remaining with them until they are able to fly.[115]

Montane Yellow-Eyed Grass

Montane yellow-eyed grass is a tall (2-12 inches) perennial species that is found growing in tufts. Yellow flowers made up of three petals emerge from bracts from mid-July to mid-August. Typically, only one to two flowers will bloom at one time although there are four to seven bracts. There are only two species of *Xyris* found in Minnesota; however, identification is distinguishable due to the range of each not overlapping. *X. montana* occurs in peatlands, floating mats, bogs,

[113] "*Botrychium angustisegmentum* (Narrow Triangle Moonwort)," Minnesota Wildflowers. Available at https://www.minnesotawildflowers.info/fern/narrow-triangle-moonwort. Last accessed August 2025. "Rare Species Guide: *Botrychium angustisegmentum*," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PPOPH01071. Last accessed August 2025.

[114] "*Ranunculus lapponicus* (Lapland Buttercup)," Minnesota Wildflowers. Available at https://www.minnesotawildflowers.info/flower/lapland-buttercup. Last accessed August 2025. "Rare Species Guide: *Ranunculus lapponicus*," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDRAN0L1G0. Last accessed August 2025.

[115] "Rare Species Guide: *Cygnus buccinator*," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABNJB02030. Last accessed August 2025.

and fens that are sunny and acidic. Many of the occurrences found in Minnesota are from smaller, isolated, bogs.[116]

American Goshawk

The American goshawk is the largest of the three *Accipiter* species occurring in Minnesota. Adults have a brown/bluish-gray back, pale gray to white breast, a dark head cap, and an obvious white stripe that occurs above red eyes. The species occurs throughout much of North America except in the southwestern United States and most of Mexico. Within north-central and northeast Minnesota, American goshawks can be found year-round in large tracts of mature forests used for nesting and foraging. These forest tracts have high, closed canopies for navigating through and moderate shrub cover. Trees used for nests are tall with large diameters. This species will typically have one to five nests they alternate using within their nesting area and exhibit nest site fidelity. Eggs are laid early to mid-April, taking approximately 30 days to incubate. The young will fledge in late June to early July.[117]

Barren Strawberry

Barren strawberry is a low-growing perennial plant often mistaken for an actual strawberry plant (*Fragaria* spp.) until it flowers. The flowers consist of five yellow petals and five sepals, blooming from April to May. This species is widespread throughout the eastern part of its range; however, it is rare in Minnesota, which is the farthest west of its range. In Minnesota, barren strawberry can be found in fire-dependent forests and in mesic hardwood forests where the community is made of various pine species. It has been found in shaded areas of forests and along roadsides, in full sun. Barren strawberries can be found in numerous soil types except in peat, muck, or other wet soils.[118]

Black Sandshell

The black sandshell is a long-lived, elongated mussel with a thick shell that is smooth, shiny, green or black, and rayed. This species can grow up to 8 inches long. The species was once common in all large rivers in Minnesota; however, due to habitat alteration in the Mississippi River through channelization, damming, and dredging, the species began declining. Additionally, negative impacts from the invasive zebra mussel (*Dreissena polymorpha*) have aided in this species' decline. Currently, the black sandshell can be found in riffles and runs of medium to large rivers dominated by sand or gravel.[119]

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[116] "*Xyris montana* (Northern Yellow-eyed Grass)," Minnesota Wildflowers. Available at https://www.minnesotawildflowers.info/flower/northern-yellow-eyed-grass. Last accessed August 2025. "Rare Species Guide: *Xyris montana*," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PMXYR010F0. Last accessed August 2025.

[117] "Rare Species Guide: *Accipiter gentilis*," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABNKC12060. Last accessed August 2025. "American Goshawk Range Map," All About Birds, Cornell Lab of Ornithology. Available at https://www.allaboutbirds.org/guide/American_Goshawk/maps-range. Last accessed August 2025.

[118] "Rare Species Guide: *Waldsteinia fragarioides*," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDROS1S012. Last accessed August 2025. "*Waldsteinia fragarioides* (Barren Strawberry)," Minnesota Wildflowers. Available at https://minnesotawildflowers.info/flower/barren-strawberry. Last accessed August 2025.

[119] "Rare Species Guide: *Ligumia recta*," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=IMBIV26020. Last accessed August 2025.

Creek Heelsplitter

The creek heelsplitter is an elongated mussel with a squared off posterior tip that can grow up to 13 centimeters (five inches) long. The species was once widespread north of St. Anthony Falls in the Mississippi drainage. The creek heelsplitter is still found in numerous rivers in Minnesota; however, the number of individuals is low. Typically, the species occurs in creeks, small rivers, and the upstream portions of large rivers, burying itself is substrates like sand, fine gravel, and mud.[120]

2.6.8.1.3 MnDNR MCE Response

On June 17, 2025, Merjent, on behalf of the Applicants, submitted a review request through the MnDNR's MCE online application review process.[121] The MnDNR provided a response on September 8, 2025 (Appendix P of the Application), which is summarized below.

Ecologically Significant Areas

The MnDNR indicated that the MBS has identified 13 SBS within the vicinity of the proposed project. One is Outstanding, four are High, and eight are Moderate. SBS have varying levels of native biodiversity and are ranked based on the relative significance of this biodiversity at a statewide level. Factors taken into account during the ranking process include the number of rare species documented within the site, the quality of the native plant communities in the site, the size of the site, and the context of the site within the landscape. There are also 36 NPCs in or near the proposed project area. The MnDNR recommends avoidance of SBS ranked High or Outstanding and NPCs ranked S1-S3.

State-Listed Species

The MnDNR identified several state-listed plant species have been documented within the vicinity of the Proposed Route and suitable habitat may be present for the narrow triangle moonwort, the goblin fern, the cuckoo flower, Lapland buttercup, barren strawberry, and montane yellow-eyed grass (see above for species and habitat descriptions). The MnDNR requires that in order to demonstrate avoidance, the Applicants will retain a qualified surveyor to determine if suitable habitat exists within the ROI for each state-protected species and, if so, conduct a survey prior to any project activities. Except for montane yellow-eyed grass, these species are unlikely to occur in the currently maintained utility right-of-way but may have suitable habitat where the Project impacts areas outside of existing rights-of-way.

The American goshawk, a state-listed bird species of special concern, has been documented in the vicinity of the proposed Project. If there is any tree removal associated with the proposed project, the MnDNR recommends trees be inspected for nests prior to being cut down between April 1 and August 15. Trumpeter swans have been documented nesting in the vicinity of the Proposed Route. The MnDNR recommends avoiding construction activities during the nesting season, April 15 through June 15, near suitable nesting habitat.

[120] "Rare Species Guide: *Lasmigona compressa*," Minnesota Department of Natural Resources. Available at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=IMBIV22020. Last accessed August 2025.
[121] "Minnesota Conservation Explorer," Minnesota Department of Natural Resources. Available at https://mce.dnr.state.mn.us/home. Last accessed June 2025.

Pugnose shiner have been found in the Floodwood River near the Proposed Route. To protect spawning pugnose shiner, work within the water, including crossing by vehicles, must be avoided from May 1 through July 31.

Creek heelsplitter and black sandshell have been documented in the Swan, Cloquet, and St. Louis Rivers in the vicinity of the Proposed Route. The MnDNR recommends effective erosion prevention and sediment control practices must be implemented and maintained near the river throughout the duration of the project and incorporated into any stormwater management plan.

To minimize impacts on bats, the MnDNR recommends that tree removal be avoided from June 1 through August 15.

2.6.8.1.4 Federally Listed Species

Based on the official species list provided by the USFWS (Appendix S of the Application), two federally threatened species, one federally endangered species, and three proposed species have been previously documented within the vicinity of the Project. Species proposed for listing are not legally protected under the federal Endangered Species Act ("ESA"). No federally designated critical habitat is present within the Proposed Route. These are summarized in Table 43.

Table 43. Federally Listed Species Previously Documented Within the Vicinity of the Proposed Route

Common Name	Scientific Name	Federal Status
Canada lynx	*Lynx canadensis*	Threatened
Gray wolf	*Canis lupus*	Threatened
Northern long-eared bat	*Myotis septentrionalis*	Endangered
Tricolored bat	*Perimyotis subflavus*	Proposed Endangered
Monarch butterfly	*Danaus plexippus*	Proposed Threatened
Suckley's Cuckoo bumble bee	*Bombus suckleyi*	Proposed Endangered

Canada Lynx

The Canada lynx is a medium-sized felid possessing large, well-furred paws and long legs adapted for hunting and traveling in deep snow. Often mistaken for the more-common bobcat (*Lynx rufus*), the lynx can be identified by its long, black ear tufts and shorter, black-tipped tail. The coat color varies seasonally; in winter, grayish fur is mixed with buff or brown, and the legs, feet, and belly are grayish white. In contrast, the summer coat color is darker and varies from reddish to grayish brown.[122]

Canada lynx is widely distributed across North America, from eastern Canada to Alaska. The species is found in moist boreal forest in areas with cold, snowy winters and a high-density snowshoe hare prey base. The predominant vegetation type in boreal forests is conifer trees, primarily species of spruce (*Picea* spp.) and fir (*Abies* spp.). In the contiguous United States, the

[122] "Canada Lynx (*Lynx canadensis*)," U.S. Fish & Wildlife Service. Available at https://www.fws.gov/species/canada-lynx-lynx-canadensis. Last accessed August 2025.

boreal forest type transitions to deciduous temperate forest in the Northeast and Great Lakes regions and to subalpine forest in the west. Individual lynx maintain large home ranges generally between 12 and 83 square miles.[123]

Gray Wolf

The gray wolf is the largest of the wild dog species and is found in a variety of habitats throughout North America. They are typically distinguishable from coyotes by their larger size, shorter, more rounded ears, and broader muzzle. Gray wolves prey primarily on large ungulates, including white-tailed deer (*Odocoileus virginianus*), elk (*Cervus elaphus*), moose (*Alces alces*), bison (*Bison bison*), and caribou (*Rangifer tarandus*), depending on location. They will occasionally take smaller prey, including beaver (*Castor canadensis*), insects, various small mammals, and domestic animals. Additionally, wolves will usurp carcasses and scavenge carrion opportunistically from kills made by other carnivores.

A habitat generalist, the gray wolf originally occupied most habitat types in North America. They show no preference for one cover type over another and successfully utilize alpine, forest, grassland, shrubland, and woodland habitats across their range. Once thought to require wilderness areas with little to no human disturbance, recent range expansions have demonstrated the species' ability to tolerate higher rates of anthropogenic development than previously thought. Given abundant prey and low rates of human-caused mortality, wolves can survive in proximity to human-dominated environments.[124]

Northern Long-Eared Bat

The range of the northern long-eared bat stretches across much of the eastern and midwestern United States. In winter, northern long-eared bats utilize caves and mines as hibernacula. During summer, they roost singly or in colonies. Suitable summer habitat for the species consists of a wide variety of forested/wooded habitats used for foraging, traveling, and roosting; however, the species is predominantly found in forested/wooded habitat that contain potential roosts (live trees and/or snags that are greater than or equal to three inches diameter at breast height that have exfoliating bark, cracks, crevices, and/or cavities) as well as within linear features such as fencerows, riparian forests, and other wooded corridors. The species has also been found, rarely roosting in structures such as barns and sheds.[125]

Tricolored Bat

The tricolored bat is one of the smallest bat species native to North America and ranges from the eastern and central United States into portions of southern Canada, Mexico, and into Central America. The species overwinters in caves and mines where available; however, throughout much of its range in the southern United States, roadside culverts, tree cavities, and abandoned water wells may also serve as suitable overwintering habitat. During the active season, the species may be found roosting among leaf clusters (live and dead) on living or recently dead deciduous hardwood trees. Roost choice may also vary by region; the species utilizes Spanish

[123] "Species Profile for Canada Lynx (*Lynx canadensis*)," U.S. Fish & Wildlife Service Environmental Conservation Online System. Available at https://ecos.fws.gov/ecp/species/3652. Last accessed August 2025.
[124] "Species Profile for Gray wolf (*Canis lupus*)," U.S. Fish & Wildlife Service Environmental Conservation Online System. Available at https://ecos.fws.gov/ecp/species/4488. Last accessed August 2025. "Gray Wolf (*Canis lupus*)," U.S. Fish & Wildlife Service. Available at https://www.fws.gov/species/gray-wolf-canis-lupus. Last accessed August 2025.
[125] "Northern Long-eared Bat (*Myotis septentrionalis*)," U.S. Fish & Wildlife Service. Available at https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis. Last accessed August 2025.

moss in the southern portion of its range and bony beard lichen (*Usnea trichodea*) in the north. Tricolored bats have also been observed roosting in eastern red cedar trees and pine needles as well as within manmade structures such as barns and bridges.[126]

Monarch Butterfly

The monarch butterfly is a large butterfly with an approximate three to four inch wingspan and characterized by bright orange coloring on the wings with distinctive black borders and veining, serving as a warning sign to predators of their toxicity. In North America, the species is split into two populations (eastern and western), both well known for their long-distance migration. During the fall, both populations begin migrating to their overwintering locations, where they require a specific microclimate with a temperature that prevents excessive lipid depletion but also prevents freezing. At overwintering sites, monarchs undergo reproductive diapause until the spring when males and females begin mating before dispersing north again. The eastern population migrates from Mexico to Canada, reproducing two to three generations while migrating. The western population migrates north and east from coastal California toward the Rockies and Pacific Northwest, also reproducing into multiple generations.

Throughout the migration corridor and during the breeding cycles, monarchs can be found in a wide variety of habitats including prairies, grasslands, urban gardens, road ditches, and agricultural fields if there is a healthy and abundant supply of nectar resources for foraging that are diverse and of sufficient quality. The patch size and location of this type of habitat is important for monarchs as well. Milkweed must also be of sufficient quality and quantity as it is the sole host plant for oviposition and for the larvae to feed on until the larvae pupates into a butterfly.[127]

Suckley's Cuckoo Bumble Bee

Suckley's cuckoo bumble bees' ("Suckley's") range spans from the Yukon south to Arizona and as far as Newfoundland in a widely distributed range of elevations. Suckley's are obligatory social parasites of social bumble bees and cannot successfully reproduce without the availability of suitable host colonies. Host bumble bee nests are often found in abandoned underground holes in a variety of habitat types including meadows, fallow fields, croplands, urban areas, and forests. When females of this species come out of hibernation, they take over the nest of a suitable host colony (most notably, western bumble bees (*Bombus occidentalis*) and Nevada bumble bees (*Bombus nevadensis*)) and the host workers provide for the Suckley's young. A generalist, adult females, eggs, larvae, male drone, and new females all require a diversity of native floral resources for pollen and nectar. Little is known about the overwintering sites; however, thermal suitability is required throughout their life cycle. Females overwinter underground in areas separate from nesting habitat, likely using loose substrates such as leaf litter, duff, or rotting logs.[128]

[126] "Tricolored Bat (*Perimyotis subflavus*)," U.S. Fish & Wildlife Service. Available at https://www.fws.gov/species/tricolored-bat-perimyotis-subflavus. Last accessed August 2025.
[127] U.S. Fish and Wildlife Service, *Monarch Butterfly (Danaus plexippus) Species Status Assessment Report, Version 2.3* (December 2024). Available at https://www.fws.gov/sites/default/files/documents/2025-01/ssa_monarch-butterfly_2024.pdf. Last accessed August 2025.
[128] U.S. Fish and Wildlife Service, *Suckley's Cuckoo Bumble Bee (Bombus suckleyi) Species Status Assessment, Alaska Region, Version 1* (August 2024). Available at https://iris.fws.gov/APPS/ServCat/DownloadFile/263505. Last accessed August 2025.

Bald and Golden Eagles

Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are not legally protected under the ESA or in the state of Minnesota; however, they are protected under the Bald and Golden Eagle Protection Act ("BGEPA") and the Migratory Bird Treaty Act ("MBTA"). Currently, the MnDNR and USFWS do not maintain a database of known eagle nests, activity, foraging areas, or winter roost areas. The Applicants conducted an aerial based eagle nest survey in the fall of 2025, after leaf-off. No eagle nests were identified within 660' of the Proposed Route. If additional eagle nests are identified, the Applicants will record their location and comply with the requirements of BGEPA and will coordinate with USFWS as necessary to ensure that unauthorized take of bald eagles does not occur.

2.6.8.2 Potential Impacts

The ROI for rare and unique resources is dependent on the species' lifecycle, mobility, and migration patterns. Potential impacts are expected to be negligible.

2.6.8.2.1 Potential Impacts on Rare Plants

Sites of Biodiversity Significance

New impacts will occur to "Outstanding," "Moderate," and "High" ranked MBS land and some NPCs along Proposed Right-of-Way; however, all impacts will be next to an existing right-of-way, thus avoiding habitat fragmentation. The Applicants will work with the MnDNR to avoid or minimize impacts on areas of biological significance and will use sediment and erosion control BMPs for all biologically significant areas crossed by the Project. See Section 2.1.6 for a discussion of impacts and mitigation for WMAs, AMAs, and State Forests within the Proposed Route.

The use of construction equipment during site preparation (grading, excavation, and soil stockpiling) could result in localized physical disturbance and soil compaction. The applicants would permanently convert forested and/or shrubland within the ROW to low-growing vegetation. Removal of vegetation and/or conversion to open habitats could increase the potential for the spread of invasive plant species/noxious weeds and could alter the structure and function of sensitive ecological resources, potentially making them less suitable for the rare species that would typically inhabit them. The primary impact mitigation to manage sensitive ecological resources is prudent routing (*i.e.*, by avoiding and/or spanning these communities if possible). In addition, following existing rights-of way and division lines such as roads, existing transmission lines, and field lines, would reduce the potential for fragmentation of these resources. Potential Impacts on State-Listed Species

Cuckoo Flower

The ROI for the cuckoo flower is the Proposed Right-of-Way. Suitable habitat for the cuckoo flower may be present within the Proposed Right-of-Way where coniferous bogs are present; however, habitat is expected to be limited and marginal since there are no documented fens within the Proposed Right-of-Way. Impacts could result from right-of-way clearing and grubbing activities, as well as access road and structure construction. If present, structures, access roads, and construction activity would be sited to avoid and minimize impacts. If impacts cannot be avoided, the Applicants will coordinate with the MnDNR.

Goblin Fern

The ROI for the goblin fern is the Proposed Right-of-Way. Suitable habitat for the goblin fern may be present within the Proposed Right-of-Way where an intact tree canopy with moist conditions are present. Impacts could result from right-of-way clearing and grubbing activities, as well as access road and structure construction. If present, structures, access roads, and construction activity would be sited to avoid and minimize documented presence. If impacts cannot be avoided, the Applicants will coordinate with the MnDNR.

Pugnose Shiner

The ROI for the pugnose shiner is the crossing of the Floodwood River, where it is crossed by the Proposed Right-of-Way. No impacts on the bed or banks of this waterbody are anticipated. The Applicants will avoid placement of structures within the Floodwood River, and they will maintain effective erosion and sediment controls near waterbodies to prevent indirect impacts on the pugnose shiner and implement the required timing restrictions specified by the MnDNR.

Narrow Triangle Moonwort

The ROI for the narrow triangle moonwort is the Proposed Right-of-Way. Suitable habitat for the narrow triangle moonwort may be present within the right-of-way where moist, shady, mature northern hardwood forests are present. Impacts could result from right-of-way clearing and grubbing activities, as well as access road and structure construction. If present, structures, access roads, and construction activity would be sited to avoid and minimize documented presence. If impacts cannot be avoided, the Applicants will coordinate with the MnDNR.

Lapland Buttercup

The ROI for Lapland buttercup is the Proposed Right-of-Way. Suitable habitat for the Lapland buttercup may be present within the Proposed Right-of-Way where forested swamps are present. Impacts could result from right-of-way clearing and grubbing activities, as well as access road and structure construction. If present, structures, access roads, and construction activity would be sited to avoid and minimize documented presence.

Trumpeter Swan

The ROI for trumpeter swans is the Project Area. Trumpeter swan populations have been increasing in the state of Minnesota and are expected to be present during the breeding season in small ponds, lakes, or larger waterbodies. It is also anticipated that they will migrate through the ROI. Due to the transient nature of trumpeter swans, it is unlikely that migrating birds would persist within the Proposed Right-of-Way during construction; therefore, impacts to migrating trumpeter swans are expected to be negligible and short-term. The Applicants will follow the requirements of MBTA to avoid impacts to migratory birds; therefore, impacts to breeding trumpeter swans are not anticipated.

Montane Yellow-Eyed Grass

The ROI for montane yellow-eyed grass is the Proposed Right-of-Way. Suitable habitat for the Montaine yellow-eyed grass may be present with the Proposed Right-of-Way where sunny, peat habitats are present. Impacts could result from right-of-way clearing and grubbing activities, as

well as access road and structure construction. If present, structures, access roads, and construction activity would be sited to avoid and minimize documented presence.

American Goshawk

The ROI for American goshawk is the Project Area. Suitable habitat for the American goshawk may be present within the ROI where there are larger tracts of mater and older upland forests. Impacts could result from right-of-way clearing and grubbing activities, as well as access road and structure construction. If present, structures, access roads, and construction activity would be sited to avoid and minimize documented presence.

Baren Strawberry

The ROI for barren strawberry is the Proposed Right-of-Way. Suitable habitat for the baren strawberry may be present where mesic hardwood forests consist of pine. Impacts could result from right-of-way clearing and grubbing activities, as well as access road and structure construction. If present, structures, access roads, and construction activity would be sited to avoid and minimize documented presence.

Black Sandshell

The ROI for the black sandshell is the Swan River, St. Louis River, and Cloquet River, where it is crossed by the Proposed Right-of-Way. No impacts on the bed or banks of these waterbodies are anticipated. The applicants will avoid placement of structures within waterbodies and they will maintain effective erosion and sediment controls near waterbodies to prevent indirect impacts to black sandshell.

Creek Heelsplitter

The ROI for the creek heelsplitter is the Swan River where it is crossed by the Proposed Right-of-Way. No impacts on the bed or banks of this waterbody are anticipated. The Applicants will avoid placement of structures within waterbodies and they will maintain effective erosion and sediment controls near waterbodies to prevent indirect impacts to creek heelsplitters.

2.6.8.2.2 Potential Impacts on Federally Listed Species

Canada Lynx

The ROI for Canada lynx is the Project Area. Suitable habitat for the Canada lynx is present within the Proposed Right-of-Way; however, due to the transient nature of the Canada lynx, it is unlikely that the Canada lynx would remain within the Proposed Right-of-Way during construction. Therefore, impacts to the Canada lynx are anticipated to be negligible and short-term. The Applicants will support the lead federal agency in consultation with the USFWS to develop necessary avoidance measures for this species.

Gray Wolf

The ROI for gray wolves is the Project Area. Suitable habitat for the gray wolf is present within the Proposed Right-of-Way; however, due to the transient nature of the gray wolf, it is unlikely that gray wolves would persist within the Proposed Right-of-Way during construction. Therefore, impacts to the gray wolf are anticipated to be minor and short-term. The Applicants will support

the lead federal agency in consultation with the USFWS to develop necessary avoidance measures for this species.

Northern Long-Eared Bat

The ROI for northern long-eared bats is the Project Area. Potential impacts on individual northern long-eared bats may occur if clearing or construction takes place when the species is breeding, foraging, or raising pups in its summer habitat. Bats may be injured or killed if occupied trees are cleared during this active window. Tree clearing activities conducted when the species is in hibernation and not present on the landscape will not result in direct impacts on individual bats but could result in indirect impacts due to removal of suitable foraging and roosting habitat. Potentially suitable roosting and foraging habitat is present in the Proposed Route.

Based on a preliminary evaluation using the USFWS Determination Key ("Dkey") for the northern long-eared bat, the Project *may affect, but is not likely to adversely affect* the species. A Dkey will be rerun closer to construction and the Applicants will commit to the minimization and avoidance measures outlined in the Dkey, including clearing trees during the winter; therefore, impacts are anticipated to be minimal.

Tricolored Bat

The ROI for tricolored bats is the Project Area. Potential impacts on individual tricolored bats may occur if clearing or construction takes place when the species is roosting in its summer habitat, in trees outside of hibernacula. Bats may be injured or killed if occupied trees are cleared during this active window. Tree clearing activities conducted when the species is in hibernation and not present on the landscape will not result in direct impacts on individual bats but could result in indirect impacts due to removal of suitable roosting habitat.

Suitable habitat for the tricolored bat is present within the Proposed Route. If the USFWS determines the species should be listed and protections for the species will coincide with Project planning, permitting, and/or construction, the Applicants will review Project activities for potential impacts to the species, develop appropriate avoidance measures, and consult with the USFWS as appropriate.

Monarch Butterfly

The ROI for monarch butterflies is the Project Area. Suitable habitat for monarchs may be present within the Proposed Right-of-Way. If the USFWS determines the species should be listed and protections for the species will coincide with Project planning, permitting, and/or construction, the Applicants will review Project activities for potential impacts to the species, develop appropriate avoidance measures, and consult with the USFWS as appropriate.

Suckley's Cuckoo Bumble Bee

The ROI for Suckley's cuckoo bumble bee is Project Area. Suitable habitat for Suckley's cuckoo bumble bee may be present within the Proposed Right-of-Way. If the USFWS determines the species should be listed and protections for the species will coincide with Project planning, permitting, and/or construction, the Applicants will review Project activities for potential impacts to the species, develop appropriate avoidance measures, and consult with the USFWS as appropriate.

Bald Eagles

The ROI for bald eagles is the area within 660 feet of and including the Proposed Route. However, in accordance with guidance, the Applicants reviewed aerial imagery and determined that suitable habitat for bald eagle activity, nesting, foraging, and winter roosts are present within the two miles of the Proposed Route. Should eagle nests be identified during additional aerial nest surveys, the Applicants will work with the USFWS to comply with BGEPA and ensure that unauthorized take of eagles doesn't occur. The Applicants will work with USFWS and MnDNR to identify any areas that may require marking transmission line shield wires, and/or to use alternate structures to reduce the likelihood of avian collisions and electrocution to the extent practical.

General Measures

The Applicants will continue to coordinate with the MnDNR and USFWS to avoid and minimize Project impacts on sensitive species. The following general measures will be used to help avoid or minimize impacts on rare natural resources during and after the completion of the proposed Project:

- Constructing within, or adjacent to, an existing right-of-way where possible, minimizing impacts to habitat.
- Using BMPs to prevent the erosion of soils in the areas of impact.
- Implementing sound water and soil conservation practices during construction and operation of the Project to protect topsoil and adjacent water resources and minimize soil erosion. Practices may include containing excavated material, protecting exposed soil, and stabilizing restored soil.
- Re-vegetating disturbed areas with native species and wildlife conservation species, where applicable if the landowner agrees.
- Implementing raptor protection measures, including following APLIC Avian Safe Design recommendations and placement of bird flight diverters on the line after consultation with USFWS and MnDNR, if needed.
- Reporting any eagle or other migratory bird nests discovered during survey of the line or in the land acquisition process to the USFWS and adhering to guidance provided by the agency.

2.6.8.3 Potential Mitigation

2.6.8.3.1 Potential Mitigation for Rare Plants

The Applicants will work with the MnDNR to mitigate impacts on areas of biological significance crossed by the Project.

2.6.8.3.1 Potential Mitigation for State-Listed Species

As described above, the Applicants will avoid and minimize impacts to state-listed species to the extent possible. If impacts cannot be avoided, the Applicants will coordinate with the MnDNR to mitigate impacts.

2.6.8.3.2 Potential Mitigation Federally Listed Species

If necessary, the Applicants will support the lead federal agency in consultation with the USFWS to develop necessary avoidance and mitigation measures for this species.

2.7 PHYSIOGRAPHIC FEATURES

2.7.1 Topography

As described in Section 2.6.5, the Proposed Route is located within Minnesota's Laurentian Mixed Forest Province, as defined by the state's Ecological Classification System.[129] More specifically, it passes through the Northern Superior Uplands and Northern Minnesota Drift and Lake Plains sections, and the North Shore Highlands, Tamarack Lowlands, and St. Louis Moraines subsections.

The landscape in this area was shaped by glaciers and ancient bedrock, creating a mix of landforms, including rolling hills and rocky ridges near Lake Superior, flat wetlands and peatlands in low-lying areas like the Tamarack Lowlands, and gently sloping moraines and small lakes formed by retreating glaciers.

The Proposed Route generally moves from the northwest to the southeast with elevations ranging from approximately 1,241 to 1,397 feet above mean sea level.[130] The greatest variability in elevations occurs near the eastern and western ends Proposed Route and are generally associated with waterbodies, with less variability in the central area of the Proposed Route (see Map 11).

2.7.1.1 Potential Impacts

The ROI for topography is the Proposed Right-of-Way. Only minimal surface grading is anticipated to improve access to the Proposed Right-of-Way, and disturbed topography will be returned to pre-construction conditions and will blend with the surrounding terrain. As such, construction of the Project will not alter the topography in the ROI and impacts are anticipated to be minimal.

2.7.1.2 Potential Mitigation

Impacts to topography are anticipated to be minimal; therefore, no mitigation is proposed.

2.7.2 Geology

The Proposed Route is predominantly located in the Superior Upland Province[131] with the west end of the Proposed Route located in the Central Lowland Province.[132] The uppermost bedrock layer in the Proposed Route area consists of the Paleoproterozoic Era Virginia and Thomas

[129] "Laurentian Mixed Forest Province," Minnesota Department of Natural Resources Ecological Classification System. Available at https://www.dnr.state.mn.us/ecs/212/index.html. Last accessed August 2025.
[130] "MnTOPO," Minnesota Department of Natural Resources. Available at https://mntopo.dnr.state.mn.us/. Last accessed August 2025.
[131] "Superior Upland Province," National Park Service. Available at https://www.nps.gov/articles/superiorupland.htm. Last accessed August 2025.
[132] "Central Lowlands Province," National Park Service. Available at https://www.nps.gov/articles/centrallowlandprovince.htm. Last accessed August 2025.

Formations that are part of the Animikie Group. This formation consists of slate and graywacke.[133] The depth to bedrock is generally greater than 101 feet throughout the Proposed Route with limited areas where depth to bedrock is 50 to 101 feet.[134]

No geologic hazards such as sinkholes, karst features,[135] or springs[136] were identified along the Proposed Route.

2.7.2.1 Potential Impacts

The ROI for geology is the Proposed Right-of-Way. Based on regional soil types, transmission structures are expected to be embedded approximately 30 to 50 feet into the ground, which is not anticipated to disturb subsurface geologic features. As such, construction of the Project will not alter the geology of the ROI and impacts are anticipated to be negligible.

2.7.2.2 Potential Mitigation

Impacts to geology are anticipated to be minimal; therefore, no mitigation is proposed.

2.7.3 Soils

Soils within the Proposed Route were primarily deposited by glacial activity associated with the St. Louis Sublobe and Superior Lobe approximately 14,000 to 18,000 years ago.[137]

To characterize soil resources in the Proposed Right-of-Way, data from the USDA NRCS Soil Survey Geographic Database ("SSURGO") were reviewed. This data is accessible through the USDA Web Soil Survey. According to the NRCS, "soil surveys can be used for general farm, local, and wider area planning. Onsite investigation is needed in some cases, such as soil quality assessments and certain conservation and engineering applications."[138]

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[133] Mark A. Jirsa, Amy R. Block, Terrence J. Boerboom, and V.W. Chandler, "Bedrock Geology," *Geologic Atlas of St. Louis County, Minnesota*. County Atlas Series, Atlas C-51, Part A, St. Louis County, Plate 2-Bedrock Geology, Scale 1:200,000 (University of Minnesota – Minnesota Geological Survey, 2022); Gary N. Meyer and Mark A. Jirsa, "Aggregate Endowment of Southeast Itasca County," *Aggregate Resource Potential of Itasca County, Minnesota*. Miscellaneous Map Series, Map M-131, Plate 6-Aggregate Endowment, Southeast. Scale 1:300,000 (University of Minnesota – Minnesota Geological Survey, 2005). Available at https://mnatlas.org/gis-tool/?id=k_0130. Last accessed August 2025.

[134] Amy R. Block, "Depth to Bedrock," *Geologic Atlas of St. Louis County, Minnesota.* County Atlas Series, Atlas C-51, Part A, St. Louis County, Plate 6-Bedrock Topography and Depth to Bedrock. Scale1:250,000 (University of Minnesota – Minnesota Geological Survey, 2022); "Minnesota Natural Resource Atlas," Natural Resources Research Institute. Available at https://mnatlas.org/gis-tool/?id=k_0130. Last accessed August 2025.

[135] "Karst Features Map," Minnesota Department of Natural Resources. Available at https://arcgis.dnr.state.mn.us/portal/home/item.html?id=e9d79d4c2c934035802fee2ba267ab42. Last accessed August 2025.

[136] "Minnesota Spring Inventory," Minnesota Department of Natural Resources. Available at https://arcgis.dnr.state.mn.us/portal/apps/webappviewer/index.html?id=560f4d3aaf2a41aa928a38237de291bc. Last accessed August 2025.

[137] "Glacial Geology," Minnesota Geological Survey. Available at https://cse.umn.edu/mgs/glacial-geology#:~:text=2)%20marks%20the%20extent%20of,The%20Bemis%20moraine%20(Fig. Last accessed September 2025.

[138] "Web Soil Survey," United States Department of Agriculture Natural Resources Conservation Service. Available at https://websoilsurvey.nrcs.usda.gov/app/. Last accessed September 2025.

A soil series "is the lowest category of the national soil classification system."[139] Each series represents a homogenous set of soil properties that distinguish it from soils of a different series. This includes characteristics, drainage, location, use, and vegetation. Soils along the Proposed Route are presented in Appendix U and Map 12. Soil textures vary greatly along the Proposed Route and range from coarse, sand-dominant particles to finer, silt-dominant particles, with the loamy textures falling in between. A soil's texture has a strong influence on a soil's susceptibility to erosion; 62.5 percent of the soils along the Proposed Route have a slight erosion hazard, 26.3 percent have a moderate erosion hazard, 9.9 percent have a severe erosion hazard, and the remaining are not rated.[140]

Certain soils can also support sustained high crop yields with minimal environmental impact (*e.g*. Prime Farmland). Prime Farmland is "land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses."[141] As provided in Table 44, approximately 968 acres of Prime Farmland and 3,717 acres of Farmland of Statewide Importance, which refers to agricultural land, other than prime or unique farmland that has good physical and chemical characteristics to produce food at a statewide level, were identified within the Proposed Route. This amounts to approximately 7.3 percent and 28 percent, respectively, of the entire Proposed Route. The majority (63 percent) of the Proposed Route is not considered Prime Farmland (*see* Table 44).

Table 44. Acres of Prime Farmland and Farmland of Statewide Importance Within the Proposed Route

Farmland Classification	Acres	Percentage
All areas are prime farmland	968.3	7.3
Farmland of statewide importance	3,717.5	27.9
Not prime farmland	8,401.4	62.9
Prime farmland if drained	253.6	1.9
TOTAL	**13,340.8**	**100.0**

2.7.3.1 Potential Impacts

The ROI for soils is the Proposed Right-of-Way. Soils along the Proposed Right-of-Way are presented in Appendix U and Map 12. Acres of Prime Farmland and Farmland of Statewide Importance within the Proposed Right-of-Way are presented in Table 45.

[139] "Official Soil Series Descriptions (OSDs)," United States Department of Agriculture Natural Resources Conservation Service. Available at https://www.nrcs.usda.gov/resources/data-and-reports/official-soil-series-descriptions-osd. Last accessed September 2025.
[140] "Potential Erosion Hazard Forest Roads and Trails," United States Department of Agriculture Natural Resources Conservation Service SSURGO dataset. Available at https://www.arcgis.com/home/item.html?id=4cde6817055f44d5b8049cfbde647604. Last accessed September 2023.
[141] U.S. Department of Agriculture Natural Resources Conservation Service, *Field Office Technical Guide, Section II: Soils Information, Prime and Statewide Important Farmland,* (Natural Resources Conservation Service, March 2015), 1-2. Available at https://efotg.sc.egov.usda.gov/references/public/CO/5a_Prime_Farmland_Definition.pdf.

Table 45. Acres of Prime Farmland and Farmland of Statewide Importance Within the Proposed Right-of-Way

Farmland Classification	Acres	Percentage
All areas are prime farmland	119.2	10.0
Farmland of statewide importance	286.2	24.1
Not prime farmland	753.4	63.4
Prime farmland if drained	28.7	2.4
TOTAL	**1,187.5**	**100.0**

Potential impacts related to construction activities are expected to be minimal (i.e., short-term and limited) in scale; however, they could affect Prime Farmland or Farmland of Statewide Importance. These impacts may include soil compaction from construction equipment and increased susceptibility to wind and water erosion due to soil disturbance. Ground disturbance and soil exposure would be primarily limited to the pole locations, which would typically consist of a hole 30 to 50 feet deep and 7 to 10 feet in diameter for each pole. Impacts on physiographic features should be minimal during and after installation of the transmission line structures. Moderate or significant (including long-term) impacts are not expected.

To minimize soil compaction within wetlands, construction will either occur under frozen conditions or will use construction mats. As outlined in Section 2.6.4, the restoration contractor will implement measures to address soil compaction where necessary. Additionally, as discussed in Section 2.6.4, the Applicants will obtain an NPDES Construction Stormwater Permit from the MPCA and will prepare a SWPPP identifying measures to minimize soil erosion and sedimentation during construction.

Erosion and sediment control BMPs will be employed to minimize runoff during construction. These BMPs may include, but are not limited to, sediment barriers (such as silt fences, straw bales, and bio-logs), filter socks, mulch, upslope diversions, and slope breakers. As detailed in Section 2.6.5, any exposed soil will be revegetated as soon as practicable to reduce erosion. A VMP has also been developed for the Project (*see* Appendix M of the Application).

2.7.3.2 Potential Mitigation

The Applicants will take reasonable measures to minimize erosion and sedimentation during construction. Final grading, where necessary, will ensure proper drainage and conform to the natural terrain; therefore, mitigation is not anticipated.

2.8 SUMMARY OF POTENTIAL ENVIRONMENTAL EFFECTS

The Applicants have analyzed the potential environmental effects of the Project. Generally, Project effects are anticipated to be temporary and/or minor. Based on desktop data, no residences are anticipated to be displaced by the Project, as all residences appear to be located outside of the Proposed Right-of-Way. All land impacted during construction will be restored to the extent possible, and landowners will be compensated due to construction operations or structure and conductor placement. No stray voltage issues are anticipated. Similarly, Project facilities will comply with applicable noise standards. The Project will parallel existing high-voltage transmission lines for much of its length, minimizing visual impacts to the extent possible. The

routing of the Project minimizes tree clearing to the extent practicable; however, some tree clearing will still be required. There are wetlands and waterbodies within the Proposed Right-of-Way that will be spanned to the extent possible; however, some poles will be placed in wetlands. Unavoidable impacts include a change in aesthetics, limited wetland impacts, and the presence of additional traffic during construction on the local roads. These and other potential environmental effects, as well as applicable avoidance and minimization measures, are described in more detail throughout this EA.

2.9 UNAVOIDABLE IMPACTS

The Project will be designed, constructed, and operated in a manner that mitigates potential impacts to the greatest extent possible; however, even with mitigation measures, there will be impacts that cannot be avoided. These impacts are distinct based on the phase of the project: construction or operation.

Unavoidable impacts associated with construction could include:

- Fugitive dust emissions on and near gravel roads.
- Greenhouse gas emissions.
- Incremental vegetative clearing.
- Minor amounts of habitat loss.
- Construction dewatering
- Noise disturbances and visual impacts.
- Soil compaction and erosion.
- Short-term traffic delays.
- Temporary disturbance and displacement of wildlife; impacts to individual wildlife.

Unavoidable impacts associated with operation could include:

- Continued maintenance tall growing woody vegetation.
- Conversion of agricultural land at structure locations.
- Increased EMF on the landscape. (Potential impacts from EMF are minimal and are not expected to impact human health.)
- Incremental increase in the potential for avian collisions or electrocution.
- Limited greenhouse gas emissions.
- Limited visual changes to the landscape.

2.10 IRREVERSIBLE AND IRRETRIEVABLE IMPACTS

Minn. Stat. § 216I.05, subd. 11(b)(11), requires the Commission to consider "irreversible and irretrievable commitments of resources" when determining whether to issue a route permit. "Resource commitments are irreversible when it is impossible or very difficult to redirect that resource to a different future use; an irretrievable commitment of resources means the resource is not recoverable for later use by future generations."[142]

Irreversible resource commitments associated with the Project will include the land use associated with the substation expansion and the transmission line. Transmission line and substation components, such as conductors and transformers, could be repurposed or recycled. While the land could be restored to agricultural use or some other function, tall growing woody vegetation could return the Proposed Right-of-Way, and certain Project components could be reused or recycled, this is unlikely to happen in the reasonably foreseeable future.

Irretrievable resource commitments associated with the Project are related to construction activities. The use of aggregate, concrete, fuel, human labor, steel, water, wood and other consumable resources is irretrievable. Funding could be irretrievable in part.

2.11 CUMULATIVE IMPACTS

Minn. R. 4410.0200, Subp. 11(a), defines "cumulative potential effects" as the "effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects."

Department of Commerce Energy Environmental Review and Analysis documents have previously defined "environmentally relevant area" to mean "locations where the potential effects of the project coincide with the potential effects of other projects to impact the elements studied in this EA. Generally, this area includes the ROI for the different resource elements."

The "environmentally relevant area" includes locations where the potential effects of the project coincide with the potential effects of other projects that could impact the human and/or environmental resources studied in this EA. Generally, this area includes the ROI identified in the assessment of each resource. Cumulative effects are discussed here for projects that are currently happening or are reasonably likely to occur with construction or operation schedules that would overlap the project's or are otherwise foreseeable within the environmentally relevant area. Cumulative potential effects focus on current or future projects. The aggregate effects from past projects with overlapping footprints contribute to the conditions of the existing landscape in the environmentally relevant geographic area.

The following current or foreseeable Projects have been identified in the environmentally relevant area:

- Great River Energy and Minnesota Power's Northland Reliability Project is a 140-mile-long transmission project with a terminus located near the Iron Range Substation. NRP

[142] *Frazee to Erie Transmission Line Project*, Docket No. ET2,E017/TL-20-423, ENVIRONMENTAL ASSESSMENT at 120 (May 14, 2021).

includes an expansion of the Iron Range Substation. NRP is currently under construction and will be completed prior to construction of this Project.

- Minnesota Power's HVDC Modernization Project is located at the St. Louis County and Arrowhead substations and construction may overlap with construction of this Project.
- In May 2025, the city of Hermantown was in early stages of a development near the Project, but details on the scope, size, and use of the development are limited.[143] On September 24, 2025, the *Duluth News Tribune* reported that this new development could soon host a data center.[144] In November 2025, Minnesota Public Radio reported that Mortenson, the developer of the proposed data center, has removed its request for a permit from the Hermantown Planning and Zoning Commission while city officials decide whether an additional environmental review is warranted.[145]

A review of the Itasca and St. Louis County websites, known Minnesota Department of Transportation ("MnDOT") District projects, and the EQB's website listing active projects subject to environmental review did not reveal any additional projects proposed with similar timing and within close proximity to the Proposed Route that would be expected to interact negatively, or create significant cumulative impacts with, the proposed Project.

It is assumed that the construction-related impacts of these foreseeable projects are short-term. For example, construction impacts may cause local disturbances, such as increased noise levels, fugitive dust, and traffic delays or reroutes. Thus, the cumulative potential effects discussion is focused on potential long-term impacts.

2.11.1 Land-Based Economies

This project, in combination with NRP, HVDC, and the potential data center, could interact to result in minimal cumulative effects on land-based economies. Cumulative effects on land-based economies may occur as a result of conversion of different land uses to land developed with energy infrastructure. The HVDC Project and the potential data center would result in more land use conversion than this project; however, the land is not currently used for agricultural purposes or other economies and much of the land underneath transmission lines can still be farmed or otherwise used for commercial activities; therefore, these projects in combination would not significantly alter land use, and cumulative effects on land-based economies from these projects are not anticipated.

2.11.2 Natural Environment

This project, in combination with NRP, HVDC, and the proposed data center, could interact to result in minimal effects on the natural environment. The location where these projects intersect

[143] Jana Hollingsworth and Walker Orenstein, "A massive development is proposed for a northeastern Minnesota city. Local officials aren't saying what it is," *Star Tribune*, May 21, 2025. Available at https://www.startribune.com/a-massive-development-is-coming-to-a-northeast-minnesota-city-local-officials-arent-saying-what-it-is/601347560.
[144] Peter Passi, "Secretive Hermantown project is a data center, documents show," *Duluth News Tribune*, September 24, 2025. Available at https://www.duluthnewstribune.com/news/local/proposed-hermantown-data-center-comes-into-clearer-focus.
[145] Dan Kraker. Minnesota Public Radio. November 15, 2025. Available at https://www.mprnews.org/story/2025/11/14/hermantown-data-center-developer-plans-public-meeting. Last Last accessed December 2025.

includes largely undeveloped land on the edge of the City of Hermantown, or land that is already developed by the Applicants for industrial use as high voltage transmission facilities. This project, NRP, and HVDC are expected to be designed to avoid or span surface waters to the extent practicable; as such, the potential for cumulative effects on surface waters are anticipated to be negligible. Cumulative potential effects on wildlife and associated habitat could occur as a result of vegetation clearing and associated habitat conversion; however, where the projects intersect, the landscape is primarily industrial or undeveloped on the edge of the City of Hermantown, with minimal native habitat. These projects are anticipated to avoid impacts on federally and/or state protected species, should any be inhabiting the area. To the extent practicable, this project and the foreseeable projects would be expected to avoid or span sensitive ecological resources, which may provide habitat for protected species. Potential impacts would be minimized through project design, impact minimization measures, and permit conditions that would be incorporated into this project. It is anticipated that potential impacts to the natural environment from these projects would also be minimized through prudent design and mitigation measures. Given that the projects are on industrial land or undeveloped land, cumulative effects on the natural environment from these projects are not anticipated.

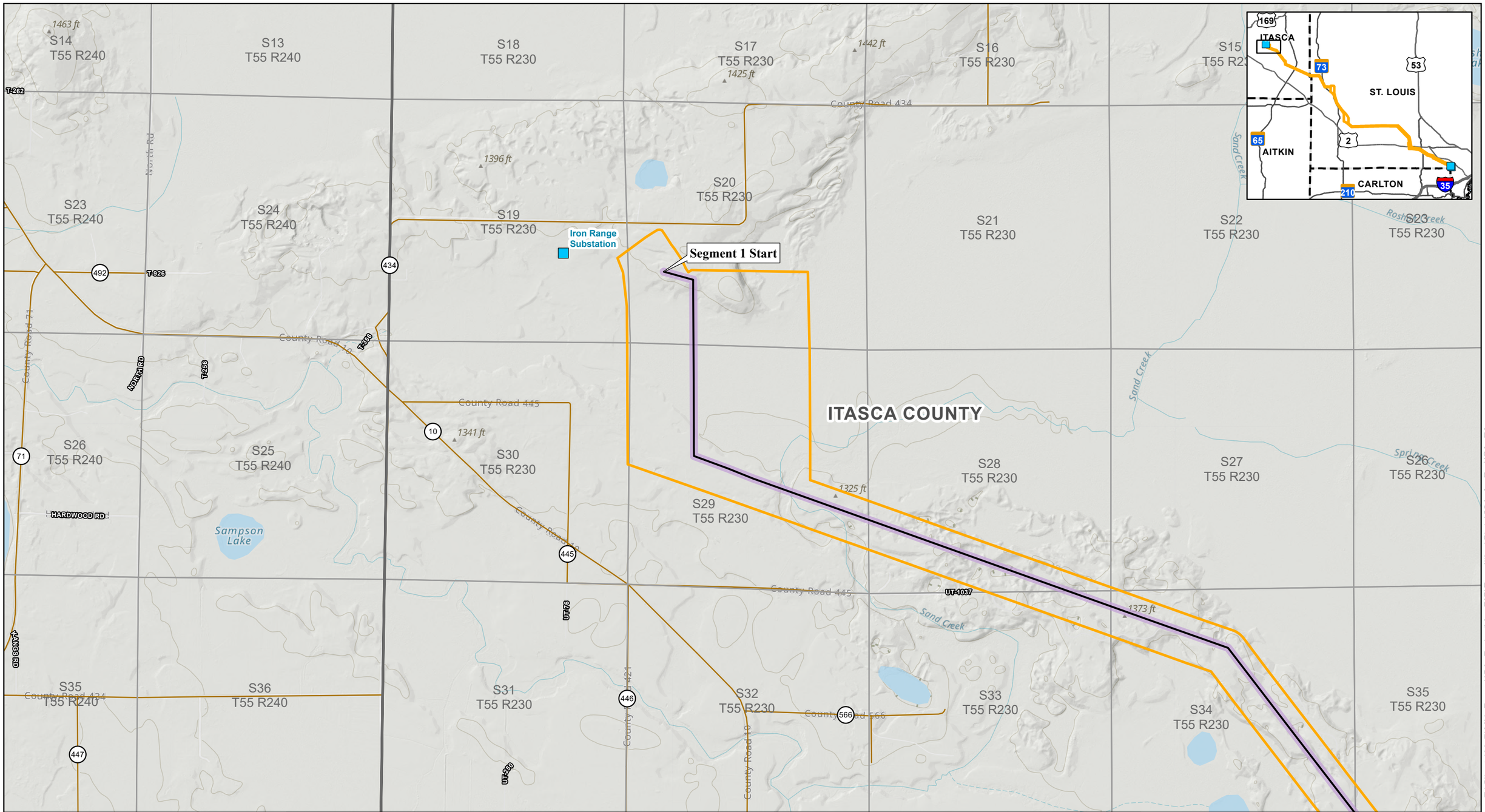
2.11.3 Human Health and Safety

This project, in combination with NRP, HVDC, and the potential data center, could interact to result in cumulative effects on human health in the form of audible noise by adding to background noise levels at the locations where the projects overlap or are in close proximity to each other. The most stringent applicable MPCA noise standard for Project substations is the L_{50} daytime and nighttime standards equivalent to 60 dBA and 50 dBA, respectively. The noise generated by the Project, NRP, HVDC, and the potential data center, will each be in compliance with the MPCA's limit regulated noise standards. The potential human health impacts related to Project are anticipated to be within MPCA limits and therefore minimal. In general, it is anticipated that this project in combination with NRP, HVDC, and the potential data center would have minimal impacts on human health and safety when operational. Given the short-term nature of construction activities in the area, cumulative effects on human health and safety from these projects are not anticipated.

Attachments

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Map 1. Project Location
Map 2. Project Area and Facilities
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Map 8. Wetlands
Map 9. Land Cover
Map 10. Unique and Natural Features
Map 11. Topography
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Attachment 1 – Sample High-Voltage Transmission Line Route Permit



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Minnesota Power

Itasca and St. Louis Counties, Minnesota

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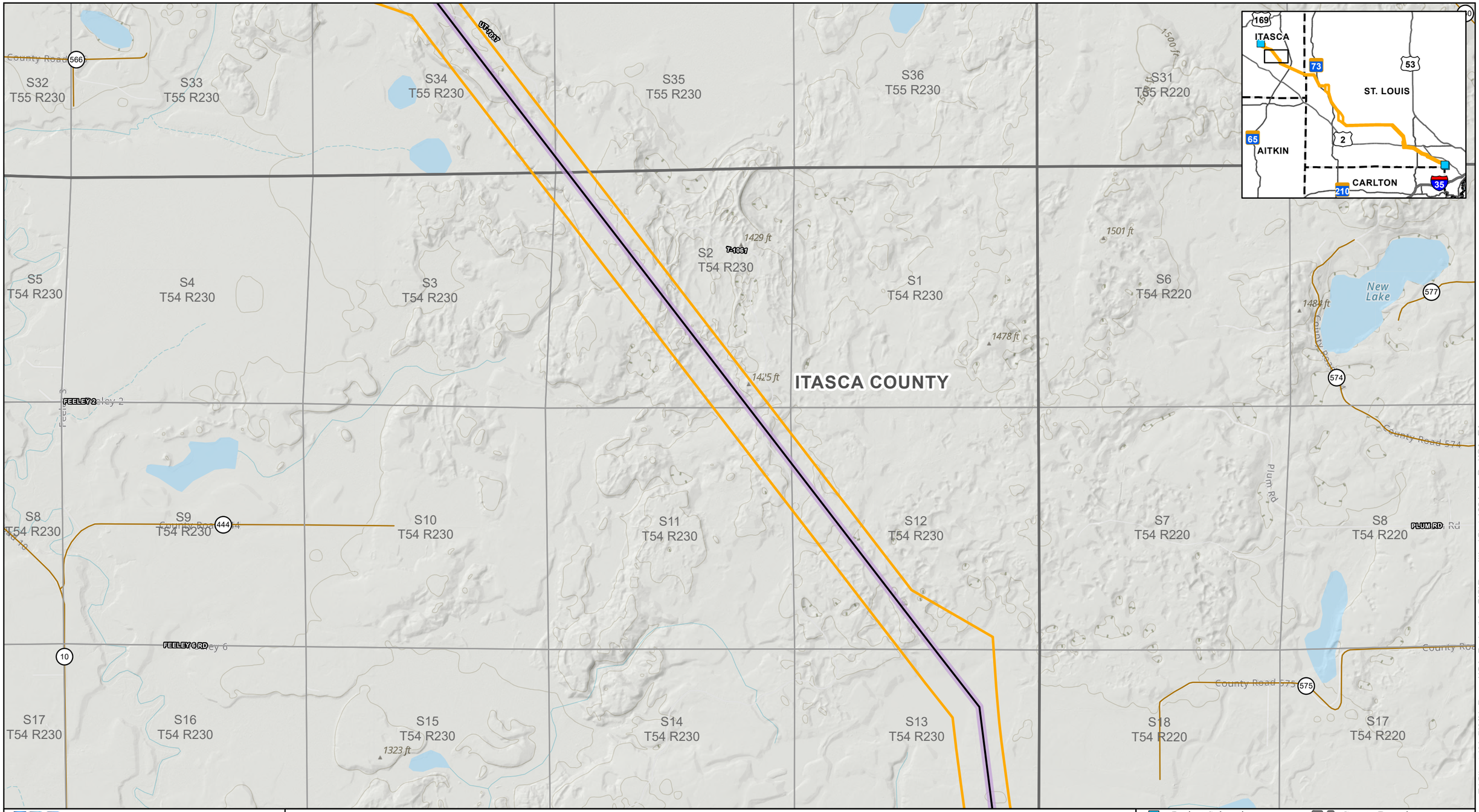
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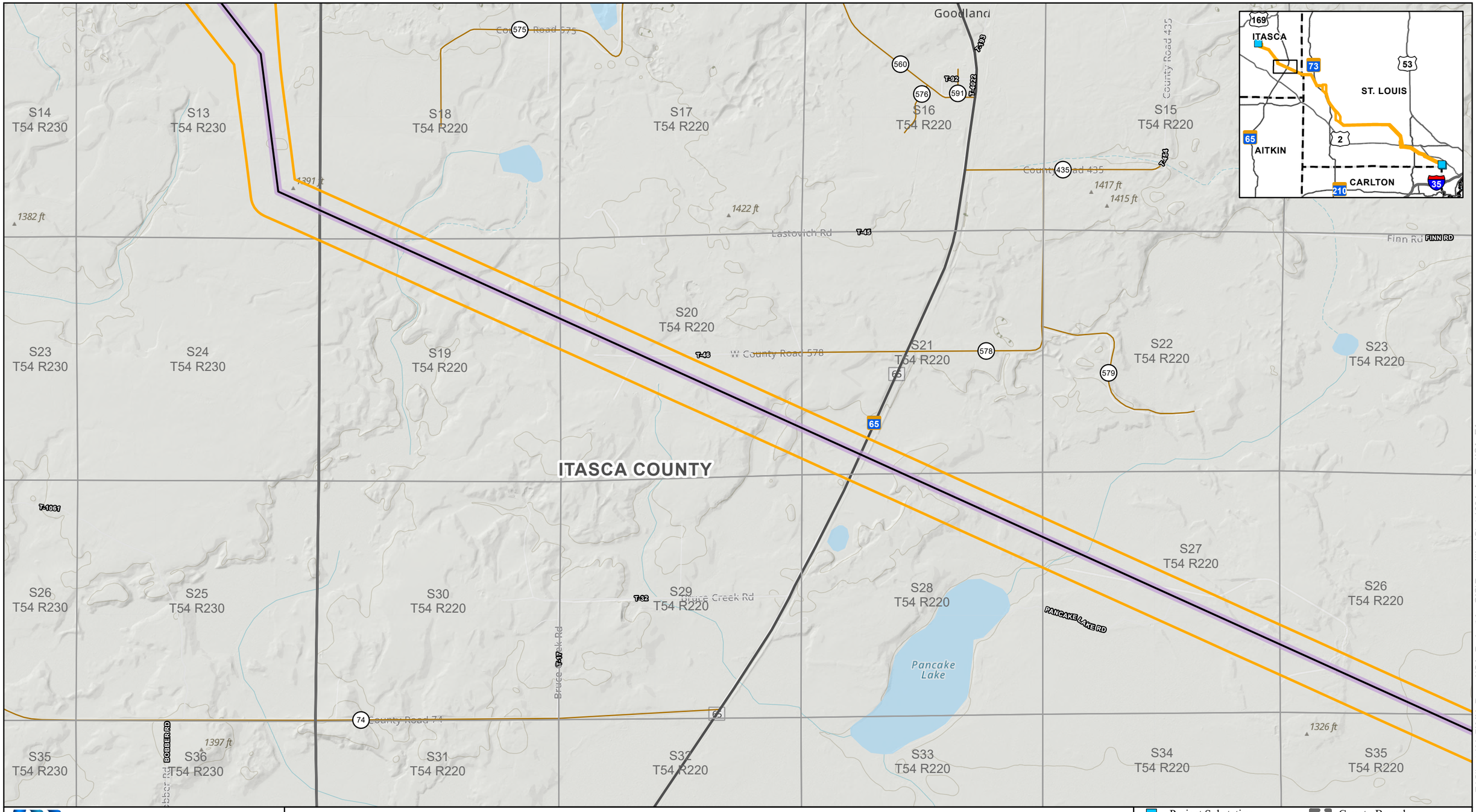
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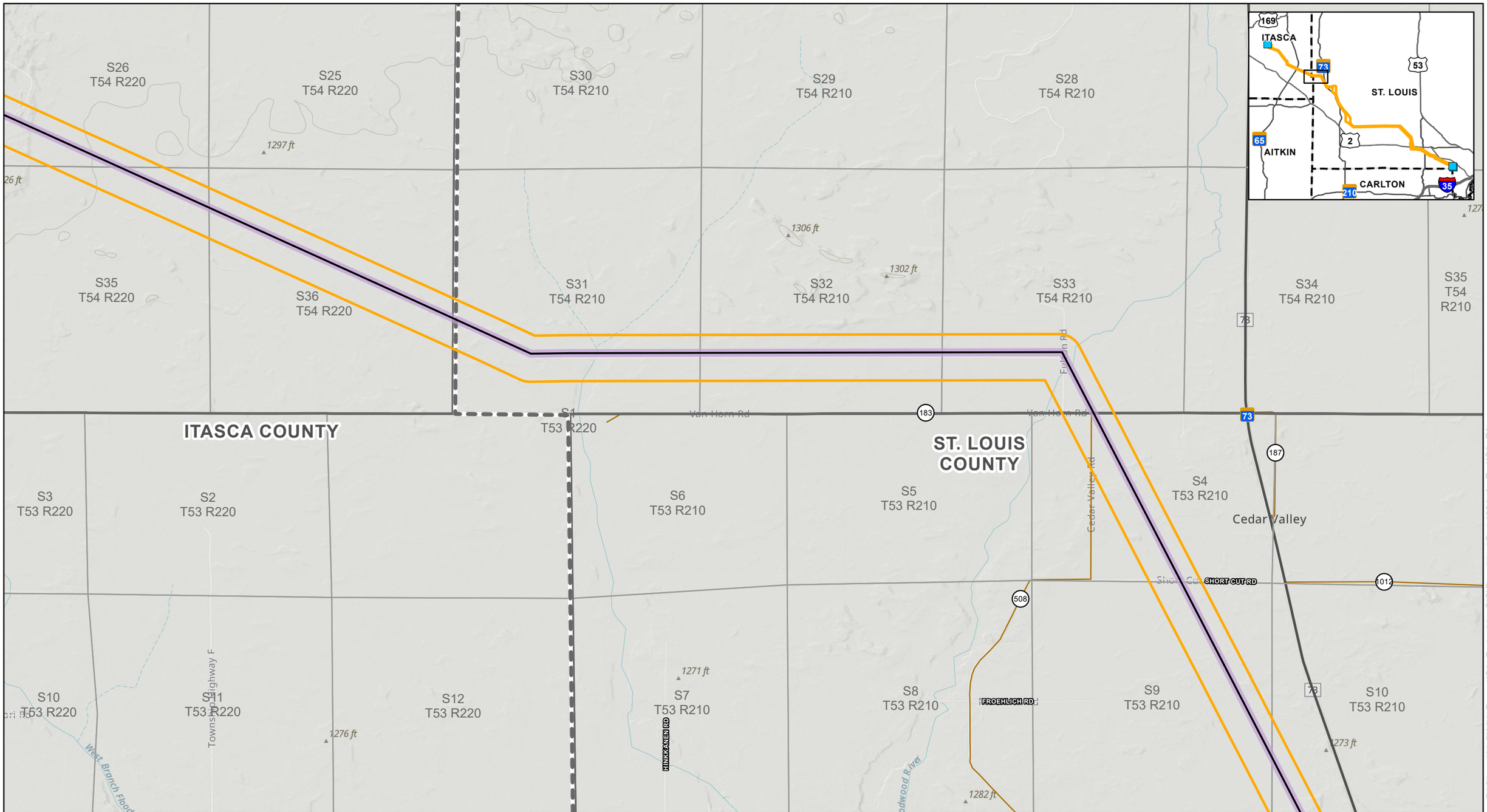
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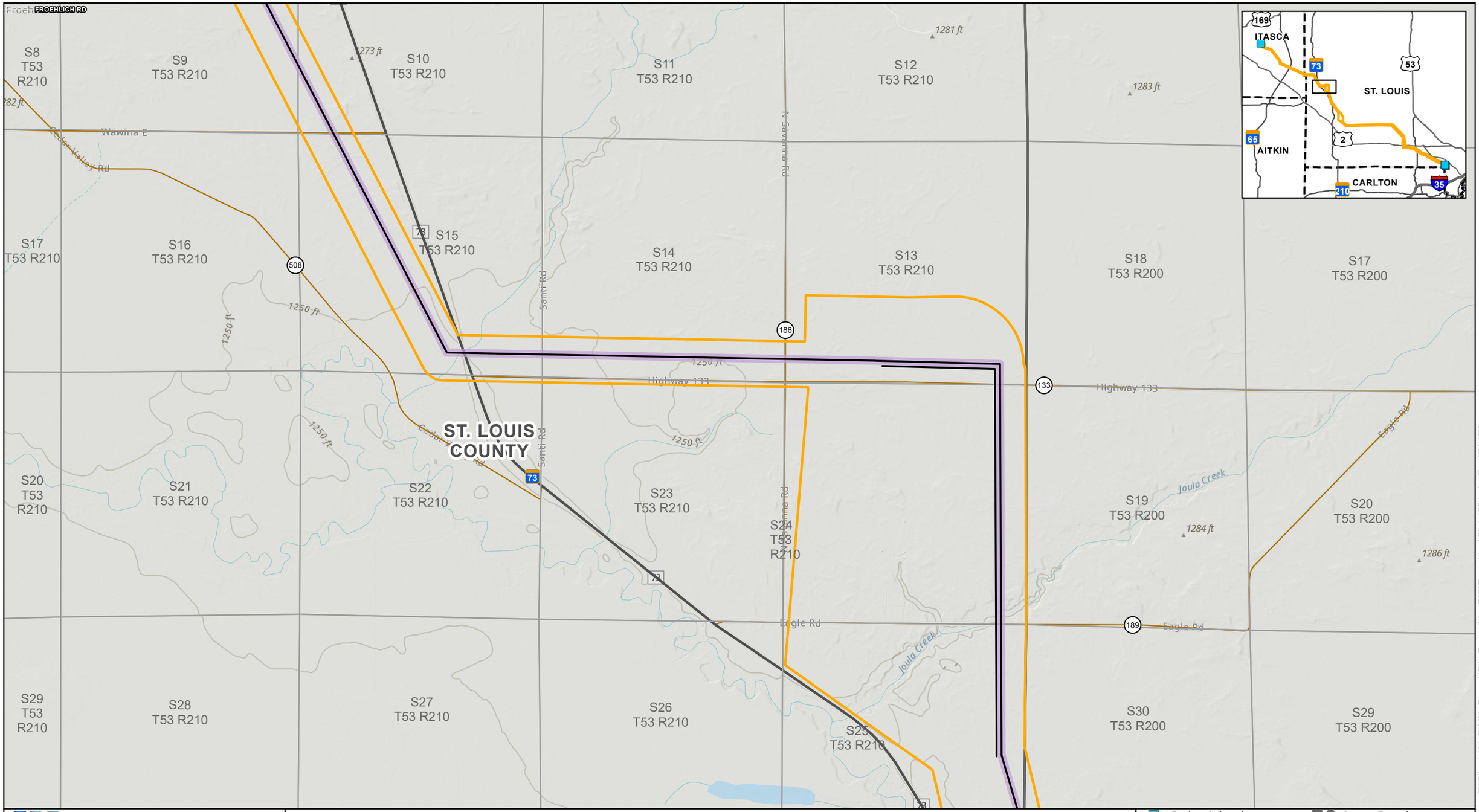
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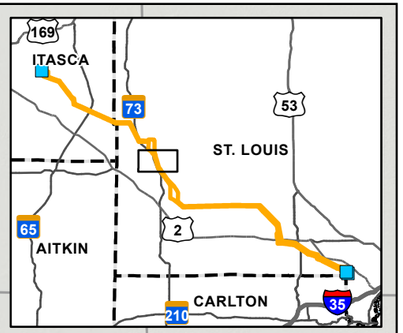
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S10 T52 R210 | S11 T52 R210 | S12 T52 R210 | S7 T52 R200 | S8 T52 R200 | S9 T52 R200 | S10 T52 R200

ST. LOUIS COUNTY

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1262 ft

Floodwood River

Romanek Rd

AUTO RD

Adams Rd

73 | 733 | 186 | 191

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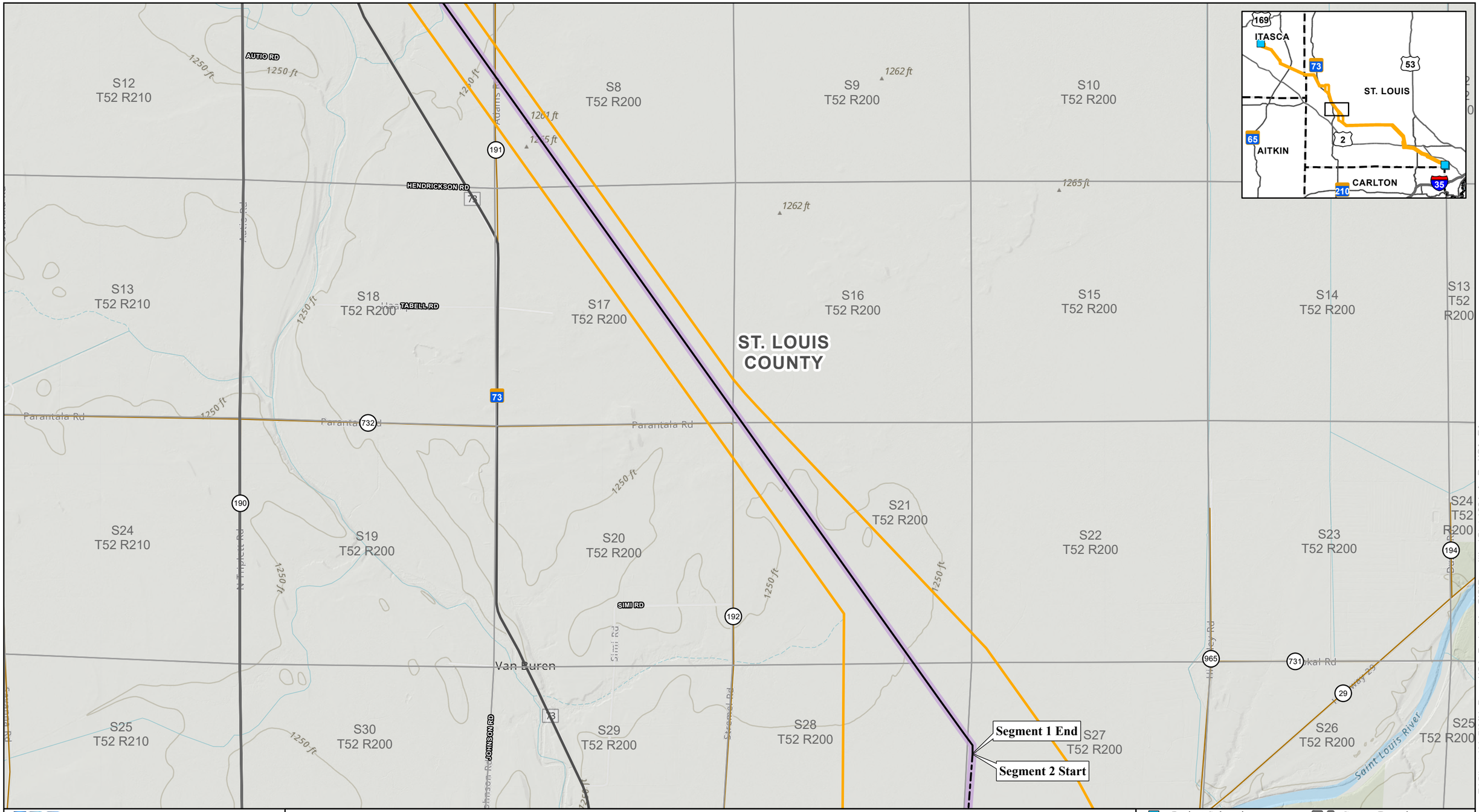
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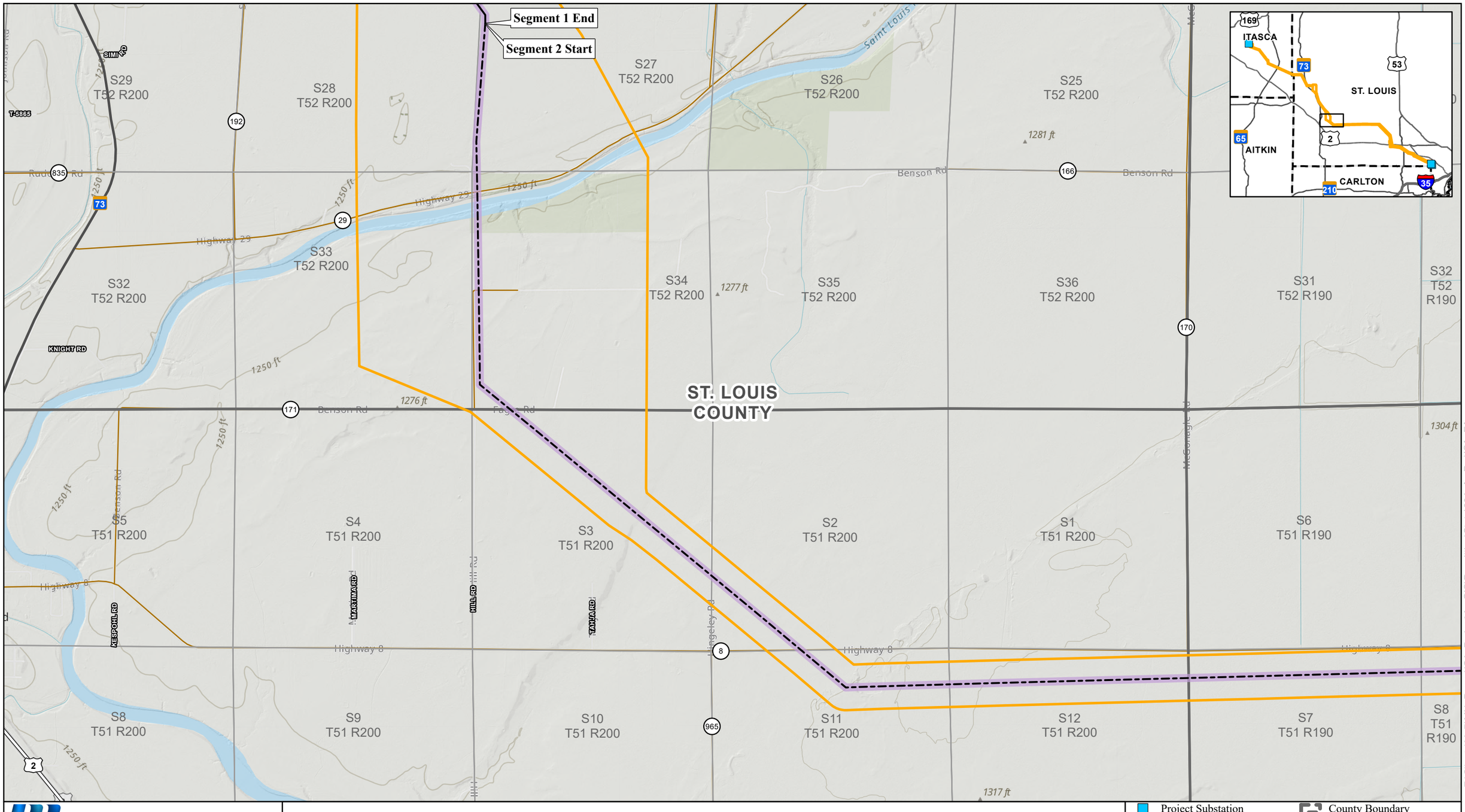
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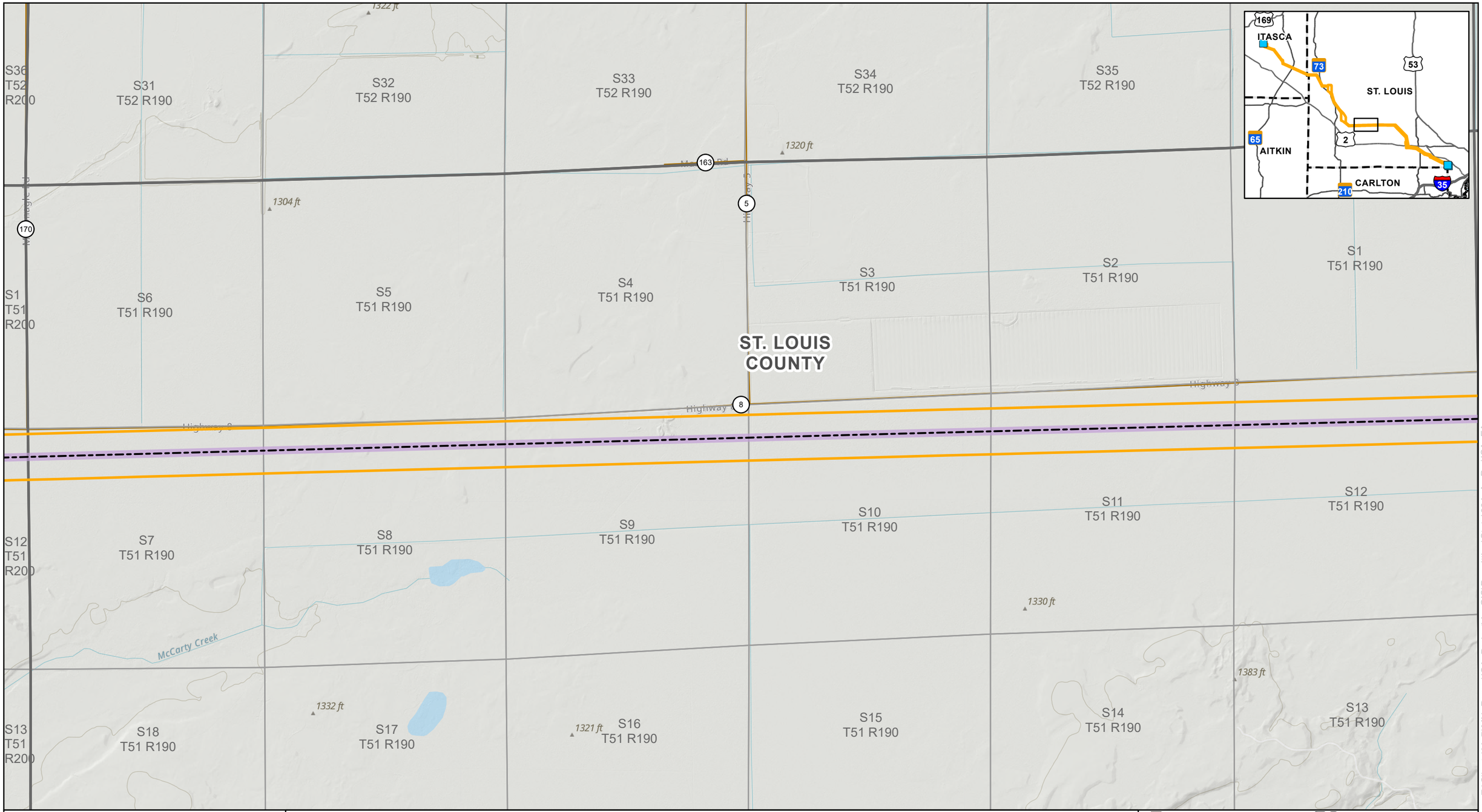
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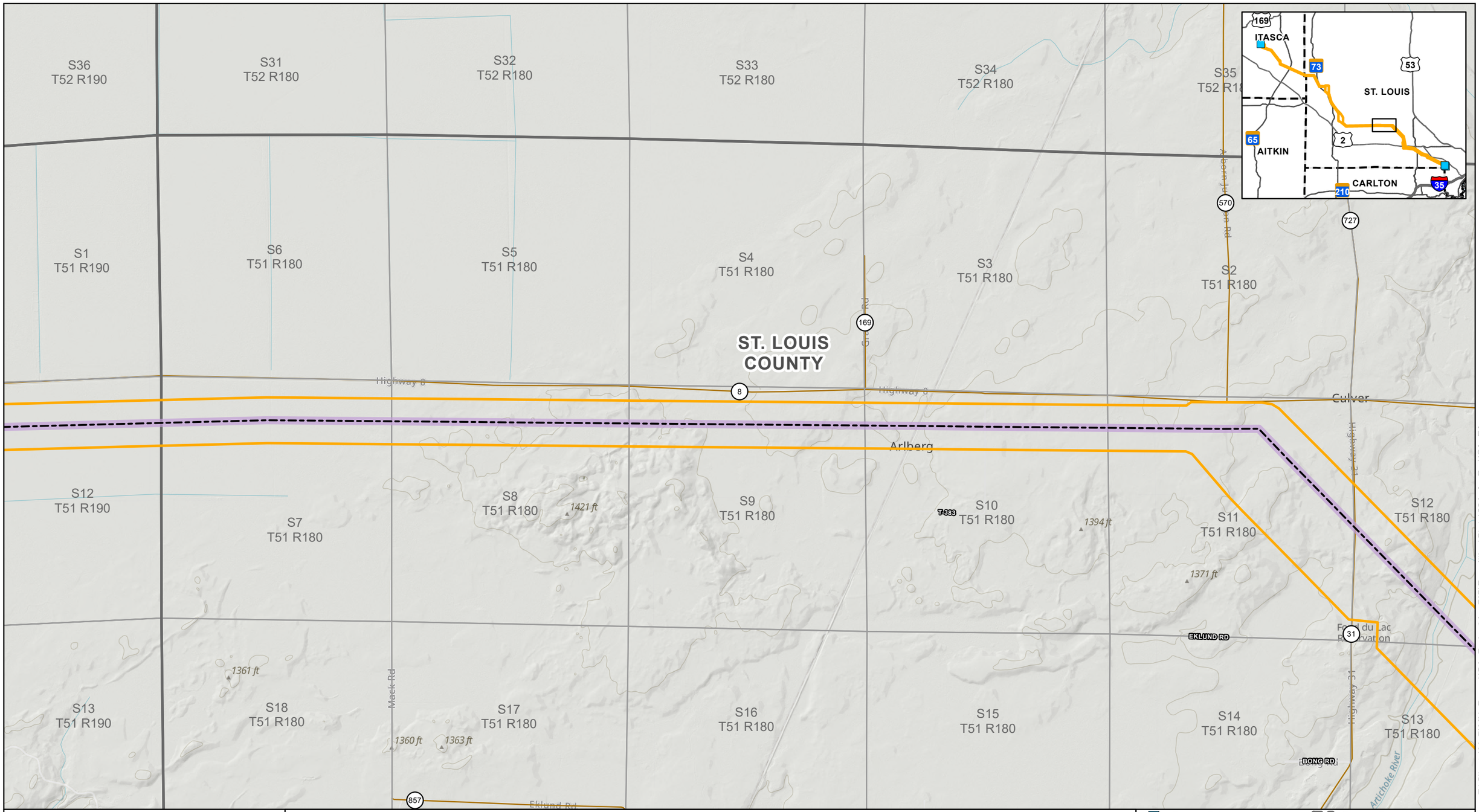
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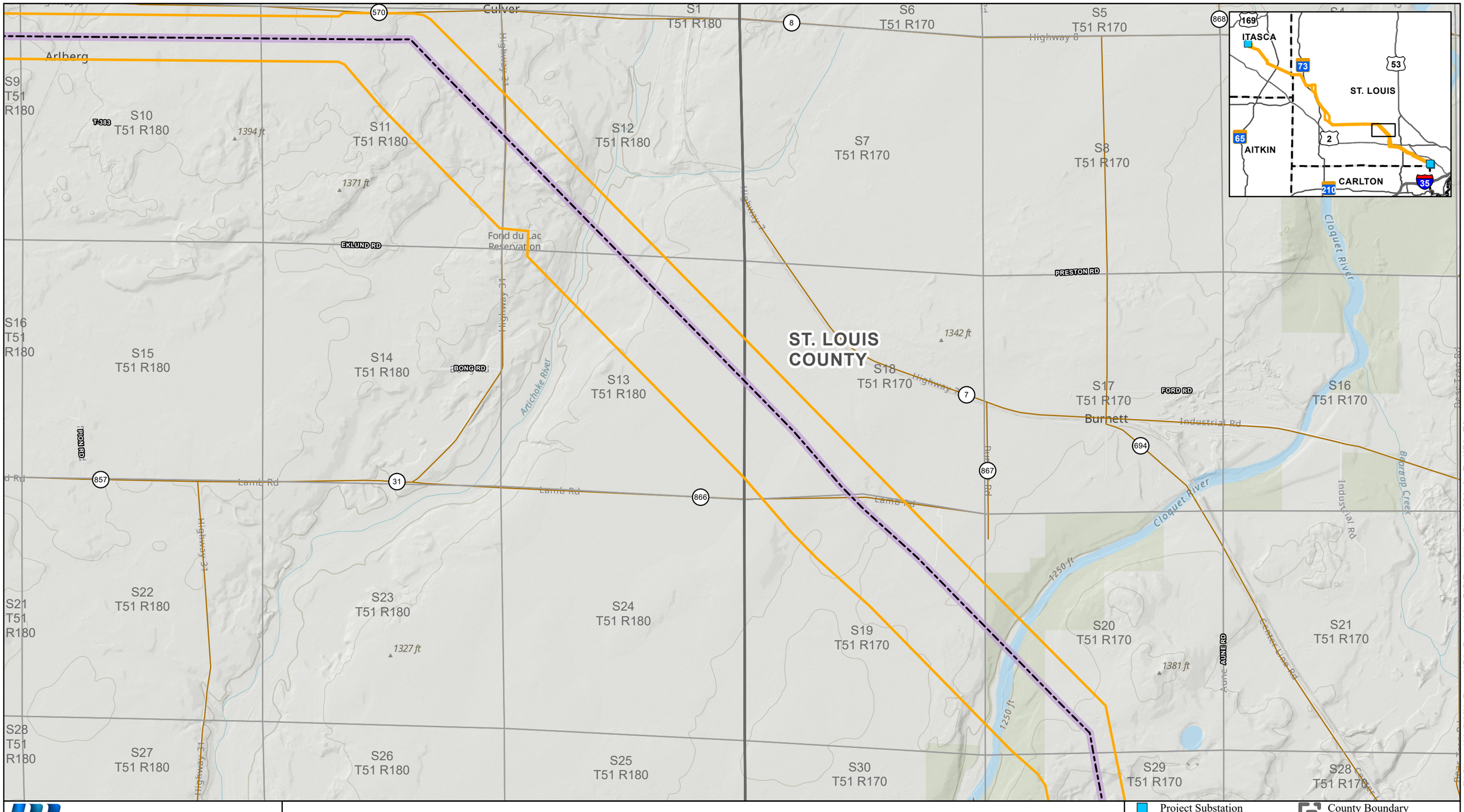
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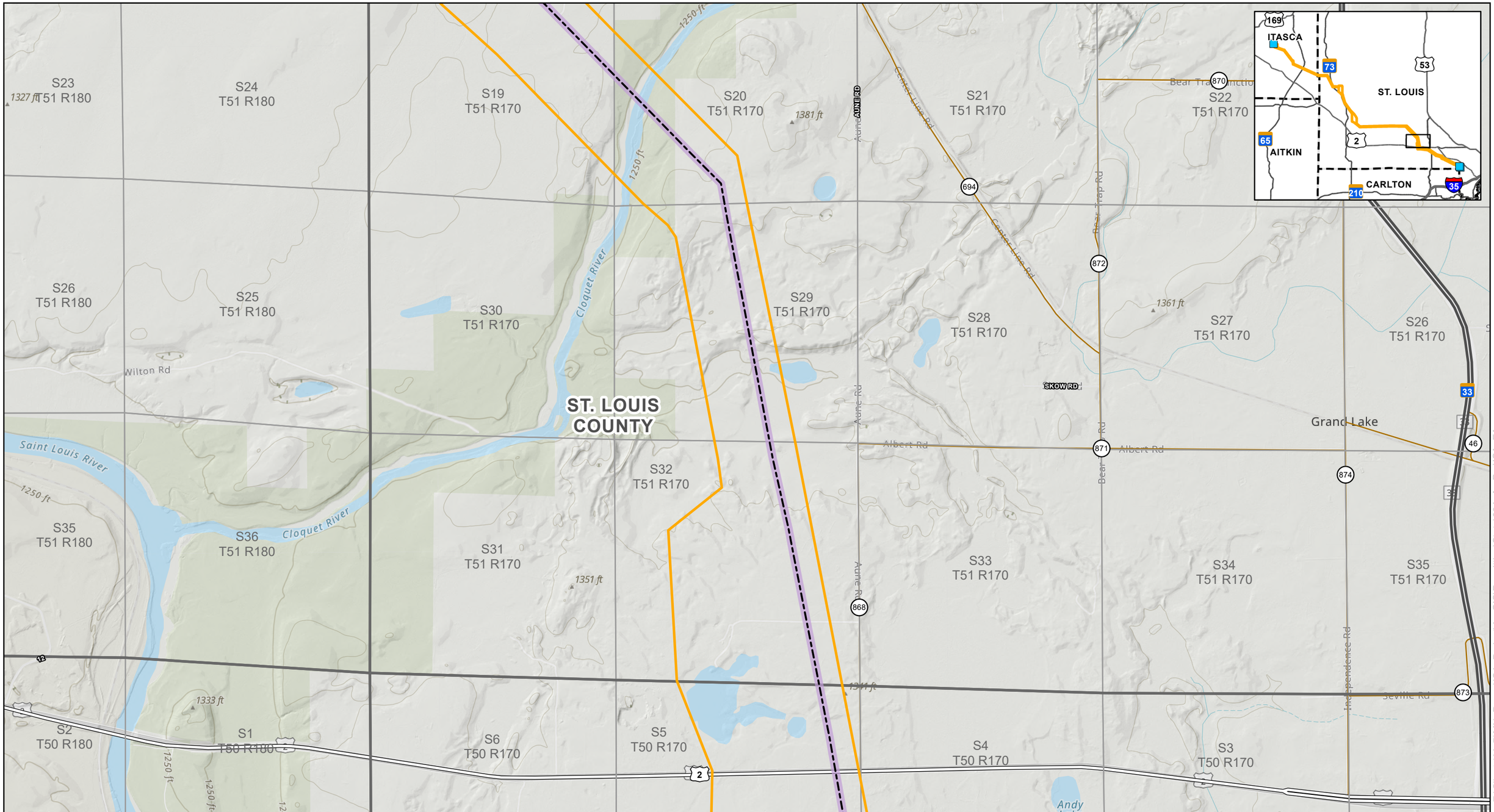
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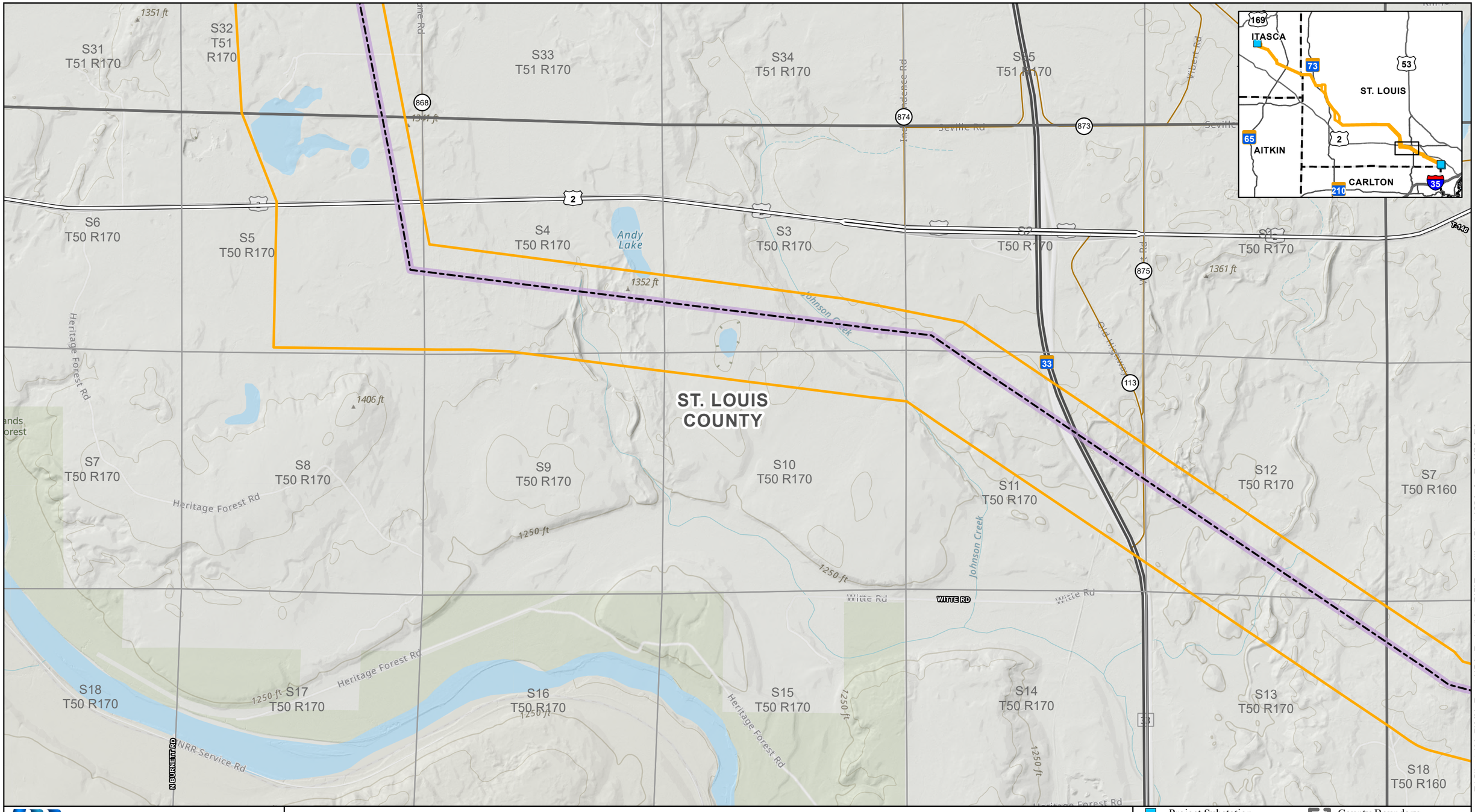
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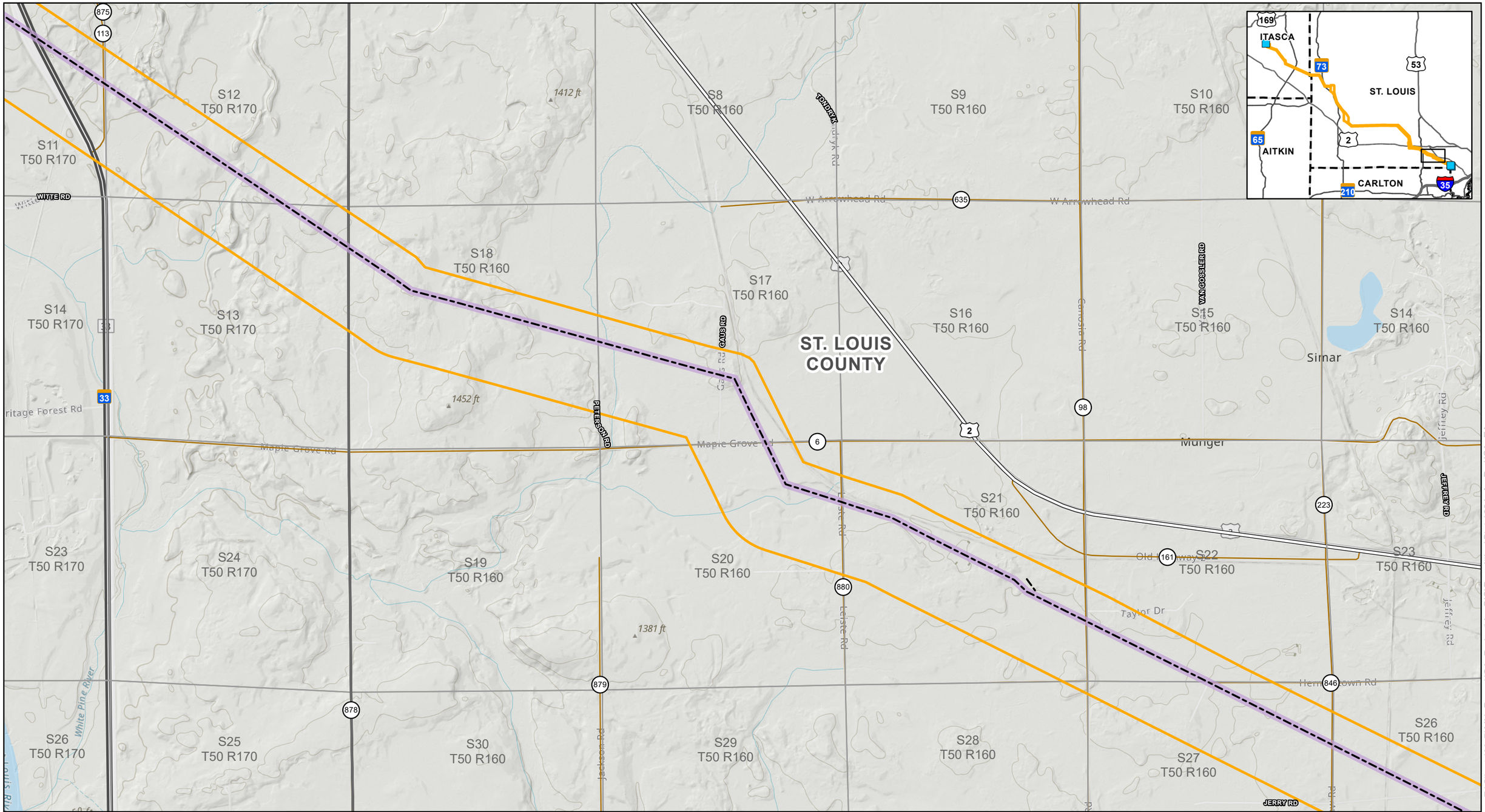
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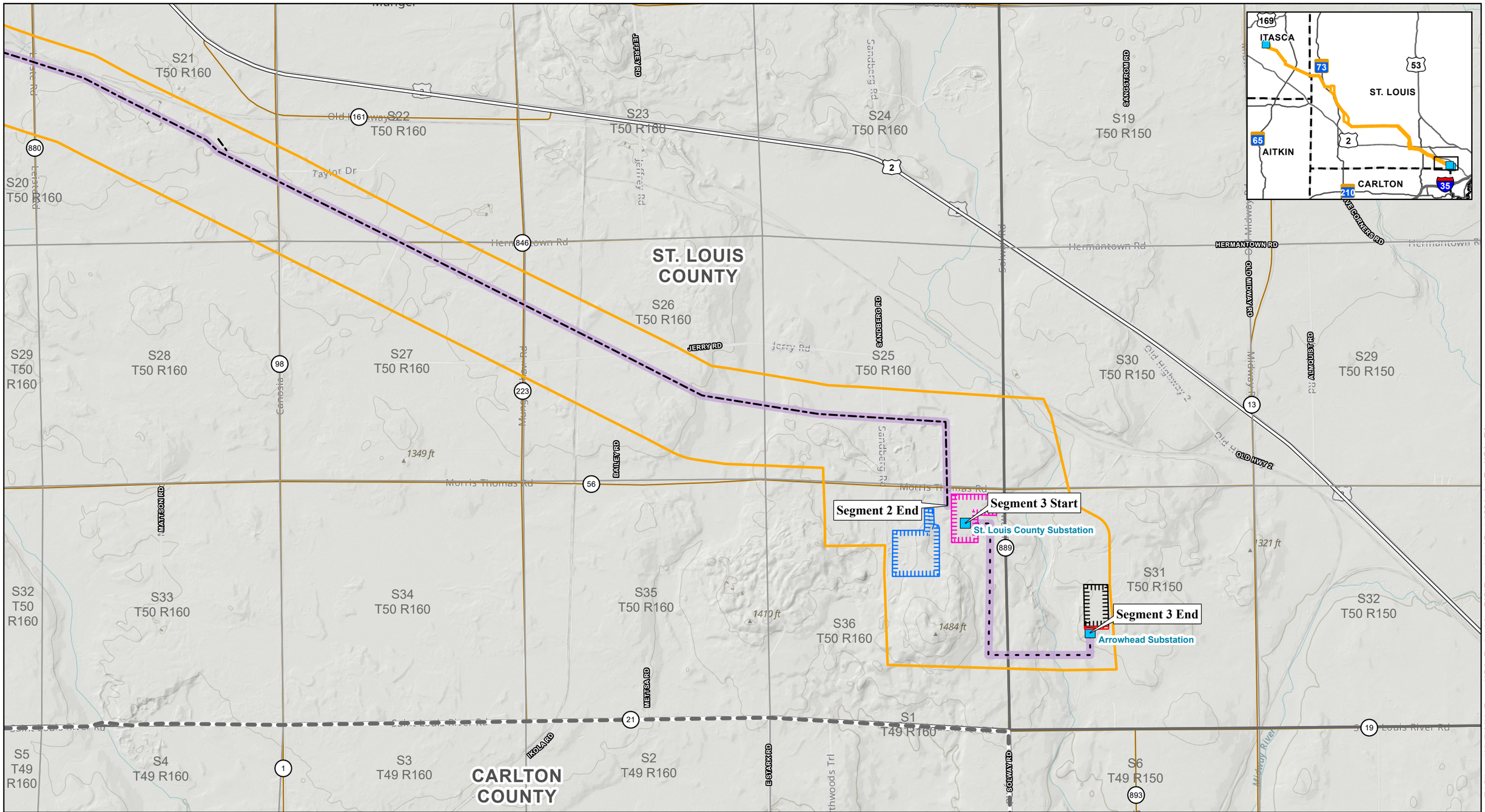
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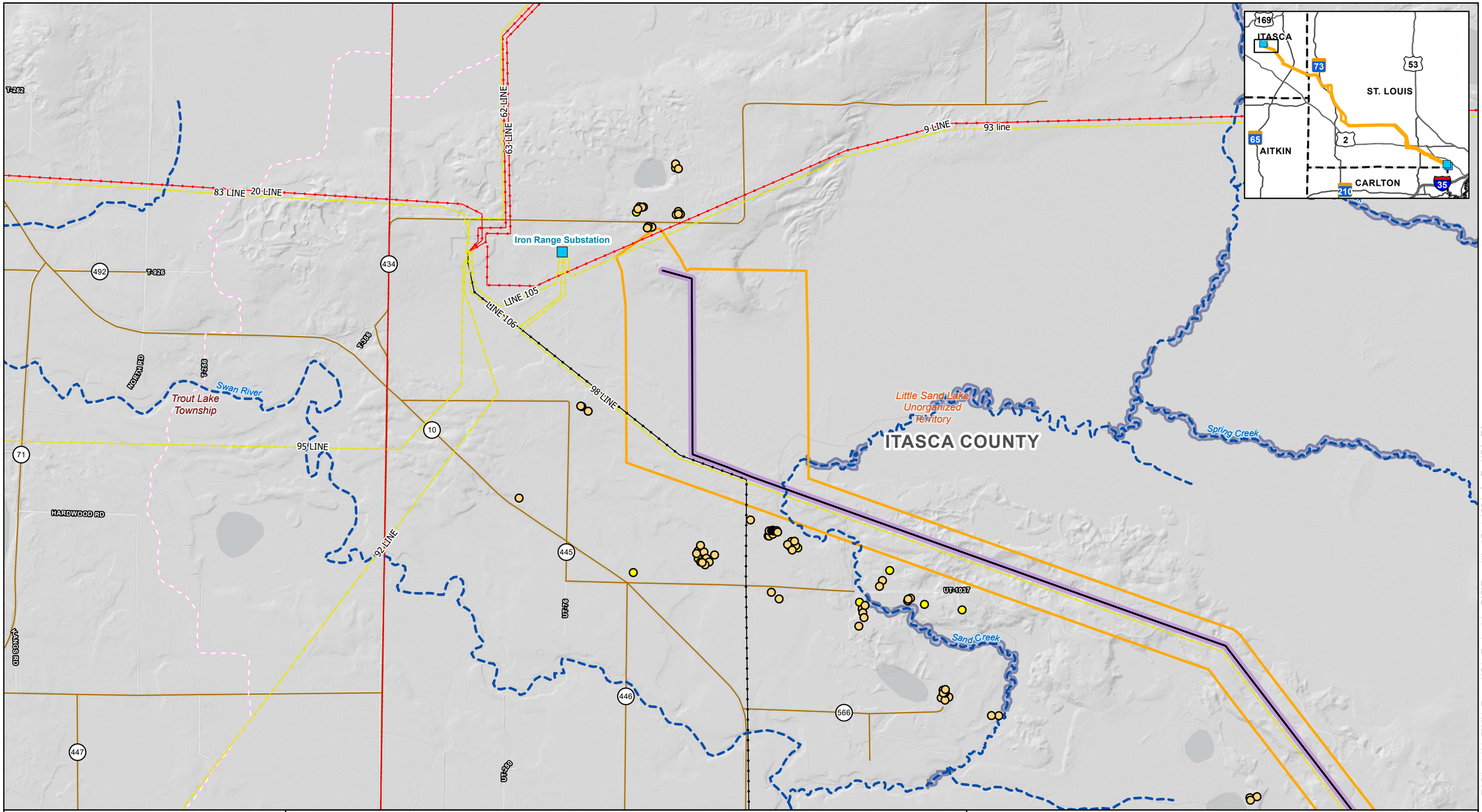
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- Existing ATC Arrowhead Substation
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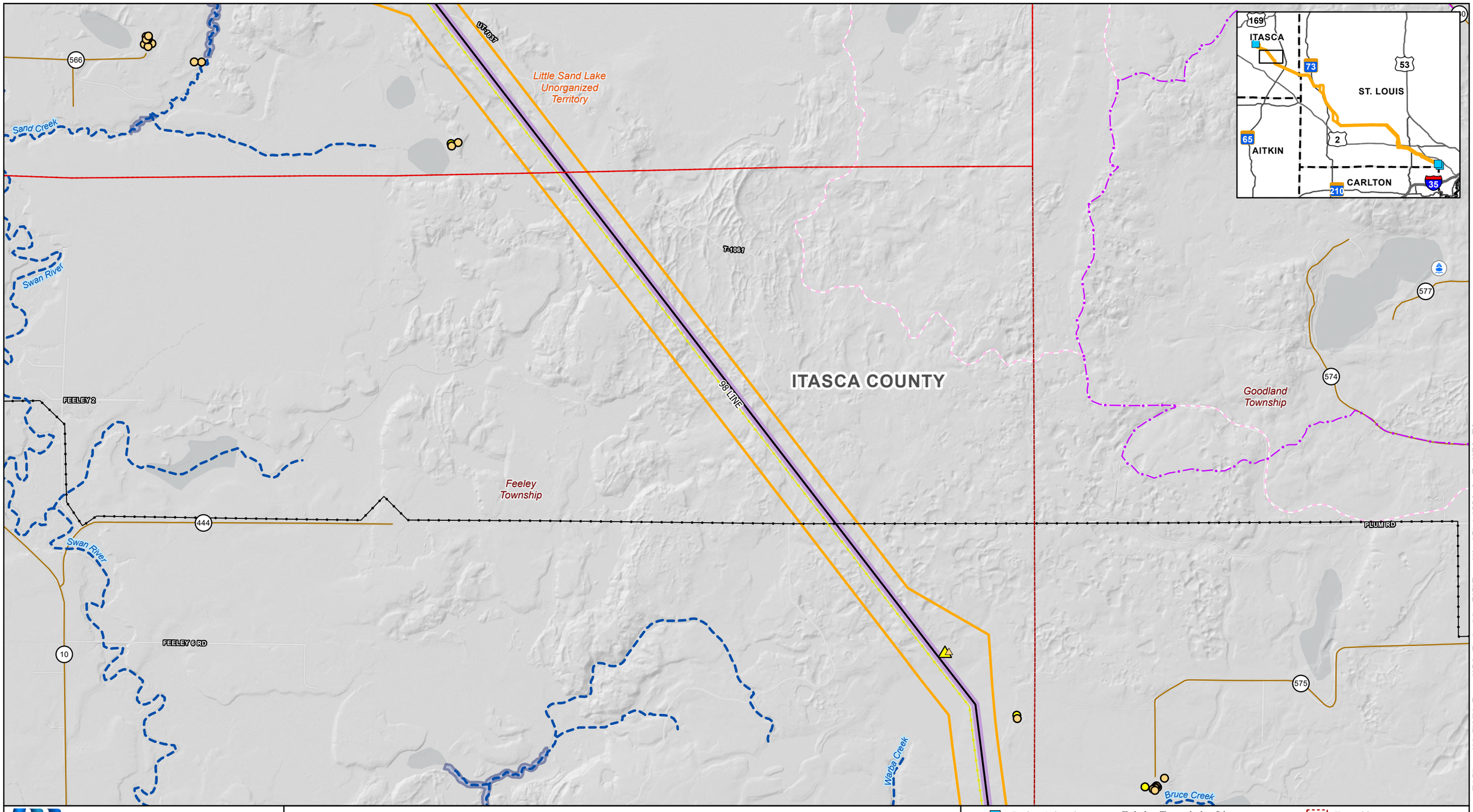
Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

Existing Tranmission Line
- 69 kV
- 115 kV
- 230 kV
- Residential Structure
- Non-Residential Structure

- Township
- Unorganized Territory
- County Boundary
- Aquatic Management Area
- Snowmobile Trail
- Major Waterbody

ISA Combined Application
Docket Nos. E015/CN-25-111 and E015/TL-25-112
Appendix E

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0 1,000 2,000 Feet

1 inch = 2,000 feet

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Map 2: Project Area and Facilities
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

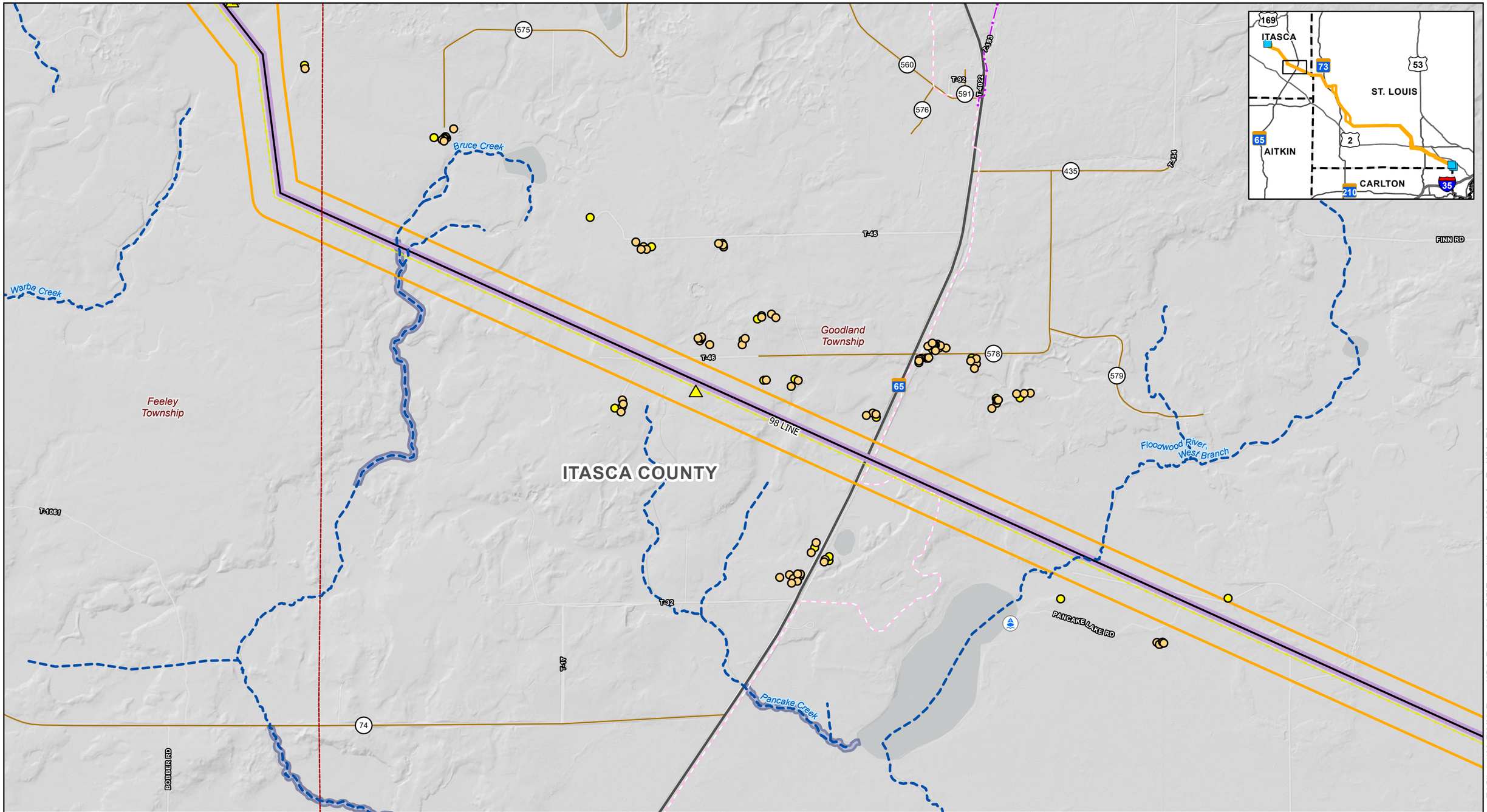
Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

Existing Tranmission Line
- 69 kV
- 230 kV
- Residential Structure in Route
- Non-Residential Structure in Route
- Residential Structure
- Non-Residential Structure

- Township
- Unorganized Territory
- County Boundary
- Water Access Site
- Aquatic Management Area
- State Park Trail / Road
- Snowmobile Trail
- Major Waterbody

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Map 2: Project Area and Facilities
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

Page 3 of 15

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

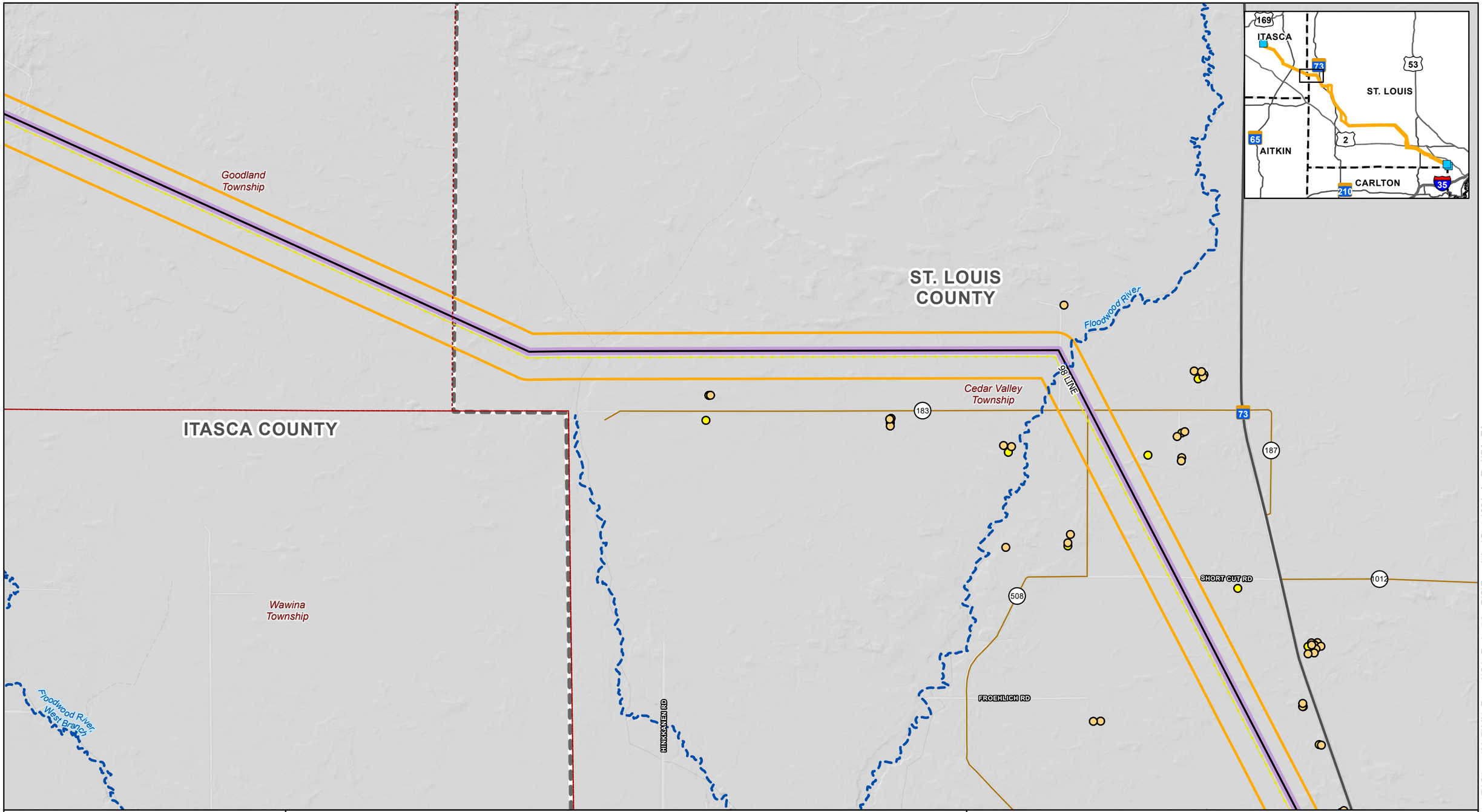
Existing Tranmission Line

- 230 kV
- Residential Structure in Route
- Non-Residential Structure in Route
- Residential Structure
- Non-Residential Structure

- Township
- County Boundary
- Water Access Site
- Aquatic Management Area
- State Park Trail / Road
- Snowmobile Trail
- Major Waterbody

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Map 2: Project Area and Facilities
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

Page 4 of 15

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

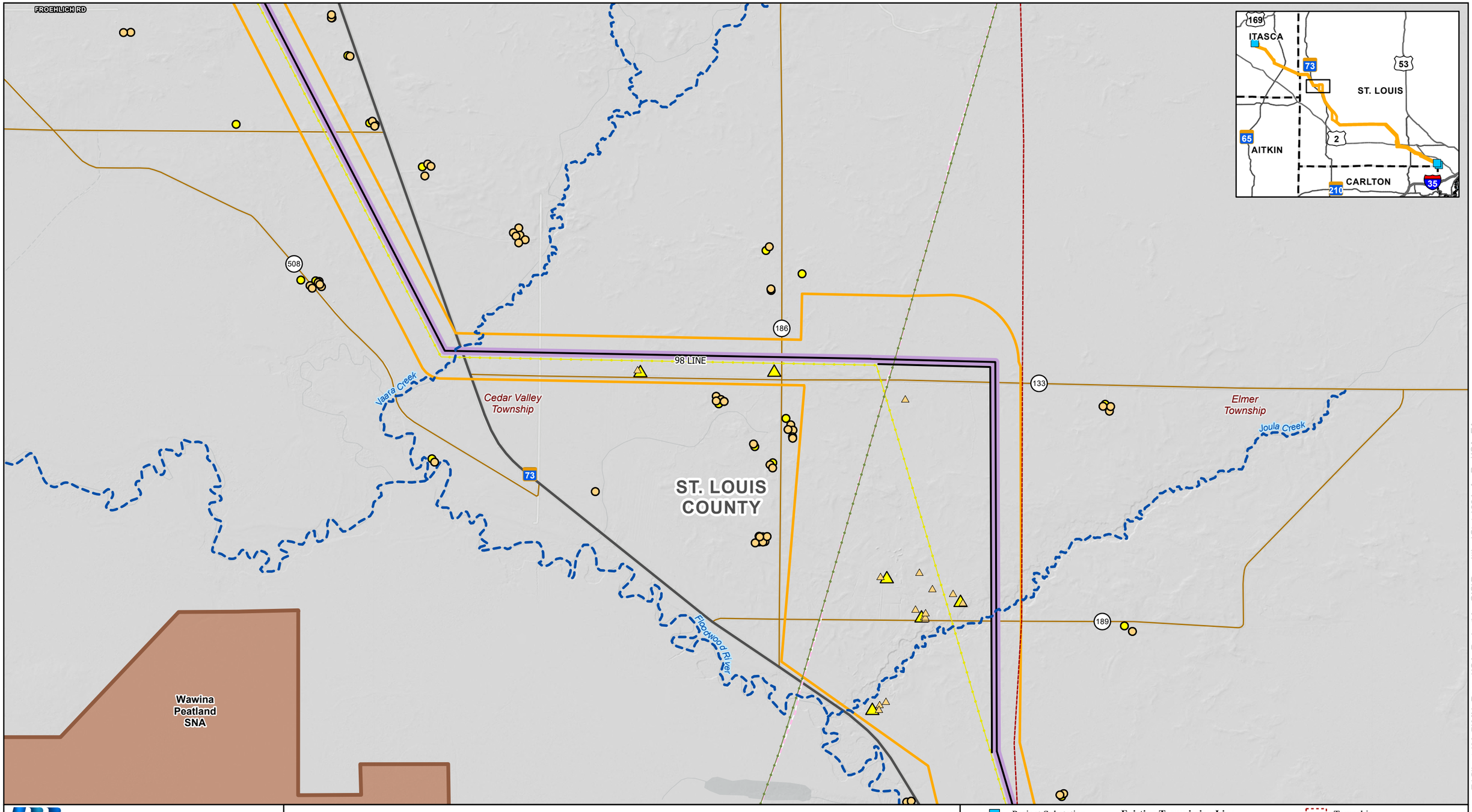
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- 230 kV
- Residential Structure
- Non-Residential Structure

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ISA Combined Application
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Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
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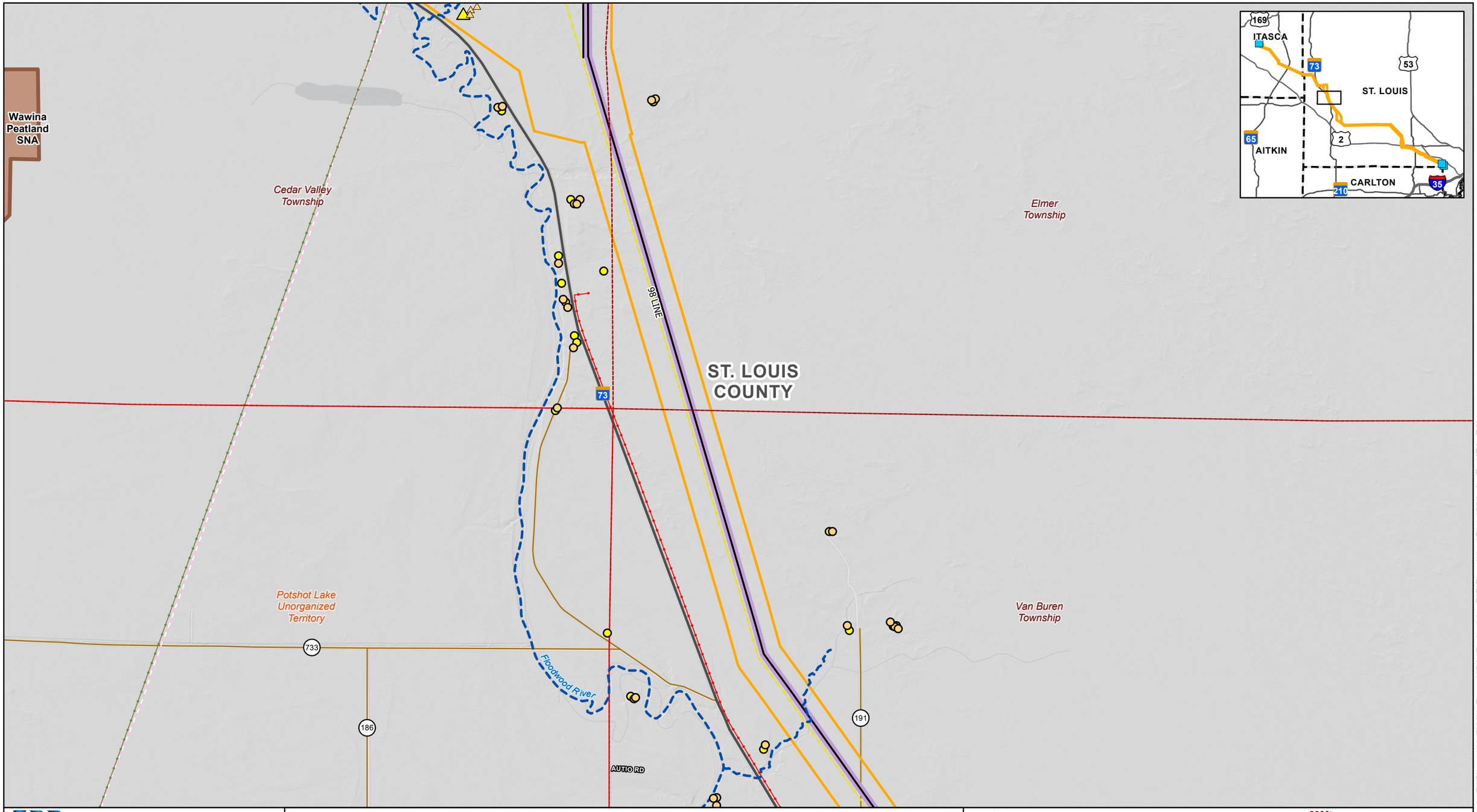
Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

Existing Tranmission Line
- 230 kV
- 500 kV
- Residential Structure in Route
- Non-Residential Structure in Route
- Residential Structure
- Non-Residential Structure

- Township
- County Boundary
- Scientific and Natural Area
- Snowmobile Trail
- Major Waterbody

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Map 2: Project Area and Facilities
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

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- Project Substation
- Proposed Right Of Way
- Proposed Route

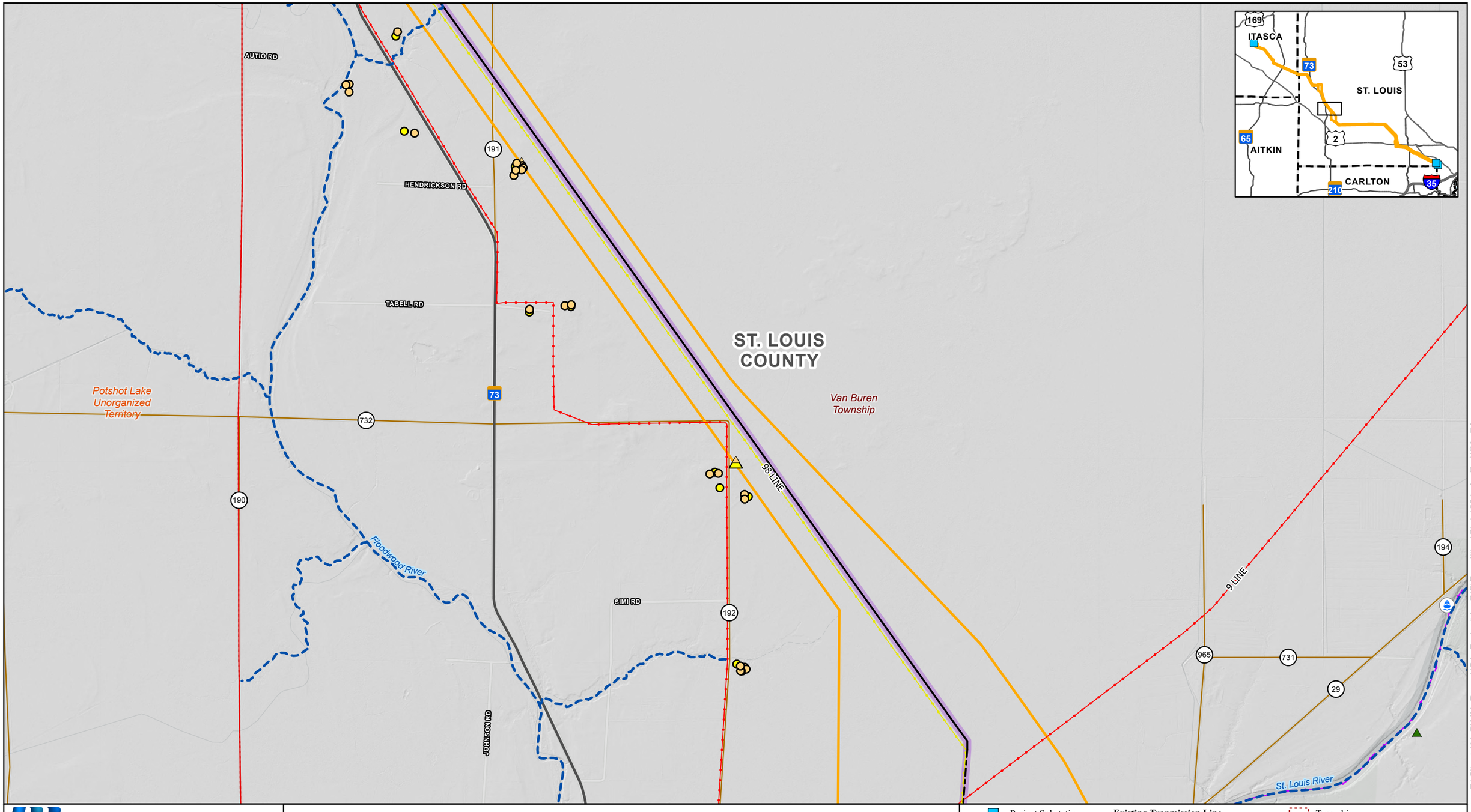
Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

Existing Tranmission Line
- 115 kV
- 230 kV
- 500 kV
- Residential Structure in Route
- Non-Residential Structure in Route
- Residential Structure
- Non-Residential Structure

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- Unorganized Territory
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- Scientific and Natural Area
- Snowmobile Trail
- Major Waterbody

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Map 2: Project Area and Facilities
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Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
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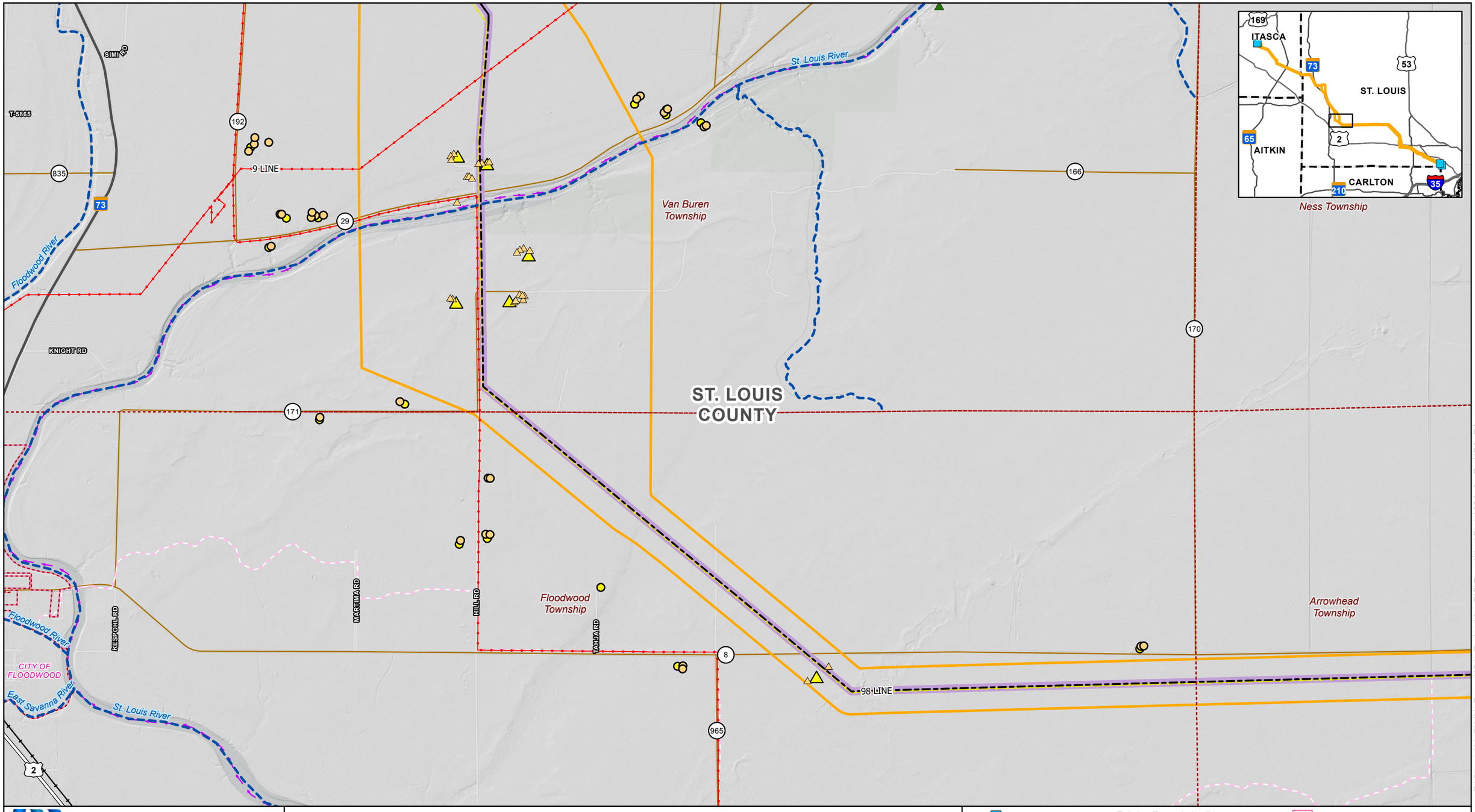
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- Non-Residential Structure

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- County Boundary
- Water Access Site
- DNR Parks and Trails Camping Units
- State Park Trail / Road
- Major Waterbody

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Map 2: Project Area and Facilities
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
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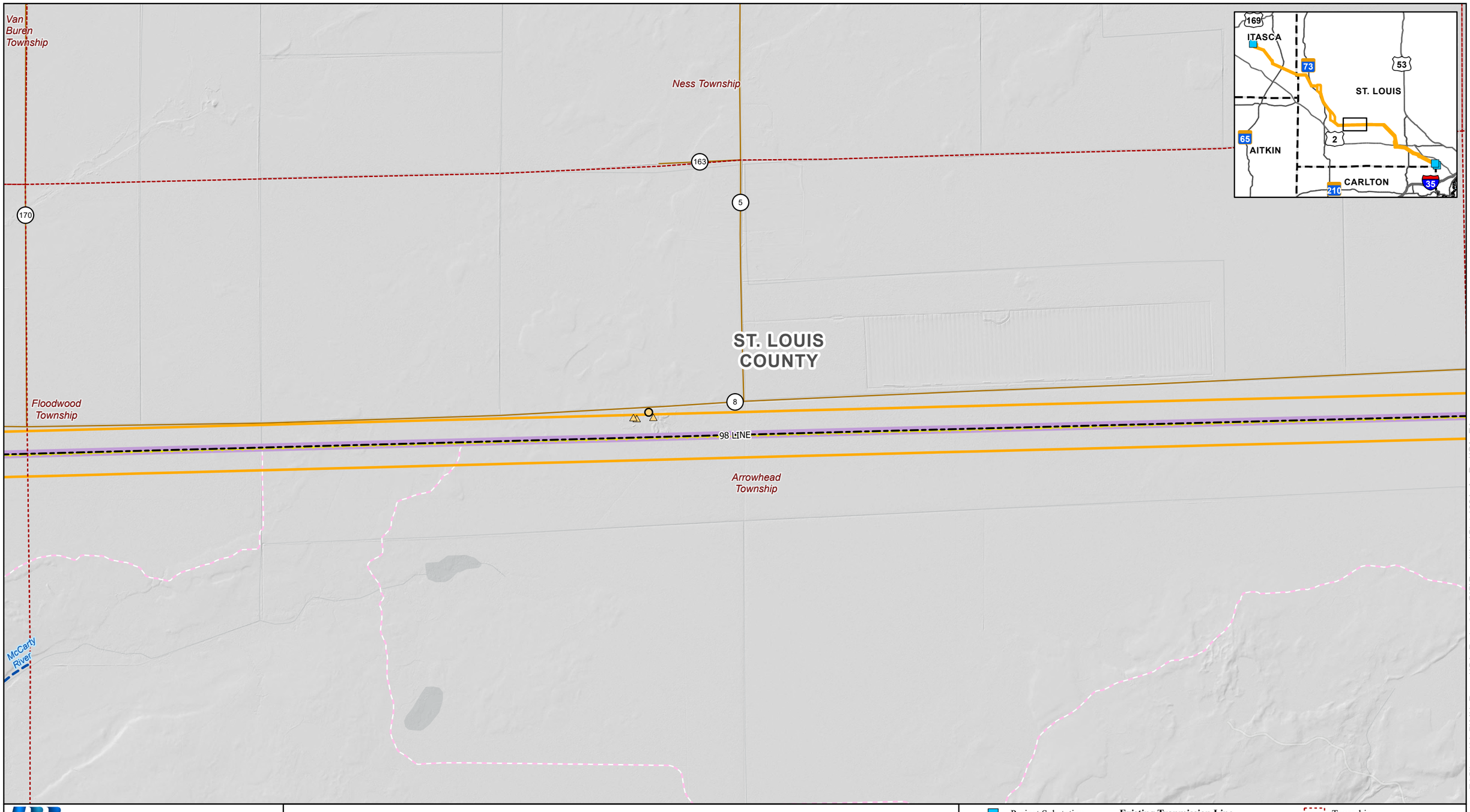
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Existing Tranmission Line
- 115 kV
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- Residential Structure in Route
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Map 2: Project Area and Facilities
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
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Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

Existing Tranmission Line

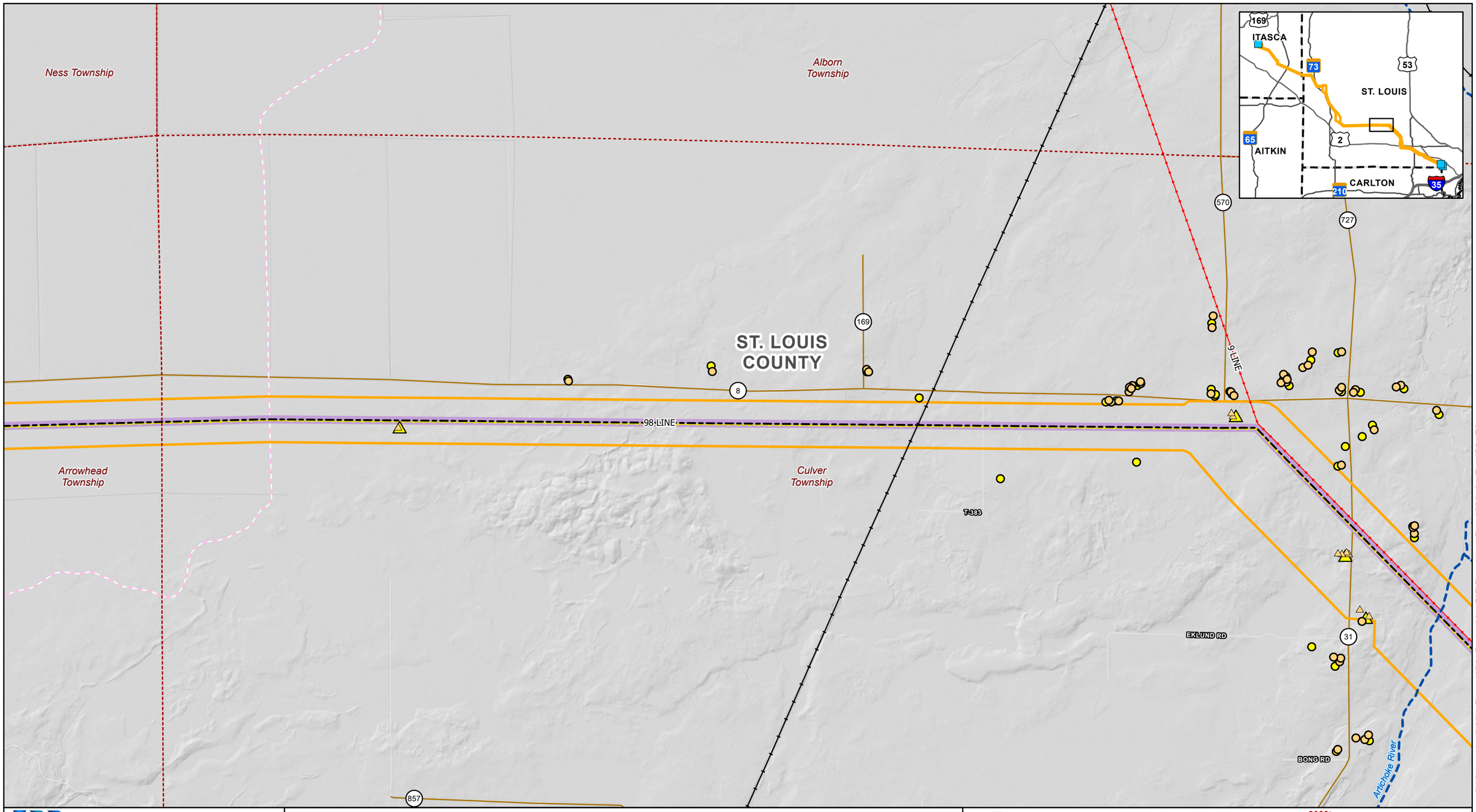
- 230 kV
- Non-Residential Structure in Route
- Non-Residential Structure

- Township
- County Boundary
- Snowmobile Trail
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ISA Combined Application
Docket Nos. E015/CN-25-111 and E015/TL-25-112
Appendix E

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Minnesota Power

Itasca and St. Louis Counties, Minnesota

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Existing Tranmission Line

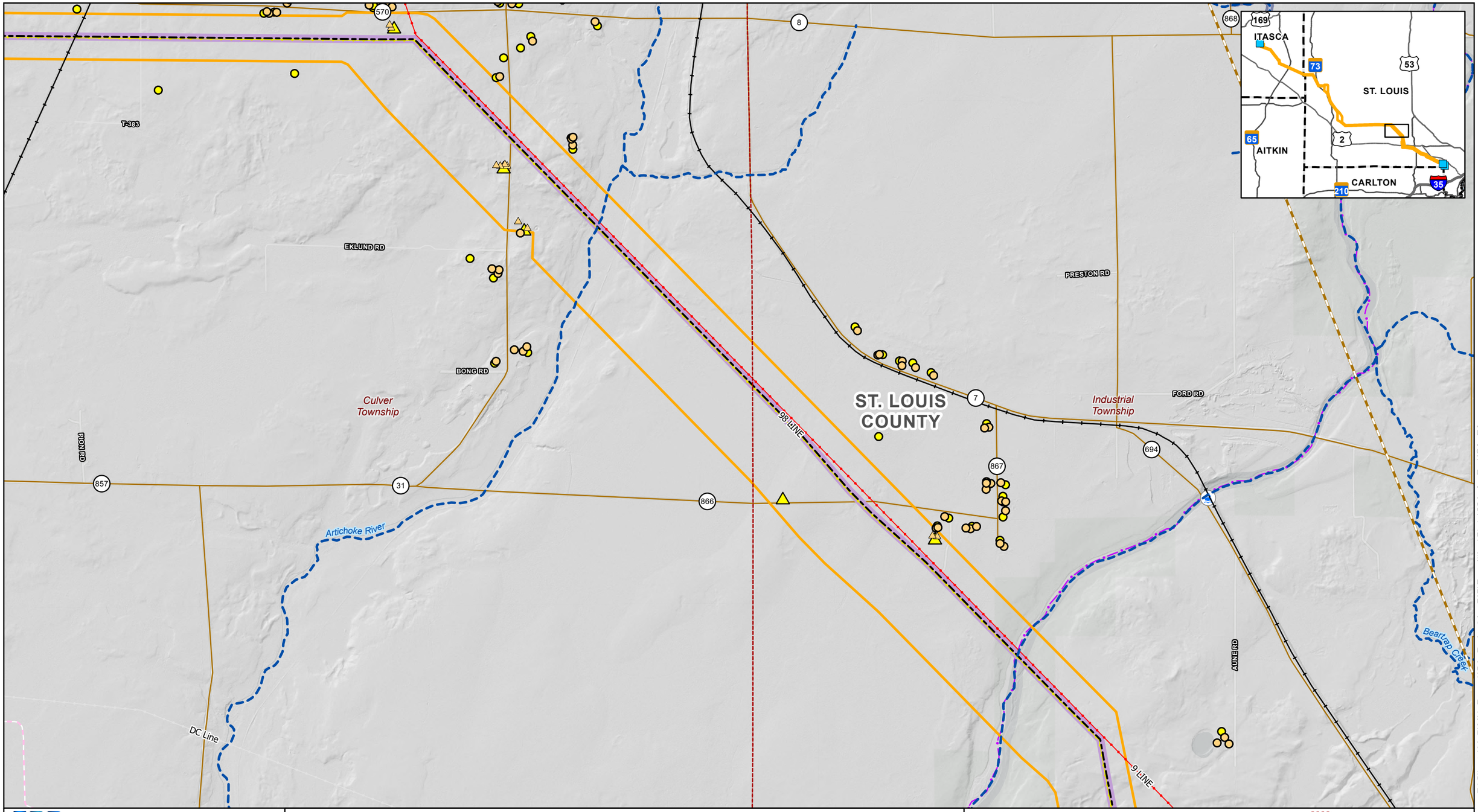
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- Rail Line
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Map 2: Project Area and Facilities
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

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Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

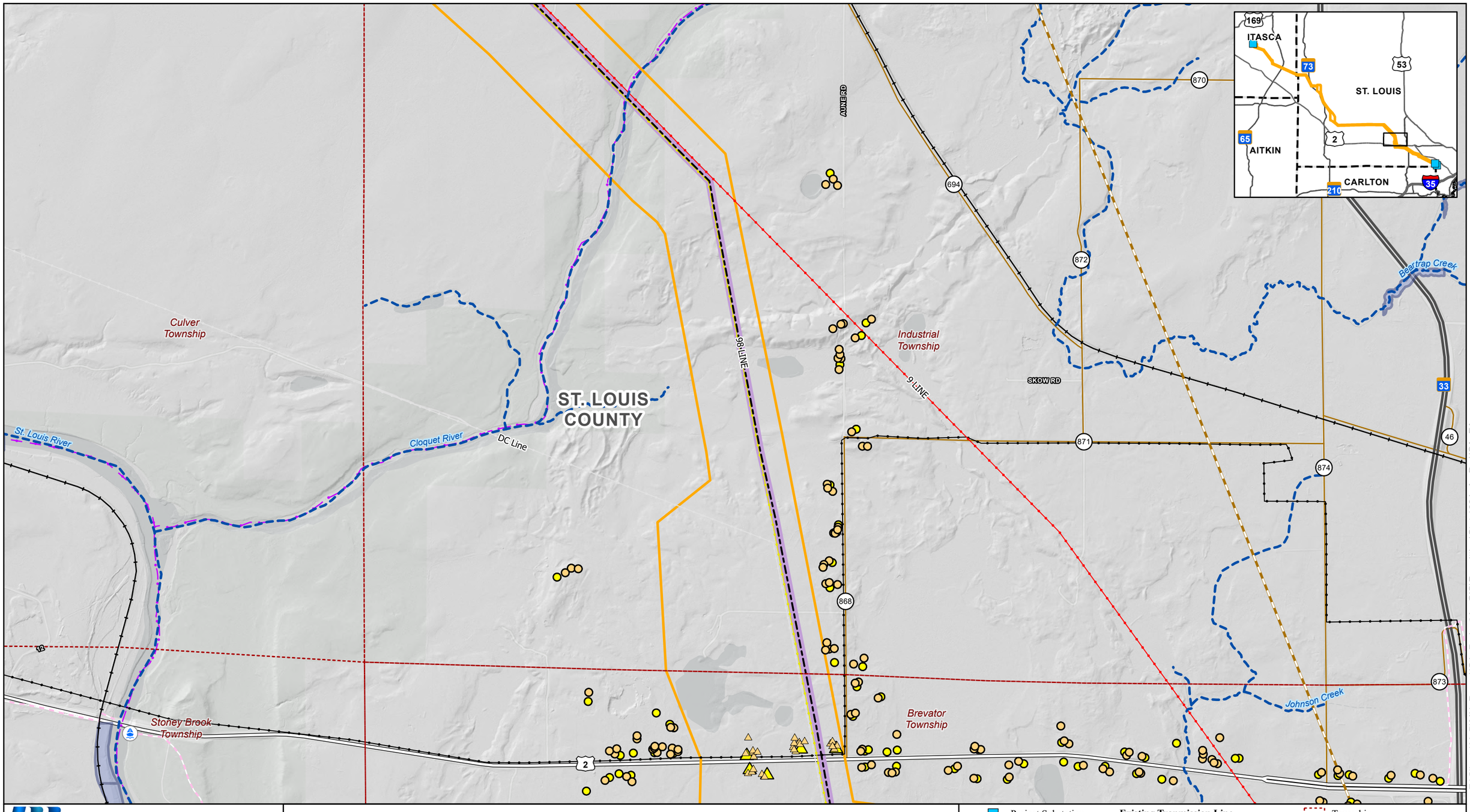
- Project Substation
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Existing Tranmission Line
- 115 kV
- 230 kV
- DC Line
- Residential Structure in Route
- Non-Residential Structure in Route
- Residential Structure
- Non-Residential Structure

- Township
- County Boundary
- Water Access Site
- Aquatic Management Area
- Existing Natural Gas Pipeline
- Rail Line
- State Park Trail / Road
- Snowmobile Trail
- Major Waterbody

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Map 2: Project Area and Facilities
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

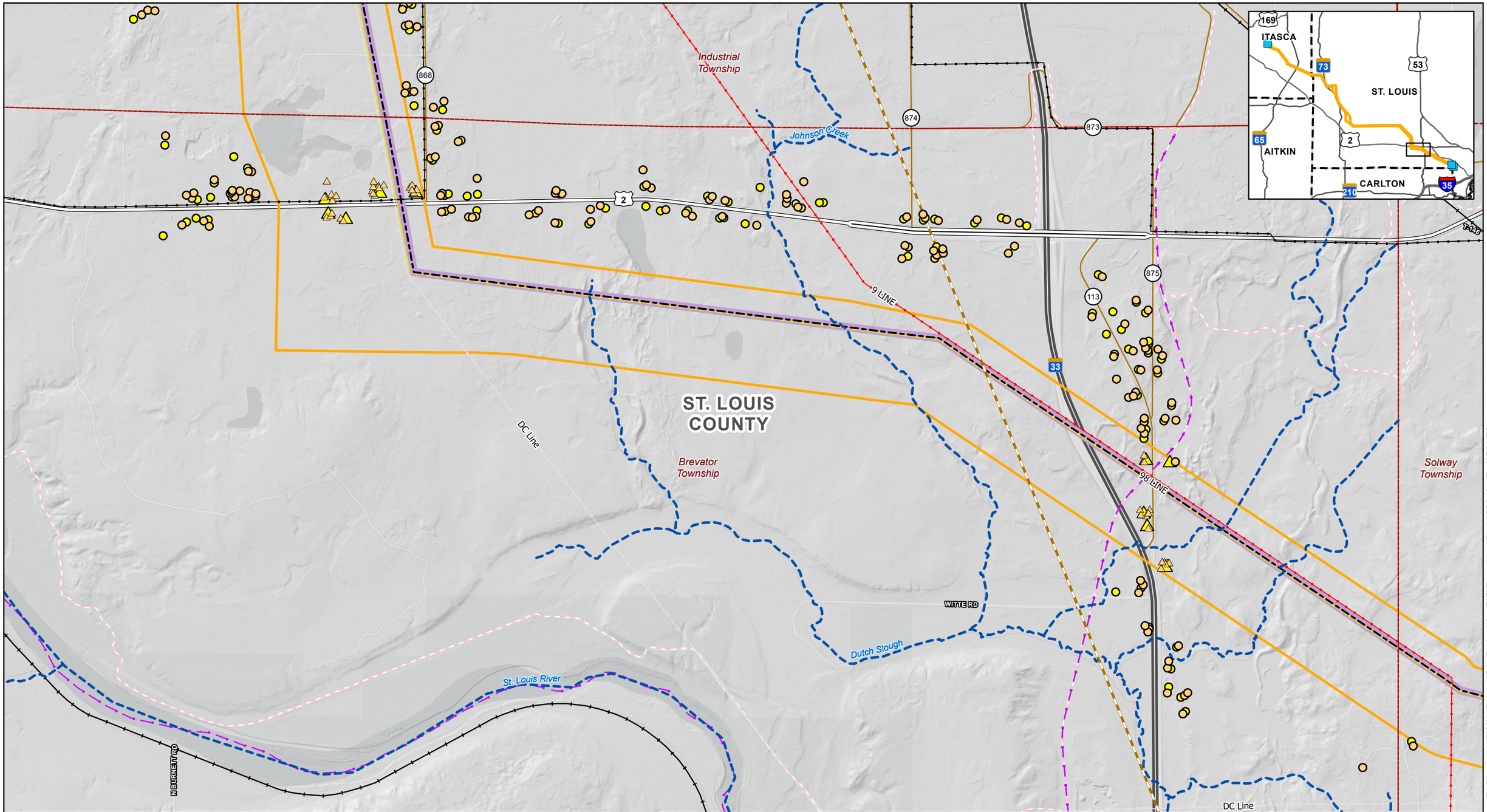
Page 12 of 15

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

Existing Tranmission Line
- 69 kV
- 115 kV
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- Residential Structure in Route
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- Residential Structure
- Non-Residential Structure

- Township
- County Boundary
- Water Access Site
- Aquatic Management Area
- Existing Natural Gas Pipeline
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Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

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- Segment 1
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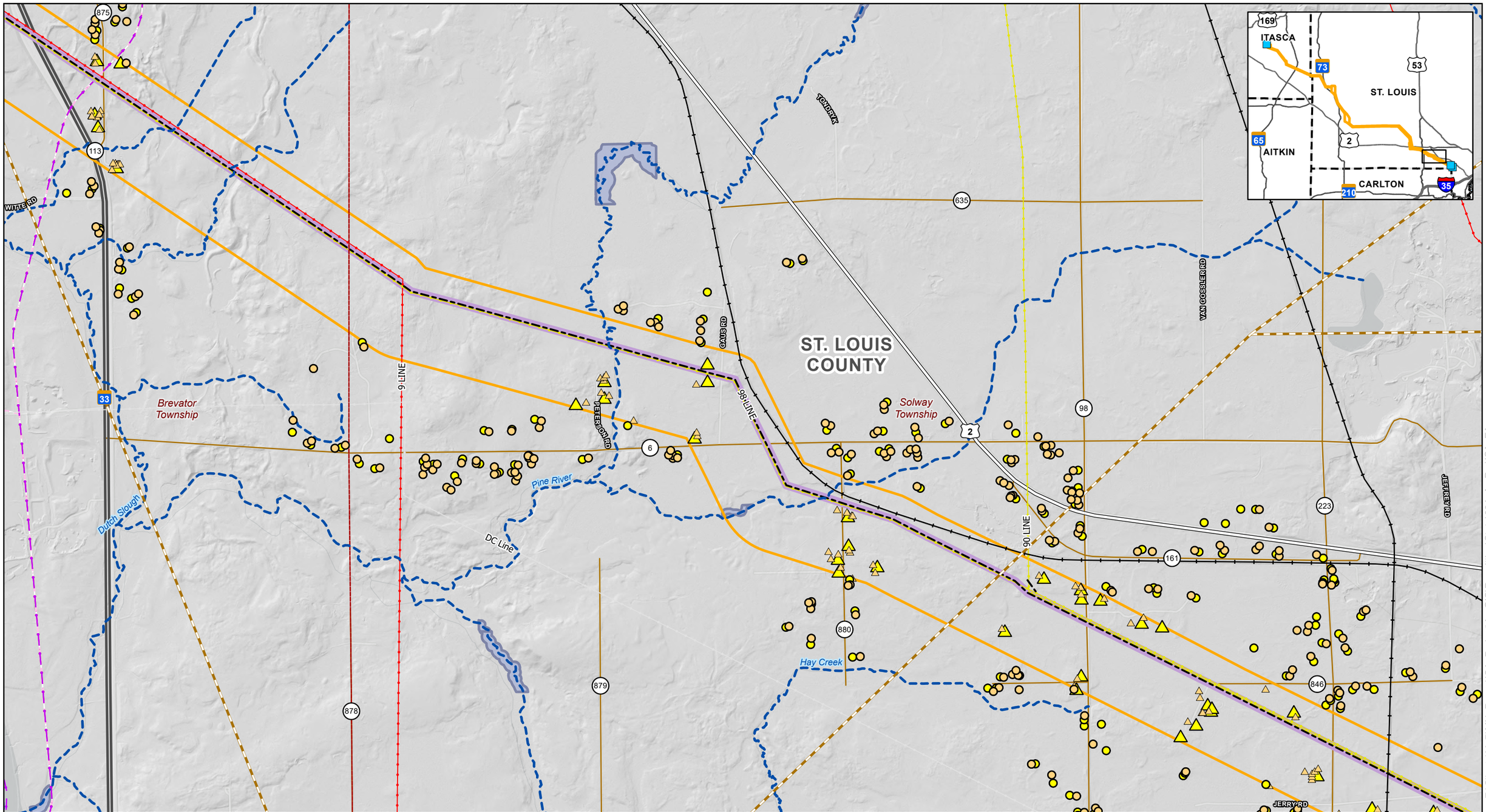
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- State Trail
- Snowmobile Trail
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Itasca and St. Louis Counties, Minnesota

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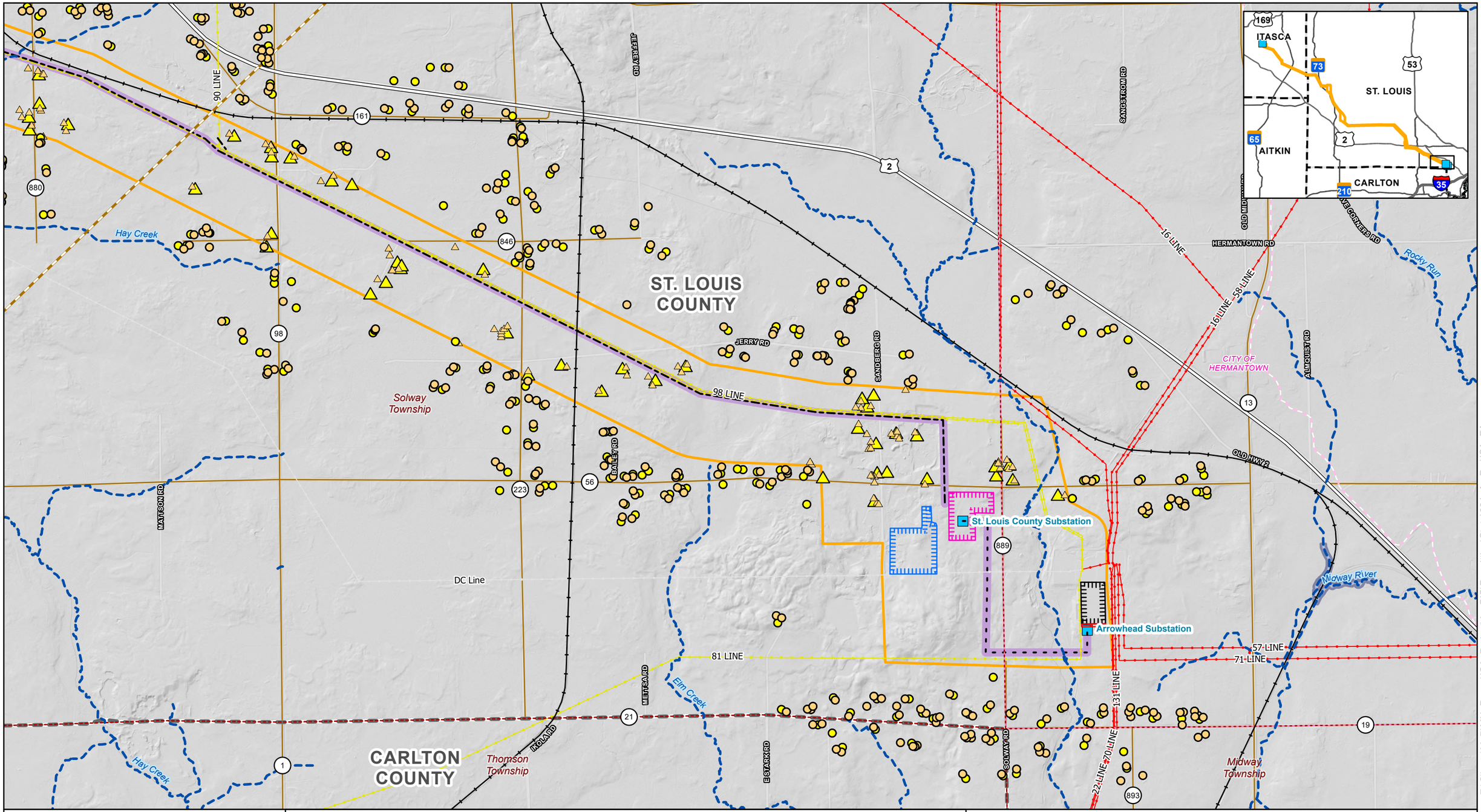
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- Rail Line
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- State Trail
- Snowmobile Trail
- Major Waterbody

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Map 2: Project Area and Facilities
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

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- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3
- ATC Arrowhead Substation Expansion
- Existing ATC Arrowhead Substation
- St. Louis County Substation Expansion
- HVDC Modernization Footprint

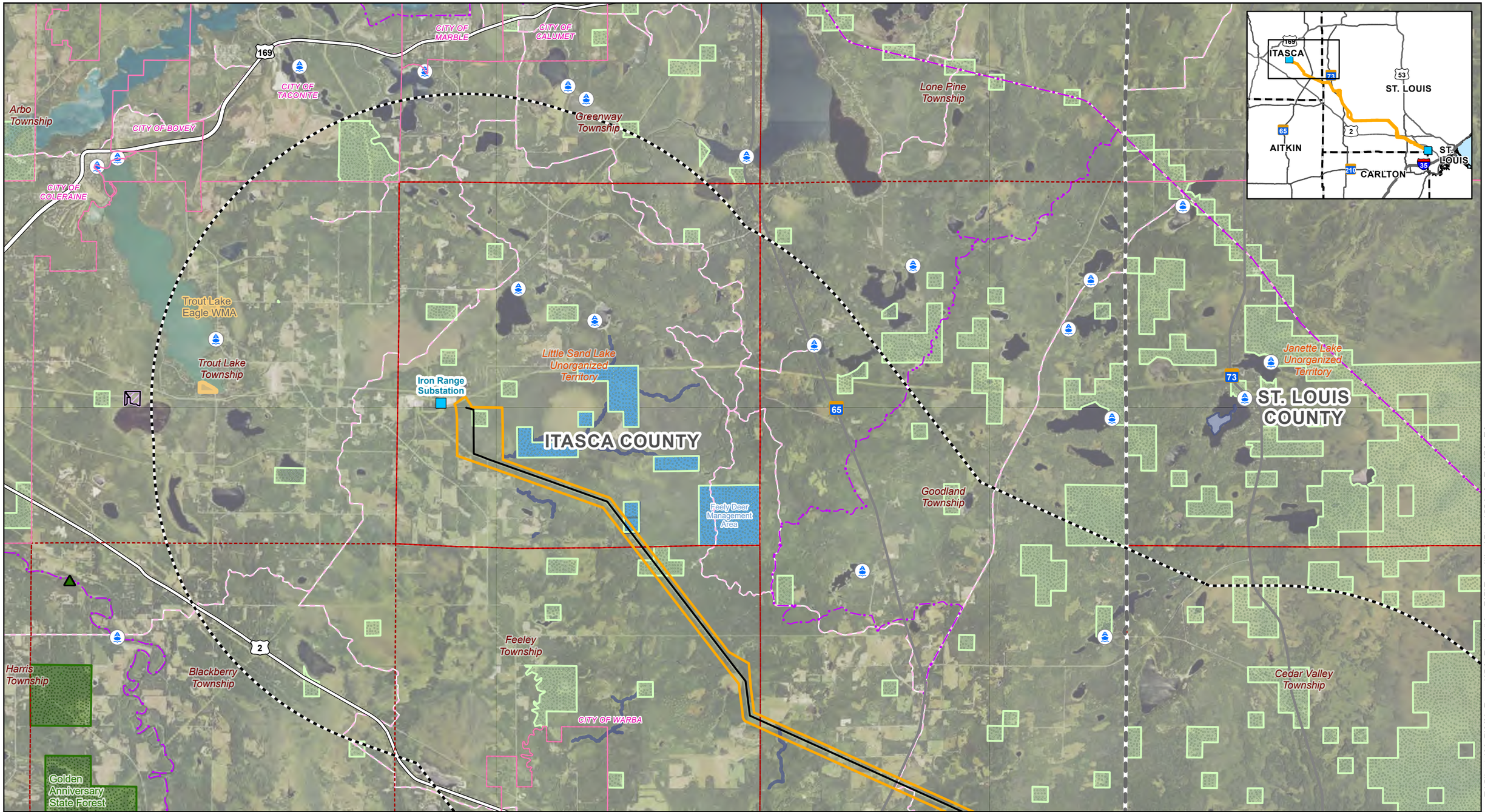
Existing Tranmission Line

- 115 kV
- 230 kV
- DC Line
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- Non-Residential Structure in Route
- Residential Structure
- Non-Residential Structure
- City/Municipality
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- County Boundary
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- Rail Line
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Appendix E



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Map 3: Public Land Ownership and Recreation
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3
- Proposed Route 5-Mile Buffer
- County Boundary
- City/Municipality
- Township
- Unorganized Territory
- Water Access Site
- DNR Park and Trail Camping Unit
- Snowmobile Trail
- State Park Trail / Road
- State Trail
- Aquatic Management Area
- Wildlife Management Area
- State Forest
- Other State Forest Land
- Deer Management Area
- BWSR RIM Easement

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Trout Lake Township
Little Sand Lake Unorganized Territory
Feely Deer Management Area
Janette Lake Unorganized Territory
Lavell Township
Feeley Township
Blackberry Township
CITY OF WARBA
Goodland Township
ITASCA COUNTY
Cedar Valley Township
ST. LOUIS COUNTY
Elmer Township
Splithand Township
Sago Township
Swan River Deer Yard WMA
Wawina Township
Wawina Peatland SNA
Ball Bluff Township
Savanna State Forest
Northwest Aitkin Unorganized Territory
AITKIN COUNTY
Northeast Aitkin Unorganized Territory
Potshot Lake Unorganized Territory
Van Buren Township
Savanna State Forest



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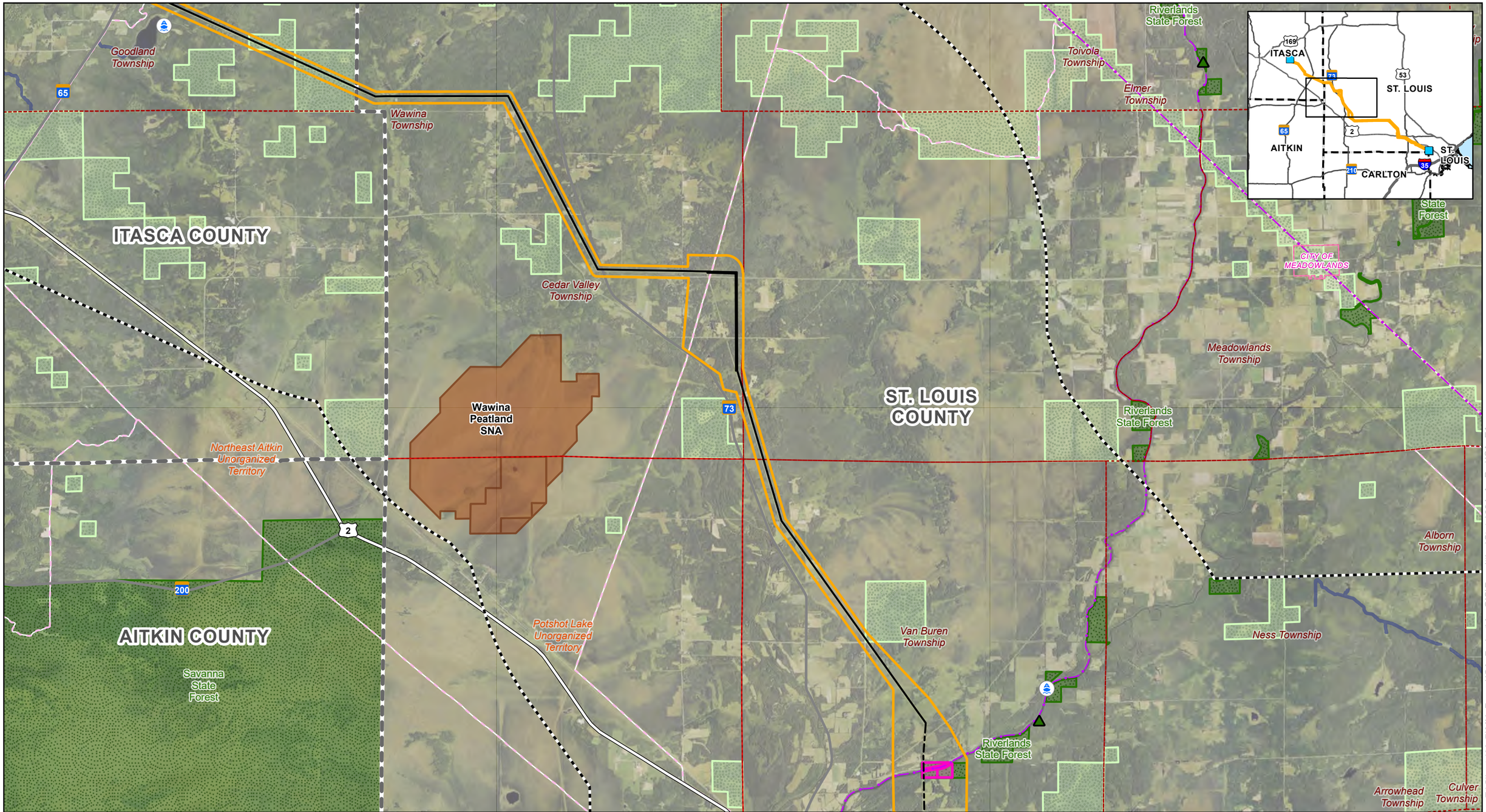
Map 3: Public Land Ownership and Recreation
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power
Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Route

Proposed Alignment
- Segment 1
- Segment 2
- Segment 3
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- County Boundary
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- Township
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Map 3: Public Land Ownership and Recreation
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

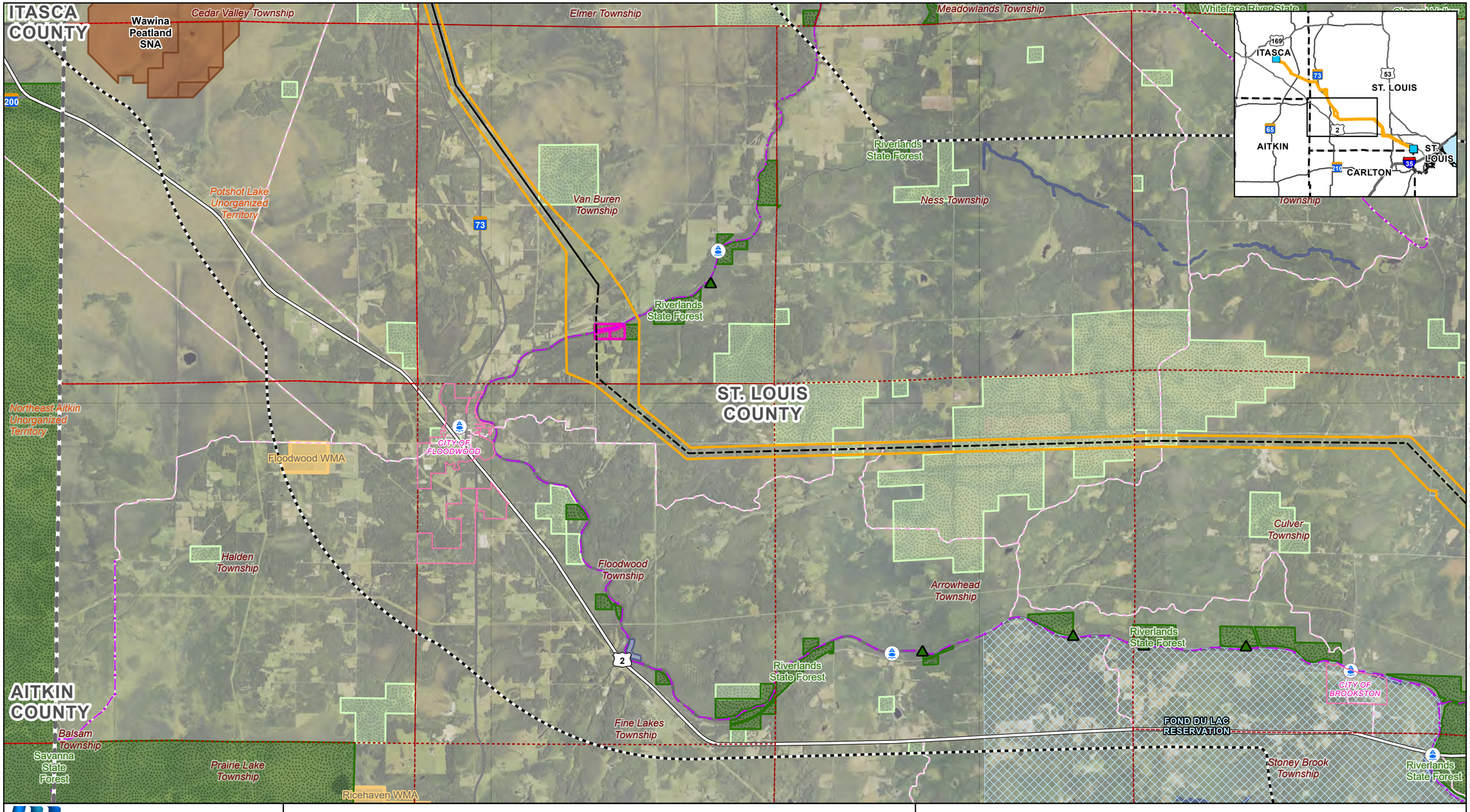
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- Proposed Route

Proposed Alignment

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- Segment 3
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- State Park Trail / Road
- State Trail
- Aquatic Management Area
- Scientific and Natural Area
- State Forest
- Other State Forest Land
- DNR Land and Water Conservation Fund Area

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Minnesota Power

Itasca and St. Louis Counties, Minnesota

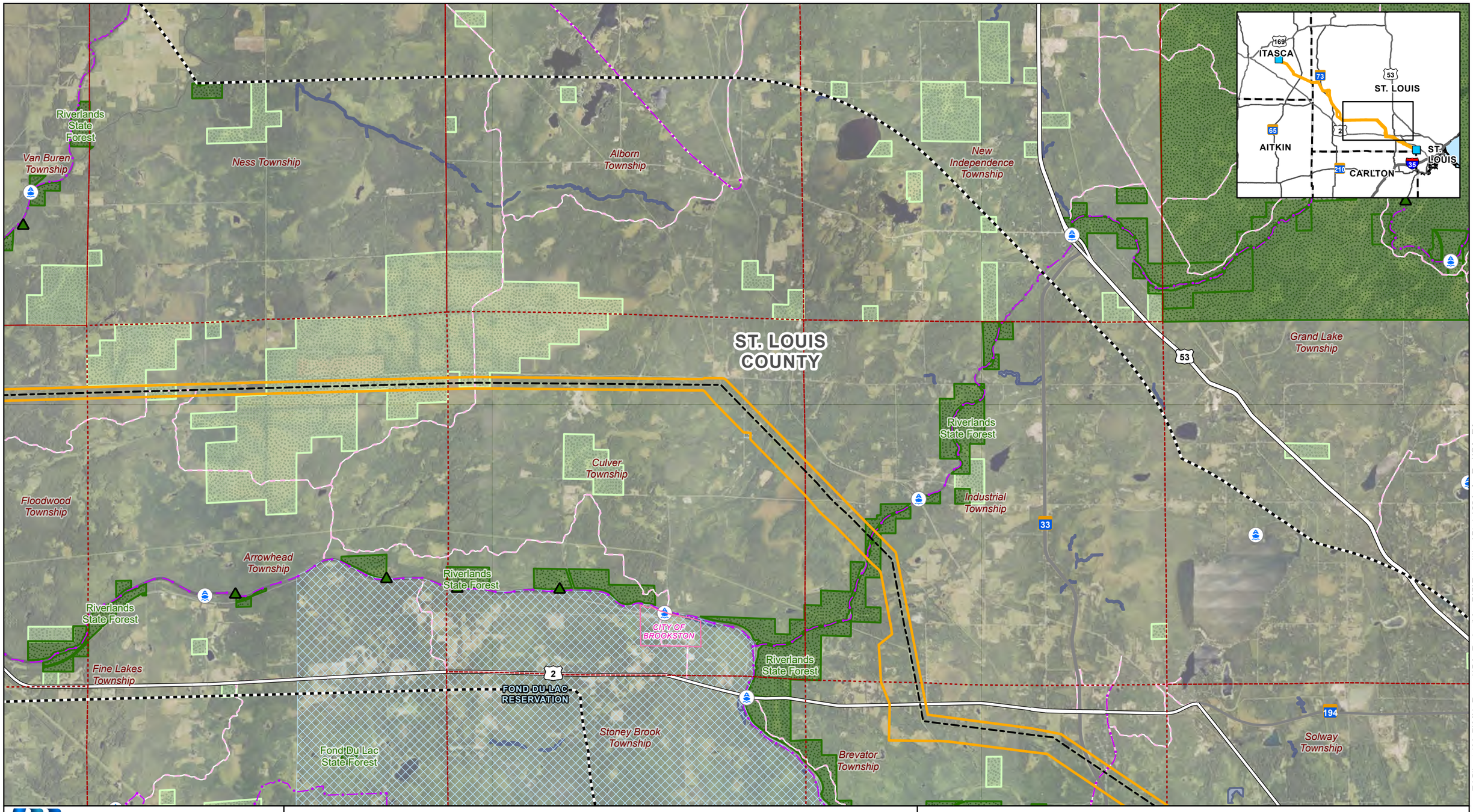
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- Other State Forest Land
- DNR Land and Water Conservation Fund Area
- Tribal Boundary

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Date: (12/7/2025)



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1 inch = 8,000 feet

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Map 3: Public Land Ownership and Recreation
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

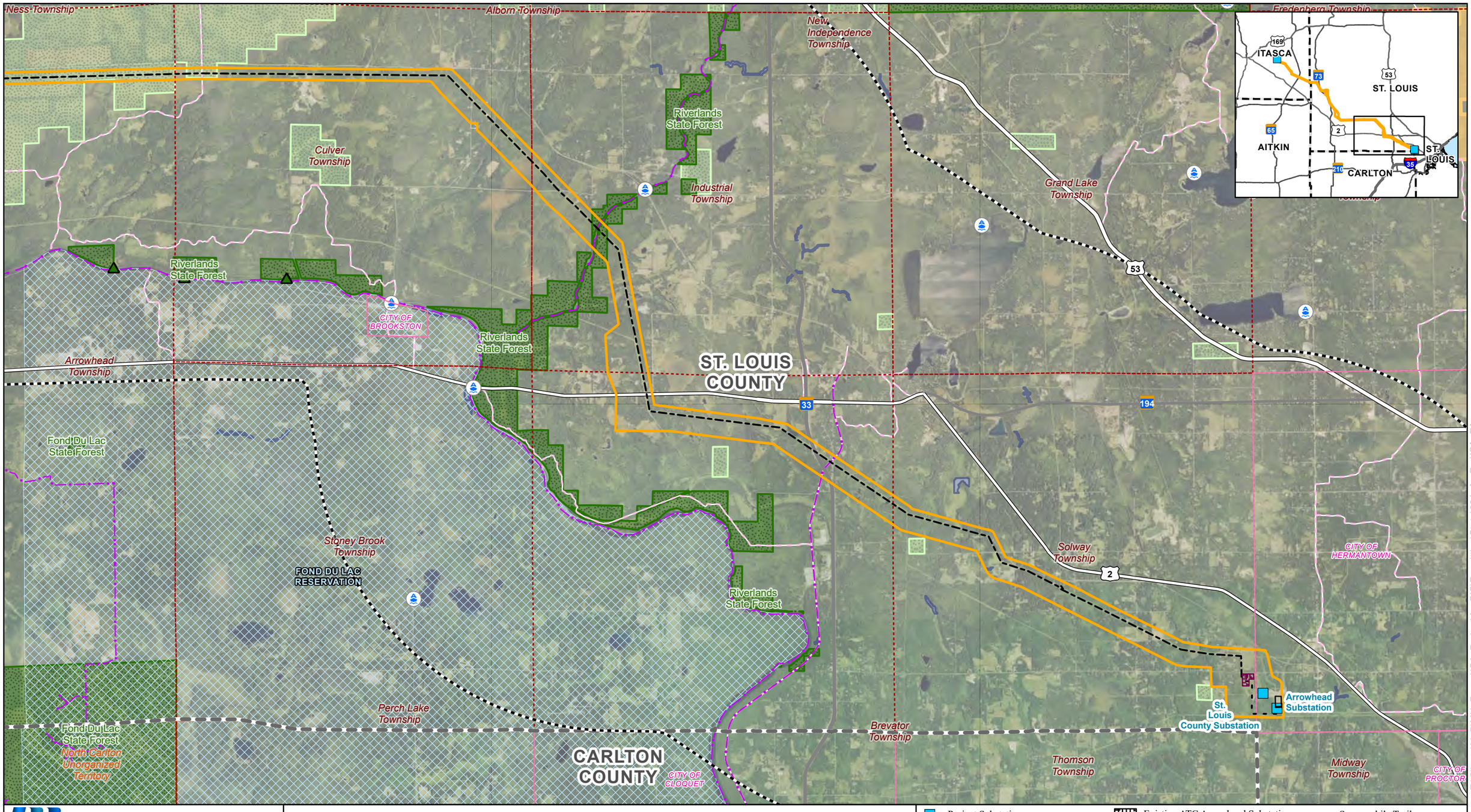
- Project Substation
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3
- Proposed Route 5-Mile Buffer
- County Boundary
- City/Municipality
- Township
- Water Access Site
- DNR Park and Trail Camping Unit
- Snowmobile Trail
- State Park Trail / Road
- State Trail
- Aquatic Management Area
- State Forest
- Other State Forest Land
- Tribal Boundary

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Map 3: Public Land Ownership and Recreation
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

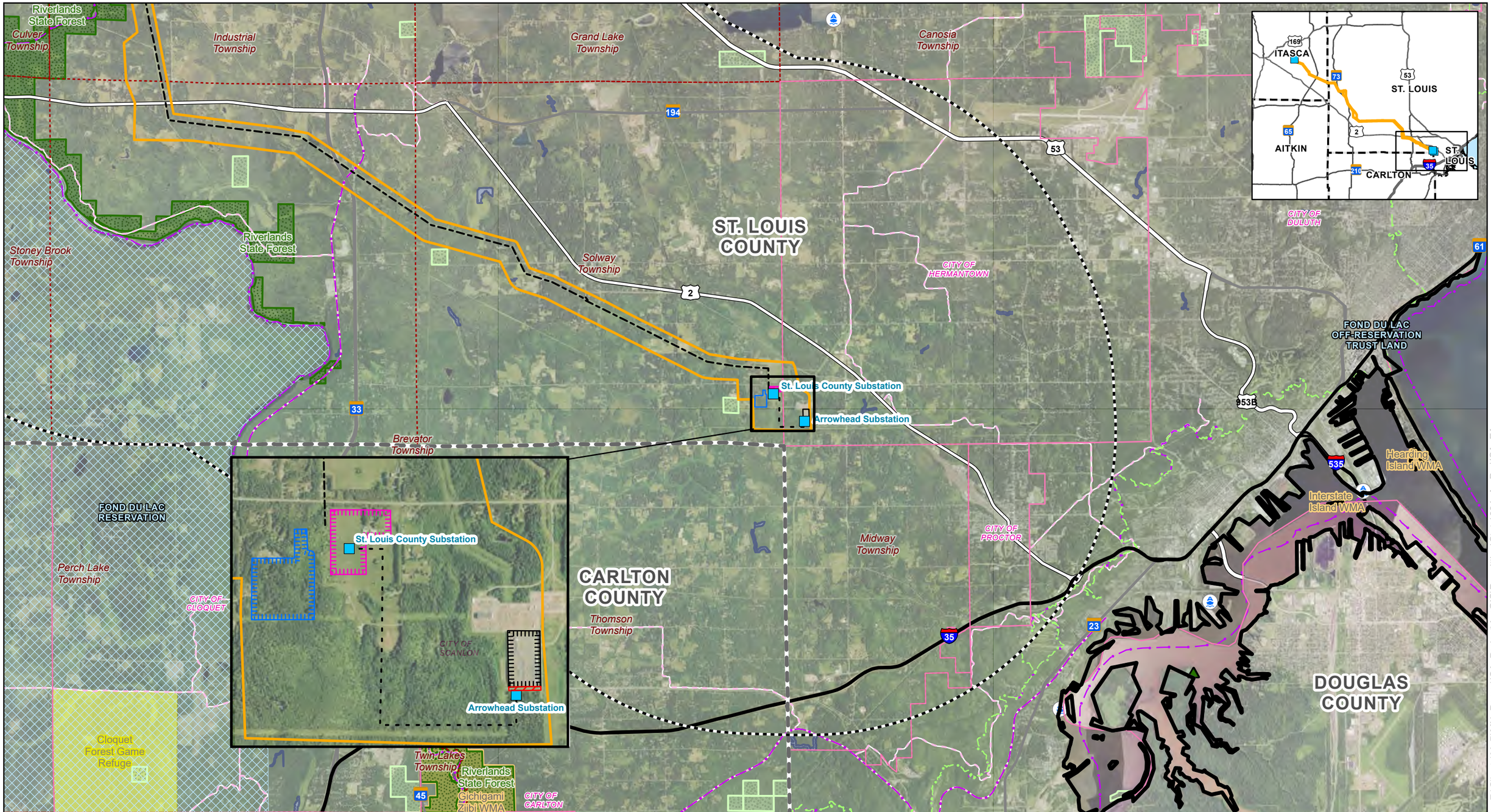
- Project Substation
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3
- Proposed Route 5-Mile Buffer
- ATC Arrowhead Substation Expansion
- Existing ATC Arrowhead Substation
- St. Louis County Substation Expansion
- County Boundary
- City/Municipality
- Township
- Unorganized Territory
- Water Access Site
- DNR Park and Trail Camping Unit
- Snowmobile Trail
- State Park Trail / Road
- State Trail
- Aquatic Management Area
- Wildlife Management Area
- State Forest
- Other State Forest Land
- Tribal Boundary

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Map 3: Public Land Ownership and Recreation
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

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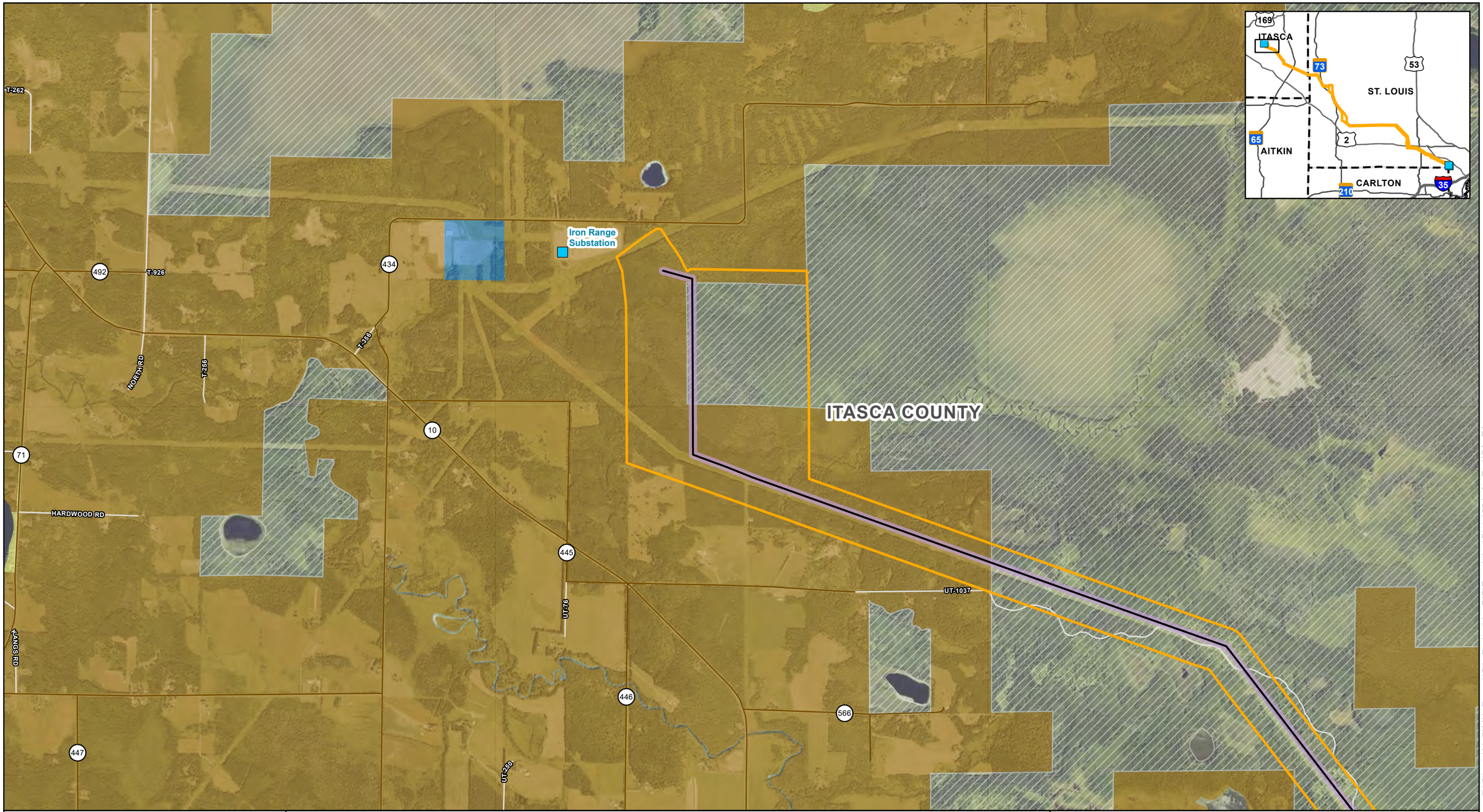
- Project Substation
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3
- Proposed Route 5-Mile Buffer
- ATC Arrowhead Substation Expansion
- Existing ATC Arrowhead Substation
- St. Louis County Substation Expansion
- HVDC Modernization Footprint
- County Boundary
- City/Municipality
- Township
- Unorganized Territory
- Water Access Site
- DNR Park and Trail Camping Unit
- Snowmobile Trail
- State Park Trail / Road
- State Trail
- Superior Hiking Trail
- Wildlife Refuge Inventory
- Aquatic Management Area
- Wildlife Management Area
- State Forest
- Other State Forest Land
- Tribal Boundary

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Map 4: Zoning Location
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project
Minnesota Power
Itasca and St. Louis Counties, Minnesota

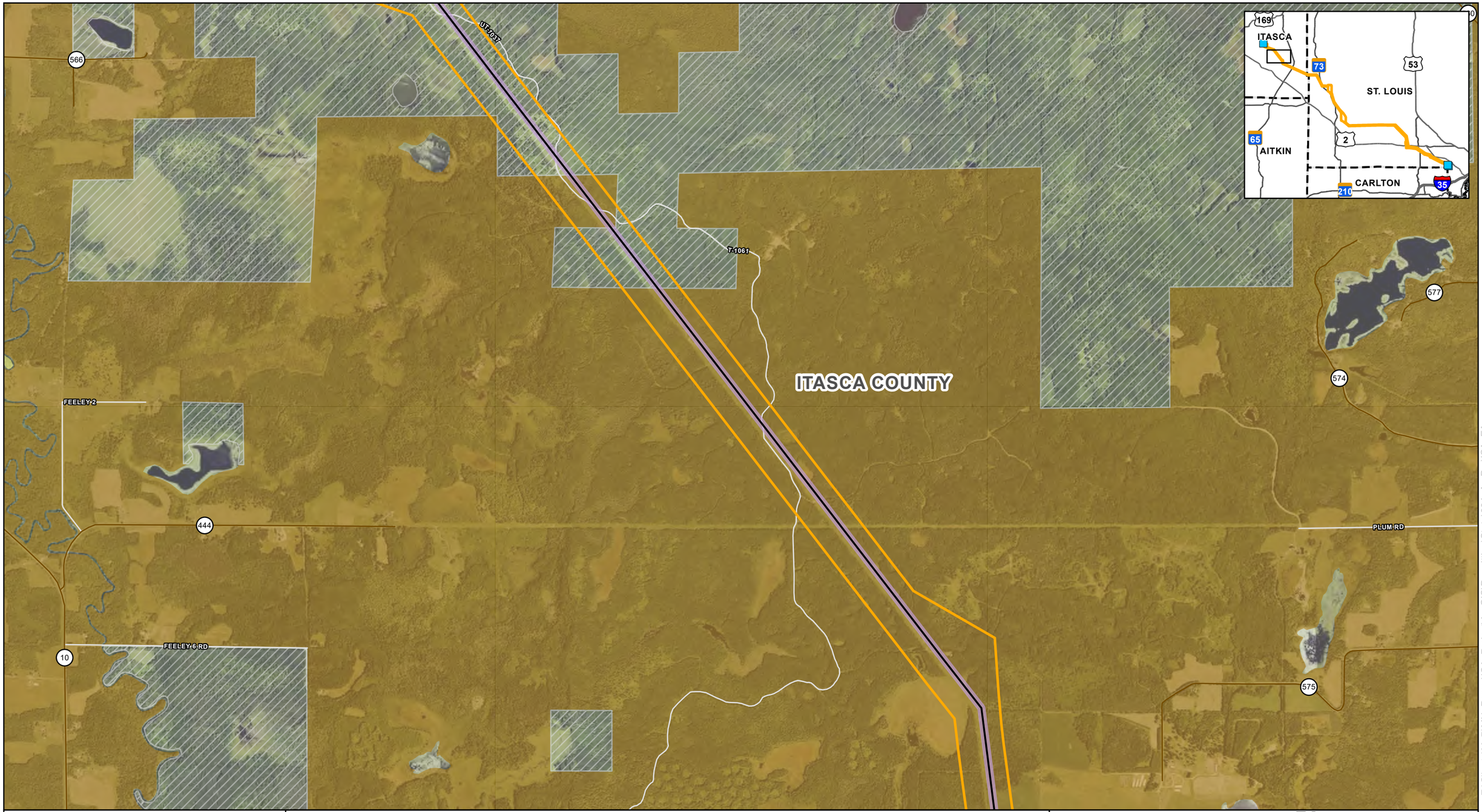
- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

- County Boundary

Itasca County Zoning
- 1 - Rural Residential
- 2 - Farm Residential
- 5 - Industrial
- 6 - Public

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Map 4: Zoning Location
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

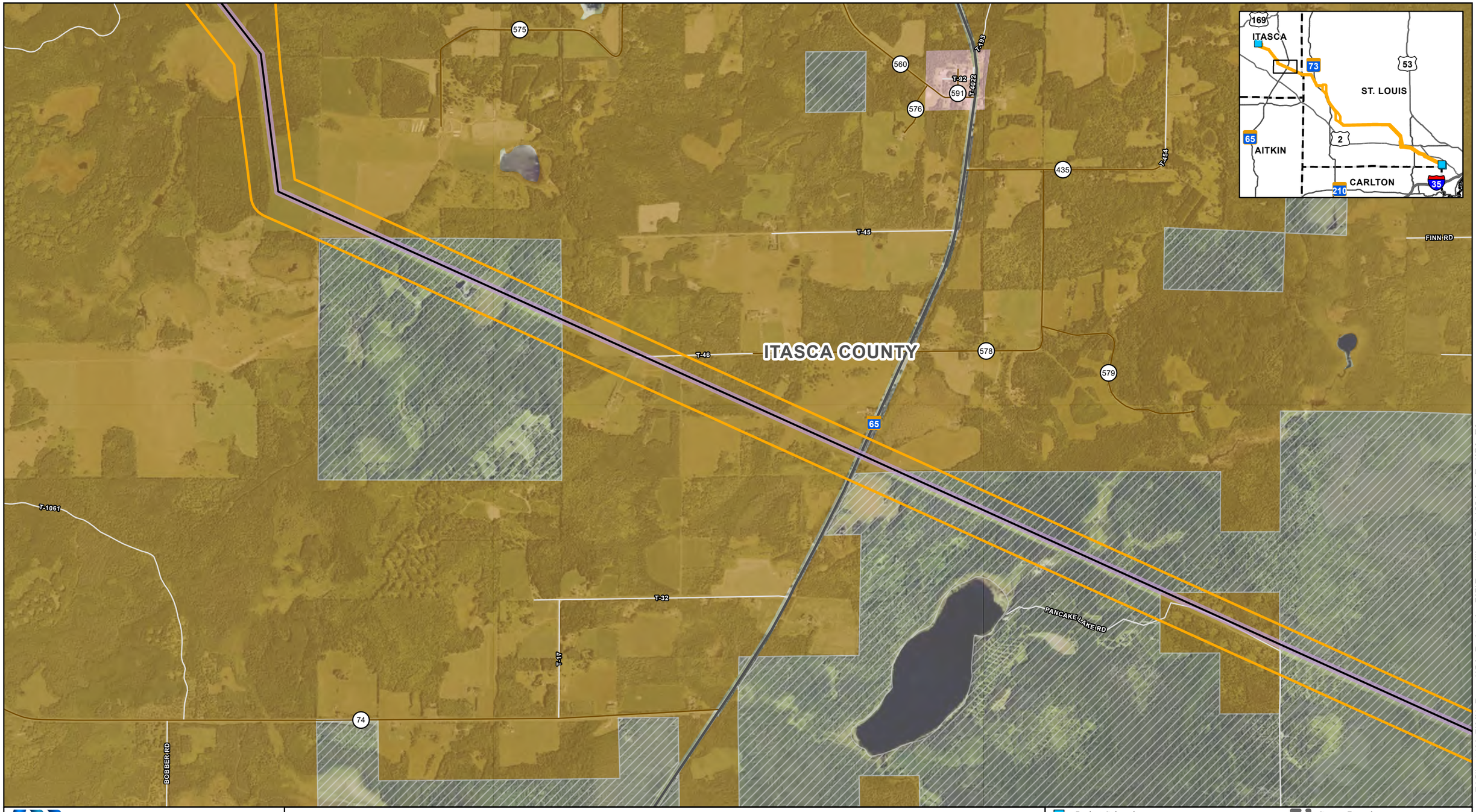
- County Boundary

Itasca County Zoning

- 1 - Rural Residential
- 2 - Farm Residential
- 6 - Public

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Map 4: Zoning Location
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

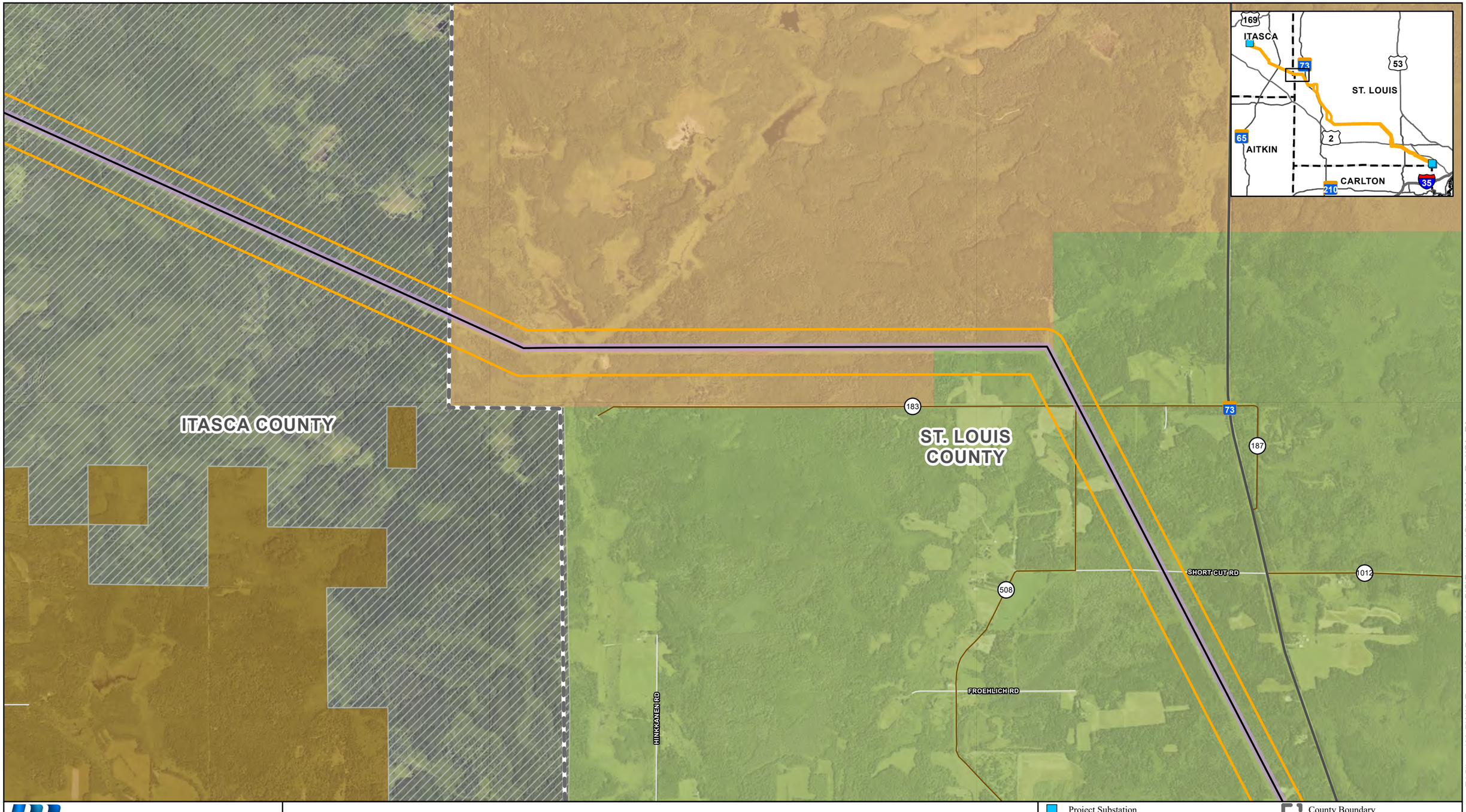
- County Boundary

Itasca County Zoning

- 2 - Farm Residential
- 3 - Recreational Commercial; 4 - Light Industrial / Commercial
- 6 - Public

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Map 4: Zoning Location
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

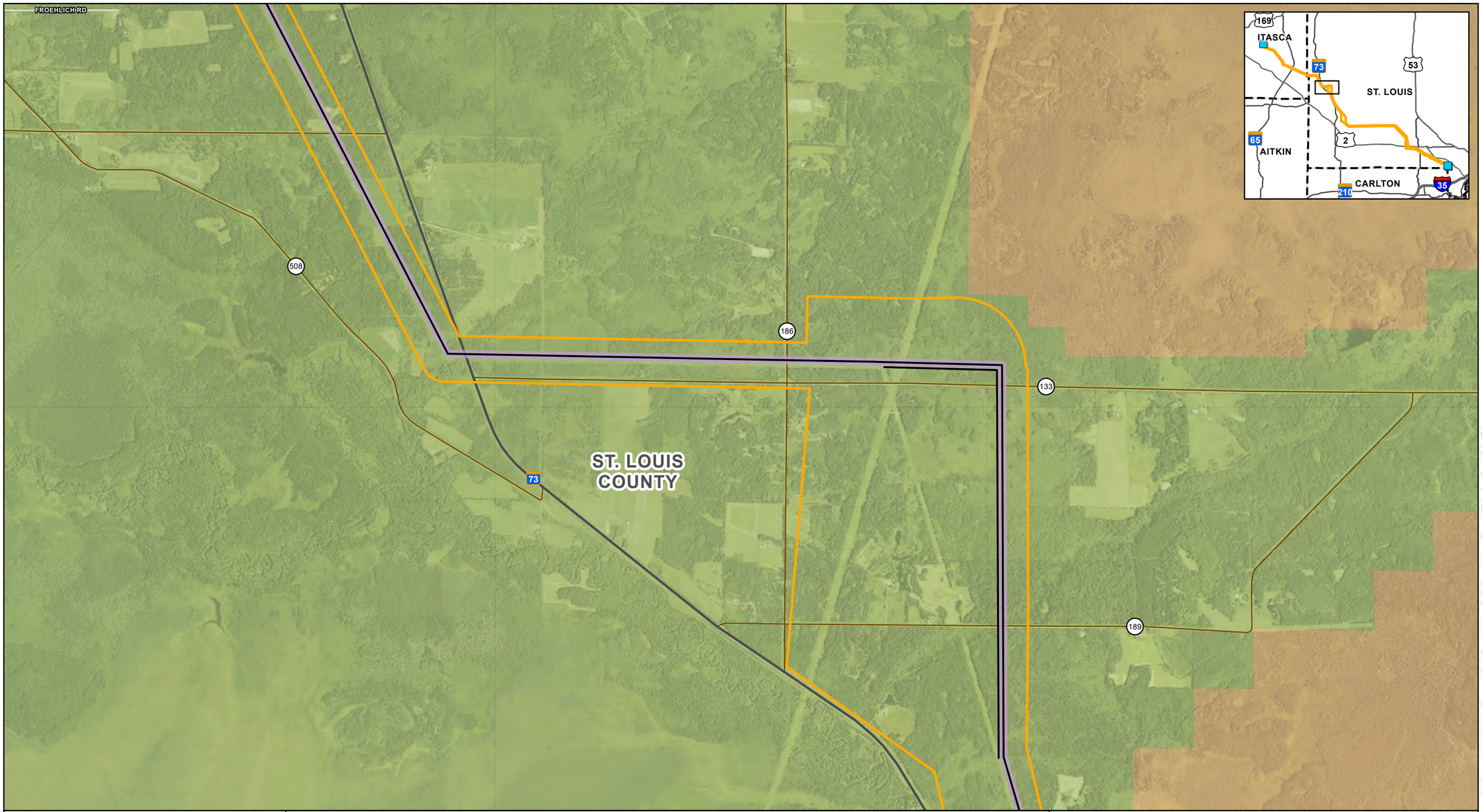
- County Boundary

Itasca County Zoning
- 2 - Farm Residential
- 6 - Public

St. Louis County Zoning
- Forest Agricultural Management
- Sensitive Areas

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Map 4: Zoning Location
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project
Minnesota Power
Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

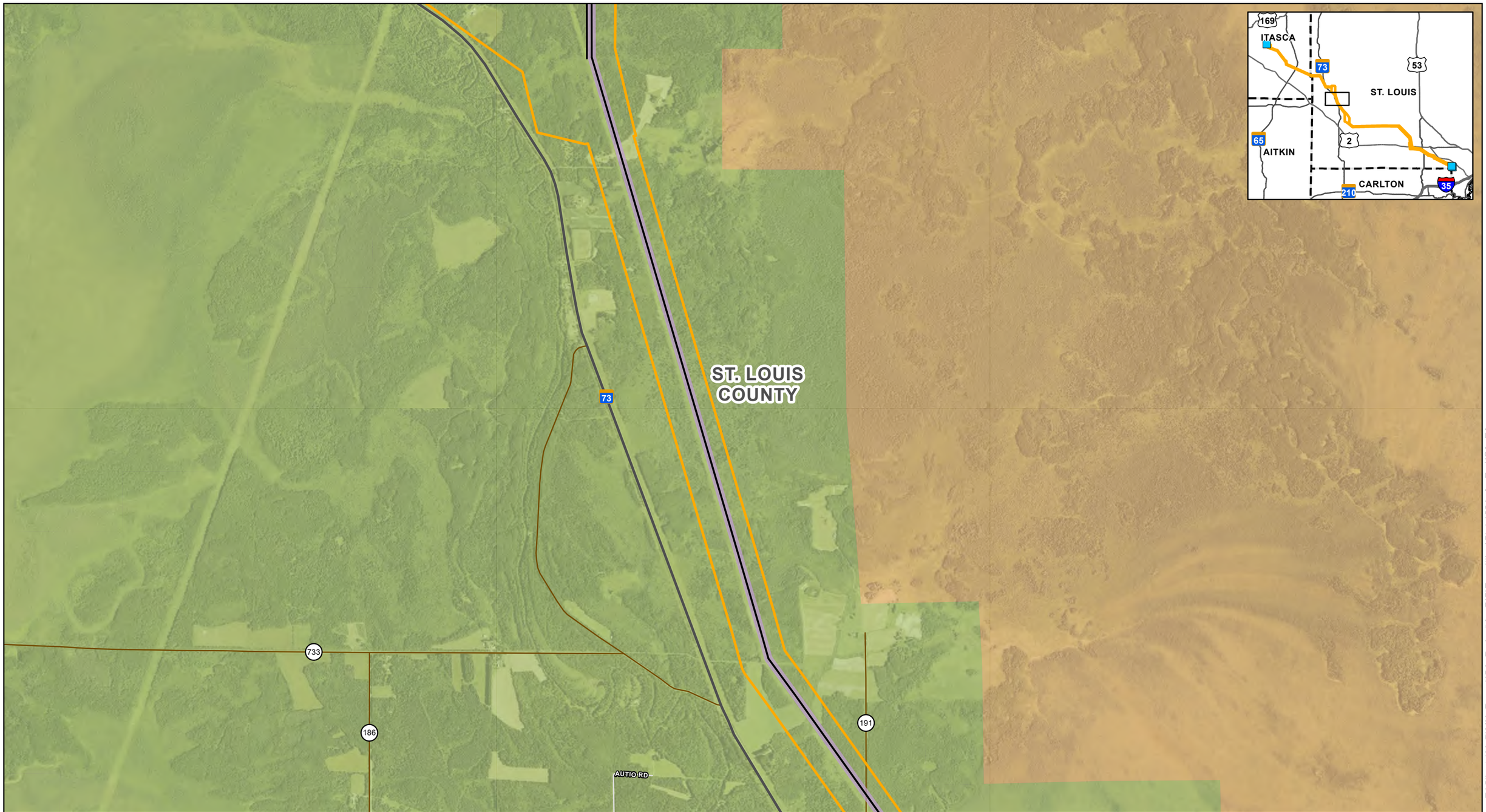
Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

- County Boundary

St. Louis County Zoning
- Forest Agricultural Management
- Sensitive Areas

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Map 4: Zoning Location
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project
Minnesota Power
Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

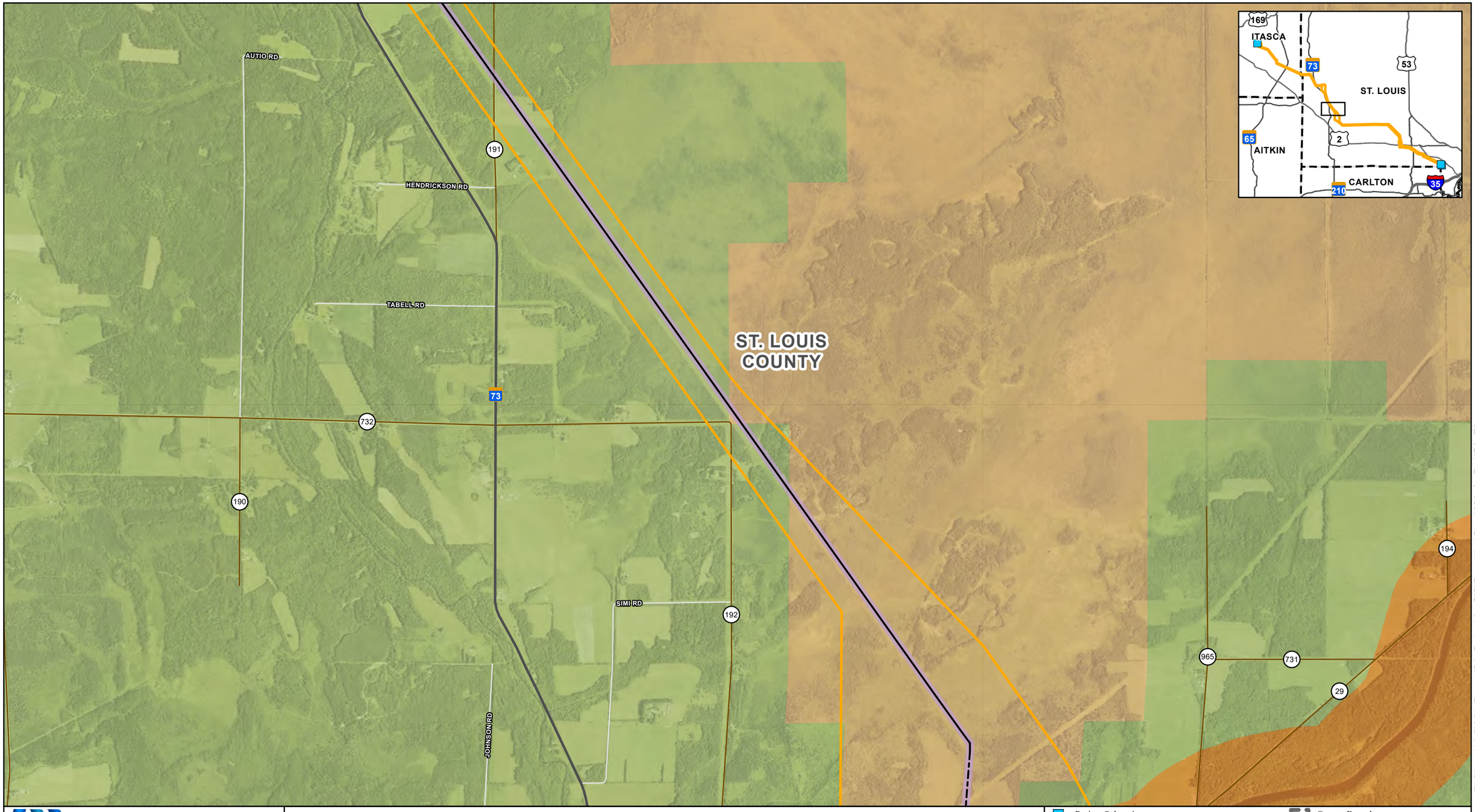
Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

- County Boundary

St. Louis County Zoning
- Forest Agricultural Management
- Sensitive Areas

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Map 4: Zoning Location
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

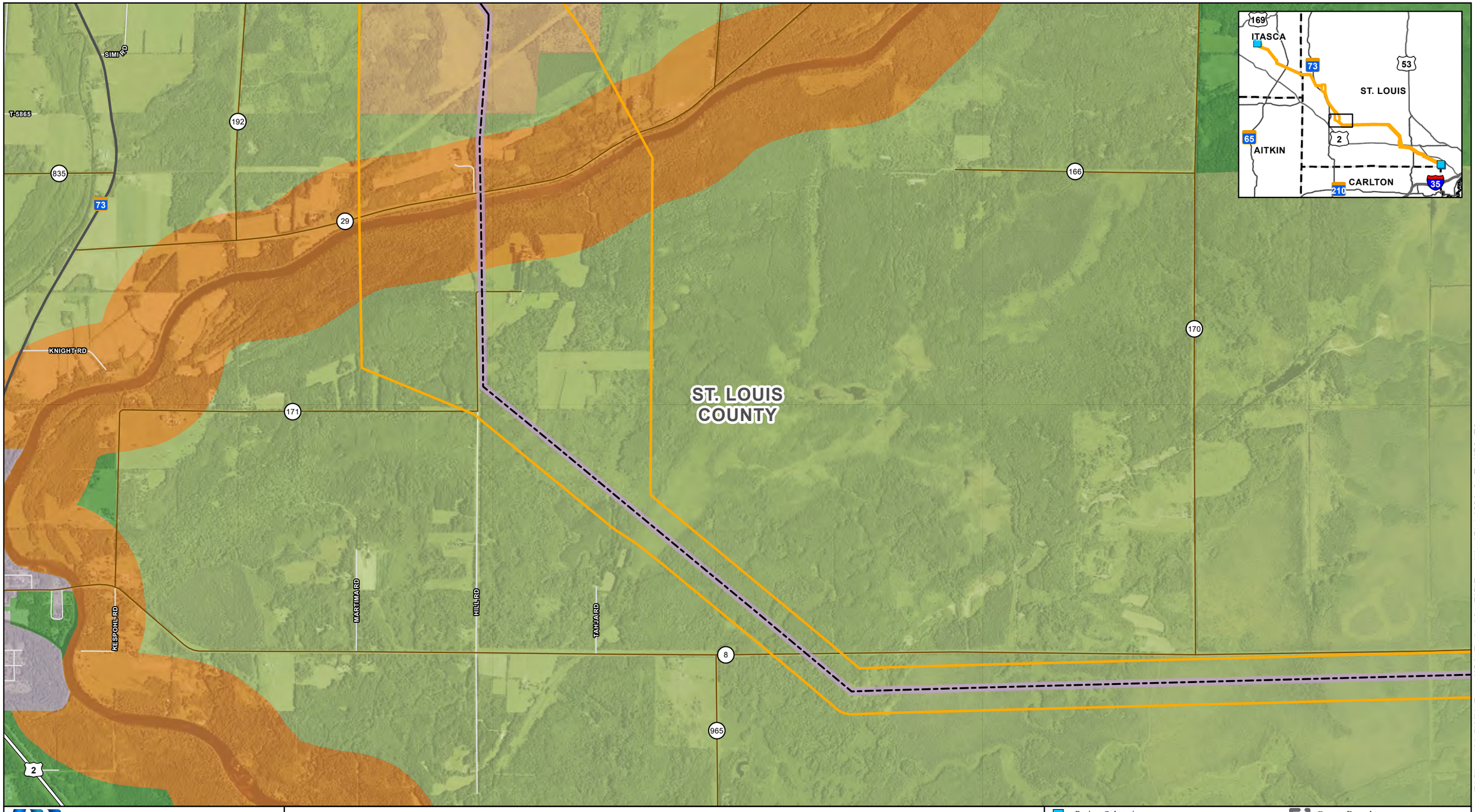
- County Boundary

St. Louis County Zoning

- Forest Agricultural Management
- Sensitive Areas
- Shoreland Multiple Use

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Map 4: Zoning Location
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

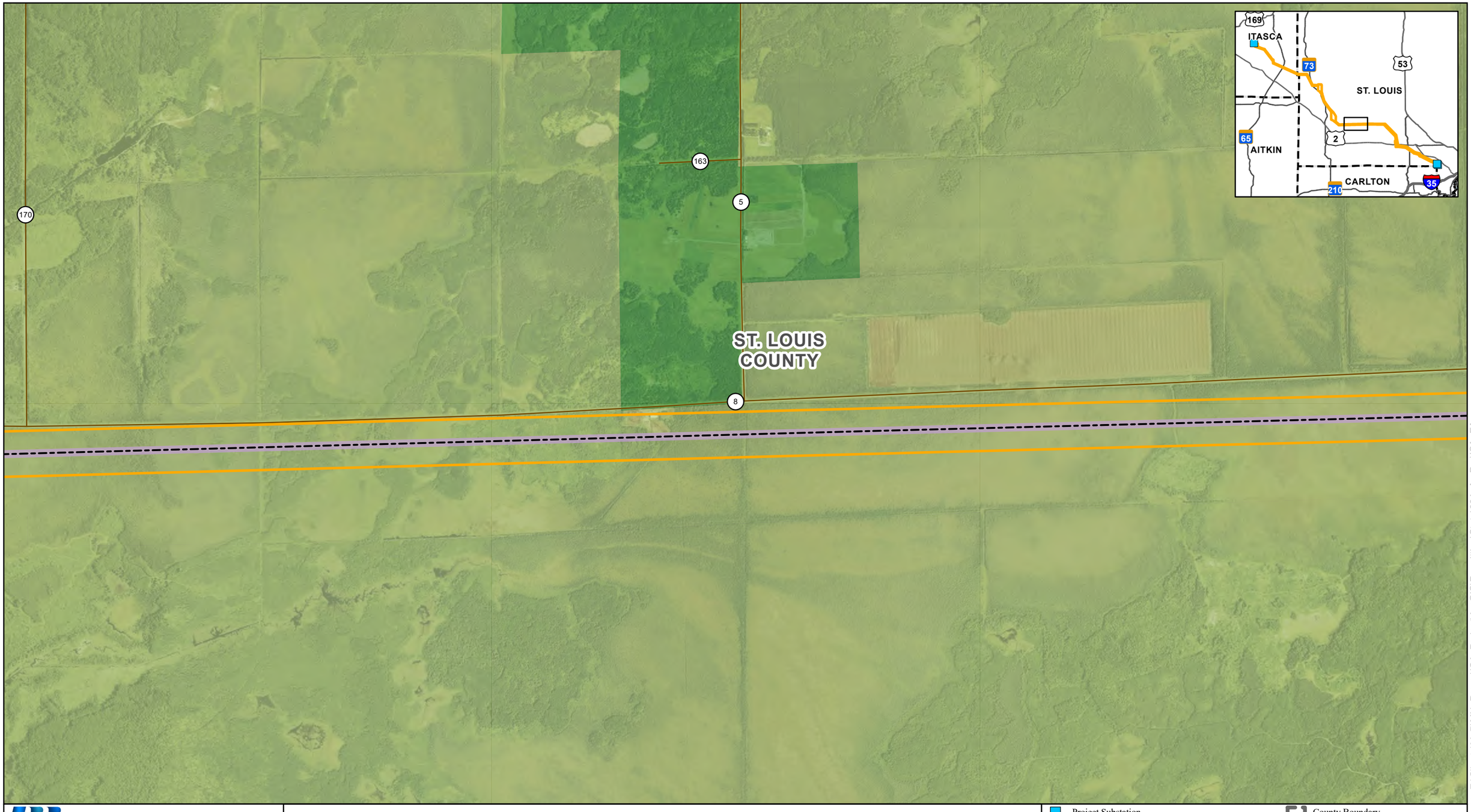
- County Boundary

St. Louis County Zoning

- Multiple Use
- Forest Agricultural Management
- Sensitive Areas
- Shoreland Multiple Use
- Non Jurisdiction Area

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Map 4: Zoning Location
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project
Minnesota Power
Itasca and St. Louis Counties, Minnesota

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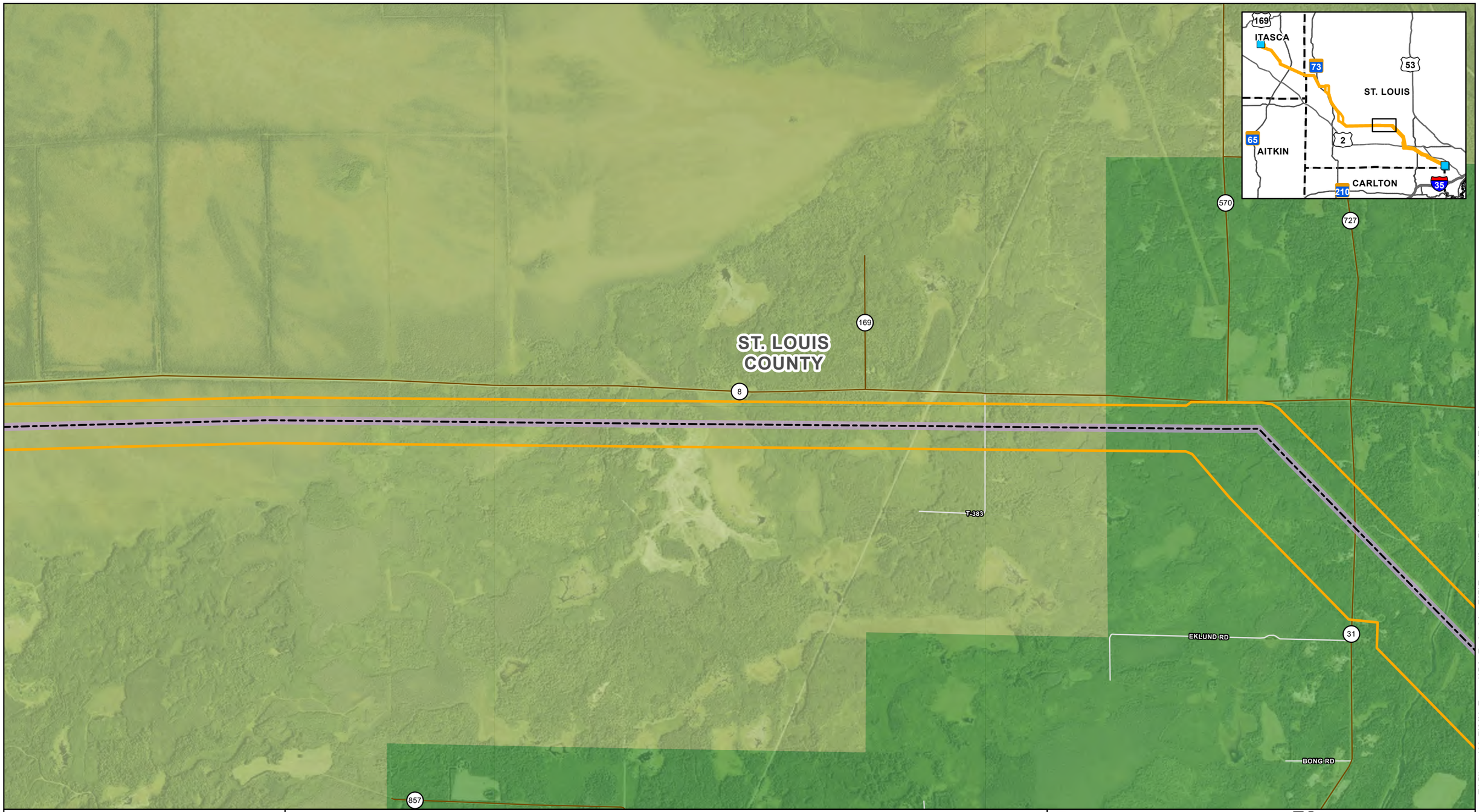
- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

- County Boundary

St. Louis County Zoning
- Multiple Use
- Forest Agricultural Management

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Map 4: Zoning Location
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project
Minnesota Power
Itasca and St. Louis Counties, Minnesota

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- Project Substation
- Proposed Right Of Way
- Proposed Route

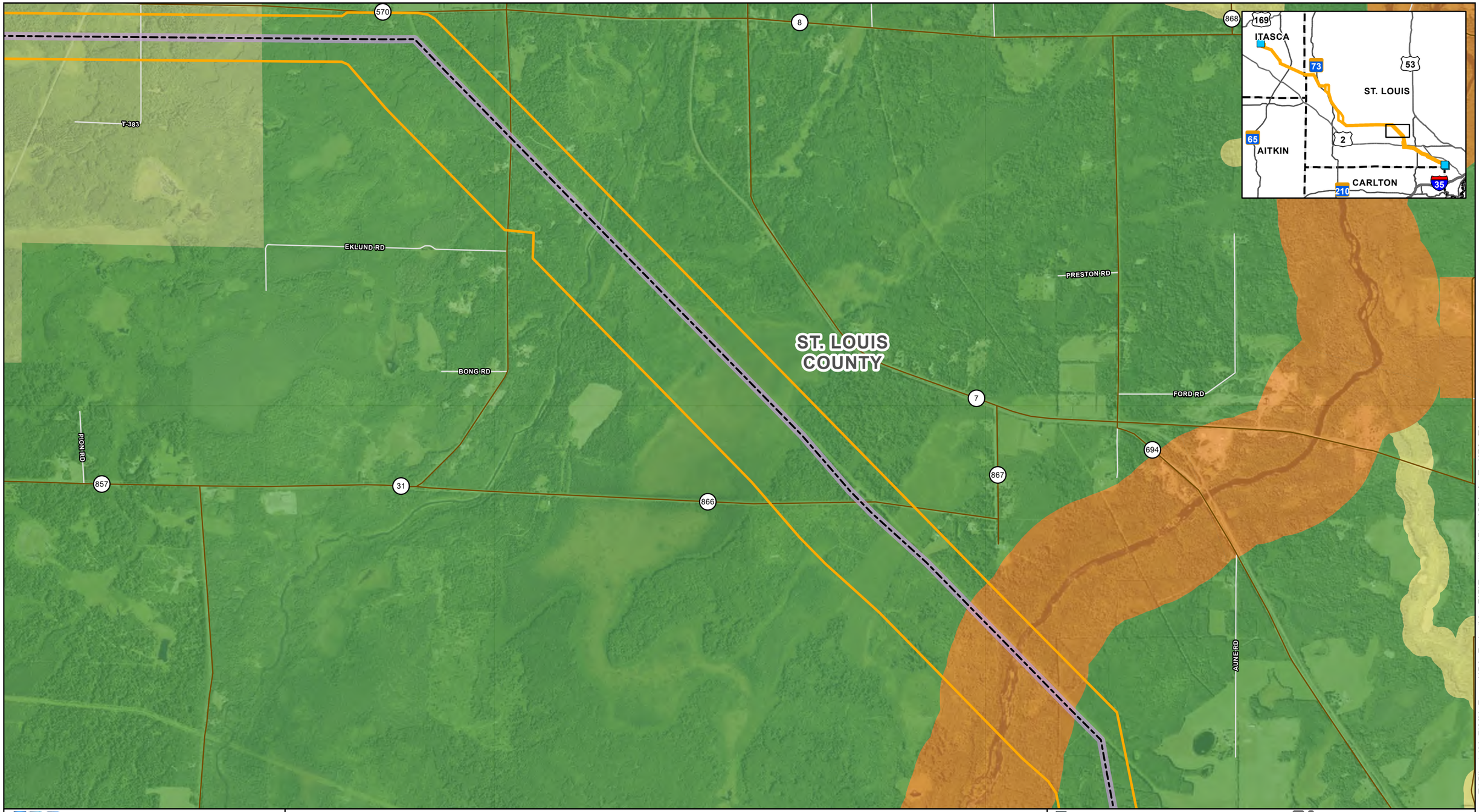
Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

- County Boundary

St. Louis County Zoning
- Multiple Use
- Forest Agricultural Management

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Map 4: Zoning Location
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

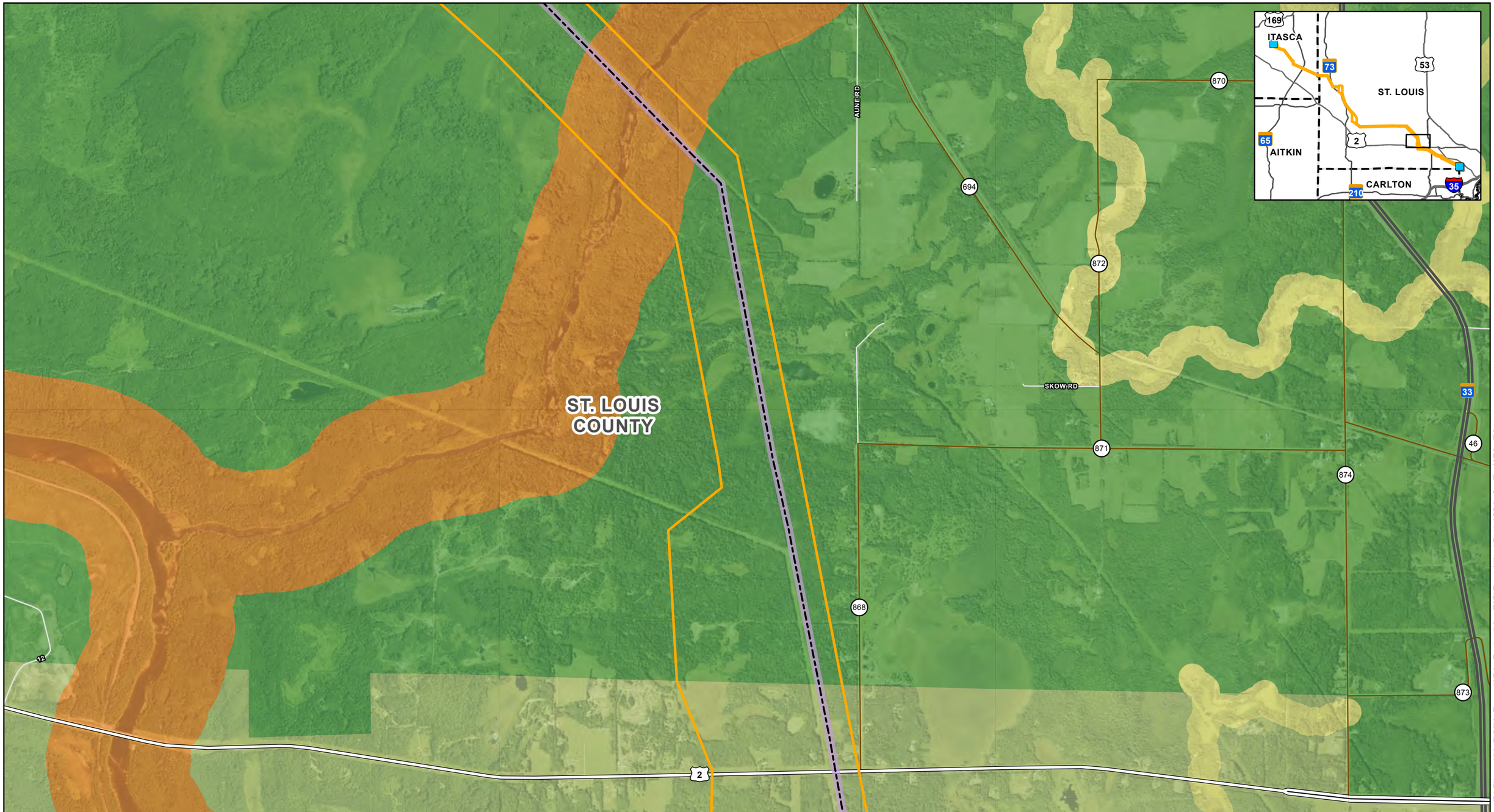
- County Boundary

St. Louis County Zoning

- Multiple Use
- Residential
- Forest Agricultural Management
- Shoreland Multiple Use

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Map 4: Zoning Location
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

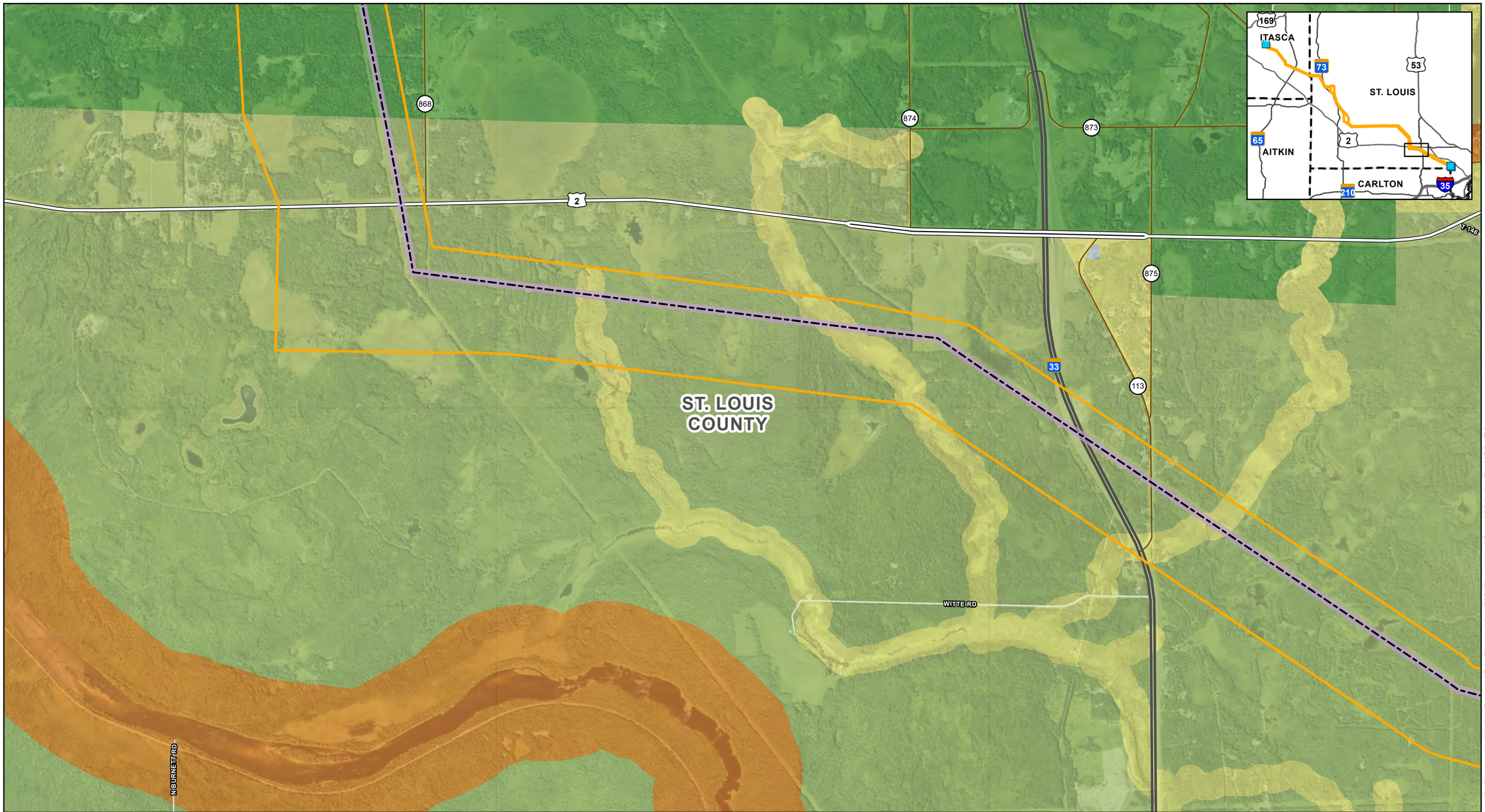
- Segment 1
- Segment 2
- Segment 3
- County Boundary

St. Louis County Zoning

- Multiple Use
- Residential
- Forest Agricultural Management
- Shoreland Multiple Use

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Map 4: Zoning Location
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

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- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

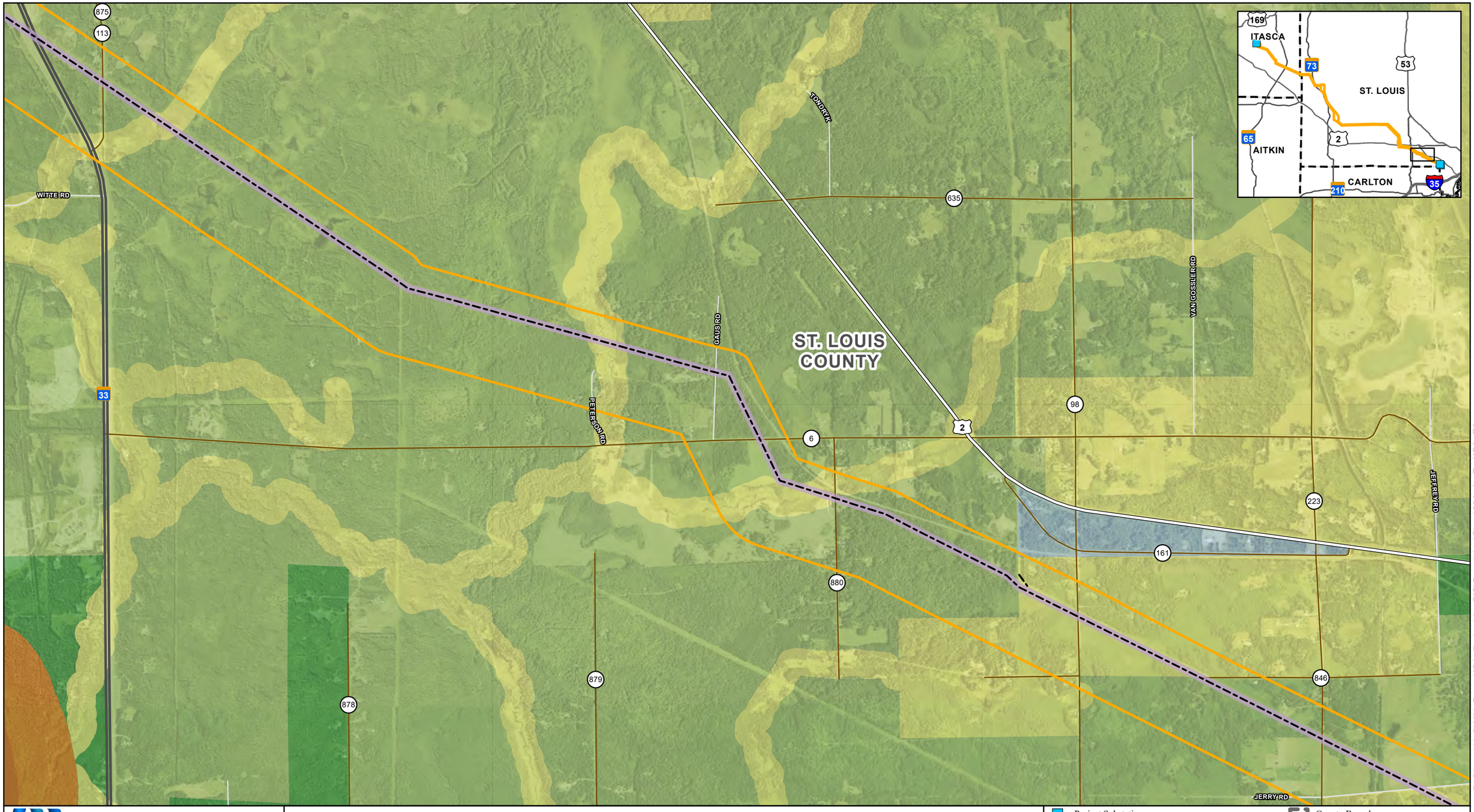
- County Boundary

St. Louis County Zoning

- Commercial
- Multiple Use
- Residential
- Forest Agricultural Management
- Shoreland Multiple Use

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Map 4: Zoning Location
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

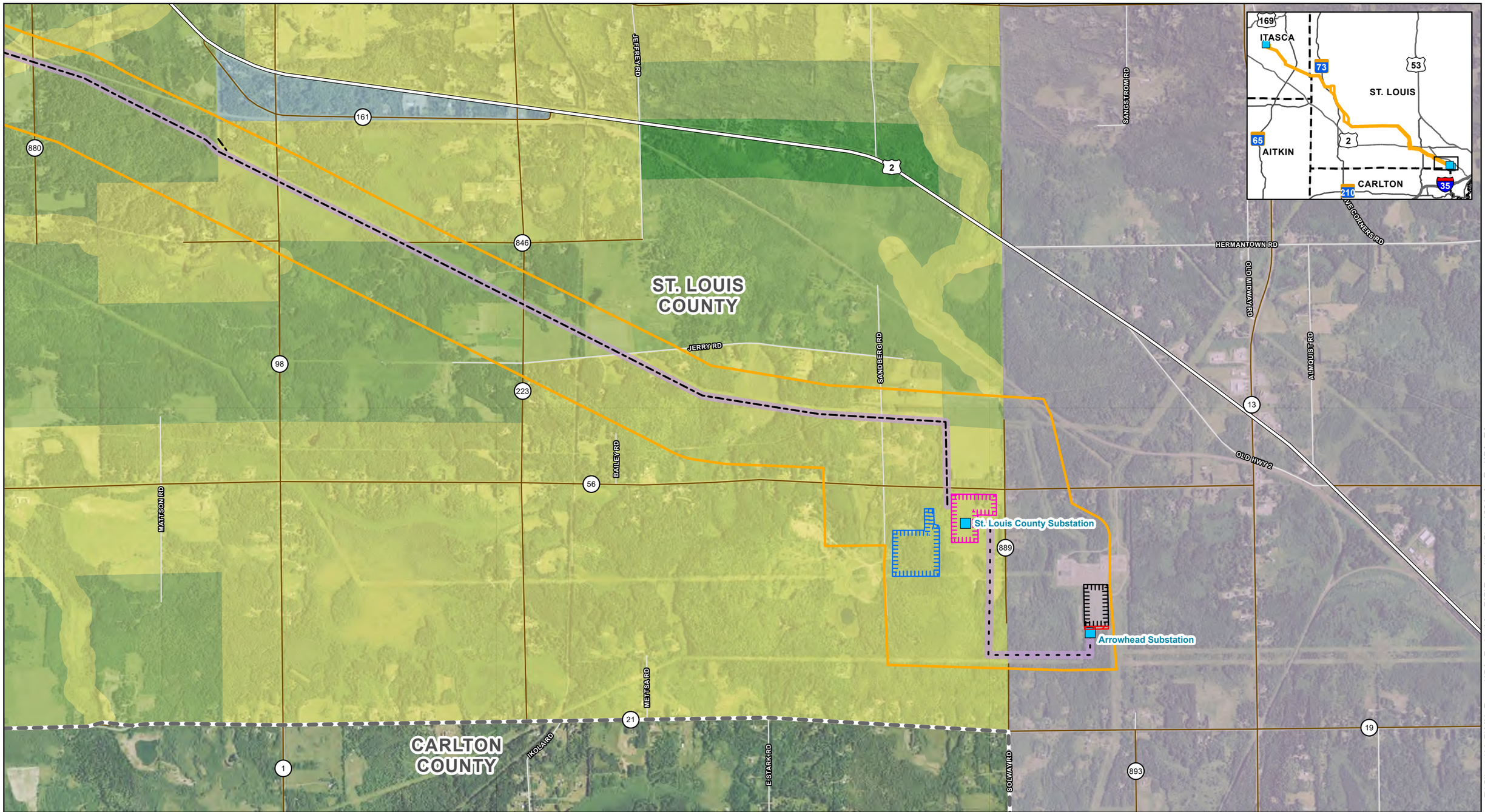
- Segment 1
- Segment 2
- Segment 3
- County Boundary

St. Louis County Zoning

- Commercial
- Multiple Use
- Residential
- Forest Agricultural Management
- Shoreland Multiple Use

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For Environmental Review Purposes Only

Map 4: Zoning Location
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project
Minnesota Power
Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

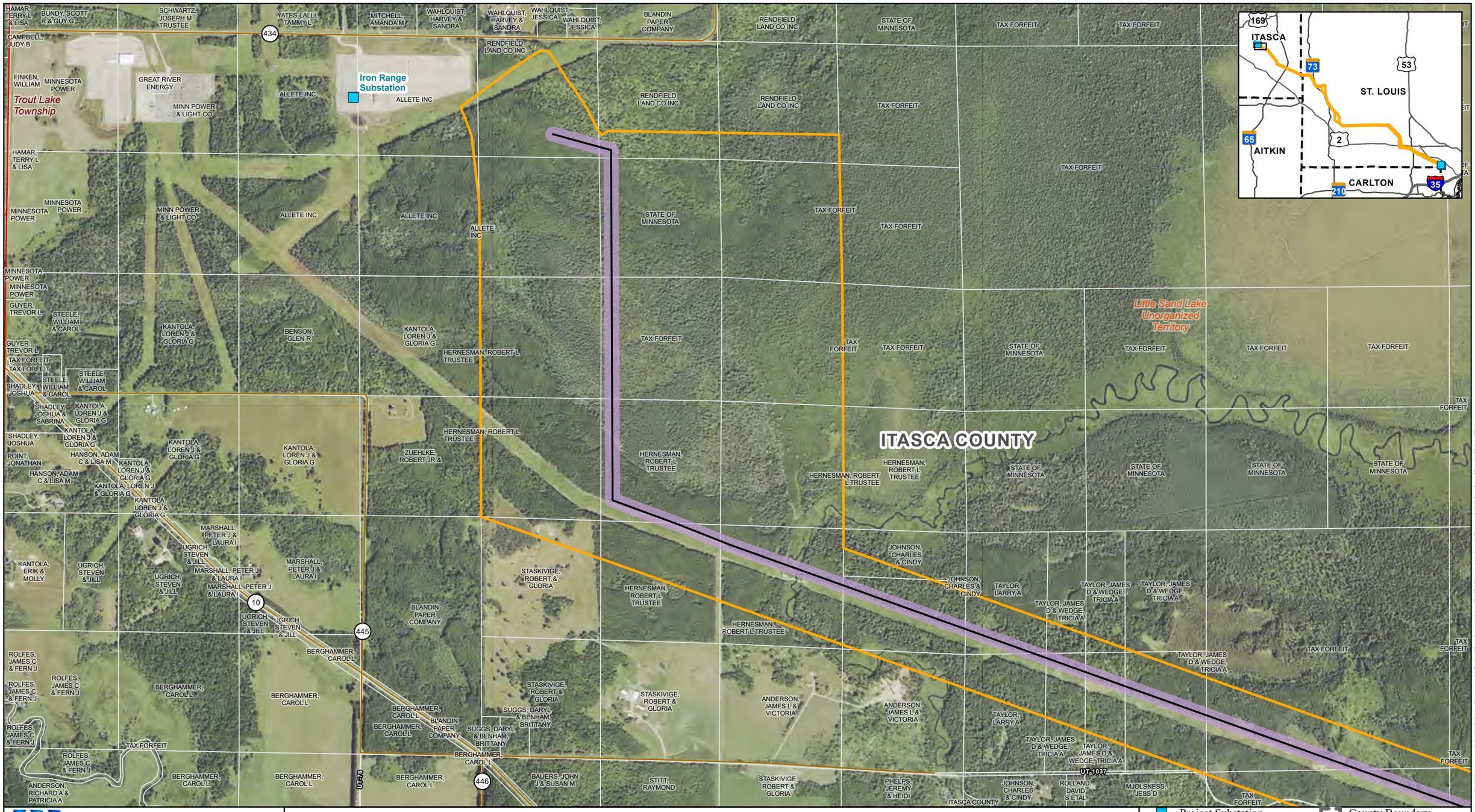
Proposed Alignment
- Segment 1
- Segment 2
- Segment 3
- ATC Arrowhead Substation Expansion
- Existing ATC Arrowhead Substation

- St. Louis County Substation Expansion
- HVDC Modernization Footprint
- County Boundary

St. Louis County Zoning
- Commercial
- Multiple Use
- Residential
- Forest Agricultural Management
- Industrial

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Map 5: Land Ownership and Parcel Boundaries
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

- County Boundary
- Parcel Boundary
- Township
- Unorganized Territory

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Map 5: Land Ownership and Parcel Boundaries
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

- County Boundary
- Parcel Boundary
- Township
- Unorganized Territory

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Map 5: Land Ownership and Parcel Boundaries
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

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- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

- County Boundary
- Parcel Boundary
- Township

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Map 5: Land Ownership and Parcel Boundaries
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route
- County Boundary
- Parcel Boundary
- Township

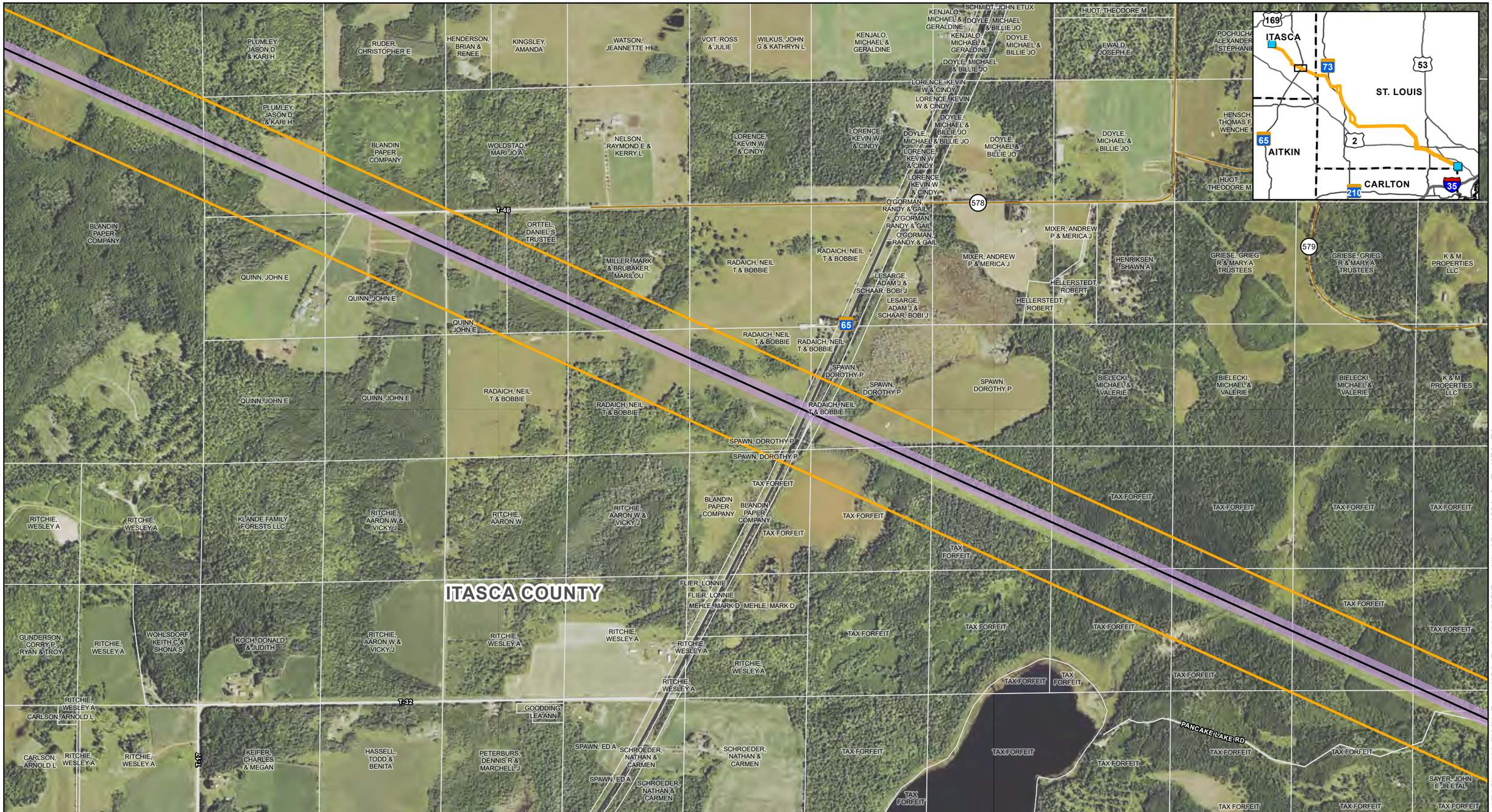
Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

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Appendix E

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Map 5: Land Ownership and Parcel Boundaries
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route
- County Boundary
- Parcel Boundary
- Township

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

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Map 5: Land Ownership and Parcel Boundaries
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

- County Boundary
- Parcel Boundary
- Township

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Itasca and St. Louis Counties, Minnesota

- Project Substation
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- Proposed Route
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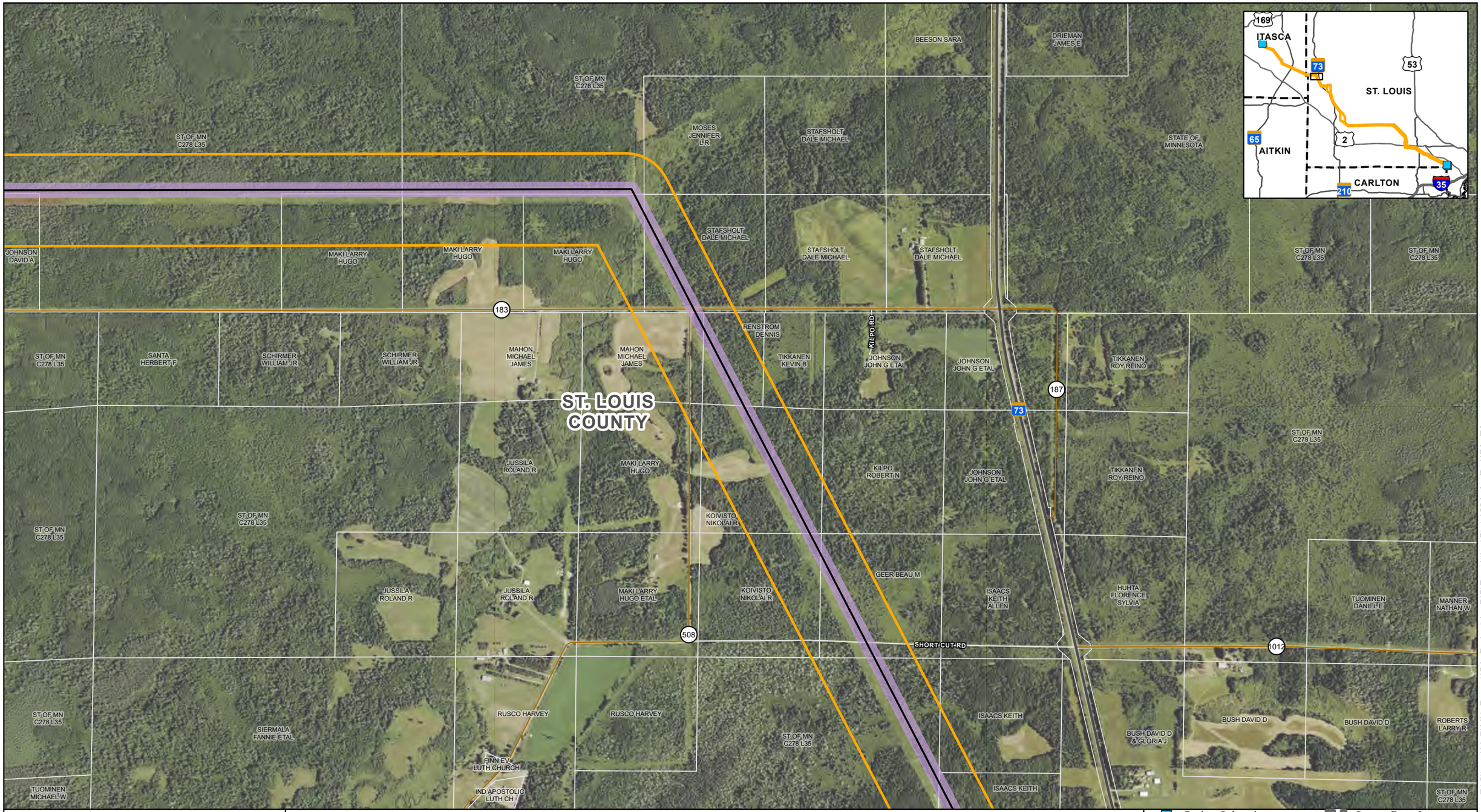
Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

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- Project Substation
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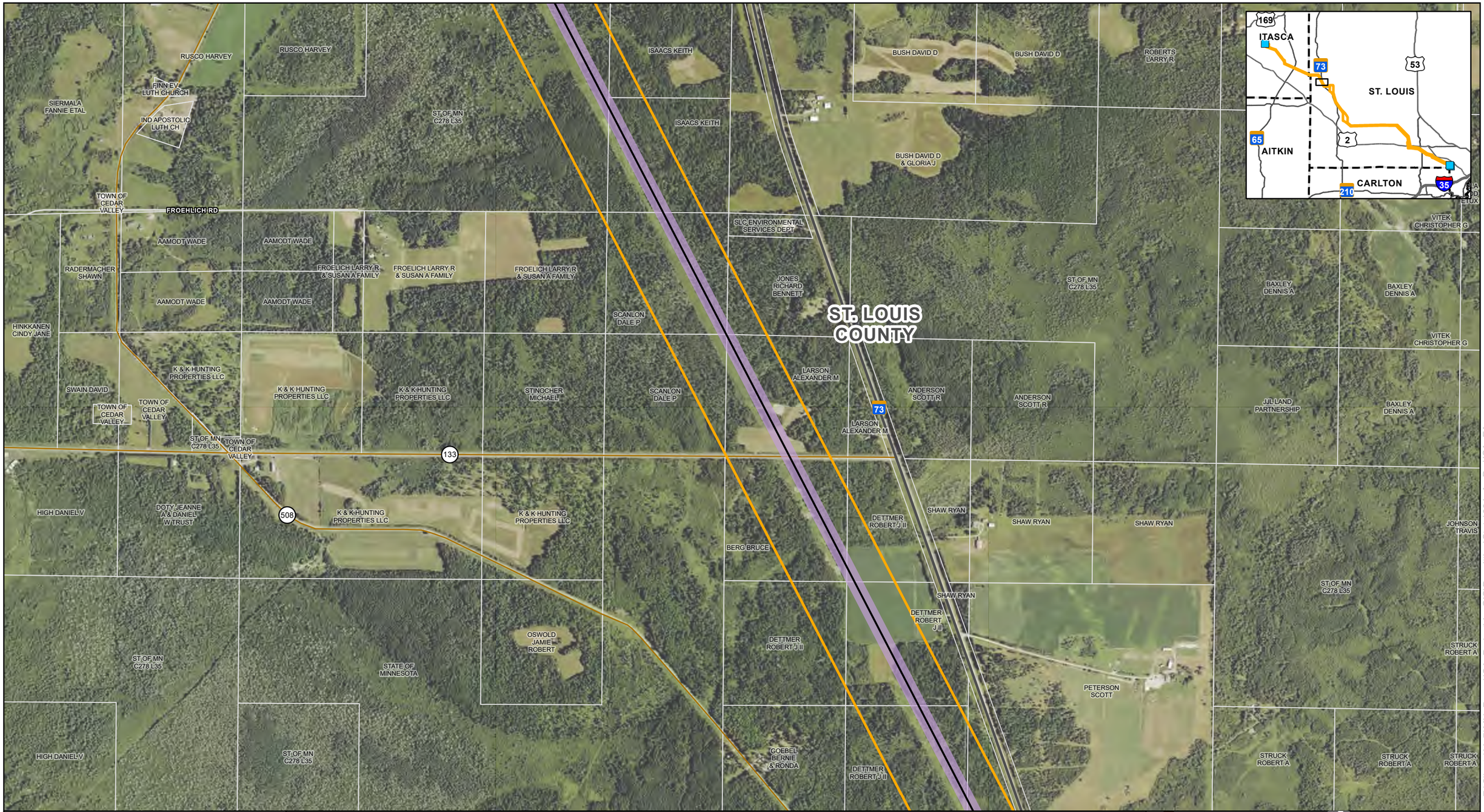
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- Segment 1
- Segment 2
- Segment 3

- County Boundary
- Parcel Boundary
- Township

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- Project Substation
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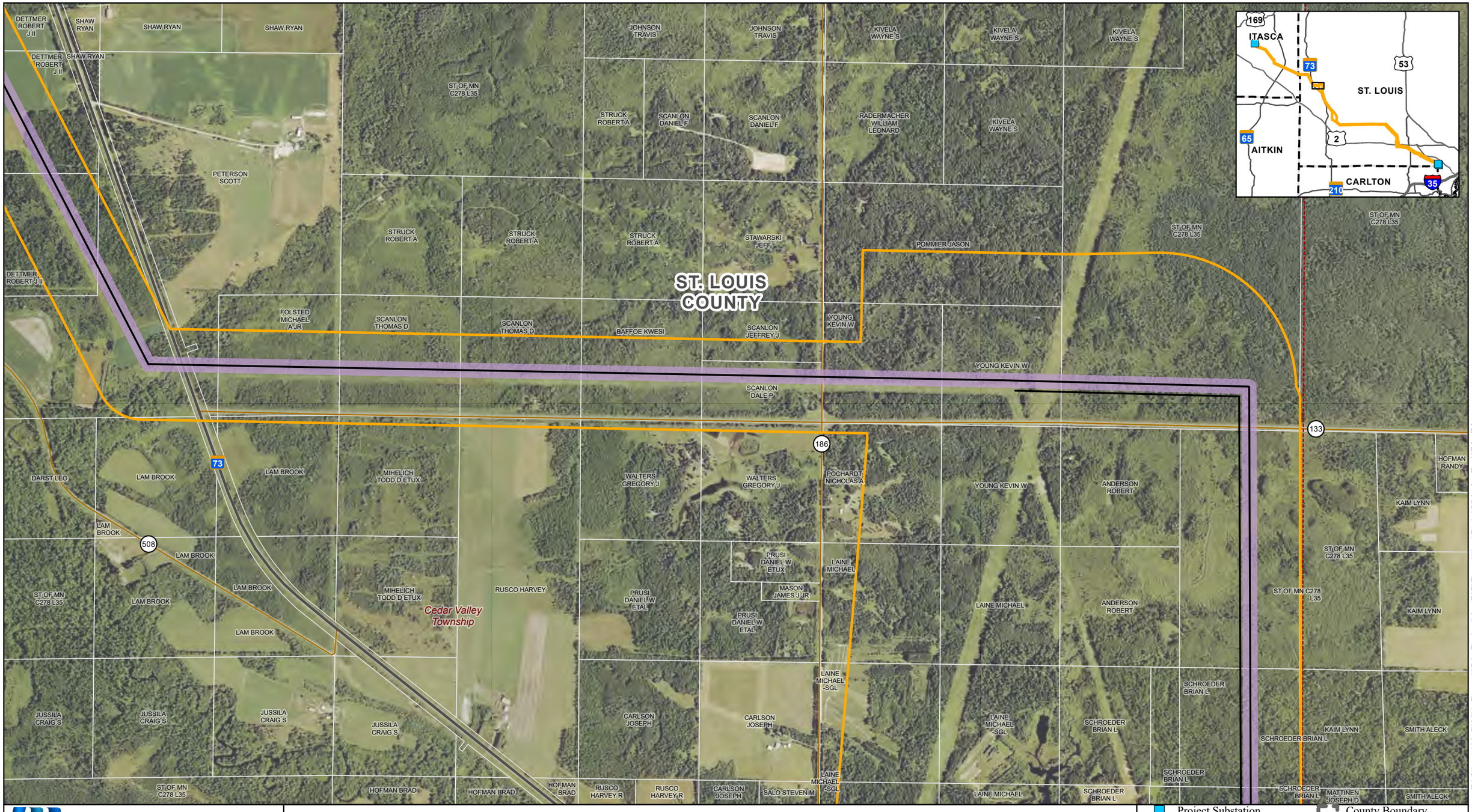
- Segment 1
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- County Boundary
- Parcel Boundary
- Township

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- Project Substation
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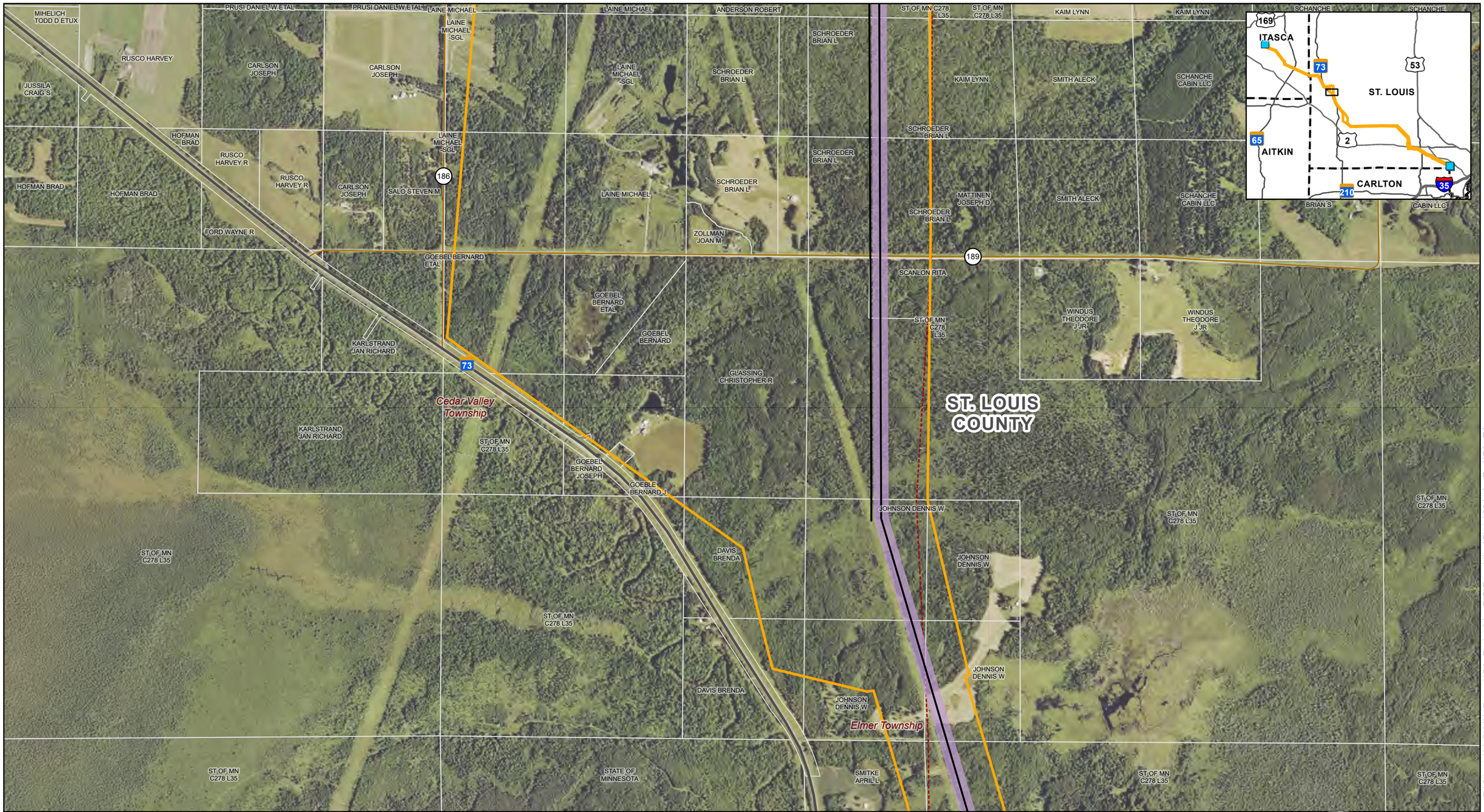
Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

- County Boundary
- Parcel Boundary
- Township

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Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
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Proposed Alignment

- Segment 1
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- County Boundary
- Parcel Boundary
- Township

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Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

- County Boundary
- Parcel Boundary
- Township
- Unorganized Territory

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Minnesota Power
Itasca and St. Louis Counties, Minnesota

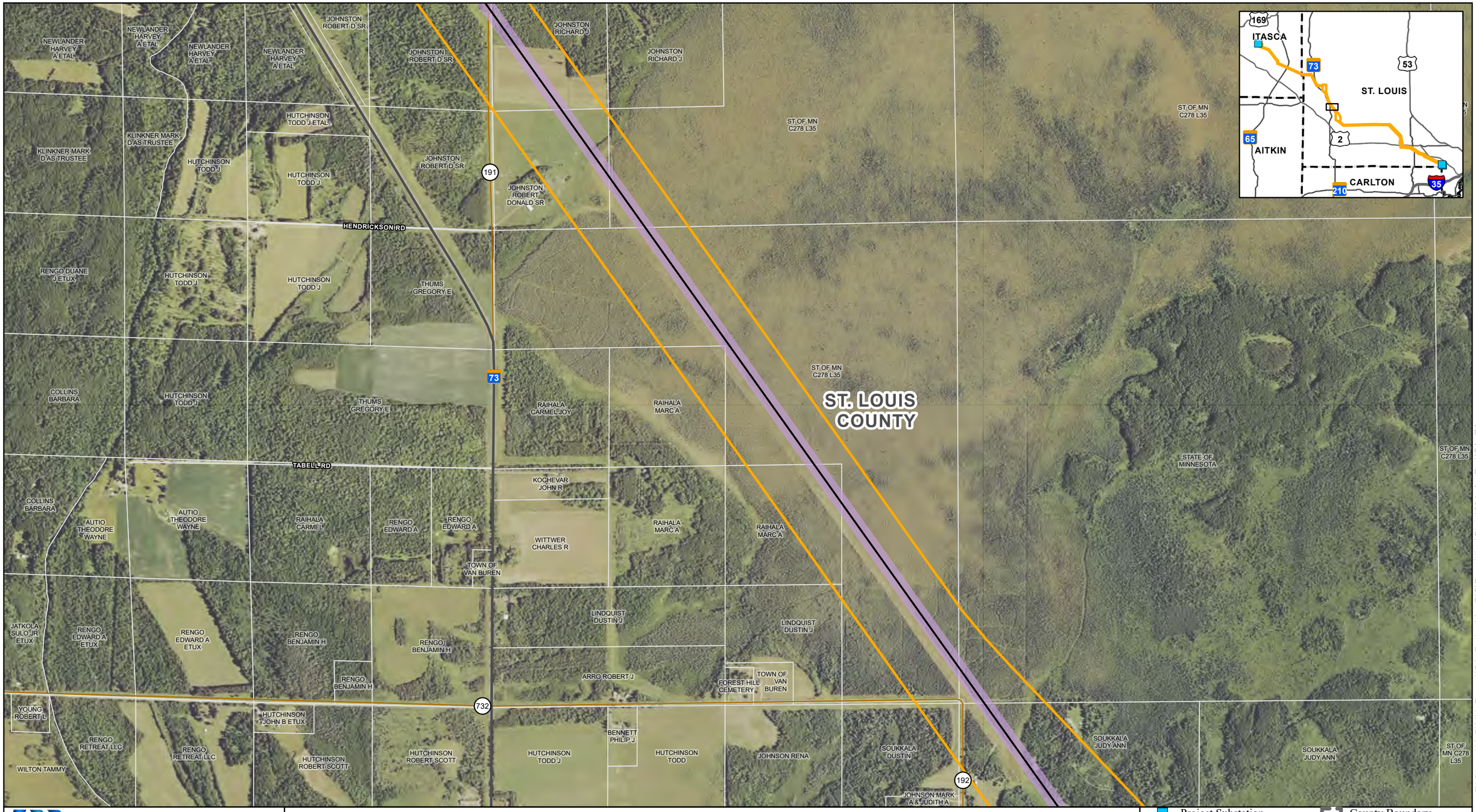
- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

- County Boundary
- Parcel Boundary
- Township
- Unorganized Territory

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Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
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Proposed Alignment

- Segment 1
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- County Boundary
- Parcel Boundary
- Township

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Map 5: Land Ownership and Parcel Boundaries
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Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

- County Boundary
- Parcel Boundary
- Township

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Map 5: Land Ownership and Parcel Boundaries
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

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- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

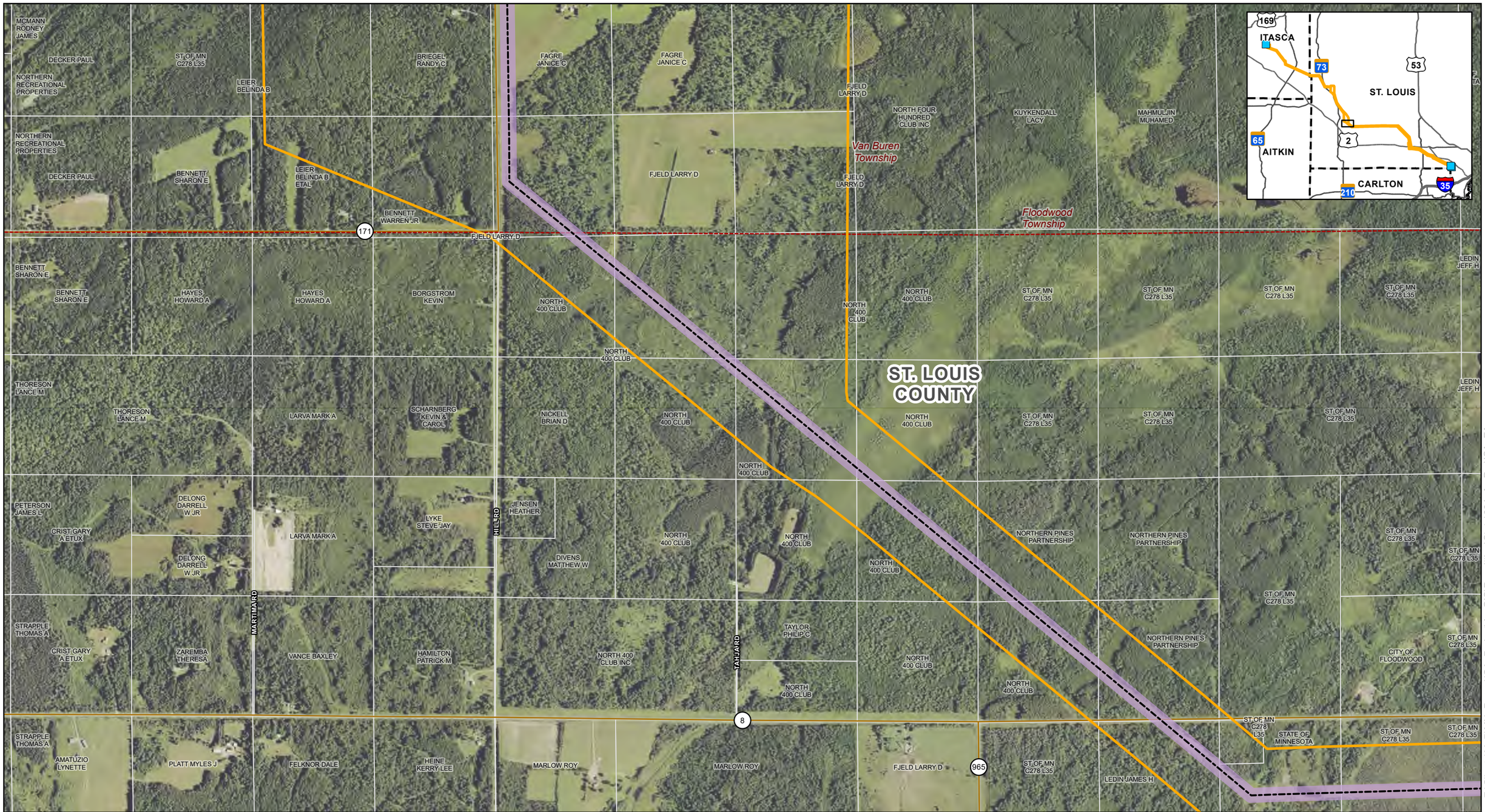
- Segment 1
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- County Boundary
- Parcel Boundary
- Township

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Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route
- County Boundary
- Parcel Boundary
- Township

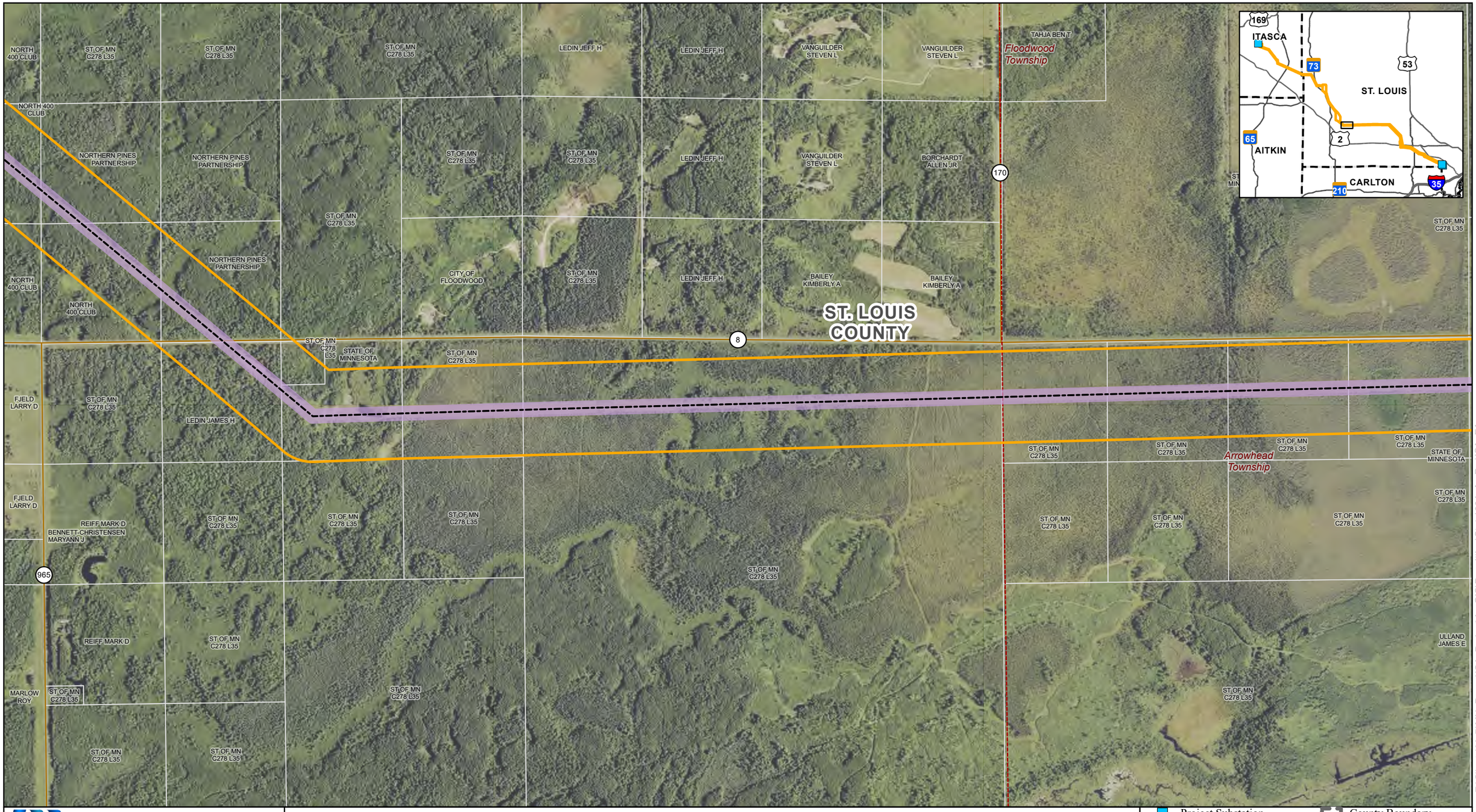
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Minnesota Power

Itasca and St. Louis Counties, Minnesota

Project Substation
Proposed Right Of Way
Proposed Route

Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

County Boundary
Parcel Boundary
Township

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Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
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- Segment 1
- Segment 2
- Segment 3

- County Boundary
- Parcel Boundary
- Township

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Itasca and St. Louis Counties, Minnesota

- Project Substation
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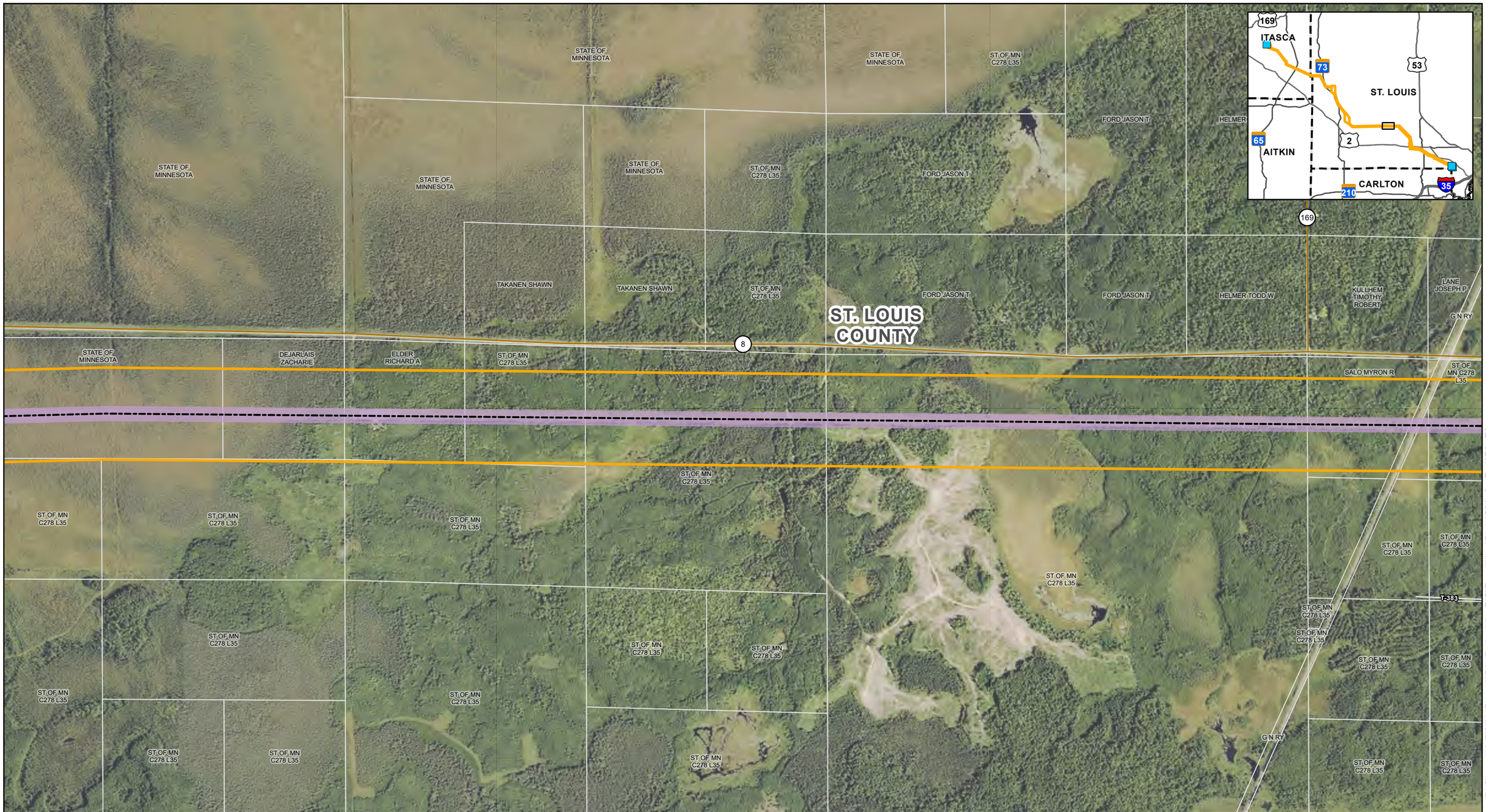
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Map 5: Land Ownership and Parcel Boundaries
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

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- Project Substation
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- Proposed Route
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Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
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- Segment 1
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- County Boundary
- Parcel Boundary
- Tribal Boundary
- Township

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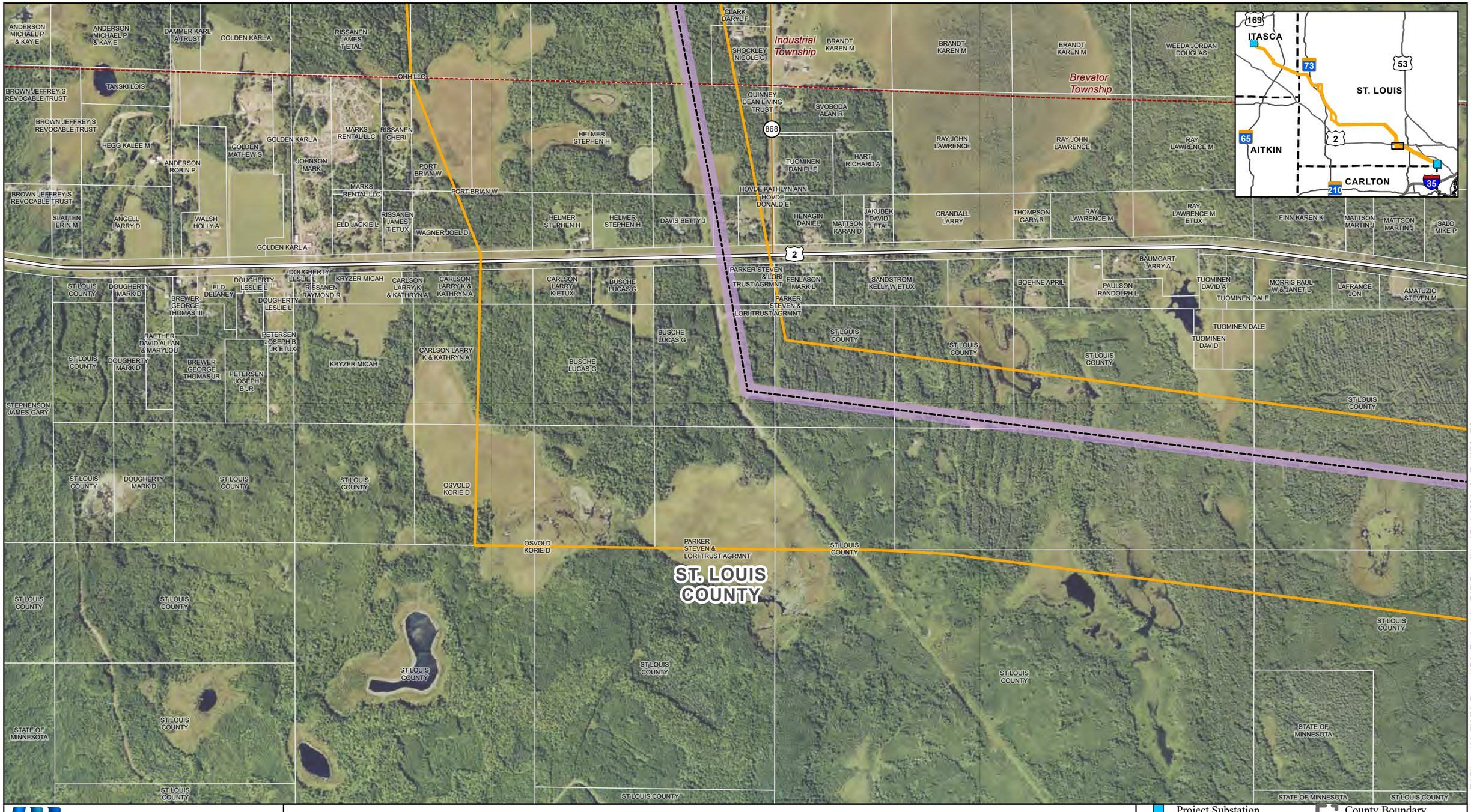
- Segment 1
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- County Boundary
- Parcel Boundary
- Township

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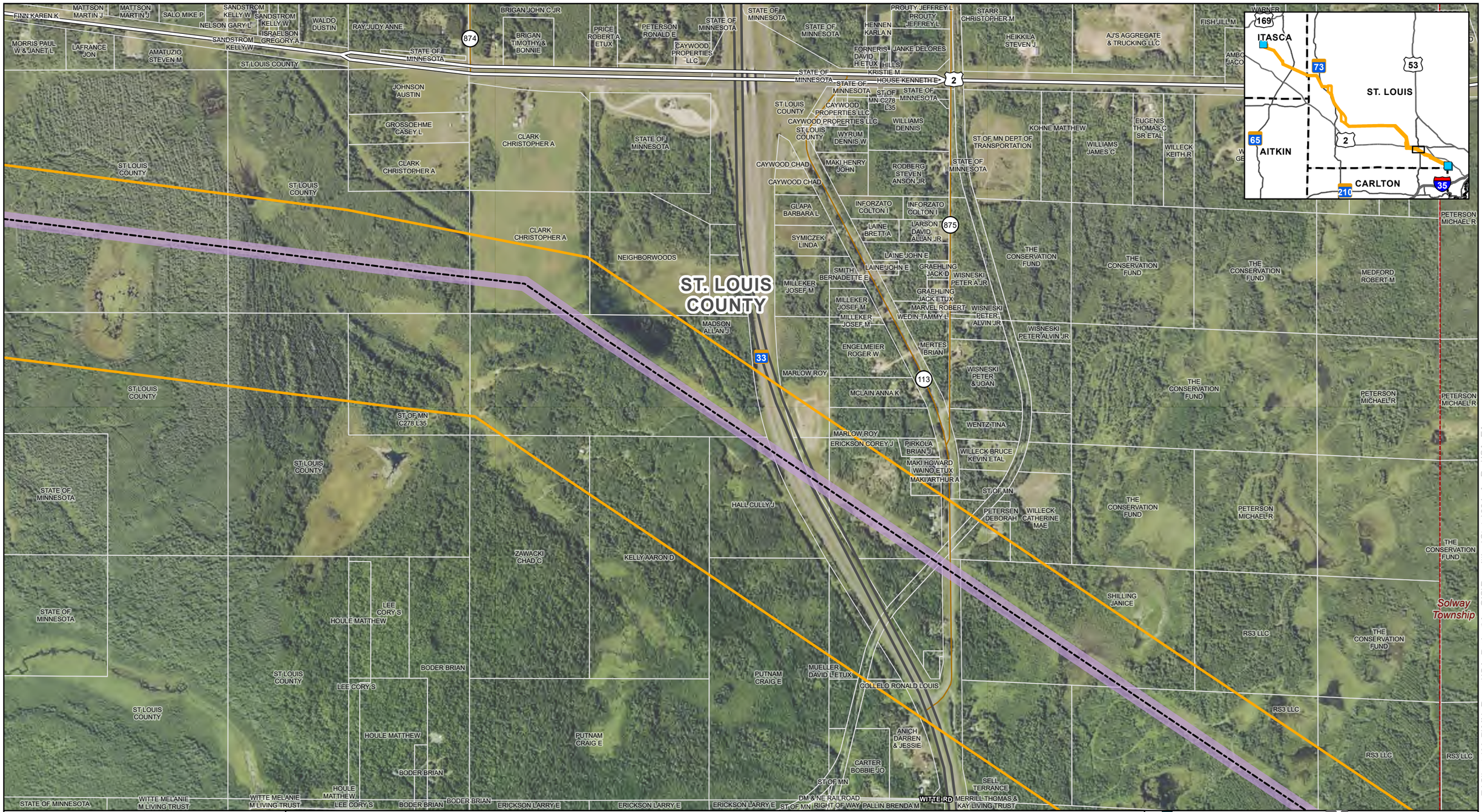
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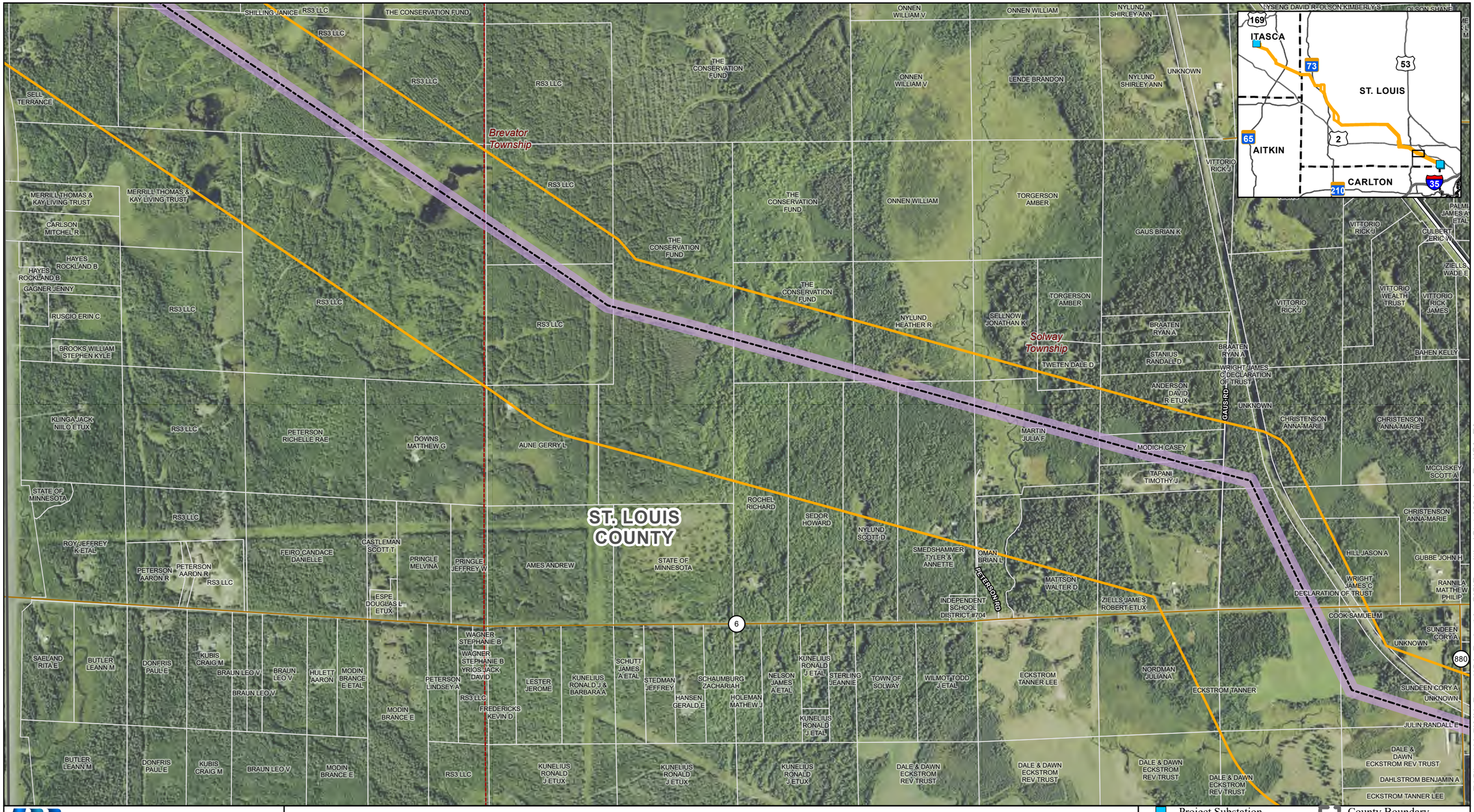
- Segment 1
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- County Boundary
- Parcel Boundary
- Township

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Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
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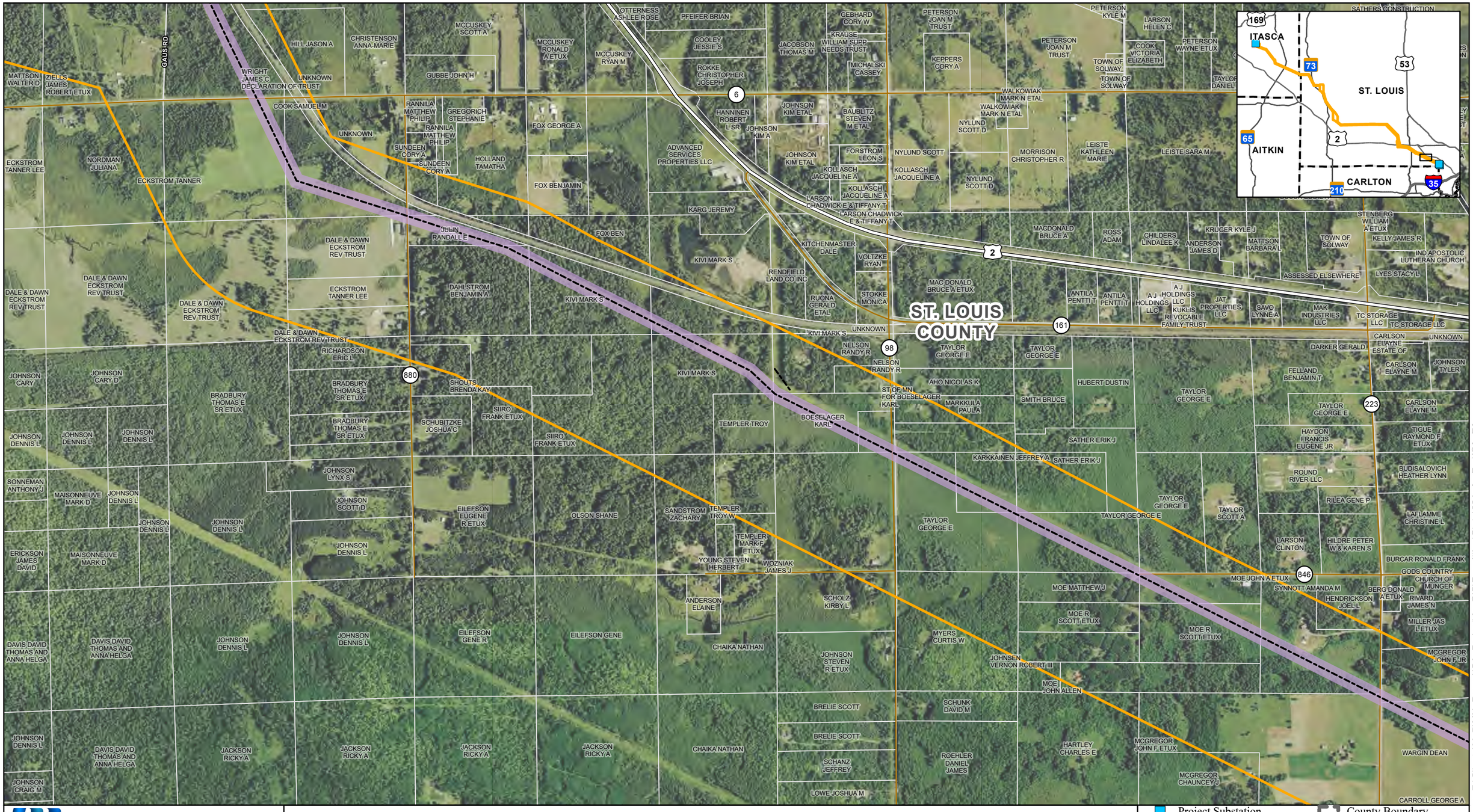
- Segment 1
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- County Boundary
- Parcel Boundary
- Township

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Map 5: Land Ownership and Parcel Boundaries
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Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route
- County Boundary
- Parcel Boundary
- Township

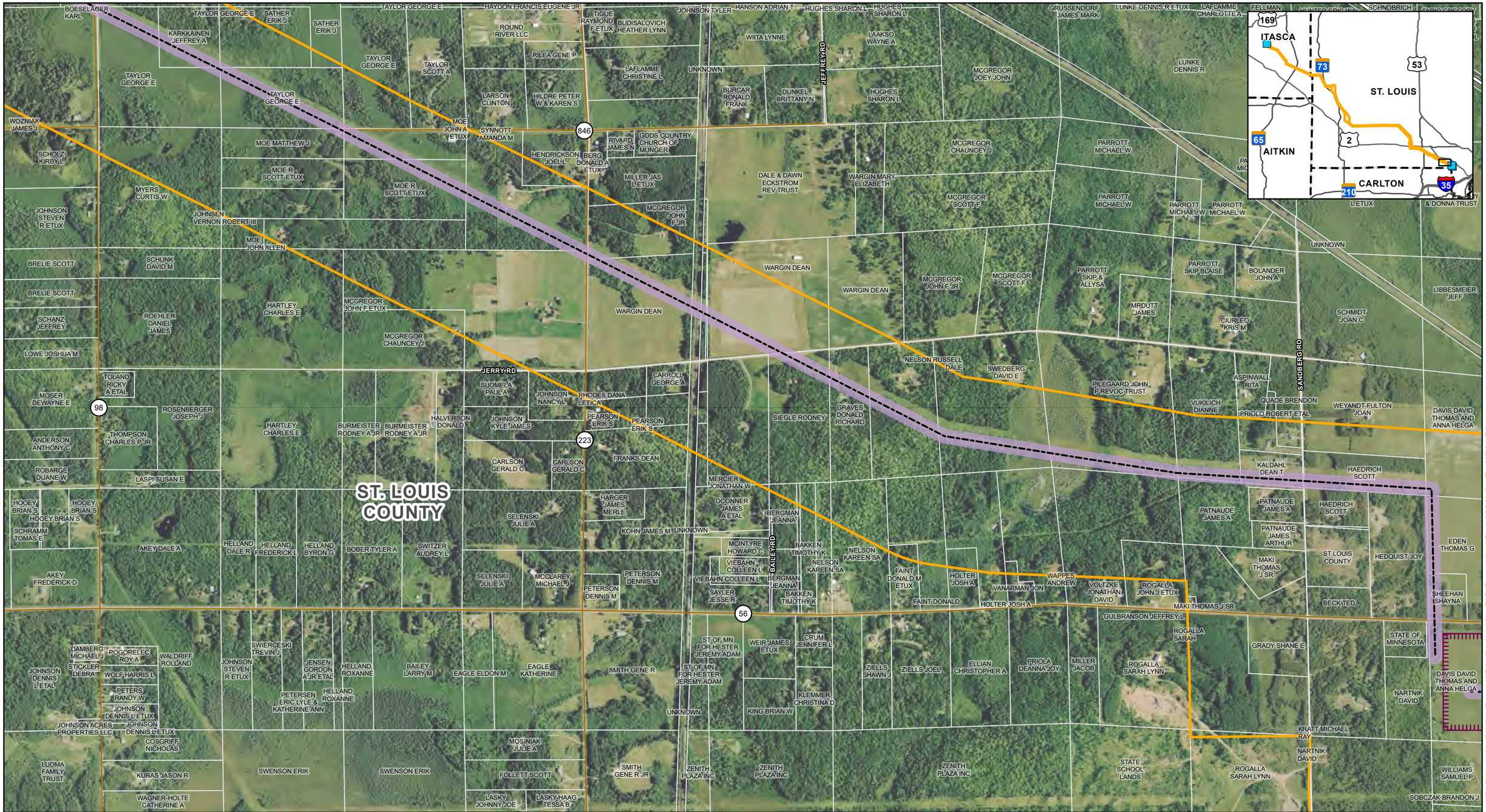
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Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
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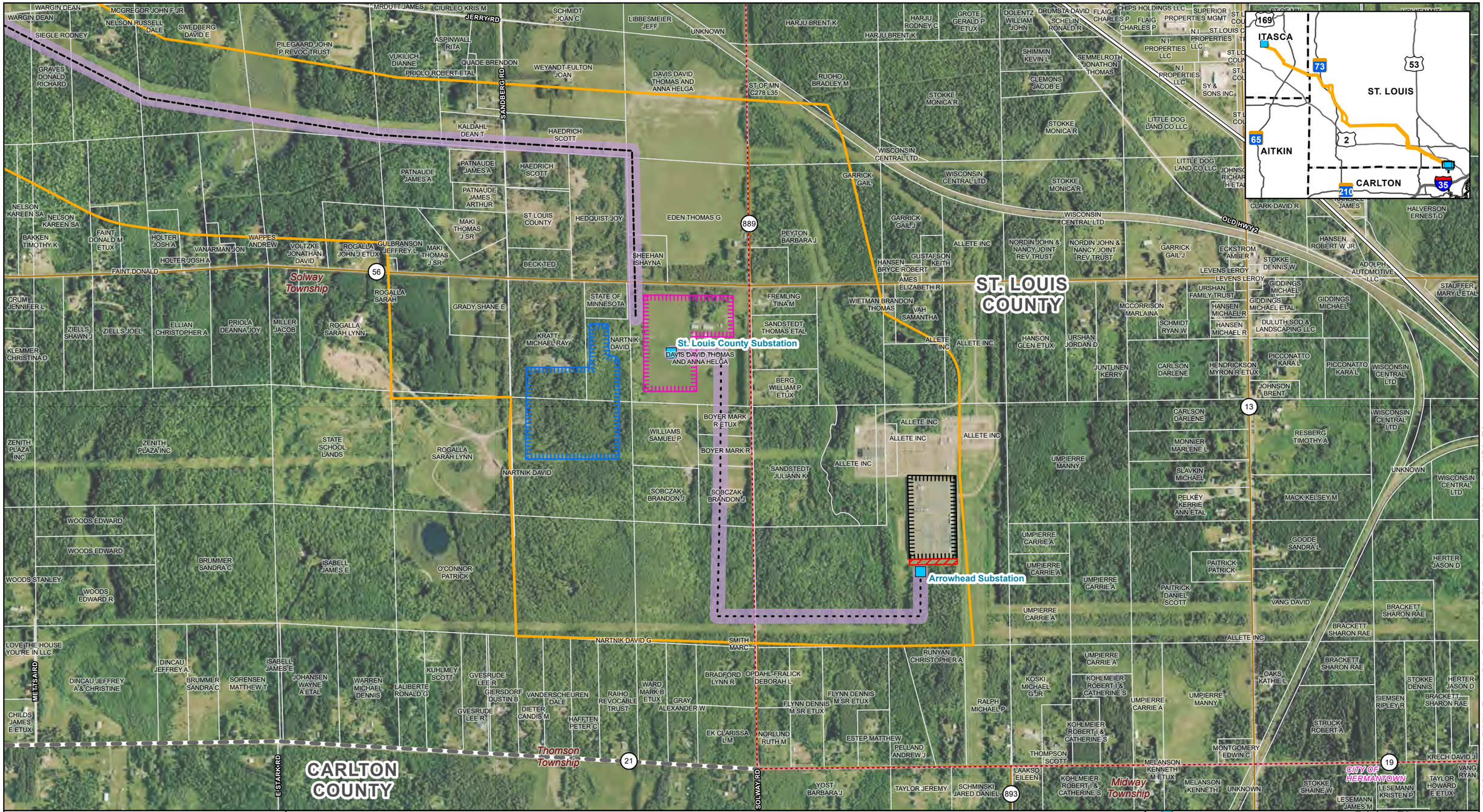
Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

- St. Louis County Substation Expansion
- County Boundary
- Parcel Boundary
- Township

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Minnesota Power

Itasca and St. Louis Counties, Minnesota

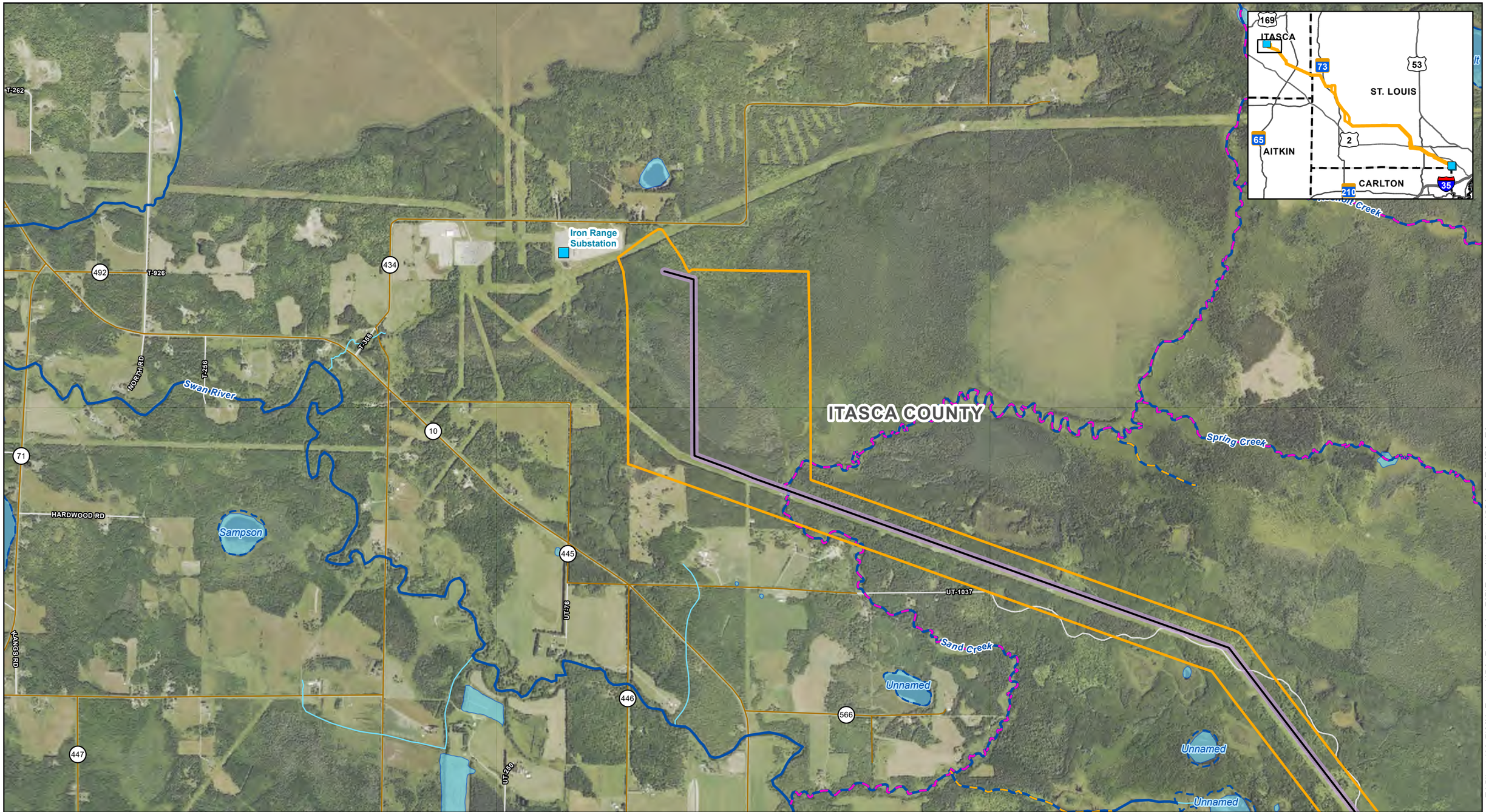
- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3
- ATC Arrowhead Substation Expansion
- Existing ATC Arrowhead Substation
- St. Louis County Substation Expansion
- HVDC Modernization Footprint
- County Boundary
- Parcel Boundary
- City Municipality Township

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Map 6: Surface Waters
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment

- Segment 1
- Segment 2
- Segment 3
- Public Water Watercourse
- Public Waters Basin/Wetland
- DNR Stream/River
- DNR Waterbody
- Designated Trout Stream
- Protected Tributary to Designated Trout Stream
- County Boundary

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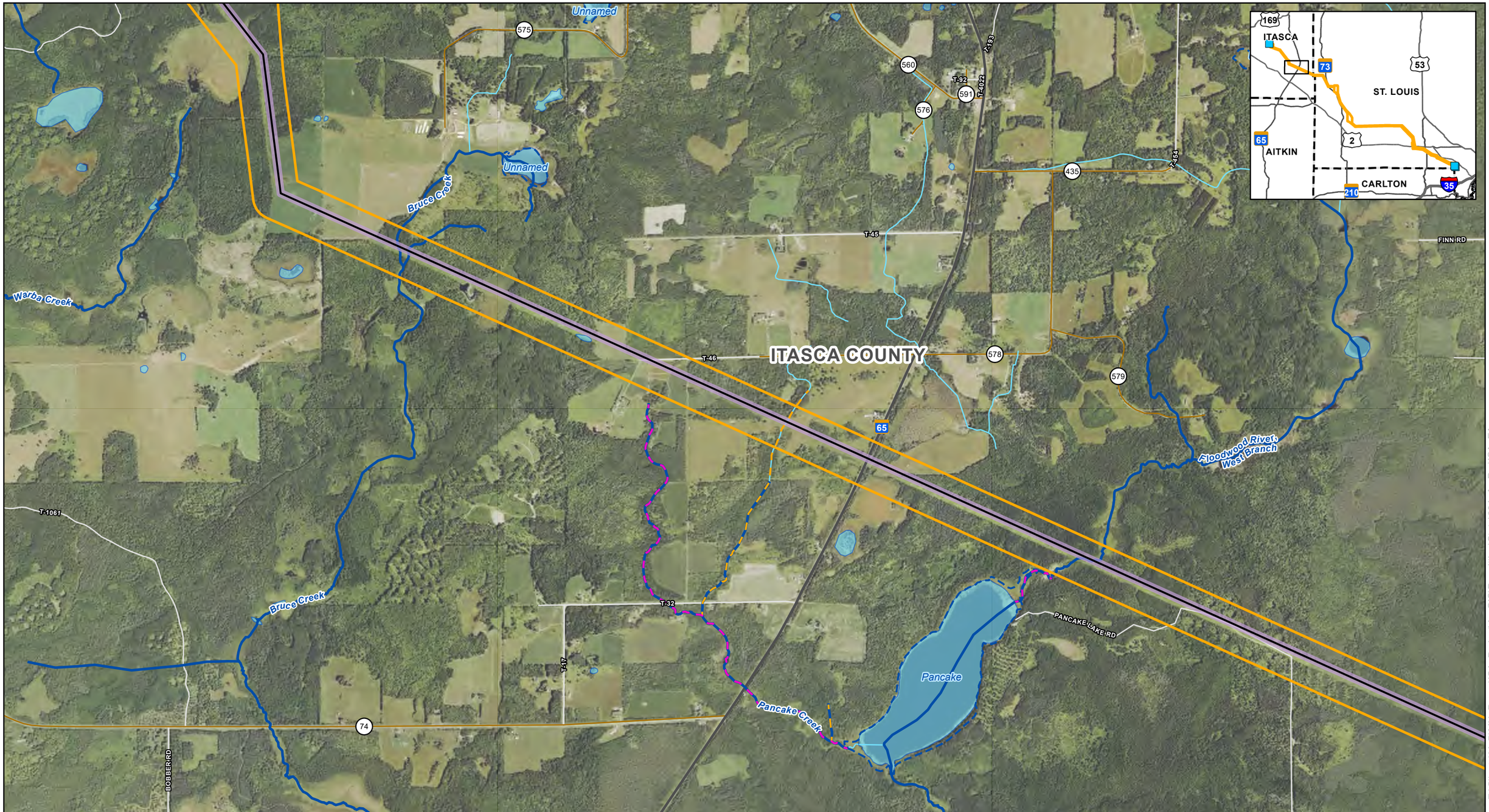
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Minnesota Power
Itasca and St. Louis Counties, Minnesota

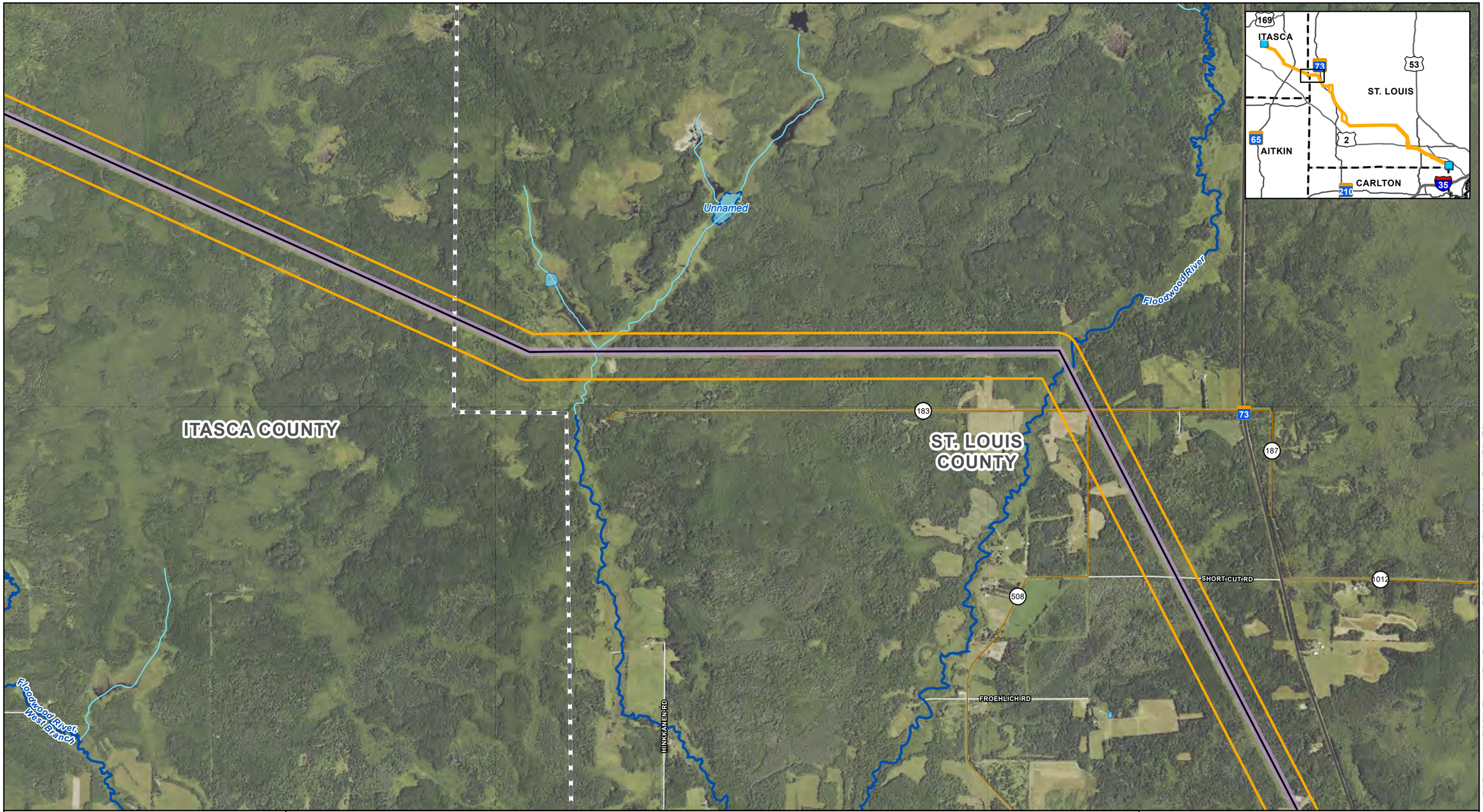
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Proposed Alignment

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Minnesota Power
Itasca and St. Louis Counties, Minnesota

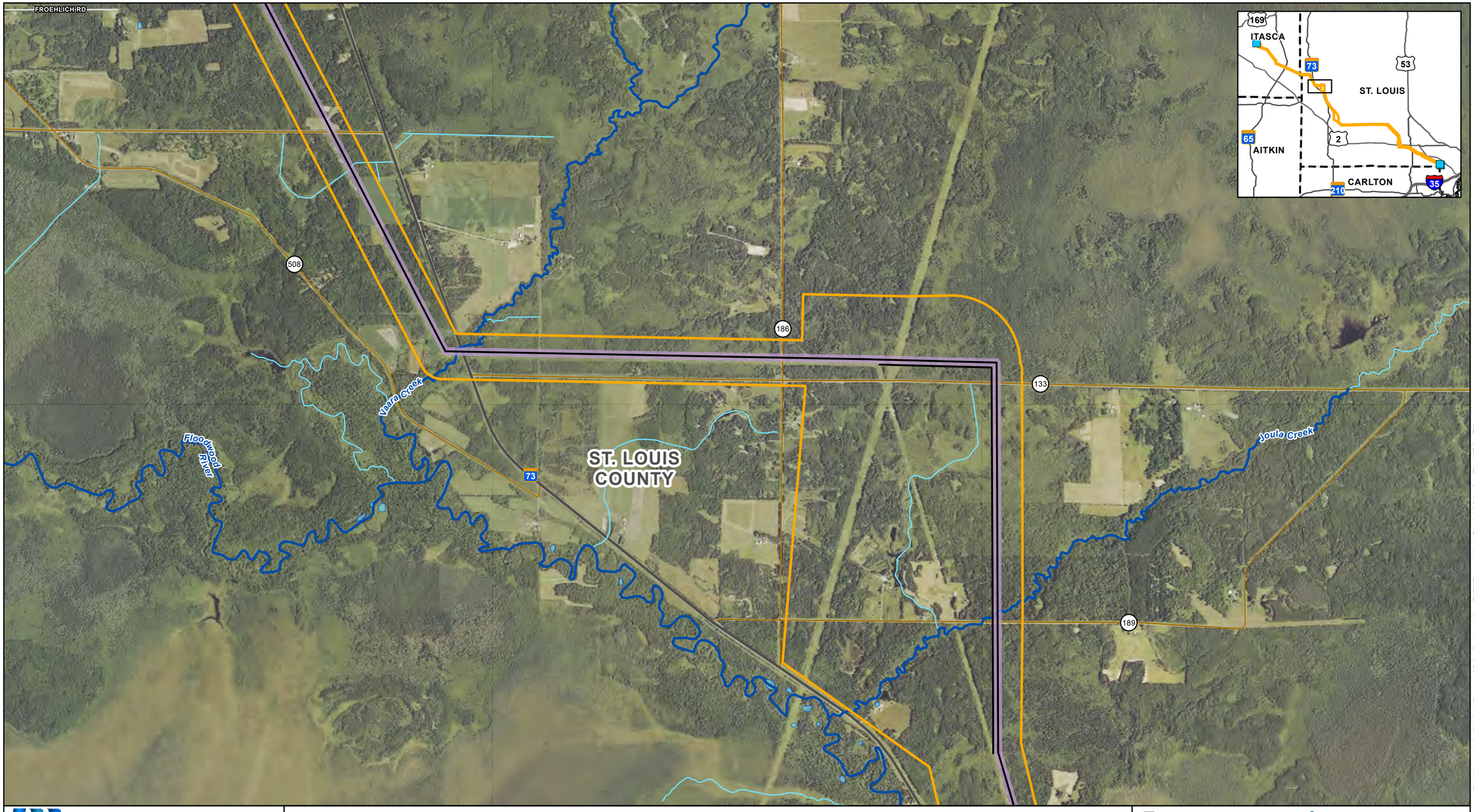
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Map 6: Surface Waters
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project
Minnesota Power
Itasca and St. Louis Counties, Minnesota

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- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

- Public Water Watercourse
- DNR Stream/River
- DNR Waterbody
- County Boundary

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Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project
Minnesota Power
Itasca and St. Louis Counties, Minnesota

- Project Substation
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- Proposed Route

Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

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- Public Water Ditch
- DNR Stream/River
- DNR Waterbody
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Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project
Minnesota Power
Itasca and St. Louis Counties, Minnesota

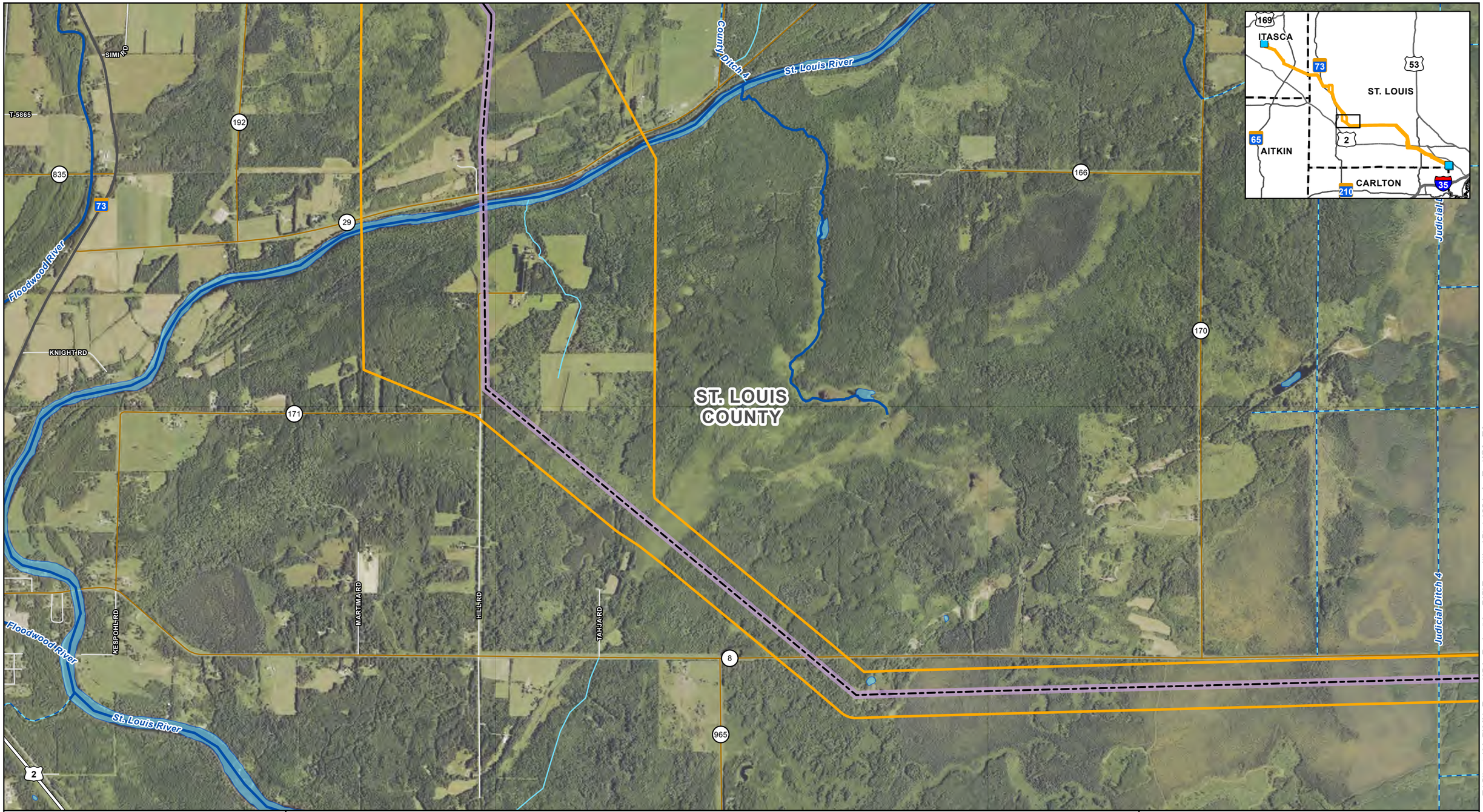
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- Project Substation
- Proposed Right Of Way
- Proposed Route

Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

- Public Water Watercourse
- Public Water Ditch
- DNR Stream/River
- DNR Waterbody
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Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project
Minnesota Power
Itasca and St. Louis Counties, Minnesota

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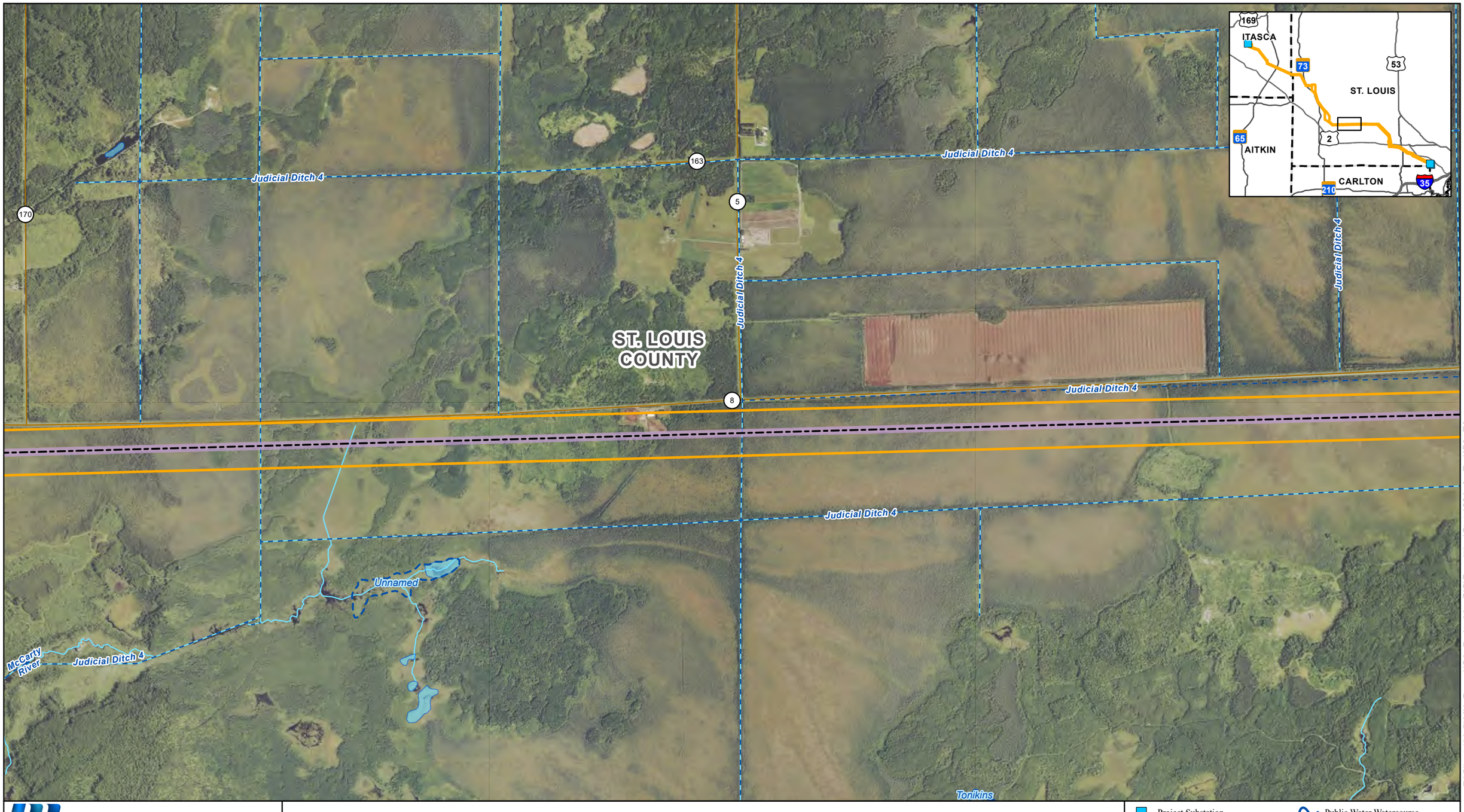
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Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
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Map 6: Surface Waters
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project
Minnesota Power
Itasca and St. Louis Counties, Minnesota

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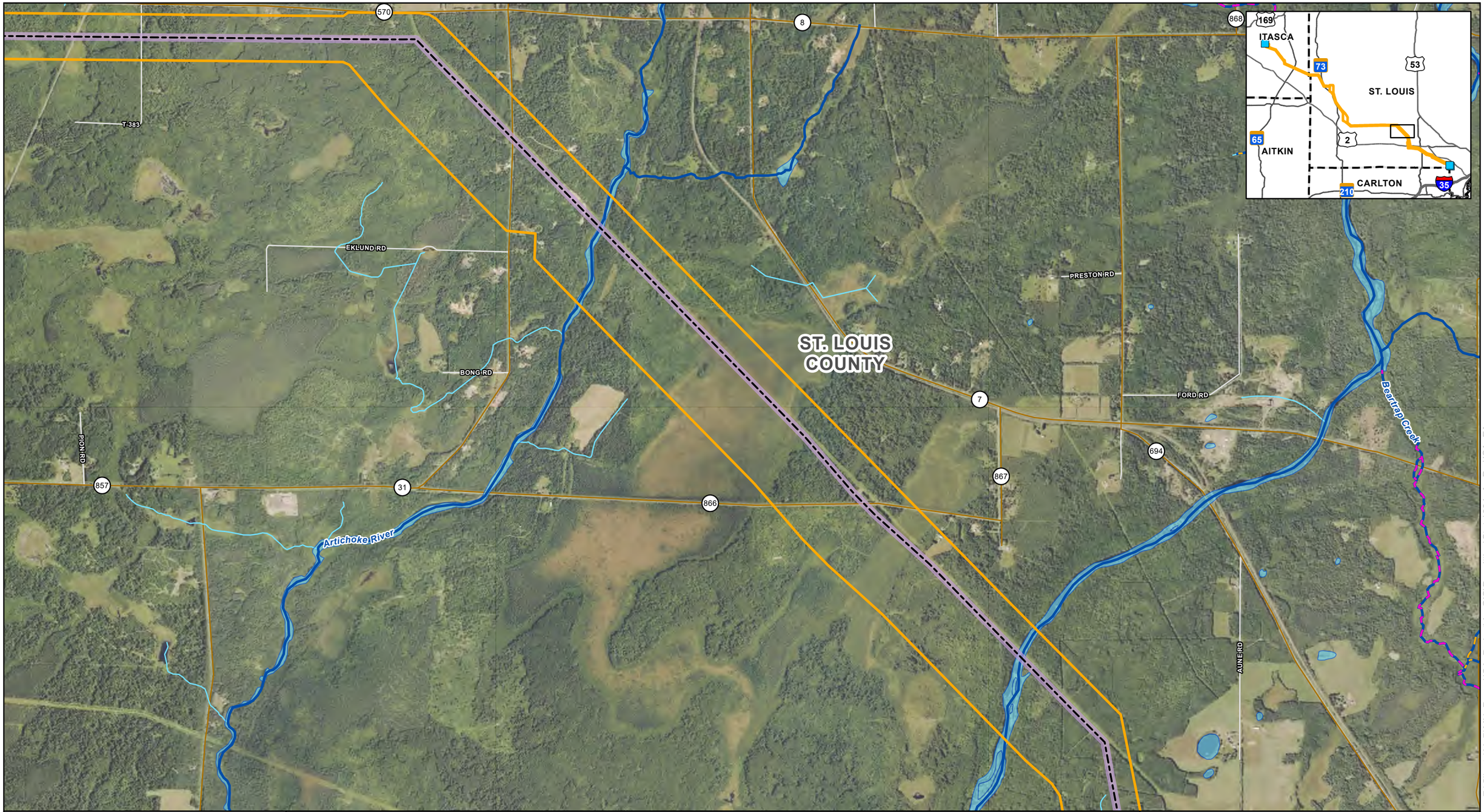
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Minnesota Power

Itasca and St. Louis Counties, Minnesota

- Project Substation
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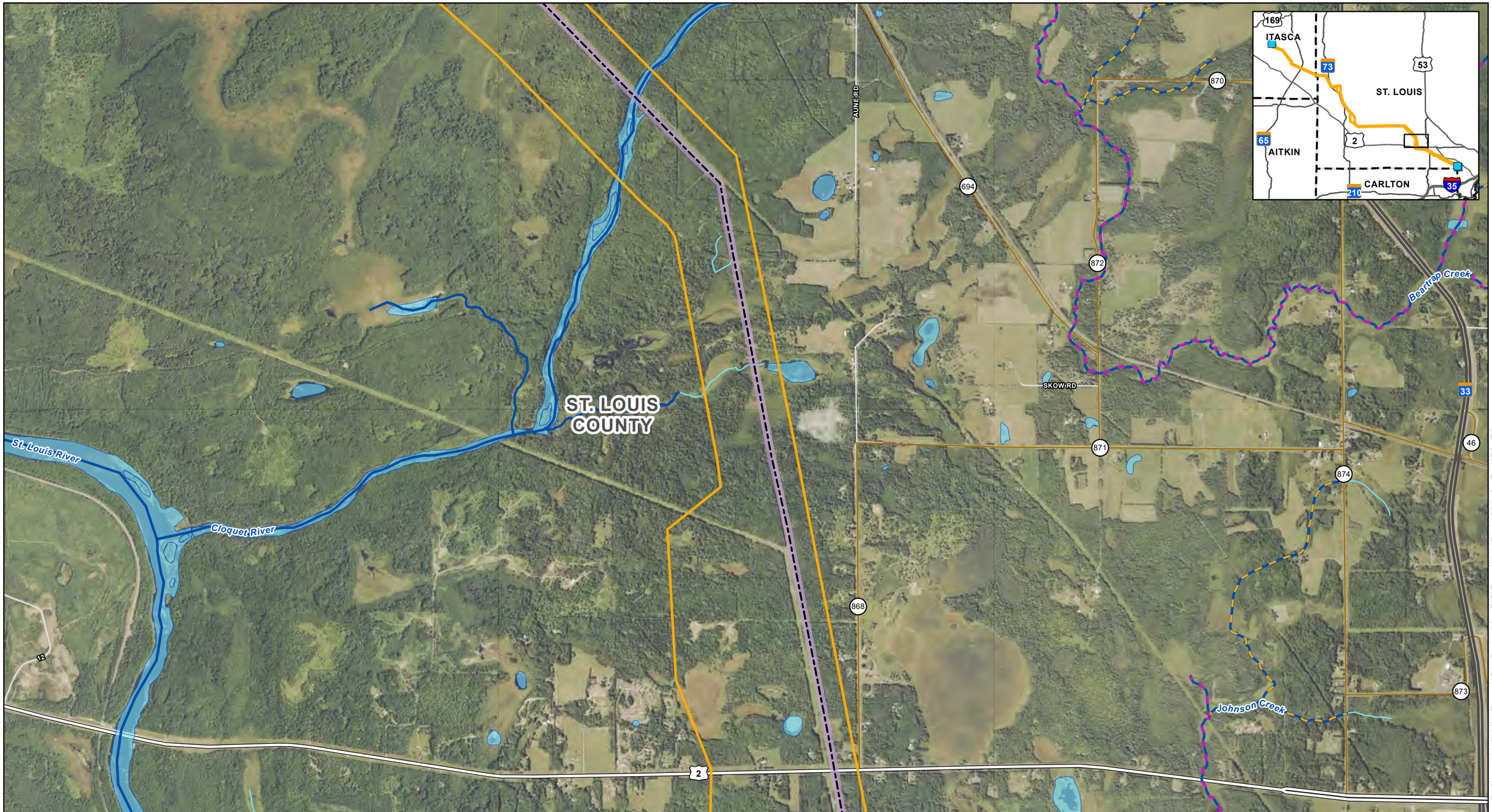
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Map 6: Surface Waters
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project
Minnesota Power
Itasca and St. Louis Counties, Minnesota

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- Project Substation
- Proposed Right Of Way
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Minnesota Power
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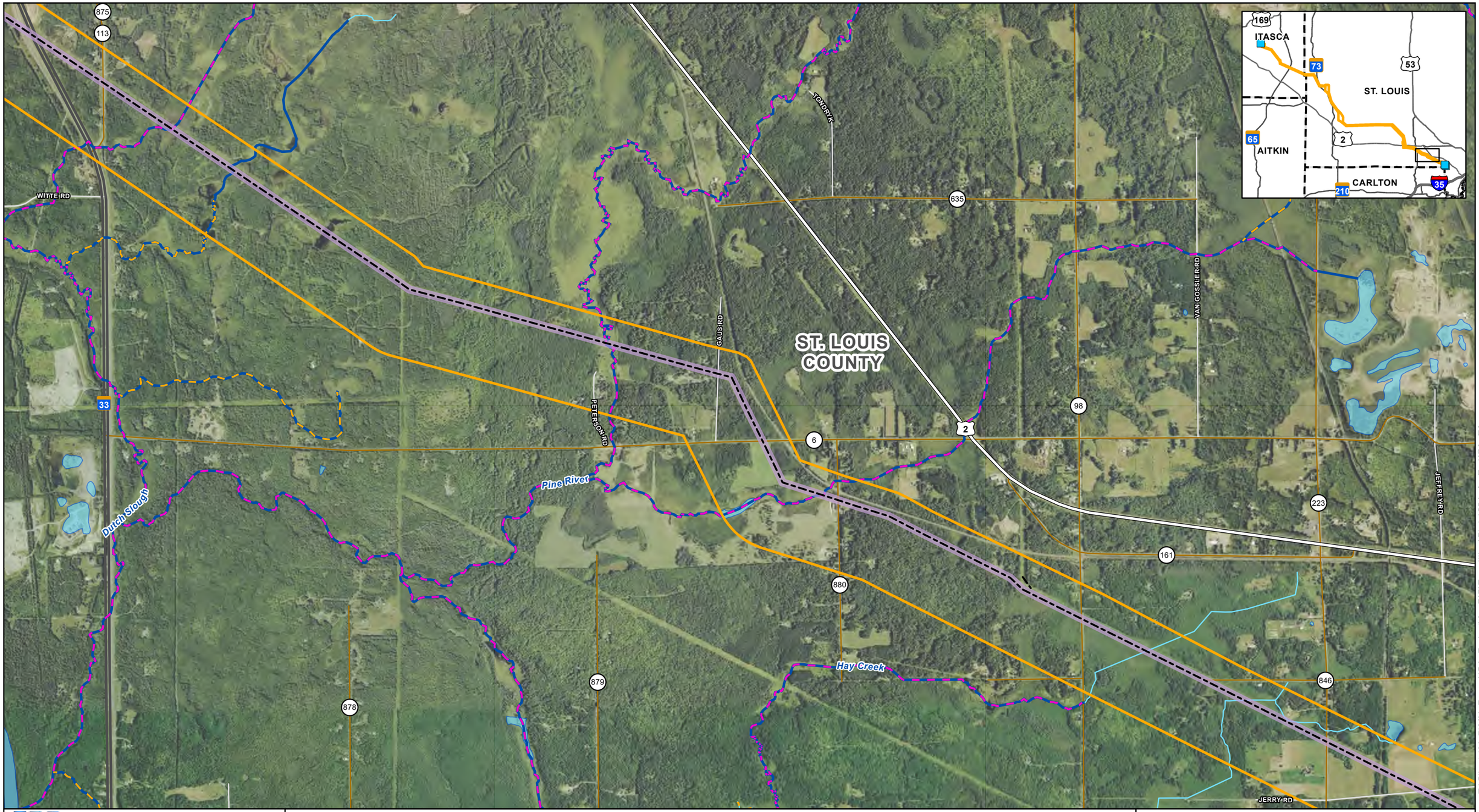
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Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project
Minnesota Power
Itasca and St. Louis Counties, Minnesota

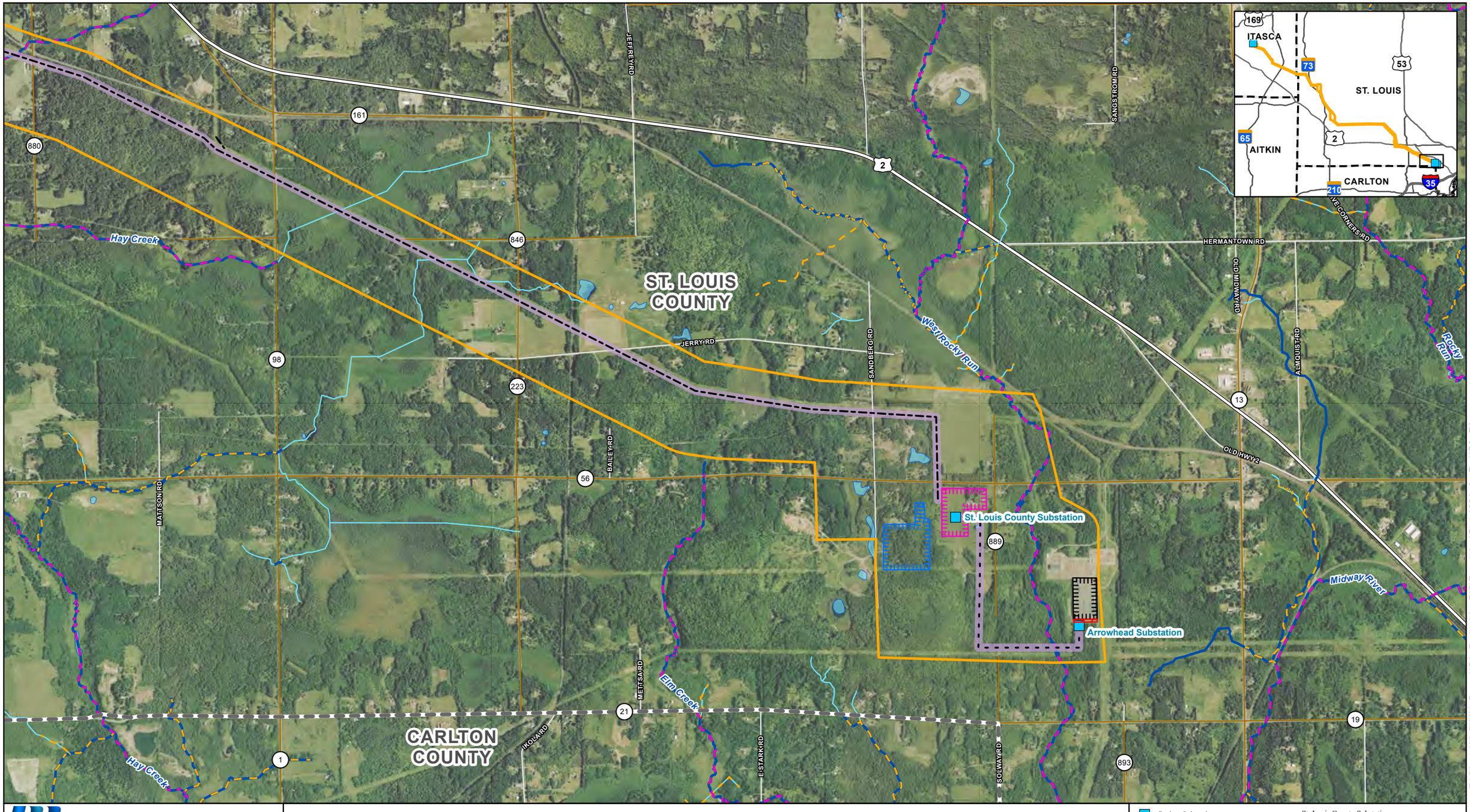
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- Protected Tributary to Designated Trout Stream
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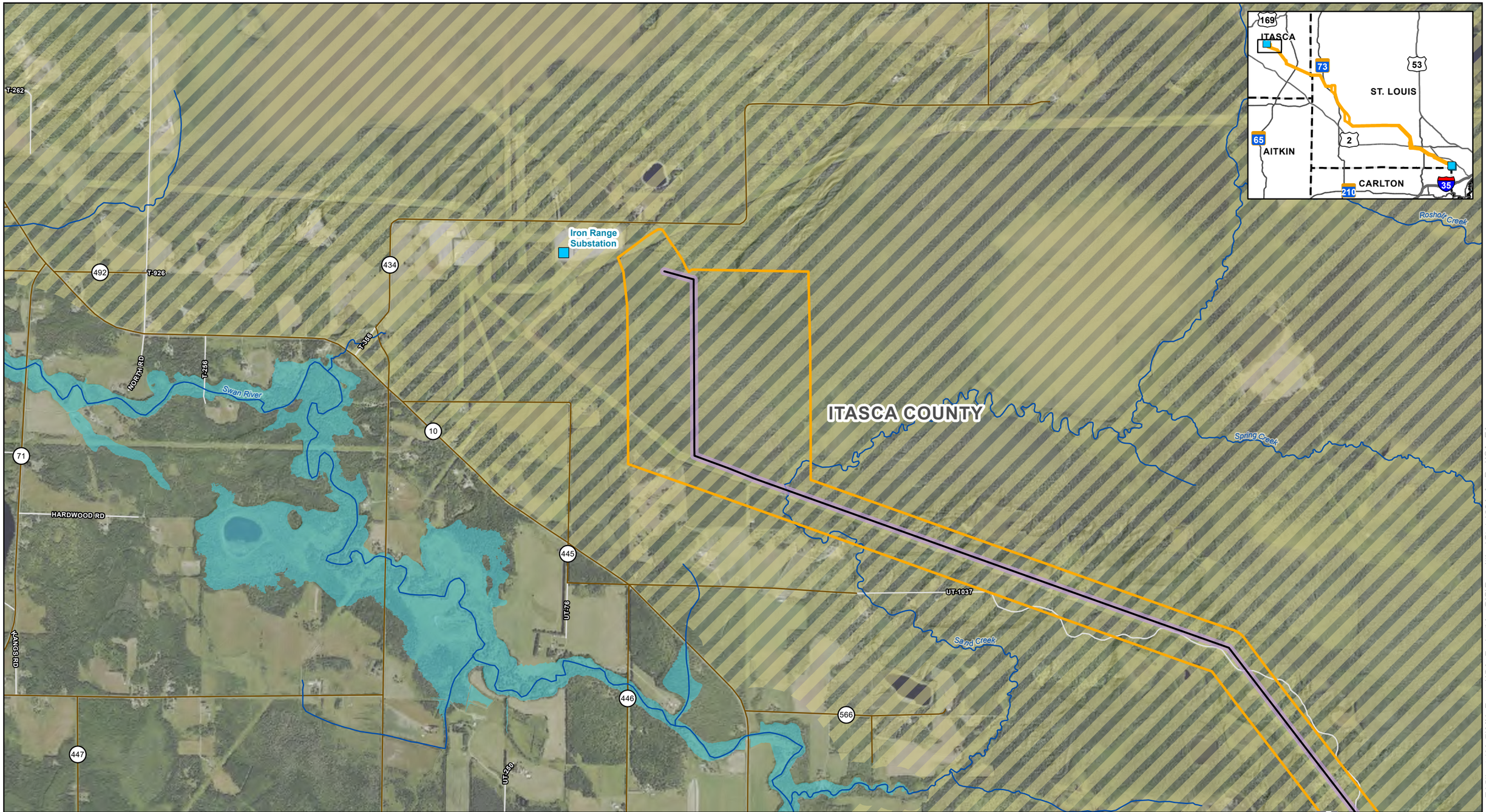
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Minnesota Power
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- Project Substation
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Map 7: Floodplains
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project
Minnesota Power
Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Route
- Proposed Right Of Way

Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

- County Boundary
- DNR Stream/River
- 1% Annual Chance Flood Hazard
- Area of Undetermined Flood Hazard

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Minnesota Power
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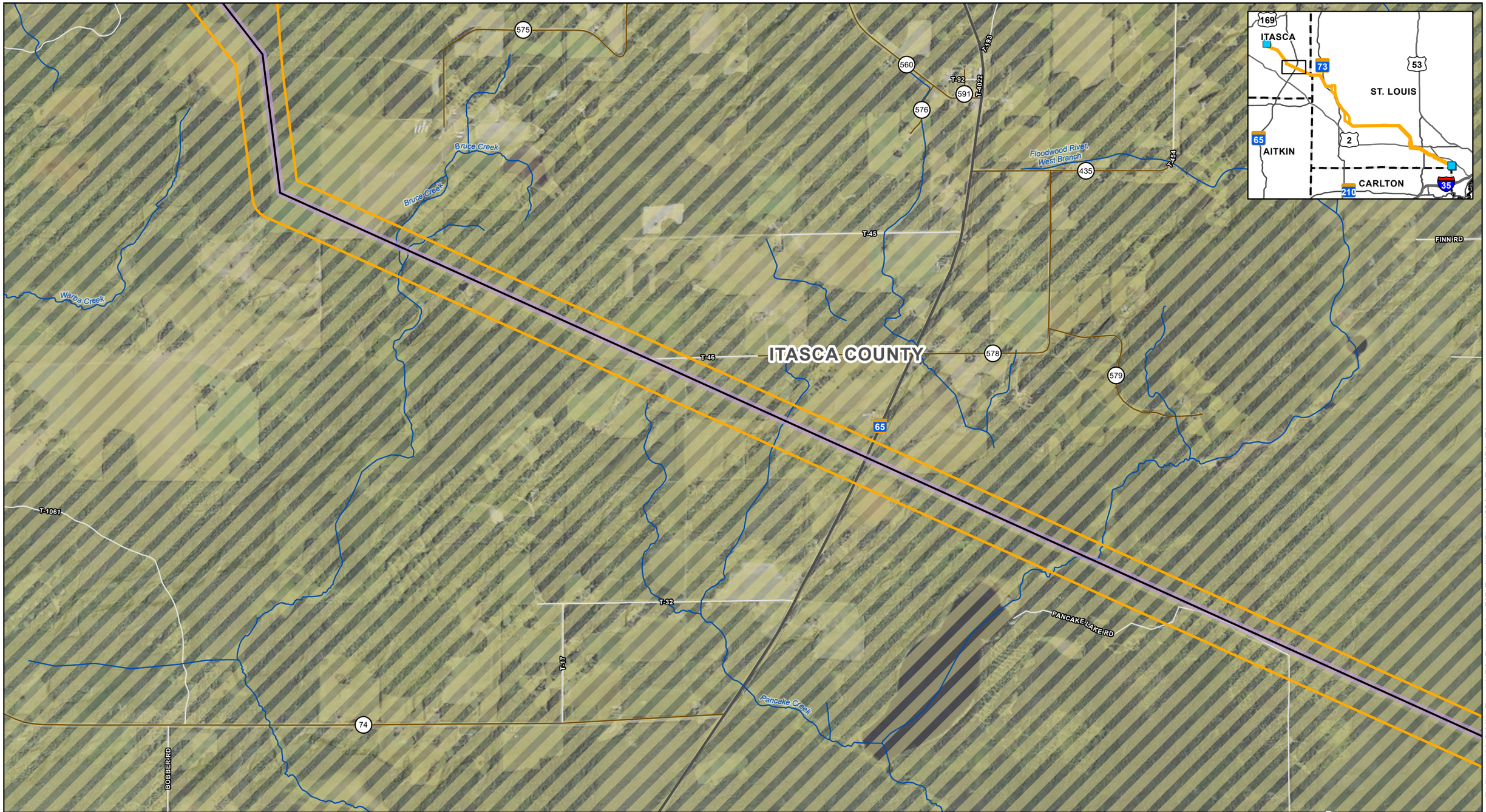
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Minnesota Power
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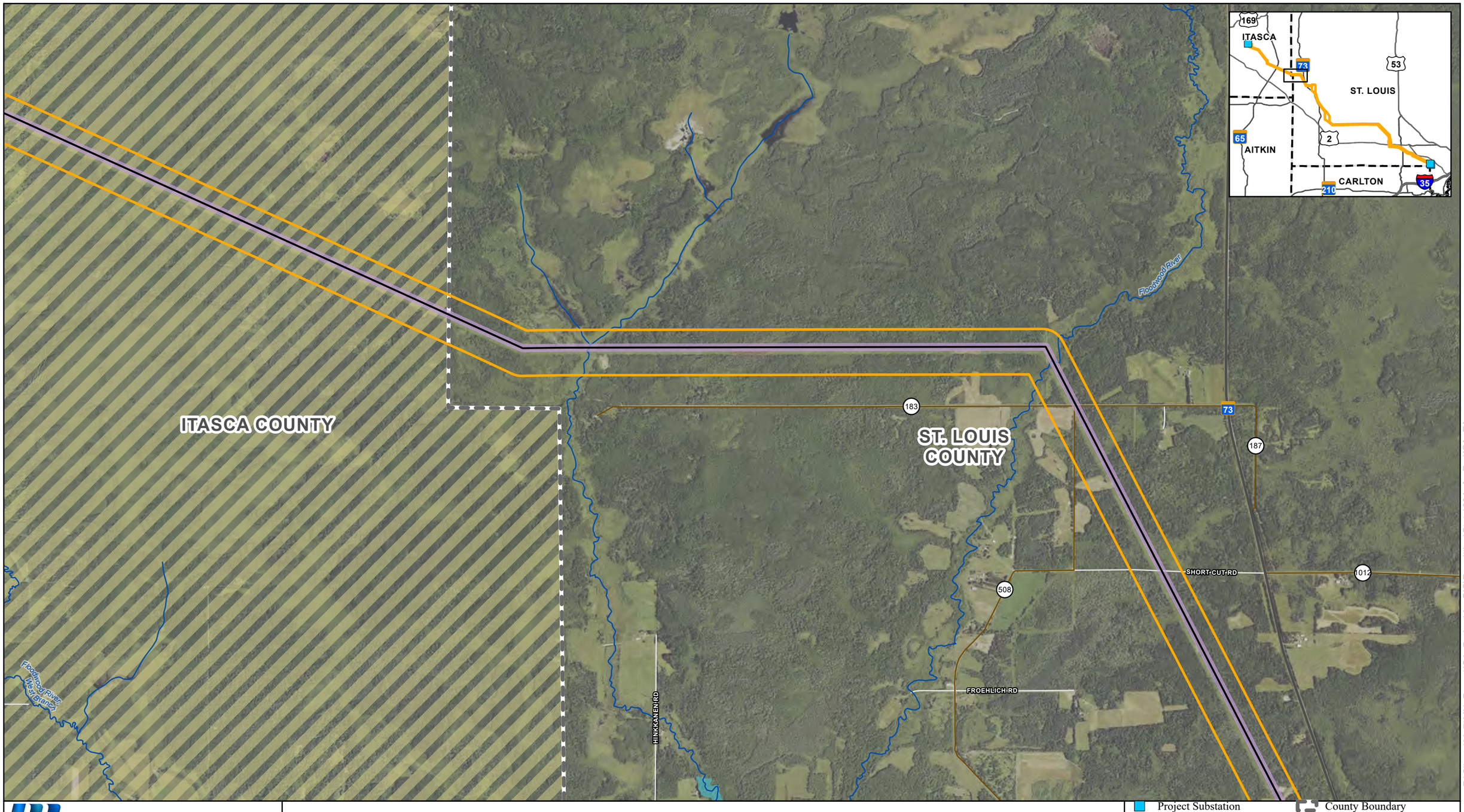
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- Proposed Right Of Way

Proposed Alignment
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- Segment 2
- Segment 3

- County Boundary
- DNR Stream/River
- Area of Undetermined Flood Hazard

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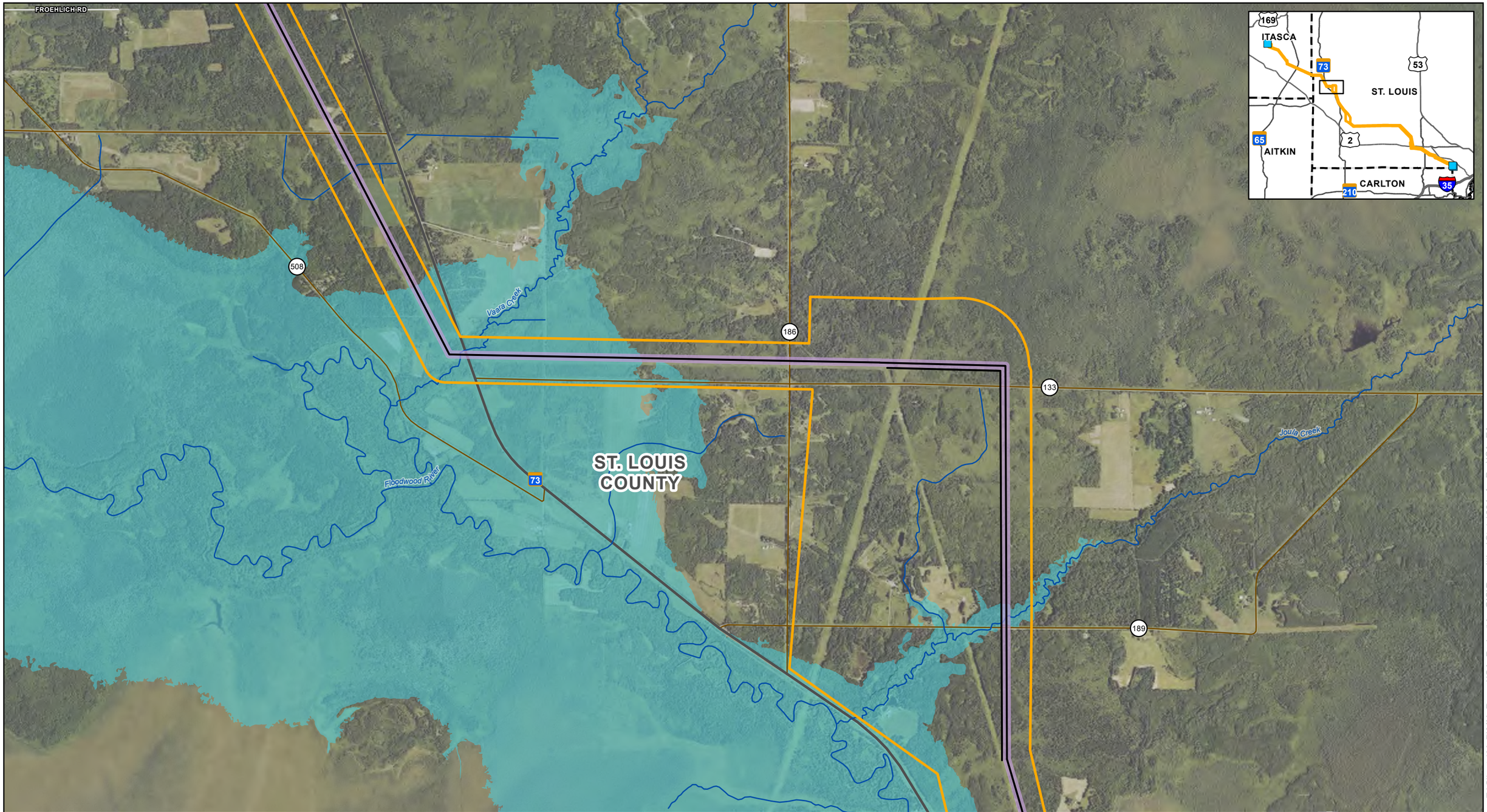
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- Proposed Right Of Way

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- Segment 1
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- County Boundary
- DNR Stream/River
- 1% Annual Chance Flood Hazard
- Area of Undetermined Flood Hazard

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Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

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- Project Substation
- Proposed Route
- Proposed Right Of Way

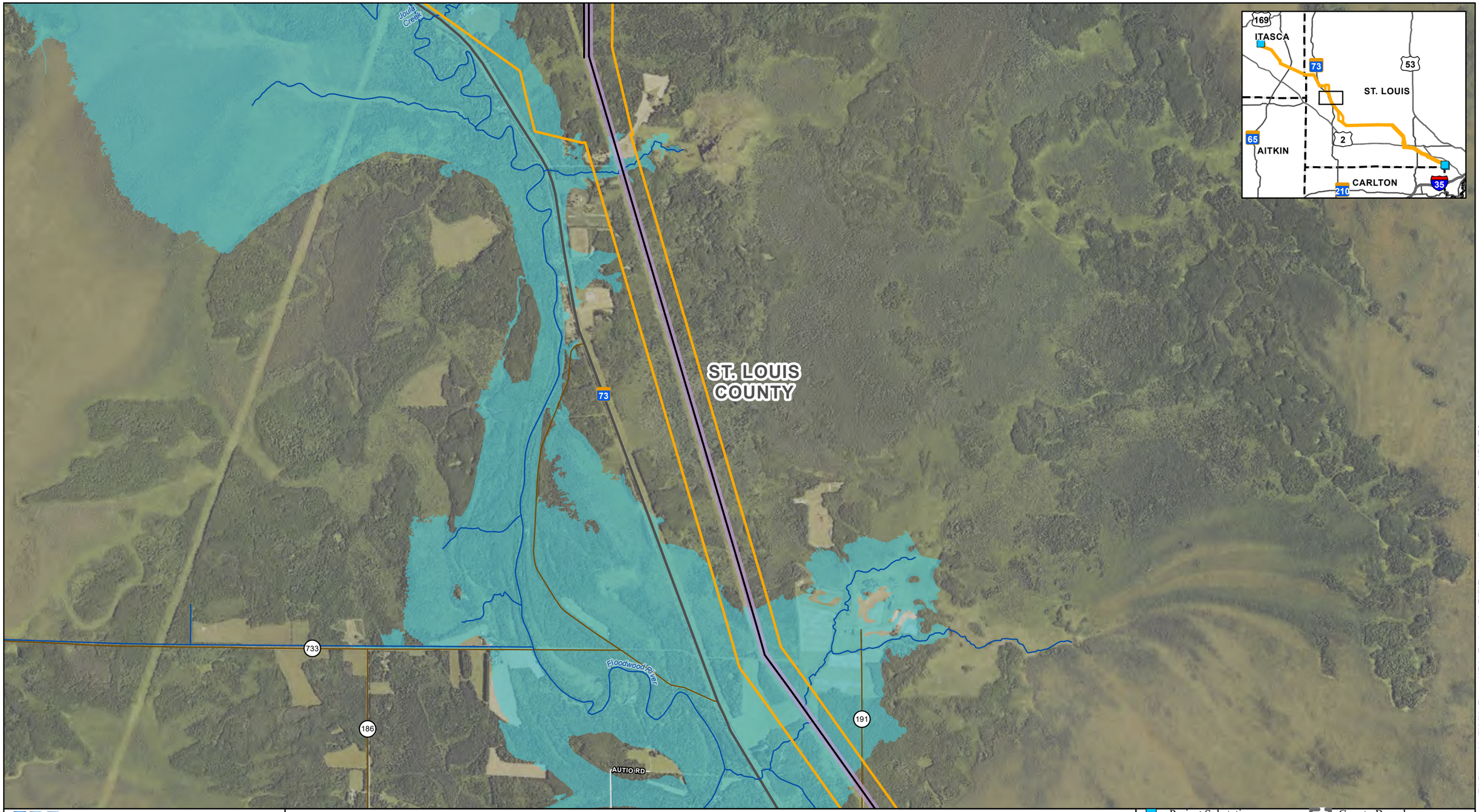
Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

- County Boundary
- DNR Stream/River
- 1% Annual Chance Flood Hazard

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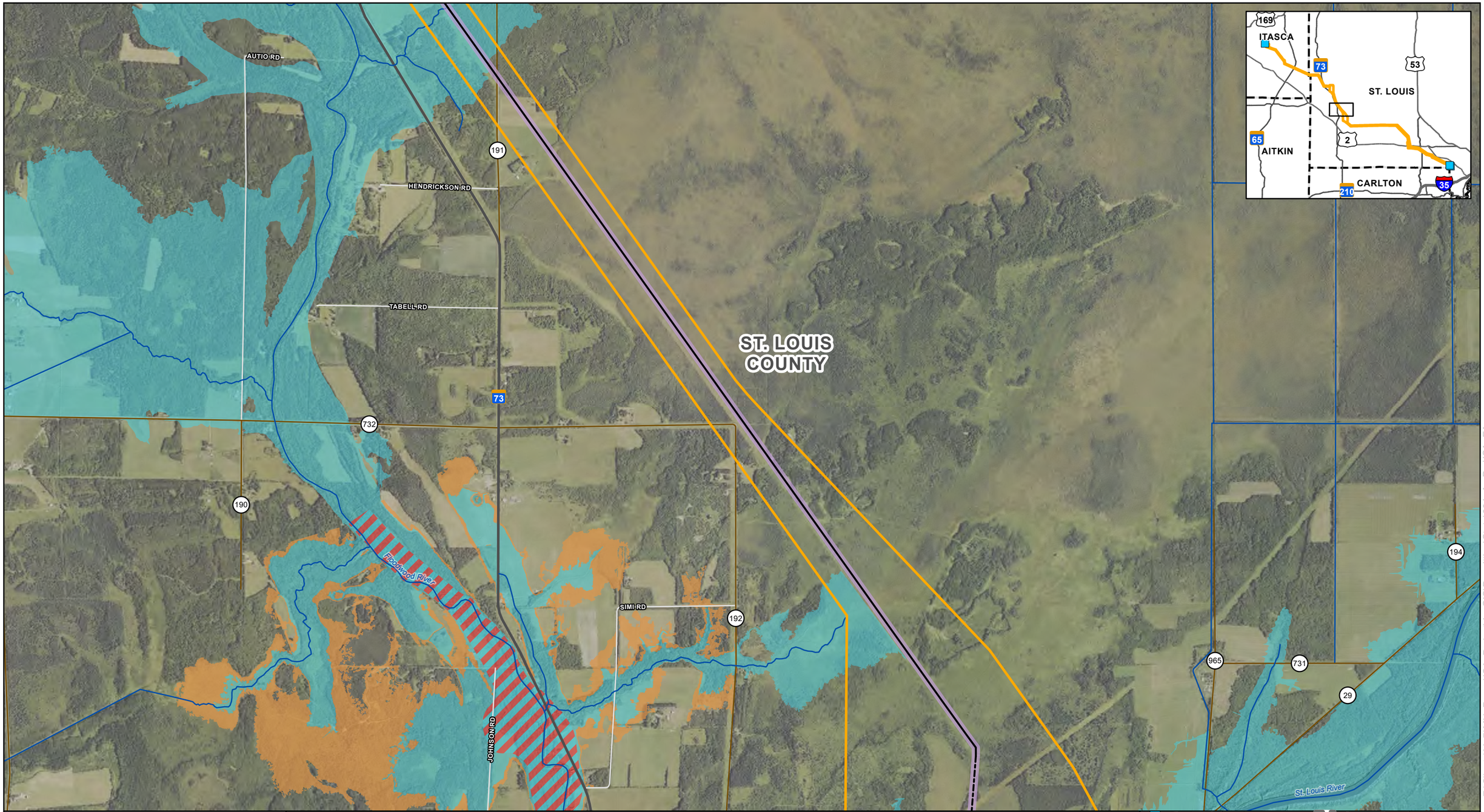
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- Proposed Right Of Way

Proposed Alignment
- Segment 1
- Segment 2
- Segment 3

- County Boundary
- DNR Stream/River
- 1% Annual Chance Flood Hazard

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Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project

Minnesota Power

Itasca and St. Louis Counties, Minnesota

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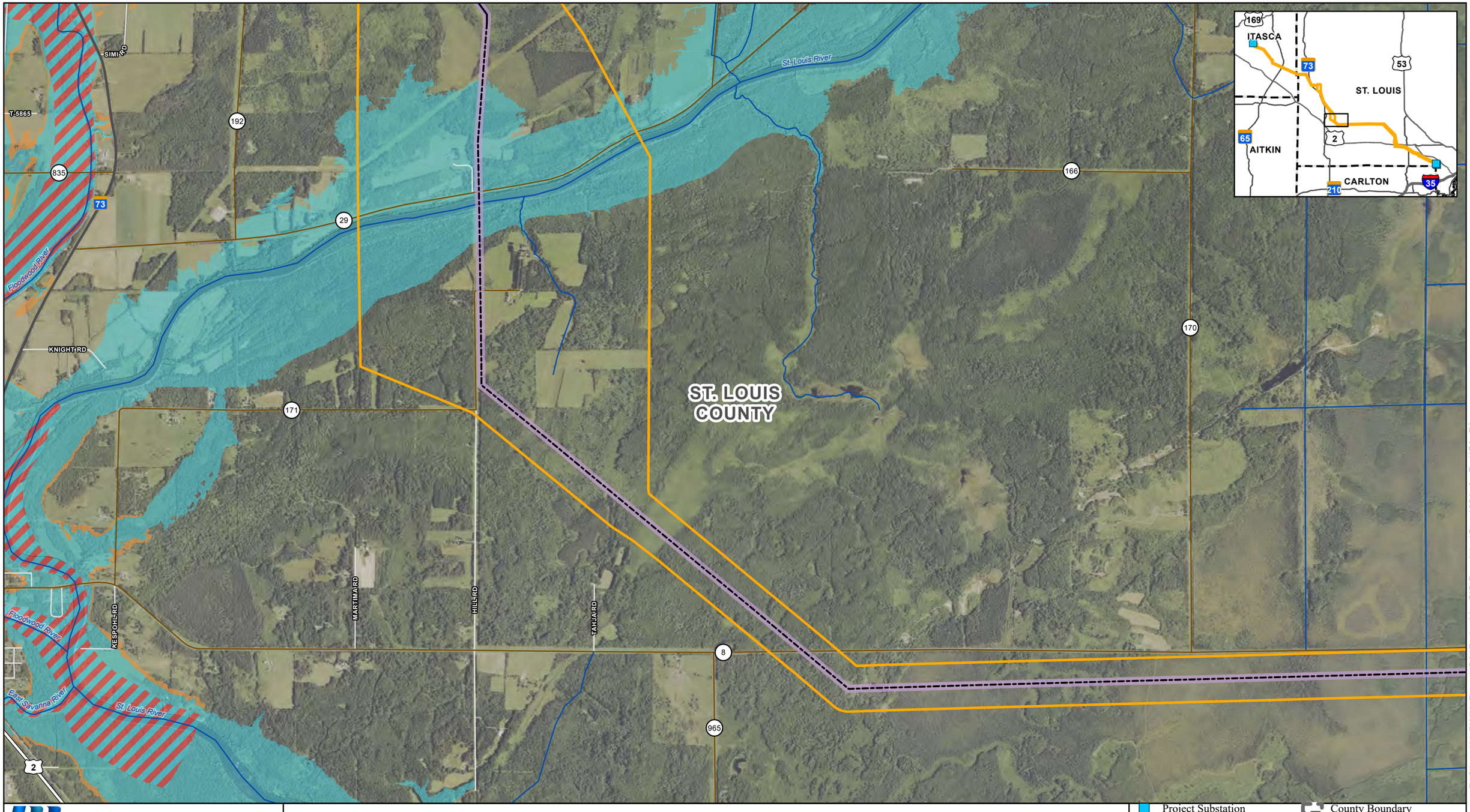
Proposed Alignment

- Segment 1
- Segment 2
- Segment 3

- County Boundary
- DNR Stream/River
- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- 0.2% Annual Chance Flood Hazard

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Minnesota Power

Itasca and St. Louis Counties, Minnesota

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- County Boundary
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- Regulatory Floodway
- 0.2% Annual Chance Flood Hazard

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Source: Z:\Clients\M_P\MN_Power\ISA_Project\ArcGIS\Permitting\State\001_ArcProISA_EA.aprx

Date: (12/17/2025)



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0 1,000 2,000 Feet

1 inch = 2,000 feet

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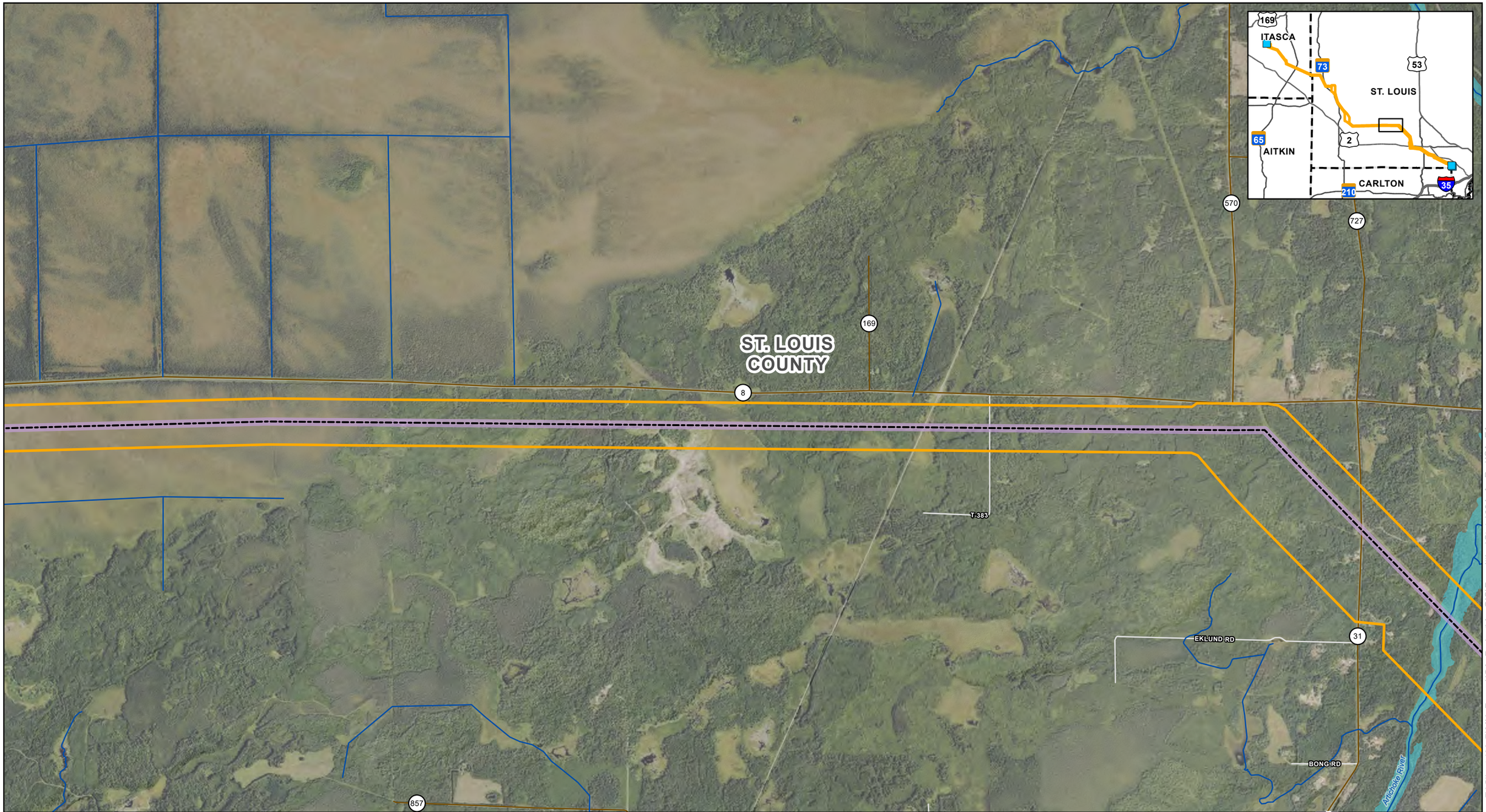
Map 7: Floodplains
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project
Minnesota Power
Itasca and St. Louis Counties, Minnesota

- Project Substation
- Proposed Route
- Proposed Right Of Way

Proposed Alignment
- Segment 1
- Segment 2
- Segment 3
- County Boundary
- DNR Stream/River

ISA Combined Application
Docket Nos. E015/CN-25-111 and E015/TL-25-112
Appendix E

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- 1% Annual Chance Flood Hazard

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Map 7: Floodplains
Iron Range - St. Louis County - Arrowhead 345 kV Transmission Project
Minnesota Power
Itasca and St. Louis Counties, Minnesota

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