MAYWOOD - MISSISSIPPI RIVER 345KV TRANSMISSION LINE ROUTE SELECTION STUDY

FINAL REPORT

Prepared For:
Ameren Transmission
1901 Chouteau Avenue
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TRC

May 16, 2024

FIGURES (larger figures appear after text in Appendix A)

TABLES

APPENDICES

1 Introduction and Project Overview

1.1 Project Description and Overview

Ameren Transmission (Ameren) is proposing to construct and operate approximately 2.3 miles of new 345-Kilovolt (kV) overhead electric transmission line between the existing Ameren-owned Maywood Substation and the existing AECI-owned Palmyra Substation. Additionally, Ameren is proposing to rebuild and upgrade approximately 5.8 miles of an existing 161kV line to double circuit 345/161kV line from the Palmyra Substation to the Mississippi River (***Figure 1***). This Project is located in Marion County, Missouri.

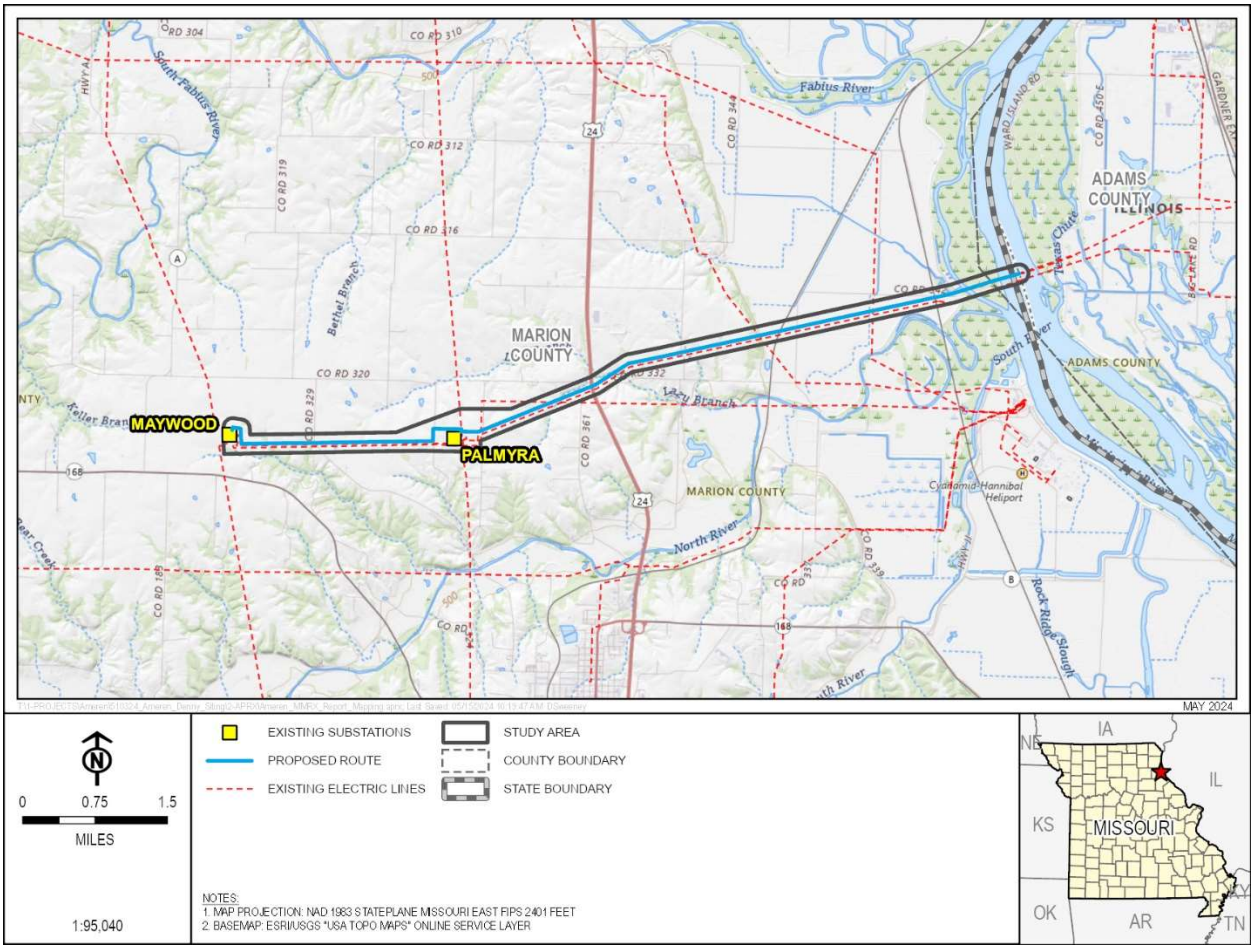


Figure 1. Project Vicinity Map

Ameren and its consultant, TRC (collectively the "Routing Team"), conducted an evaluation of the existing Ameren line and its right of way (ROW) from the Maywood Substation to the Palmyra Substation and from the Palmyra Substation to the Mississippi River to evaluate paralleling and rebuilding the existing transmission lines.

The Routing Team evaluated routes that parallel the north and the south side of the existing double circuit 345/345kV Maywood to Palmyra line, and a rebuild route of the existing 161kV

Palmyra to Mississippi River line, while avoiding identified constraints including existing and potential encroachments and minimizing the need for tree clearing. This study will refer to the Project components in two distinct sections – Maywood to Palmyra, and Palmyra to Mississippi River. The new 345kV portion of the line does not terminate at the existing Palmyra Substation and is a contiguous route to the Mississippi River.

2 Route Selection Methodology

The Route Selection Study (RSS) draws upon the latest available land use and ecological data collected from multiple public sources and commercial providers. This study is supplemented through field evaluations by the Routing Team where the route was visible from public roads. The field evaluation also provides an opportunity to qualitatively assess the various routes once developed. The result of this process is a comprehensive assessment of the Study Area and best placement of a paralleled route and rebuild route. The scope of the RSS for this Project was limited to evaluating options on either side of the existing 345kV Maywood to Palmyra line and evaluating potential constraints and encroachments along the existing 161kV Palmyra to Mississippi River line to be rebuilt.

2.1 Scoping

Scoping is a critical first step of the RSS. Project limitations, specific design criteria, goals, and timelines are also discussed and agreed upon during Project scoping and kick-off. Due to the nature of this Project, the scope did not require a typical full RSS with evaluation of a large number of route alternatives. The focus of this RSS is to evaluate an existing corridor and rebuilding/upgrading an existing transmission line, therefore resulting in an abbreviated RSS.

2.2 Definition of a Study Area

The second step in the RSS is to develop a focused Study Area in which to collect detailed constraint and opportunity data. The Study Area for this Project was selected based on the Project endpoints, route, and ROW of the existing lines.

2.3 Collection and Mapping of Opportunity and Constraint Data

Certain conditions present more favorable locations for placement of transmission lines, which are referred to as opportunities. Opportunities include areas that are generally compatible with transmission lines, such as being close to existing linear corridors. Constraints are conditions that are generally unfavorable for placement of a new transmission line or upgrade of an existing line. Constraints may include unsuitable terrain/inaccessible areas, developed or congested areas, ecologically sensitive areas, or protected areas. Constraint and opportunity data were collected under three broad categories, including ecological, cultural/land use, and technical. Multiple individual criteria were collected under these broad categories and selected based on their relevance to the Project, the Study Area, and the availability and quality of the dataset.

2.4 Propose and Refine Routes

The goal of the RSS is to identify viable candidate routes based on reasonable physical placement of the proposed transmission line that avoided or minimized effects on sensitive land uses,

ecological resources, and cultural features in the Study Area. In evaluating the routing criteria, it is generally considered desirable to maximize certain criteria that are most compatible with transmission development (i.e., paralleling existing utility corridors). These more favorable criteria are known as opportunities. Undesirable criteria for routing, such as residences, wetlands, and historic properties, are generally referred to as constraints, and the RSS seeks to avoid or minimize their proximity to the Project. The scope of this RSS was limited to only evaluating routes paralleling the existing Ameren double circuit 345/345kV line from Maywood to Palmyra, and the route of the existing 161kV line from the Palmyra Substation to the Mississippi River.

3 Study Area Characteristics

Although the focus of the Project is evaluating the concept of paralleling an existing transmission ROW and rebuilding an existing transmission line, the Routing Team reviewed the Study Area for other potential opportunities and constraints, including potential unforeseen constraints restricting the use of the existing ROW.

The approximately 8-mile-long Study Area is located north of the City of Palmyra, in Marion County, Missouri. The natural resources, physiography, and current land use characteristics of the Study Area proved to be important factors for the siting study. To develop essential context for the Study Area and to help guide decisions on relevant routing criteria, the Routing Team reviewed USGS 7.5-minute topographic maps, digital georeferenced aerial photographs, GIS data layers and online information related to the geology, land use, and general climate and ecology of the Study Area.

3.1 Physiography & Ecology

The Routing Team reviewed aerial photographs, USGS 7.5-minute topographic maps, online biological and climate resources, and street mapping to build a picture of the drainage, topography, and land use within the Study Area.

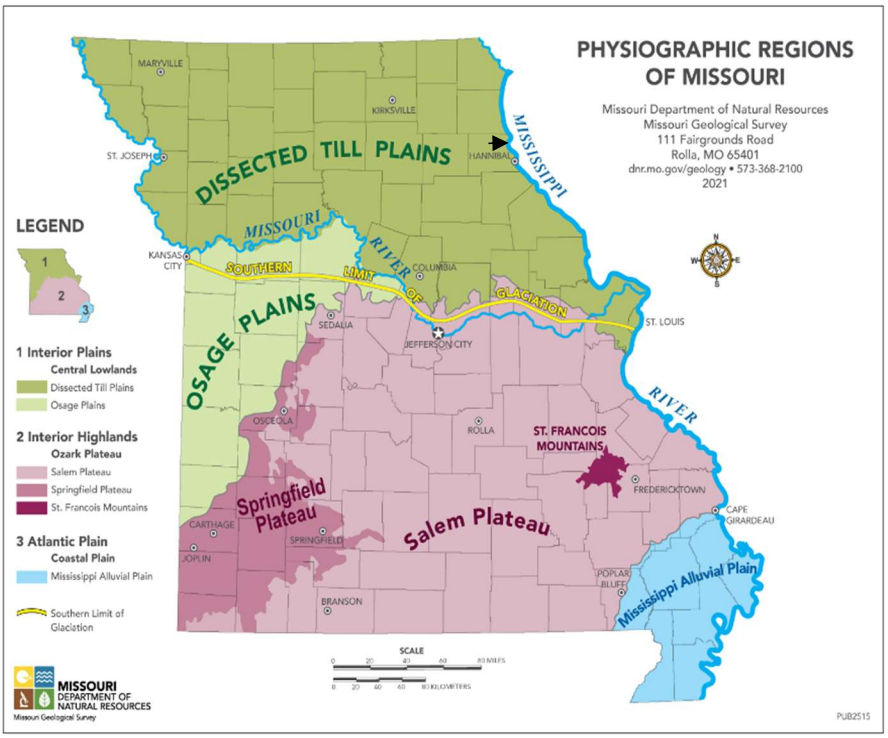


Figure 2. *Physiographic Regions of Missouri. Source :* https://dnr.mo.gov/document-search/physiographic-regions-mo-pub2515/pub2515

Topography and hydrology can have a significant impact directly and indirectly on siting, as they both affect historic and future land use, and can impose engineering challenges on transmission development. The Project is located within the dissected till plains section of northern Missouri (***Figure 2*** - Project location illustrated with the black arrow), within the limits of the last glacial ice sheet, which deposited a thick layer of glacial drift across the area. This was subsequently eroded by numerous streams and headwaters to form the contemporary undulating, hummocky topography. The ridges are drier and less intensively farmed, making them more attractive for routing parts of the proposed Project.

Rolling topography is more prevalent in the western portion of the Study Area, with an abundance of tributaries that feed the Missouri River to the southeast. The Mississippi River and associated floodplains run along the length of the eastern portion of the Study Area, as well as the Upper Missouri Conservation Area, including the Fabius Chute Access Area. The Study Area's topography is lower in elevation, around 600 feet above sea level (***Figure 3*** - Project location illustrated with the black arrow).

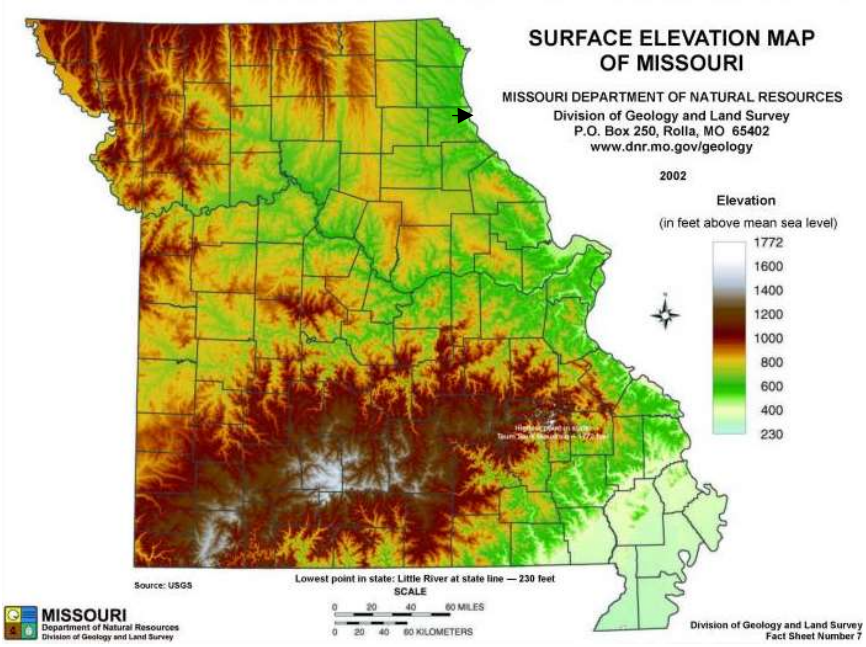


Figure 3. Elevation of Missouri. Source **:** https://dnr.mo.gov/document-search/surface-elevation-map-mo-pub2874/pub2874

3.2 Area Land Use and Development

Land use in the area consists of a mix of agricultural fields with scattered woodlots and residences. The Study Area is rural and does not cross through any towns. The city of Palmyra is located approximately two miles southeast of the Palmyra Substation; however, it does not affect route siting due to the limited scope of paralleling the existing Maywood to Palmyra transmission lines and rebuilding the existing line from Palmyra to the Mississippi River.

The Routing Team conducted a site visit in April 2024 to confirm the Study Area characteristics. The area was viewed from existing roads and was observed to be rural with farmland. No encroachments along the existing ROW were observed from the public roads.

Local roads in the area are generally arranged in a one-mile grid pattern, deviating for terrain and other factors. Several county and local roads and Highway 61 intersect the Study Area.

A heliport is located approximately two miles south of the Study Area, at the BASF Corporation Hannibal Site along the Mississippi River. A second, smaller, heliport is located at the Northeast Missouri Electric Power Cooperative Headquarters in Palmyra, MO. Neither affect route siting due to the Project location. Two north-south Burlington Northern & Santa Fe (BNSF) railroads cross the Study Area between Highway 61 and the Mississippi River.

Several electric transmission lines are mapped in the Study Area. Two east-west existing 345kV transmission lines connect the Maywood Substation to the Palmyra Substation. One 345kV line and the 161kV line to be rebuilt connect the Palmyra Substation to the Mississippi River. Three existing lines cross the Palmyra to Mississippi River lines, connecting to the industrial area around

the BASF Corporation Hannibal Site. An operational refined petroleum pipeline, owned by Magellan Pipeline Company, LP, crosses perpendicular to the 161kV line to be rebuilt west of Highway 61.

4 Route Selection Study Results

4.1 Establishing the Study Area

The Study Area for the Project was limited to a 1,000-foot corridor either side of the existing Ameren transmission lines.

4.2 Selecting Siting Criteria

Once the Study Area was established, the Routing Team used the initial Study Area characteristics review, likely permitting/regulatory needs, and technical requirements/limitations to develop a list of broad/coarse-scale, relevant routing criteria. These represent geographic locations that the Project wishes to avoid to the extent practical, minimize crossing if complete avoidance is not possible, otherwise referred to as “constraints”; and locations/land uses that are considered preferable to host the Project, otherwise referred to as “opportunities”. Collectively, constraints and opportunities are often referred to as siting or routing criteria.

For descriptive purposes, the criteria were organized into three broad categories: Land Use and Cultural, Ecological/Biological and Technical/Constructability. These were then listed in a criteria table that included a brief comment on the rationale for using that data. Each criterion was discussed along with a rationale for inclusion (i.e., its relevance to routing the Project). The relevance review was intended as a general check to make sure data was not included that was (i) not present, or not relevant to this geographic area, (ii) too broad, or too finely detailed to be visible at the scale used for this Project stage.

The criteria table was reviewed by siting experts, biologists and cultural resources staff, and Ameren’s ecological, permitting, engineering, and real estate teams. Criteria were discussed and refined (including breaking some criteria down into more refined sub-criteria), added and deleted until a final criteria table resulted (**Table 1**).

Table 1. Project Siting Criteria

Criteria	Opportunity or Constraint	Relevance
State Wildlife Management Areas	Constraint	These are areas managed/owned by the State. They require additional studies, and possible permits and mitigation measures.
Federal Threatened and Endangered (T&E) Species	Constraint	Protected species habitat, additional studies, permits, time and cost.
State T&E Species	Constraint	Protected species habitat. These habitats will require additional studies, time, and costs.
Forested Areas	Constraint	Potential species habitat and clearing costs.
Wild and Scenic Rivers	Constraint	Subject to additional permitting requirements.

Criteria	Opportunity or Constraint	Relevance
National Wetlands Inventory (NWI) PFO[1] Wetlands	Constraint	Temporary and permanent impacts to wetlands are subject to permitting. PFO is the only wetland type where the vegetation is permanently impacted by transmission lines. Avoidance is preferred.
NWI PSS[2] Wetlands	Constraint	Temporary and permanent impacts to wetlands are subject to permitting. Avoidance is preferred.
NWI PEM[3] Wetlands	Constraint	Temporary and permanent impacts to wetlands are subject to permitting. Avoidance is preferred.
Predominantly Hydric Soils	Constraint	An indicator of potential wetlands.
Stream Crossings	Constraint	Every crossing requires assessment of clearing, crossing methods, potential T&E species.
Impaired Waters	Constraint	These waters are sensitive to agency scrutiny and especially related to construction stormwater.

Criteria	Opportunity or Constraint	Relevance
National Historic Landmarks	Constraint	Agency scrutiny, public opposition, time, and cost.
Federal Lands	Constraint	NEPA trigger, additional time, cost, and documentation.
National Register of Historic Places	Constraint	Agency scrutiny, public opposition, time, and cost.
National Historic Trails and National Historic Sites	Constraint	Agency scrutiny, public opposition, time, and cost.
Cemeteries	Constraint	Agency scrutiny, public opposition, time, and cost.
Recreation Lands	Constraint	Crossing recreational land has the potential to change or adversely affect land use on the area crossed by the transmission line.
USDA NRCS Conservation Easements	Constraint	Potential restrictions on development of transmission lines.
Quarries, Landfills	Constraint	These are essentially no-go areas unless there is no other alternative.
Residences within ROW (75 feet of Centerline)	Constraint	Residences within the ROW would have to be removed. These are avoided as far as possible.
Residential Structures within ROW (150 feet of Centerline)	Constraint	Residential Structures within 150 feet of centerline.

[1] Palustrine forested (PFO)
[2] Palustrine scrub-shrub (PSS)
[3] Palustrine emergent (PEM)

Criteria	Opportunity or Constraint	Relevance
Non-Residential Structures within ROW (75 feet of Centerline)	Constraint	Non-Residential Structures within 75 feet of centerline.
Non-Residential Structures within ROW (150 feet of Centerline)	Constraint	Potential visual impacts, land-owner preferences, vegetation clearing may affect landscape trees and shrubs.
Sensitive Land Uses	Constraint	Potential for opposition, access, visual impacts, and agency sensitivity.
Commercial Land Use	Constraint	In land use context, open land or ROW is preferred, commercial is developed so there are space challenges, but compared to more sensitive land uses, commercial areas are preferred.
Industrial Land Use	Constraint	Industrial land is typically the least sensitive of the developed land uses for transmission, assume there is sufficient space.
Commercial Hunting Parcels	Constraint	This is considered an intensive land use and where firearms are used, which can damage transmission equipment. Where identified, these were avoided.
Municipal Owned Parcels	Constraint	These are parcels within a town's limits where development is typically dense. Dense development restricts transmission development as minimum clearances may not be possible.
Local Roads	Opportunity	Local roads in the area were considered an opportunity as they provide access points without crossing farmed lands. Few residences are present.
Parallel Rail Lines	Opportunity	Existing pathways through terrain, reduces habitat fragmentation, less visual impact, landowner preference.
Parallel Highways	Opportunity	Highways provide existing corridors through a landscape and help reduce habitat fragmentation while providing access.
Parallel Existing Large Capacity Pipelines	Opportunity	Existing pathways through terrain, reduces habitat fragmentation, less visual impact, landowner preference. Possible to share some ROW.
Existing HV Transmission Lines	Opportunity	Existing pathways through terrain, reduces habitat fragmentation, less visual impact, landowner preference. Possible to share some ROW.

Criteria	Opportunity or Constraint	Relevance
Route Length	Constraint	Longer routes are more costly, burdensome on the land use and environment.
Floodway	Constraint	Placement of structures in floodways have the potential to raise the flood elevation contour and modeling/permitting is usually required. Avoid or span.
Floodplain	Constraint	Floodplain development often requires additional count level permitting. Either span or avoid.
Transmission Line Crossings	Constraint	Taller poles needed, additional engineering and equipment costs. Increased difficulty of maintenance for both lines when crossing lines.
Pipeline Crossings	Constraint	Coordination and potential mitigation.
Railroad Crossings	Constraint	Coordination and potential mitigation.

Criteria	Opportunity or Constraint	Relevance
Road Crossings	Constraint	Road crossings require a permit from the county, state or federal government and can add to the schedule and cost of a project. Fewer road crossings are preferred.
Slope (>20%)	Constraint	Additional engineering and stormwater issues.
Turn Angles > 15 Degrees	Constraint	Turn angles require a more robust structure to support the sideloads imposed on the transmission line. The angle and number of turns dictates the type of structure required. Ameren use 15 degrees as the initial threshold for a dead-end structure.
Turn Angles > 50 Degrees	Constraint	A more robust structure and foundations are required for more acute turn angles, for siting purposes, Ameren uses 50 degrees as an average angle that might trigger than requirement.
Airports/Navaids	Constraint	FAA Coordination and potential lighting/marking.
State Lands	Constraint	Additional permitting and studies needed depending on the agency and the resources present.
Communication Towers	Constraint	Distance limitations may apply, guy wires are a potential hazard.
Oil and Gas Wells	Constraint	Potential for the need for technical solutions/protection if present.

4.3 Route Placement and Refinement

The preliminary routes were placed based on review of aerial photography, topographic maps, and the mapped opportunity and constraint data (**Table 1** above, **Figures 4 and 5** in Appendix A). The intent when placing the routes was to parallel the existing Ameren 345kV transmission line that connects the Ameren-owned Maywood Substation to the AECI-owned Palmyra Substation, offset by 100 feet, while avoiding identified constraints, including built-up areas, residences (including a 200-foot buffer), and forested areas. The intent when placing the rebuild route was to follow the exact route of the existing 161kV transmission line from the Palmyra Substation to the Illinois/Missouri boundary, roughly the middle of the Mississippi River, while avoiding identified constraints, including built-up areas, residences (including a 200-foot buffer), and forested areas.

If deviation from the existing transmission lines were necessary, the Routing Team considered paralleling property lines where it made practical sense without resulting in excessive sharp turns. Turns require more robust transmission structures, which are significantly more costly[4] and may require larger concrete foundations with additional wire pulling locations. The following general siting preferences were used when selecting routes to avoid/minimize identified constraints and maximize opportunities:

- Parallel the existing 345kV line, offset by 100 feet where possible.
- Favor well-drained uplands over valley bottom and floodplain agricultural land.

[4] "Cost" is not the primary driver in siting, but it is a metric that state regulators consider and that the end users are ultimately responsible for through electric rates. Therefore, issues that increase the cost of a route are weighted against the potential benefits of that route.

- In built-up areas, favor commercial and industrial land use over residential land use.
- Opportunities include major roads, property lines, and vacant land.
- Avoid/minimize crossing over existing high voltage (HV) transmission lines.
- Avoid/minimize making excessive turns that require more expensive angle structures.
- Avoid/minimize environmentally sensitive areas.

4.4 Route Description

Due to the nature of the Project, the potential route alternatives evaluated were limited when compared to a traditional route study with multiple alternative routes. The route options resulting from the Study Area review and the constraint and opportunity mapping and preference "rules" shown in Appendix A, include paralleling the north and south side of the existing Maywood to Palmyra corridor, and the rebuild route from Palmyra to the Mississippi River.

For the Maywood to Palmyra portion, since the north and south route options both parallel the existing Ameren 345kV line with a 100-foot offset, the resulting data of the criteria presented in **Table 1** is nearly identical between them. Therefore, the northern and southern paralleling options were evaluated based on visual analysis and proximity measurements to existing structures and other sensitive points of interest. The rebuild portion of the Project was also evaluated based on visual analysis and proximity measurements to existing structures and other sensitive points of interest.

The northern parallel route option has only one structure approximately 400 feet away from the proposed centerline of the route. Whereas, the southern route option has multiple structures, including residences within 400 feet. One residence would be approximately 50 feet from the proposed centerline of the southern route and would require a substantial deviation from paralleling.

The Routing Team selected the northern parallel route as the Proposed option for several reasons:

- The proximity of existing structures and need for route deviations further from the existing ROW. This deviation would add cost and require additional clearing and additional ROW acquisition.
- The southern route would require crossing of existing transmission lines and additional turn angles.

To limit the crossing of existing transmission lines, the Maywood to Palmyra section of the Project will be connected into the existing Maywood to Zachary circuit, north of the Palmyra Substation. This existing portion of the Maywood to Zachary circuit will then be connected to the new Maywood to Meredosia circuit.

From the Palmyra substation to the Mississippi River section of the Project, the existing 161kV line will be rebuilt to double circuit 345/161kV line. There are currently no encroachments onto the ROW of the existing line. The closest structure is located east of County Road 343, where there is a barn that is over 180 feet from the existing center line.

4.5 Proposed Route Summary

The RSS visual analysis and qualitative review indicates that the route with the fewest overall impacts from Maywood to Palmyra is the northern parallel option, offset 100 feet to the north of the existing 345kV transmission line. This route option does not require any deviation from the existing line. Therefore, the Routing Team recommends paralleling on the north side of the existing line.

For the Palmyra to Mississippi River section of the Project, the rebuild of the existing 161kV line to double circuit 345/161kV line does not have any encroachments and thus is the proposed route for this portion. **Figure 6** below shows the proposed route.

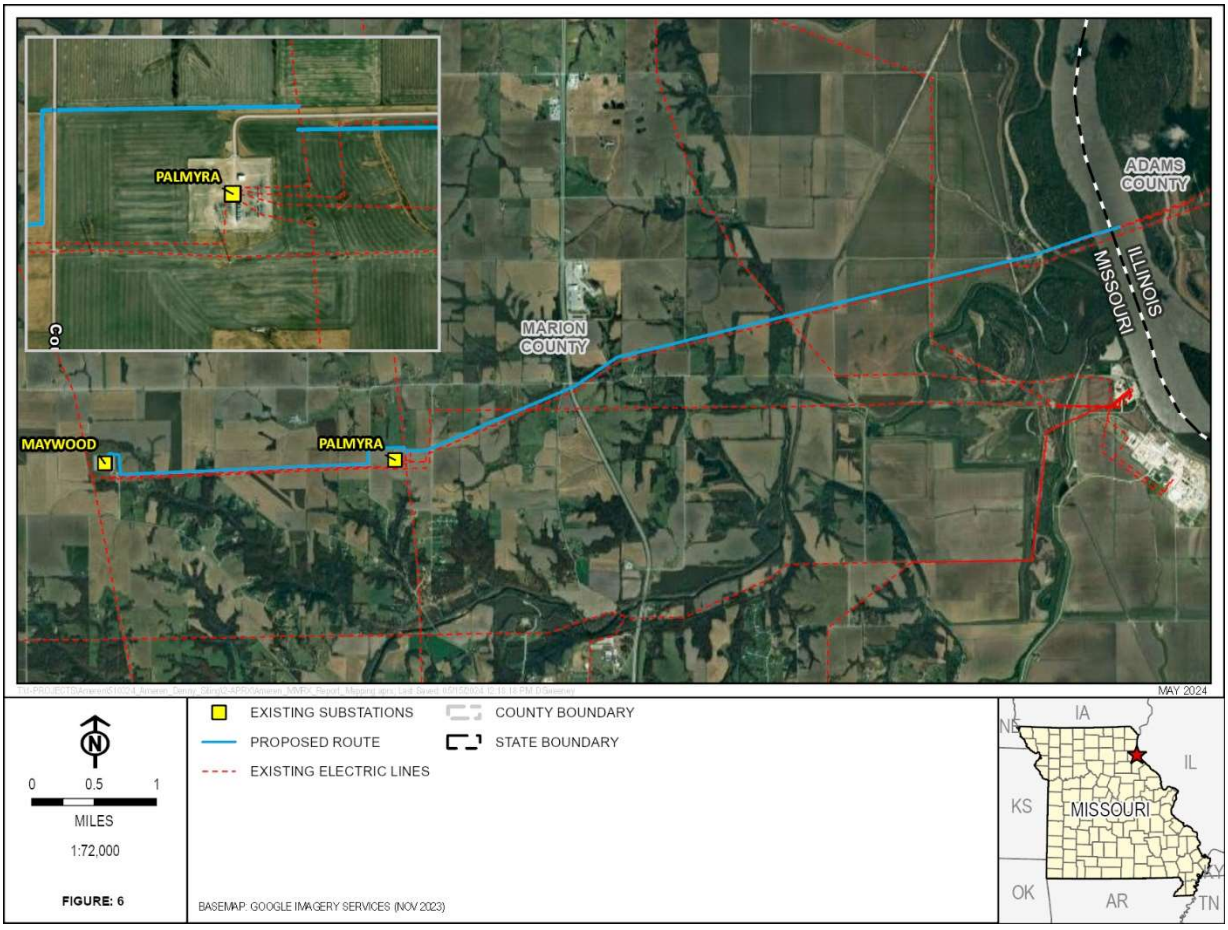


***Figure 6**. Proposed Route Map, inset showing the Palmyra Substation*

In summary, the proposed route exits the existing Ameren-owned Maywood substation to the north then immediately turns east for a short span before turning south to parallel the northern side of the existing 345kV Maywood – Palmyra double- circuit transmission line ROW. The route continues east through open, rolling agricultural areas with scattered woodlots for 2.3 miles to the existing AECI-owned Palmyra Substation parcel. At this point, the route turns north along CR 331 and bypasses the Palmyra substation to connect to the existing Maywood – Zachary circuit. The

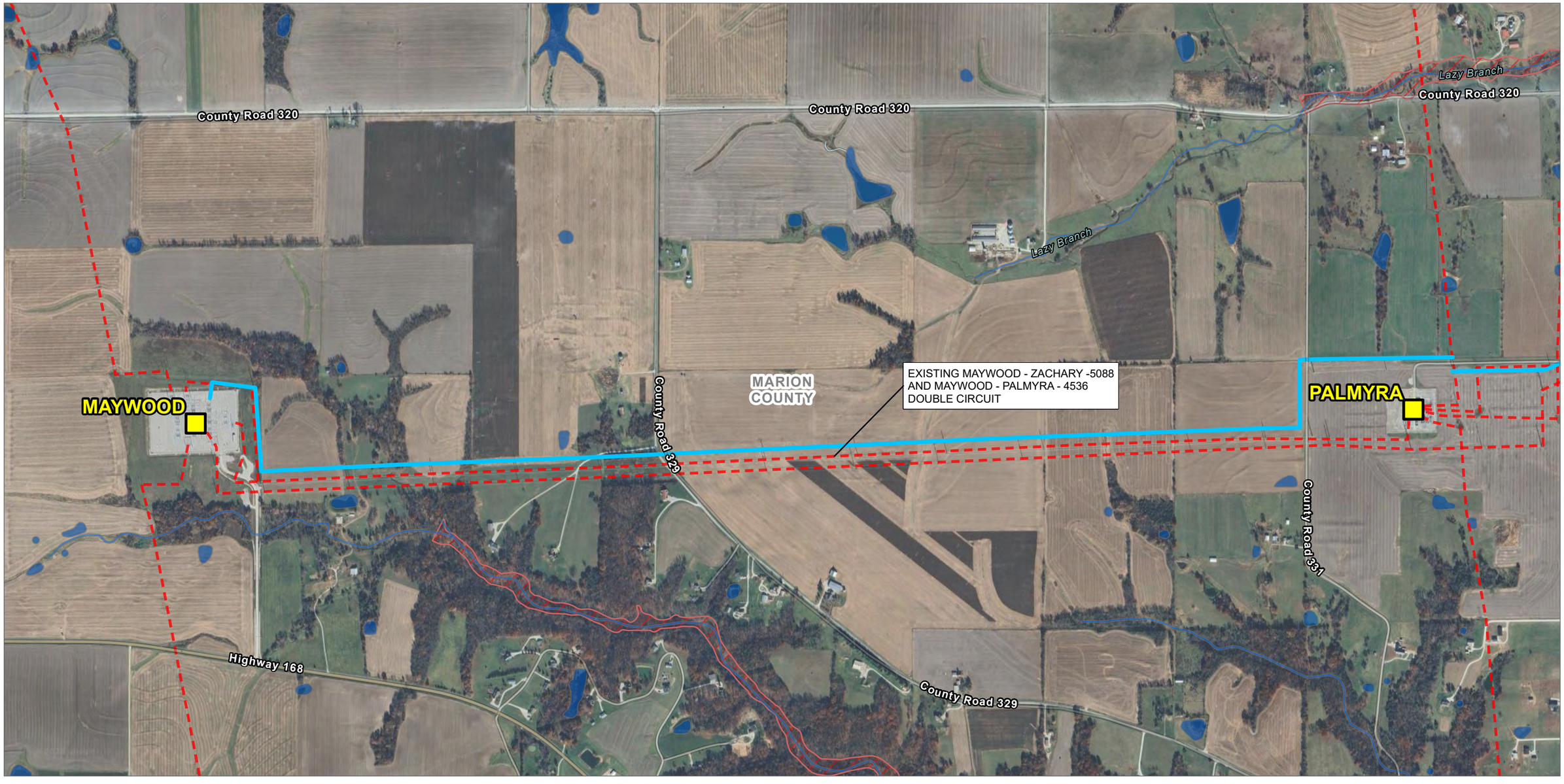
existing portion of the Maywood – Zachary circuit will then be connected to the new Maywood – Meredosia circuit.

The proposed route continues from the Palmyra substation for approximately 5.8 miles and involves rebuild and upgrade of an existing single circuit 161kV line to a double circuit 345/161kV line. This section of the route has generally similar land use to the Maywood-Palmyra line, with rolling topography, scattered woodlots and residences, and agricultural fields. In general, the existing ROW continues northeast for the remainder of the route until crossing the Mississippi River floodplains and the Fabius Chute Access point. The route terminates at the existing crossing of the Mississippi River to the Mississippi/Illinois border.

Appendix A

Figure 4 – Study Area Constraint Map (aerial)

Figure 5 – Study Area Constraint Map (USGS topographic)



EXISTING SUBSTATIONS
PROPOSED ROUTE
EXISTING ELECTRIC LINES
EXISTING PIPELINES

WETLANDS (NWI)
FRESHWATER EMERGENT WETLAND
FRESHWATER FORESTED/SHRUB WETLAND
FRESHWATER POND/LAKE
RIVERINE
100YR FLOODPLAIN

BASE MAP: GOOGLE IMAGERY SERVICE (NOV. 2023)
DATA SOURCES: ESRI, USGS, FEMA, USFWS, TRC, AMEREN, REXTAG

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PROJECT:
MAYWOOD - MISSISSIPPI RIVER CROSSING TRANSMISSION SITING PROJECT

TITLE:
PROPOSED ROUTE AND CONSTRAINTS AERIAL MAP

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CHECKED BY:	J. STONE-LORD		
APPROVED BY:	J. NICHOLAS		FIGURE 4
DATE:	MAY 2024		

TRC
1526 COLE BOULEVARD
BUILDING 3, SUITE 150
LAKEWOOD, CO 80401
PHONE: 303.792.5555

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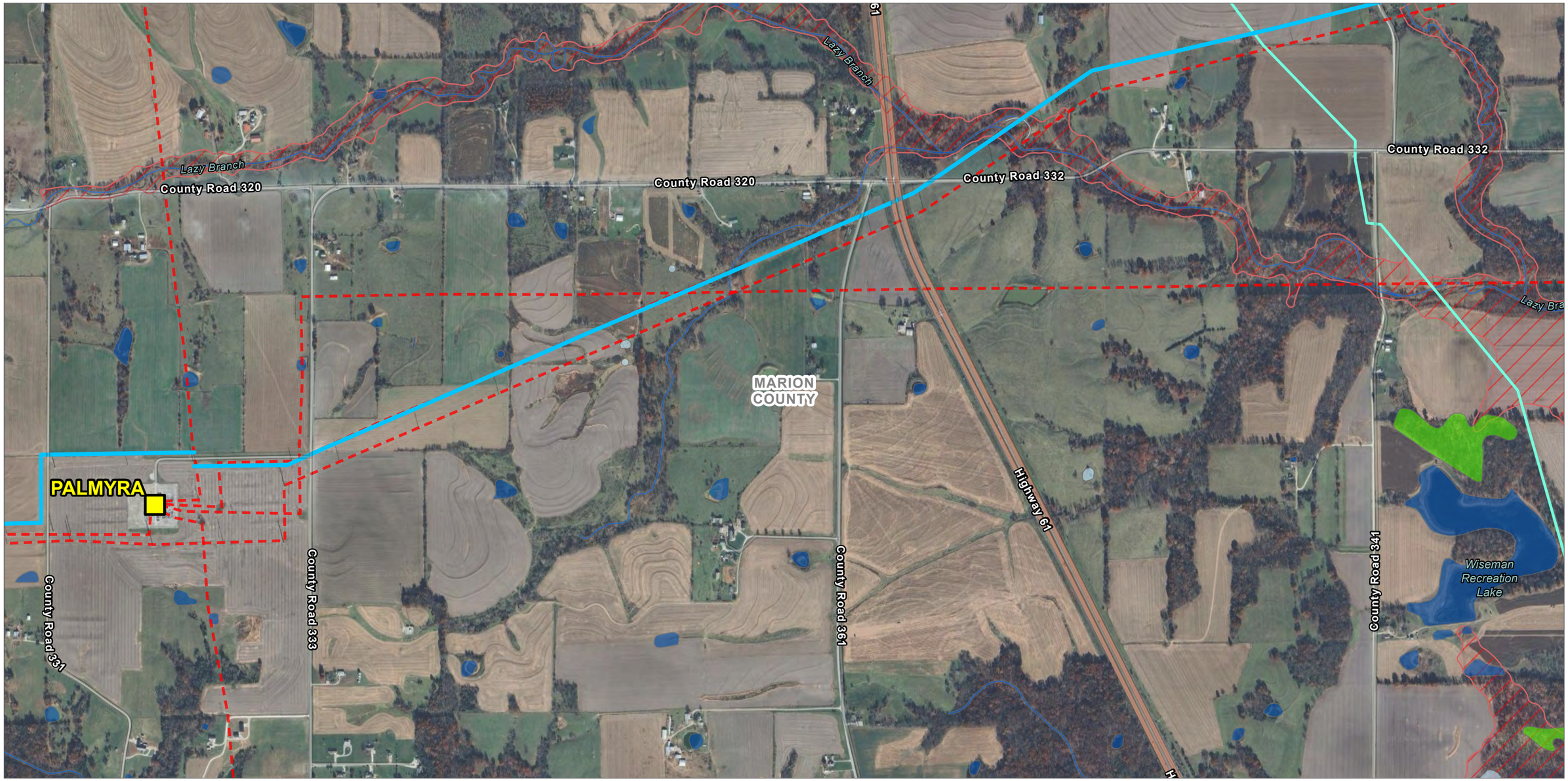

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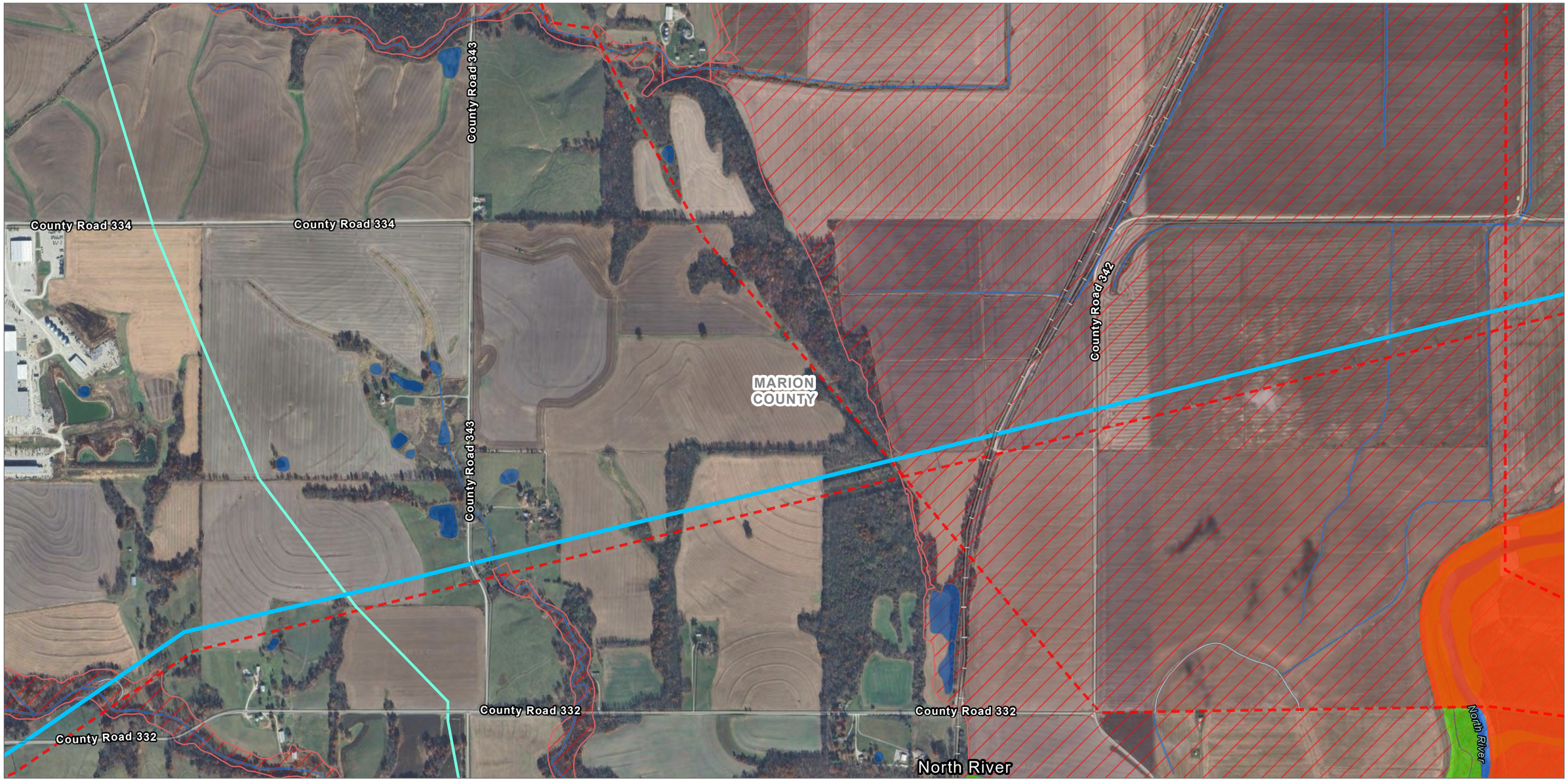

EXISTING SUBSTATIONS
PROPOSED ROUTE
EXISTING ELECTRIC LINES
EXISTING PIPELINES

SURFACE MANAGMENT (PADUS)
NATURAL RESOURCES CONSERVATION SERVICE (NRCS)

WETLANDS (NWI)
FRESHWATER EMERGENT WETLAND
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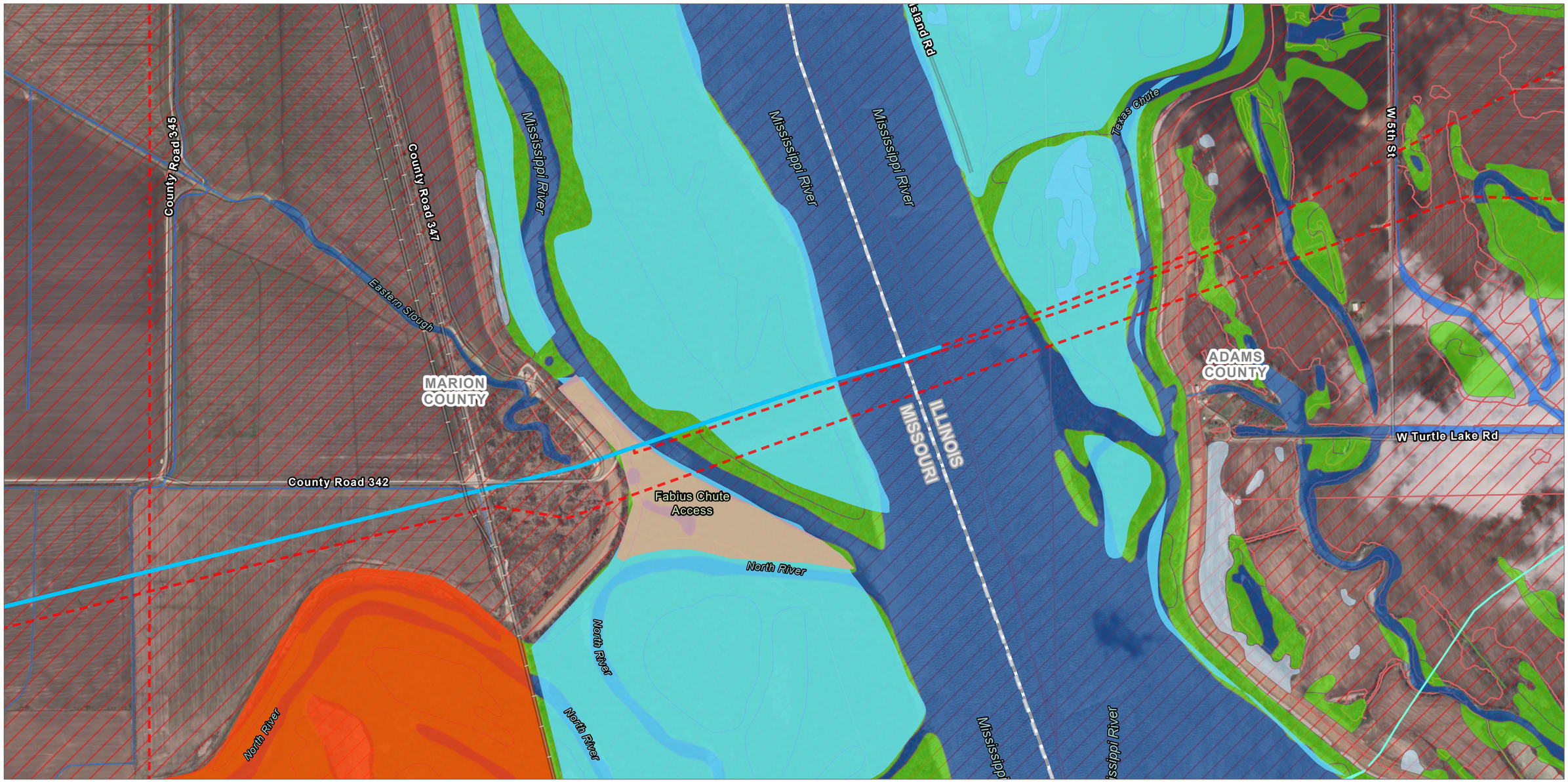

EXISTING SUBSTATIONS
PROPOSED ROUTE
EXISTING ELECTRIC LINES
EXISTING PIPELINES

SURFACE MANAGMENT (PADUS)
- ARMY CORPS OF ENGINEERS (USACE)
- NATURAL RESOURCES CONSERVATION SERVICE (NRCS)
- JOINT, OTHER, UNKNOWN

WETLANDS (NWI)
- FRESHWATER EMERGENT WETLAND
- FRESHWATER FORESTED/SHRUB WETLAND
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1526 COLE BOULEVARD
BUILDING 3, SUITE 150
LAKEWOOD, CO 80401
PHONE: 303.792.5555

FILE: Ameren_MMRX_Report_Mapping.aprx

Coordinate System: NAD 1983 UTM Zone 15N | Units: Meter | Map Rotation: 0
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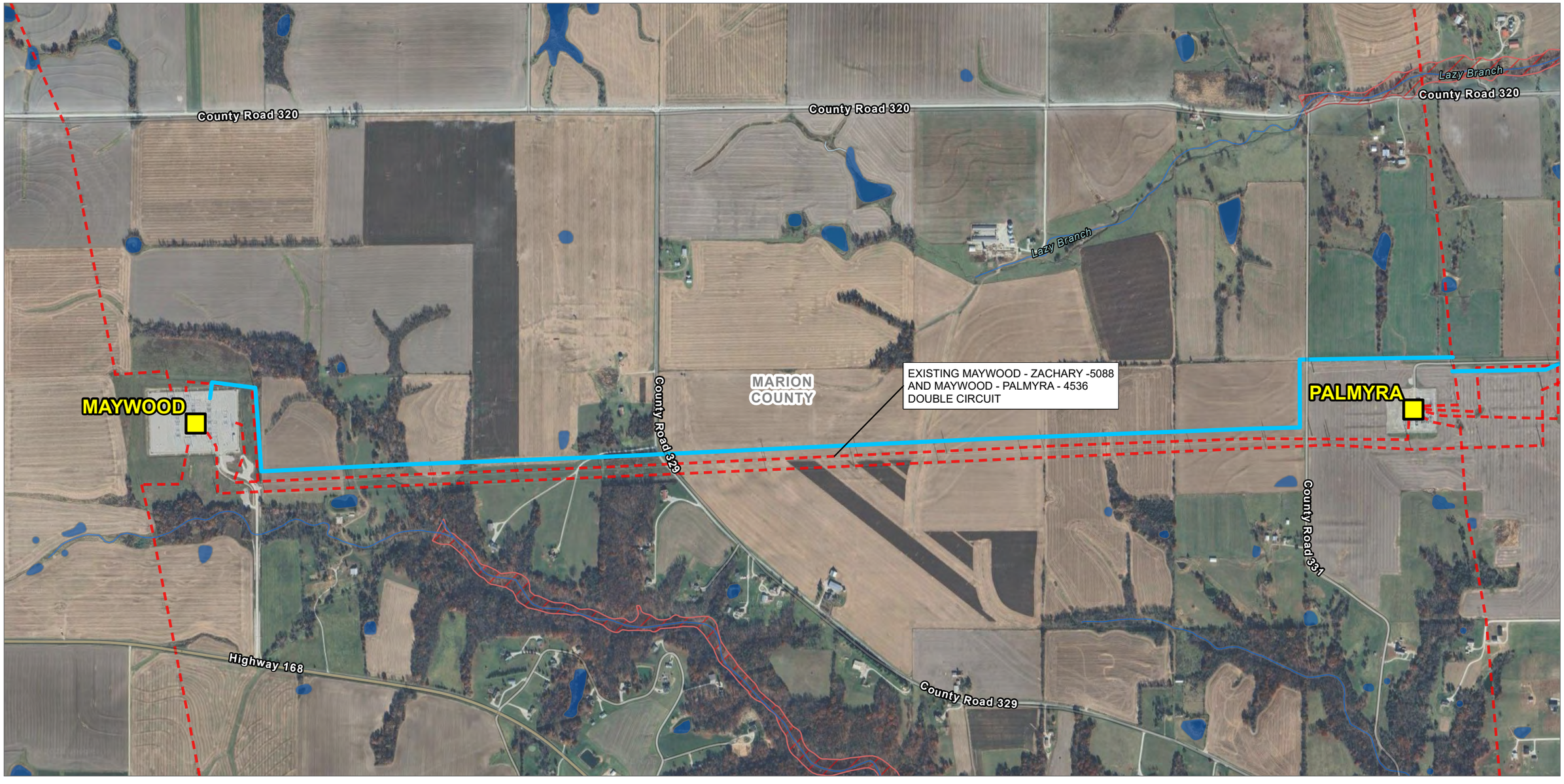

EXISTING SUBSTATIONS
PROPOSED ROUTE
EXISTING ELECTRIC LINES
EXISTING PIPELINES

WETLANDS (NWI)
FRESHWATER EMERGENT WETLAND
FRESHWATER FORESTED/SHRUB WETLAND
FRESHWATER POND/LAKE
RIVERINE
100YR FLOODPLAIN

BASE MAP: USGS 24K CLASSIC TOPOGRAPHIC MAP SERVICE
DATA SOURCES: ESRI, USGS, FEMA, USFWS, TRC, AMEREN, REXTAG

Schedule JN-D2
Page 21 of 28

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PROJECT:
MAYWOOD - MISSISSIPPI RIVER CROSSING TRANSMISSION SITING PROJECT

TITLE:
PROPOSED ROUTE AND CONSTRAINTS TOPOGRAPHIC MAP

DRAWN BY:	D. SWEENEY	PROJ. NO.:	592934.0000.0000
CHECKED BY:	J. STONE-LORD		
APPROVED BY:	J. NICHOLAS		FIGURE 5
DATE:	MAY 2024		

TRC
1526 COLE BOULEVARD
BUILDING 3, SUITE 150
LAKEWOOD, CO 80401
PHONE: 303.792.5555

FILE: Ameren_MMRX_Report_Mapping.aprx

Coordinate System: NAD 1983 UTM Zone 15N 1: Map Rotation: 0
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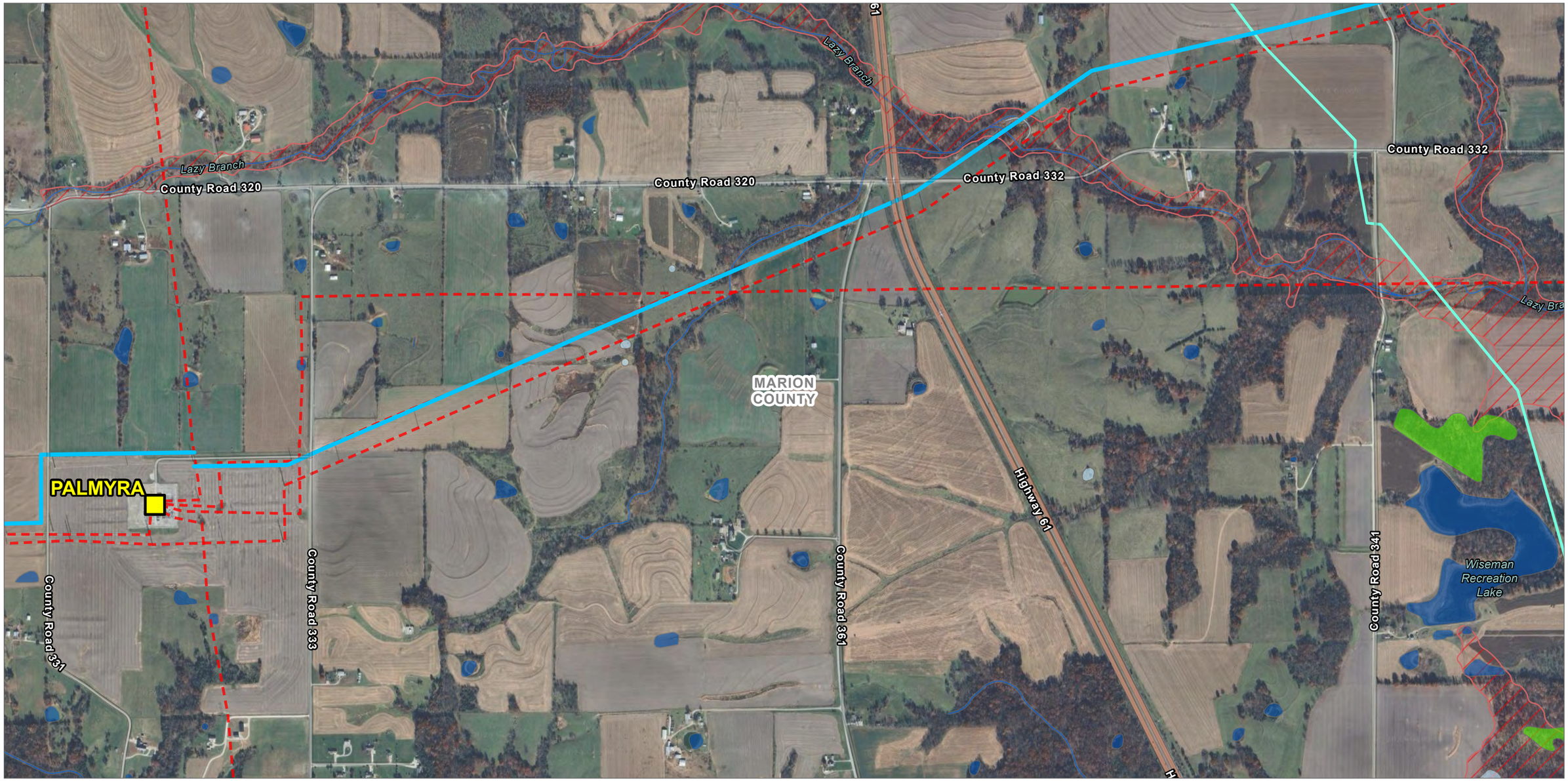

EXISTING SUBSTATIONS
PROPOSED ROUTE
EXISTING ELECTRIC LINES
EXISTING PIPELINES

WETLANDS (NWI)
FRESHWATER EMERGENT WETLAND
FRESHWATER FORESTED/SHRUB WETLAND
FRESHWATER POND/LAKE
RIVERINE
100YR FLOODPLAIN

BASE MAP: USGS 24K CLASSIC TOPOGRAPHIC MAP SERVICE
DATA SOURCES: ESRI, USGS, FEMA, USFWS, TRC, AMEREN, REXTAG

Schedule JN-D2
Page 22 of 28

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PROJECT:
MAYWOOD - MISSISSIPPI RIVER CROSSING TRANSMISSION SITING PROJECT

TITLE:
PROPOSED ROUTE AND CONSTRAINTS TOPOGRAPHIC MAP

DRAWN BY:	D. SWEENEY	PROJ. NO.:	592934.0000.0000
CHECKED BY:	J. STONE-LORD		
APPROVED BY:	J. NICHOLAS		FIGURE 5
DATE:	MAY 2024		

TRC
1526 COLE BOULEVARD
BUILDING 3, SUITE 150
LAKEWOOD, CO 80401
PHONE: 303.792.5555

FILE: Ameren_MMRX_Report_Mapping.aprx

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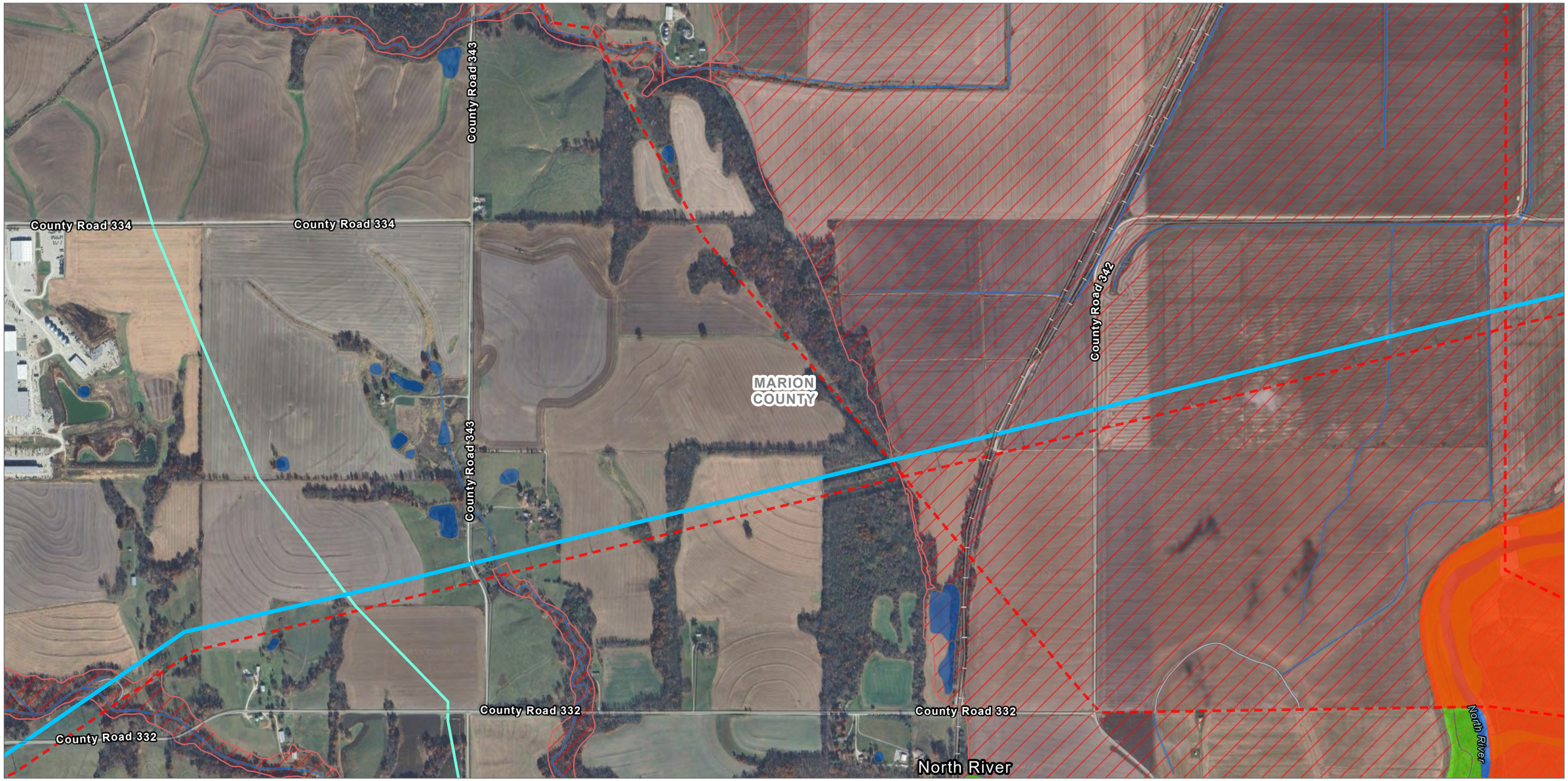

EXISTING SUBSTATIONS
PROPOSED ROUTE
EXISTING ELECTRIC LINES
EXISTING PIPELINES

SURFACE MANAGMENT (PADUS)
NATURAL RESOURCES CONSERVATION SERVICE (NRCS)

WETLANDS (NWI)
FRESHWATER EMERGENT WETLAND
FRESHWATER FORESTED/SHRUB WETLAND
FRESHWATER POND/LAKE
RIVERINE
100YR FLOODPLAIN

BASE MAP: USGS 24K CLASSIC TOPOGRAPHIC MAP SERVICE
DATA SOURCES: ESRI, USGS, FEMA, USFWS, TRC, AMEREN, REXTAG

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FEET
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PROJECT:
MAYWOOD - MISSISSIPPI RIVER CROSSING TRANSMISSION SITING PROJECT

TITLE:
PROPOSED ROUTE AND CONSTRAINTS TOPOGRAPHIC MAP

DRAWN BY:	D. SWEENEY	PROJ. NO.:	592934.0000.0000
CHECKED BY:	J. STONE-LORD		FIGURE 5
APPROVED BY:	J. NICHOLAS		
DATE:	MAY 2024		

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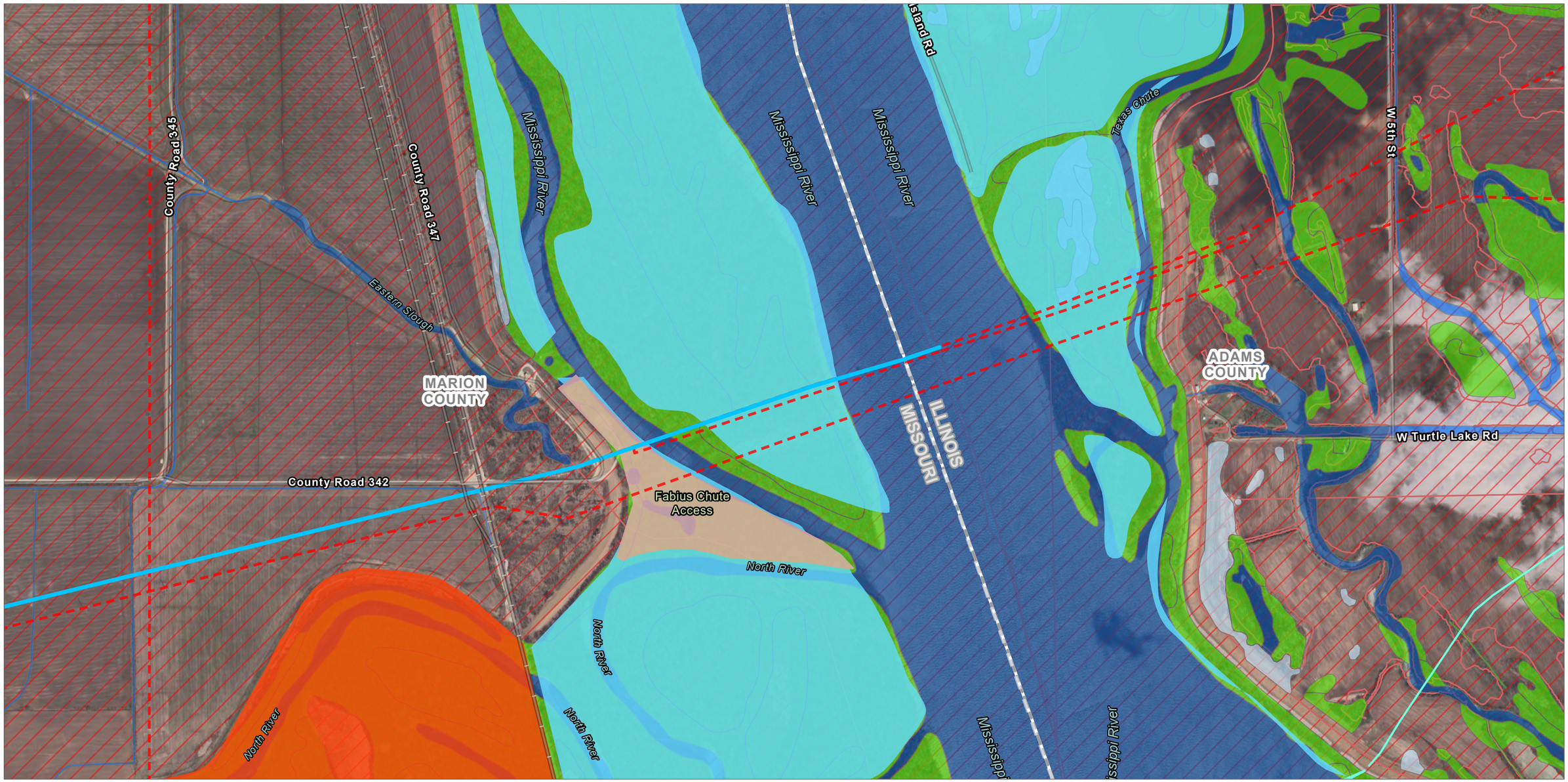

EXISTING SUBSTATIONS
PROPOSED ROUTE
EXISTING ELECTRIC LINES
EXISTING PIPELINES

SURFACE MANAGMENT (PADUS)
- ARMY CORPS OF ENGINEERS (USACE)
- NATURAL RESOURCES CONSERVATION SERVICE (NRCS)
- JOINT, OTHER, UNKNOWN

WETLANDS (NWI)
- FRESHWATER EMERGENT WETLAND
- FRESHWATER FORESTED/SHRUB WETLAND
- FRESHWATER POND/LAKE
- RIVERINE
- 100YR FLOODPLAIN

BASE MAP: USGS 24K CLASSIC TOPOGRAPHIC MAP SERVICE
DATA SOURCES: ESRI, USGS, FEMA, USFWS, TRC, AMEREN, REXTAG

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FEET
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PROJECT:
MAYWOOD - MISSISSIPPI RIVER CROSSING TRANSMISSION SITING PROJECT

TITLE:
PROPOSED ROUTE AND CONSTRAINTS TOPOGRAPHIC MAP

DRAWN BY:	D. SWEENEY	PROJ. NO.:	592934.0000.0000
CHECKED BY:	J. STONE-LORD		
APPROVED BY:	J. NICHOLAS		**FIGURE 5**
DATE:	MAY 2024		

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Coordinate System: NAD 1983 UTM Zone 15N 1: Map Rotation: 0
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Appendix B

Sources for Table 1 – Project Siting Criteria

Criteria	Opportunity or Constraint	Source
Ecological Constraints and Opportunities		
State Wildlife Management Areas	Constraint	Missouri Department of Conservation (MODOC)
Federal Threatened and Endangered (T&E) Species	Constraint	Bureau of Land Management (BLM), United States Department of Agriculture (USDA)
State T&E Species	Constraint	MODOC
Forested Areas	Constraint	United States Geological Survey (USGS) – National Land Cover Database (NLCD)
Wild and Scenic Rivers	Constraint	BLM, USDA
National Wetlands Inventory (NWI) PFO[1] Wetlands	Constraint	Untied States Fish and Wildlife Service (USFWS)
NWI PSS[2] Wetlands	Constraint	USFWS
NWI PEM[3] Wetlands	Constraint	USFWS
Predominantly Hydric Soils	Constraint	USDA Gridded Soils Survey Geographic Data (gSSURGO)
Stream Crossings	Constraint	USGS
Impaired Waters	Constraint	Environmental Protection Agency (EPA)

[1] Palustrine forested (PFO)

[2] Palustrine scrub-shrub (PSS)

[3] Palustrine emergent (PEM)

Criteria	Opportunity or Constraint	Source
National Historic Landmarks	Constraint	National Park Service (NPS)
Federal Lands	Constraint	USGS Protected Areas Database (PAD-US3.0)
National Register of Historic Places	Constraint	NPS
National Historic Trails and National Historic Sites	Constraint	NPS
Cemeteries	Constraint	USGS National Geospatial Data Asset (NGDA)
Recreation Lands	Constraint	PAD-US3.0
USDA NRCS Conservation Easements	Constraint	PAD-US3.0
Quarries, Landfills	Constraint	Missouri Department of Natural Resources (MODNR)
Residences within ROW (75 feet of Centerline)	Constraint	Microsoft Bing Structures + GIS Review
Residential Structures within ROW (150 feet of Centerline)	Constraint	Microsoft Bing Structures + GIS Review
Non-Residential Structures within ROW (75 feet of Centerline)	Constraint	Microsoft Bing Structures + GIS Review
Non-Residential Structures within ROW (150 feet of Centerline)	Constraint	Microsoft Bing Structures + GIS Review
Sensitive Land Uses	Constraint	NLCD
Commercial Land Use	Constraint	NLCD
Industrial Land Use	Constraint	NLCD
Commercial Hunting Parcels	Constraint	Dynamo Spatial, Loveland Technologies, ReportAll
Municipal Owned Parcels	Constraint	Dynamo Spatial, Loveland Technologies, ReportAll
Local Roads	Opportunity	US Census Bureau, TIGER
Parallel Rail Lines	Opportunity	US Census Bureau, TIGER
Parallel Highways	Opportunity	US Census Bureau, TIGER
Parallel Existing Large Capacity Pipelines	Opportunity	RexTag/Hart Energy
Existing HV Transmission Lines	Opportunity	RexTag/Hart Energy

Criteria	Opportunity or Constraint	Source
Route Length	Constraint	TRC GIS
Floodway	Constraint	Federal Emergency Management Agency (FEMA)
Floodplain	Constraint	FEMA
Transmission Line Crossings	Constraint	RexTag/Hart Energy
Pipeline Crossings	Constraint	RexTag/Hart Energy
Railroad Crossings	Constraint	
		US Census Bureau, TIGER
Road Crossings	Constraint	US Census Bureau, TIGER
Slope (>20%)	Constraint	USGS 3D Elevation Program
Turn Angles > 15 Degrees	Constraint	TRC GIS
Turn Angles > 50 Degrees	Constraint	TRC GIS
Airports/Navaids	Constraint	Federal Aviation Administration (FAA)
State Lands	Constraint	PAD-US3.0
Communication Towers	Constraint	Homeland Infrastructure Foundation-Level Data (HIFLD)
Oil and Gas Wells	Constraint	MODNR