

EAST RIVER

ELECTRIC POWER COOPERATIVE

121 Southeast First St
Madison, SD 57042

P.O. Box 227
Telephone (605) 256-4536

July 9, 2008

Ms. Karen Cremer, Staff Attorney
South Dakota Public Utilities Commission
State Capitol Building
500 East Capitol Avenue
Pierre, SD 57501-5070

RE: Response to PUC Staff Data Request Number 1 - In Docket Number EL08-016
In the Matter of the Application of East River Electric Power Cooperative, Inc. for
a Permit to Construct approximately 9.5 miles of 115 kV Transmission Line

Dear Ms. Cremer:

Enclosed is East River's response to the first data request in the matter referenced
above.

We have electronically filed this response and request that it be part of our application
and the official record for this proceeding.

Please contact me if you have any questions.

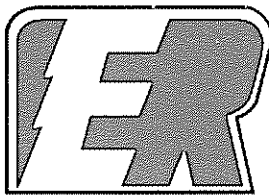
Sincerely,

Bob Sahr
General Counsel

BS/jc

Enc.





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DOCKET EL08-016

East River Response to PUC Staff Data Request 1

July 9, 2008

- 1-1. Pursuant to SDCL 49-41B-15, the owner of record of any land that is located within one-half mile of the proposed facility must be served with notice of the application and the hearing. Please provide the names and addresses of all such persons.**

The names of owner of record were supplied to the Staff on June 17, 2008.

- 1-2. Provide a narrative of the modifications and estimated additional costs that are required to be made to the Chancellor and Virgil Fodness substations to accommodate the proposed transmission line.**

East River objects to this question based on lack of jurisdiction, it being beyond the scope of the Application, and relevancy. SDCL 49-41B-2 (1) defines "associated facilities" as "...transmission substation of two hundred fifty kilovolts or more." This definition specifically exempts substations of less than 250 kV. The Chancellor substation is a 115 to 12.47 kV substation and the Fodness substation is a 230 to 115/69 kV substation.

- 1-3. Per ARSD 20:10:22:05, provide the following:**

- 1. a list of each permit that is known to be required from any other governmental entity and state when each permit application will be filed;**

2. **a list of each notification that is required to be made to any other governmental entity.**

Response to #1

- a. Franchises from Turner and Lincoln Counties of South Dakota are needed for this transmission line. The requests are scheduled to be heard by the respective County Commissions on July 22, 2008.
- b. Three Line Crossing Permits will be filed with Western Area Power Administration during the line design phase of the Project.
- c. A South Dakota Department of Transportation crossing permit for Highway 17 will be requested during the line design phase Project.

Response to #2 – No other notifications that we are aware of are required.

- 1-4. **Per ARSD 20:10:22:04, provide the applicant's verification on the truth and accuracy of the application.**

The verification on the truth and accuracy of the application is provided as Exhibit 19.

- 1-5. **Explain what environmental studies have been completed, whether any are ongoing and whether any additional studies are required or planned along the facility route. Provide a copy of any such report(s).**

Governmental review of the Project and the Governmental findings are provided in Section 2.9.1 of the original Application. A Level III Cultural Resource Survey of the Project's route was also conducted and is included in the original application. Copies of the studies and approvals are supplied as exhibits 10 thru 18 of the original application.

Subsequent to the survey being conducted additional easements were obtained (see response to question 1-30). The Applicant has commissioned a Level III Cultural Resource Survey for the land involved in these new easements. East River will provide to the PUC staff a copy of the results of the completed survey when it is received as well as the response from the South Dakota State Historical Preservation Office.

- 1-6. **Provide a copy of the Cooperative's 2007 Power Requirements Study as referenced on page 4 of the application.**

East River's 2007 Load Forecast (formerly call a Power Requirements Study is a 175 page document that contains historical and projected load

information on East River and all twenty one East River member systems. Most of the information in the Load Forecast is not relevant or related to the Project so East River is providing the following three sections from East River's 2007 Load Forecast (formerly called a Power Requirements Study) as Exhibit 20:

1. Introduction
2. East River Load Forecast Comparisons
3. Projected Energy Requirements for Southeastern Electric

These three sections provide a summary of East River and Southeastern's load forecasts which were referenced on Page 4 of the Application

1-7. Per ARSD 20:10:22:10, provide a statement on the consequences of delay or termination of the construction of the facility.

The immediate demand for the transmission line is necessitated by the expansion of the POET Chancellor Ethanol Plant near Chancellor, South Dakota. The transmission line is needed to provide adequate and reliable power supply to the ethanol plant and to not impact East River's ability to serve other cooperative customers, both new and existing, in the area. A delay or termination of the construction of the transmission line would limit East River's ability to reliably serve cooperative customers in this area and could result in a negative economic impact to the area. Also, as this line is one part of a significant infrastructure investment in the Cooperative's electric delivery system in the growing area of Sioux Falls, South Dakota and delays or termination of this Project could result in economic loss to the region.

1-8. Per ARSD 20:10:22:11, provide a map that shows lakes and rivers adjacent to the transmission site. Please provide the name of the lakes and rivers on the map, if applicable.

There are no lakes and/or rivers adjacent to the transmission line route so a map is not applicable.

1-9. Per ARSD 20:10:22:12(1), provide how the general criteria used to select alternative sites were "measured and weighed, and the reasons for selecting these criteria."

Section 2.8 of East River's application describes the Project alternatives considered along with the general criteria and the reasons for the criteria. As given in Section 2.8, the two major alternatives considered were 1) high voltage source and voltage level alternatives and 2) line route selection.

The criteria for the high voltage source and voltage level alternatives were:

- The upgraded system needed to be able to carry the existing and projected Cooperative load during normal and emergency conditions with no reliability or overloading problems.
- The upgraded system needed to maintain the multiple tie lines and high voltage sources required to allow loads to be transferred between line sections and sources during outages, emergencies, and construction/maintenance work.

This criteria was used and measured/weighed as critical in the final selection as reliable, secure, and safe operation of an electric system is the first priority.

The criteria for the line route selection included separation from existing electric facilities used in contingencies, cooperation of landowners, topographic features, cost, environmental concerns and regulations, other utilities, engineering, and location of future planned electrical facilities. This is the same criteria that East River uses in siting any transmission lines. This criteria is used in order to be able to design and build a line that will be reliable, operationally, and economically viable as well as, to the extent possible, minimize the impact of the line to landowners, existing land uses, the environment and future development.

1-10. What are the noise levels under the various combinations of operating conditions such as weather and line loading, near the closest occupied residence?

Section 2.9.2 of East River's Application addresses noise caused by corona and wind. Noise levels produced by a 115 kV transmission line are generally less than outdoor background levels and are therefore not usually audible. The proposed transmission line will not noticeably increase the noise level at nearby residences.

1-11. Per ARSD 20:10:22:13, provide the following:

- 1. identification of irreversible changes which are anticipated to remain beyond the operating lifetime of the facility;**
- 2. a list of other major industrial facilities under regulation which may have an adverse effect on the environment as a result of their construction or operation in the transmission site or siting area.**

Response to #1 – There will be no irreversible changes as a result of this proposed Project.

Response to #2 – No major transmission lines or industrial facilities regulated by the PUC exist within the transmission line route.

- 1-12. Per ARSD 20:10:22:14(4), provide a description and location of any sand and gravel, scoria and industrial and ceramic quality clay existent within the transmission site.**

East River is not aware of any economic geological deposits within the transmission line route.

- 1-13. Per ARSD 20:10:22:15(1), provide a map drawn to scale of the transmission site showing surface water drainage patterns before and after construction of the facility. If you like you can reflect the drainage patterns on the map you will provide in question 1-8.**

Surface water along the proposed Project route generally flows into the intermittent tributaries and then onto the Vermillion River. The surface water drainage pattern will be unchanged as a result of the transmission line. Since there is no change in drainage patterns before and after construction, a map is not applicable.

- 1-14. Per ARSD 20:10:22:16, provide an analysis of the impact of construction and operation of the facility on the breeding times and places and pathways of migration and planned measures to ameliorate negative biological impacts as a result of construction and operation of the facility.**

East River does not believe the proposed transmission line will in any way impact the breeding times and places and pathways of migrations.

East River has requested comments from the U.S. Fish and Wildlife Service on the environmental aspects of the proposed Project (Exhibit 13 of application). In his response to our letter, Mr. Pete Gober, Field Supervisor for the South Dakota Field Office of the U.S. Fish and Wildlife does not indicate that the construction and operation of the proposed Project will have an impact on breeding times and places and pathways of migration, he does say “We have reviewed and have NO OBJECTION to the proposed project” (Exhibit 13).

East River also requested comments from the South Dakota Department of Game, Fish and Parks on the environmental aspects of the proposed Project. Subsequently East River received a response of “no significant

impact on fish and wildlife resources” from the S.D. Department of Game, Fish and Parks. A copy of East River’s initial letter with the S.D. Department of Game, Fish and Parks stamped reply (Exhibit 14) is included with the initial application.

- 1-15. Provide more detailed maps than provided on Exhibits 6a and 6b that would depict land uses at a minimum of one half mile from the proposed transmission route. Refer to the map provided by Xcel Energy in Figure 5 which is located on page 47 of the application in Docket No. EL08-001 for an example.**

Exhibit 21 (USGS National Land Cover Database, 2001), shows the general land use in the project area including pasture, rural residential, and other land uses required to be listed in ARSD 20:10:22:18.

While East River is willing to supply the map, it questions whether the Commission has statutory authority to make this request, and, perhaps equally important, whether land use one half mile from the proposed transmission route is relevant to this matter.

- 1-16. Provide a narrative on the best management practices that will be utilized, as referenced on page 14 of the application, to minimize adverse effects to the landowner and environment from the time the initial excavation begins until the lines are attached. Incorporate the timelines from the initial earthwork to final grading, topsoil replacement, and turf establishment, if applicable, in the response.**

The best management practices referenced on page 14 refers to water quality protection with respect to minimizing the impact of erosion, sedimentation, runoff, and surface instability to wetlands, streams and rivers. As possible, East River will restrict movement near wetlands and waterways with equipment and material and reclaim land as necessary to reduce any impact to wetlands and waterways. The other bulleted items on page 14 list other best management practices that will be utilized.

East River will work to minimize adverse effects to the landowner and environment from the time the materials are delivered to the construction site until the lines are attached. The table below lists the time lines of Project construction.

Structure is completed	Less than one day
Structure erection	Less than one day
Conductor Installation	One to two weeks
Restoration	One day

1-17. Per ARSD 20:10:22:22, provide the time schedules for “accomplishment of major events” in the construction of the facility.

East River proposes an in-service date of May 1, 2009. A permitting and construction schedule for the Project is provided below;

Project Route Survey	Completed June 13, 2008
ROW Acquisition	Completed May 30, 2008
Public Utilities Commission (PUC) Route Permit Application	Submitted June 12, 2008
Line Design	June, 2008 to July, 2008
PUC Route Permit Provided	November, 2008
Transmission Line Construction	November, 2008 to April, 2009
Final ROW Contacts, Damage Settlements and Cleanup	April, 2009 to May, 2009

1-18. Per ARSD 20:10:22:23(6), provide the applicant’s plans to coordinate with the local and state office of disaster services in the event of accidental release of contaminants from the facility.

The transmission line does not have any contaminants associated with it that would require coordination with the local and state office of disaster services.

1-19. Per ARSD 20:10:22:24, provide the following: a description of job classifications, together with the estimated annual employment expenditures of the applicant, the contractors, and the subcontractors during the construction phase of the proposed facility. In a separate tabulation, the application shall contain the same data with respect to the operating life of the proposed facility, to be made for the first ten years of commercial operation in one-year intervals. The application shall include plans of the applicant for utilization and training of the available labor force in South Dakota by categories of special skills required. There shall also be an assessment of the adequacy of local manpower to meet temporary and permanent labor requirements during construction and operation of the proposed facility and the estimated percentage that will remain within the county and the township in which the facility is located after construction is completed.

The relatively short-term construction nature of the Project and the number of East River employees who will work on the Project may result in short-term positive economic impacts in the form of increased spending on lodging, meals and other consumer goods and services.

For the construction and subsequent on-going maintenance of the transmission line, East River will utilize trained specialized workers, which may be either East River’s internal workforce or hired contractors which will include linemen, construction supervisors, surveyors and right of way agents. Local manpower will not be used to meet temporary or permanent labor requirements associated specifically with this Project. Also, this Project will not create any new permanent jobs. However, East River will continue to staff an area maintenance center in the Sioux Falls area to respond to maintenance issues on its system. The estimated labor costs for construction of the Project are estimated at approximately \$1 million.

Each year East River actively seeks to hire between four and five apprentice linemen from the Vocational School in Mitchell, South Dakota and several Vocational Schools in Minnesota. East River understands that the demand for people graduating from these Vocational Schools as linemen is very high.

The following table summarizes the estimated number of East River employees which will work on this Project during its construction:

Labor used during construction of proposed Project

<u>Type of Work</u>	<u>Number of Employees</u>
Right of Way Agent	1
Surveyor	2
Linemen	20 to 24
Construction Supervisor	2
Other Supervisory persons	1

The Project will not create any new permanent jobs and there will not be any job positions dedicatedly solely to the Project once construction is completed so a year by year listing of job classifications and annual employment expenditures associated with the Project for the first ten years is not applicable.

1-20. Provide the applicant’s policy for continued right-of-way maintenance for weed control.

East River is not responsible for weed control along the transmission line route. Where a private easement for the proposed Project is provided, the

landowner remains responsible for weed control. Where the proposed Project is located public right of way, the governmental body or adjoining landowner remains responsible for weed control.

1-21. Per ARSD 20:10:22:35(1) and (3), provide the following:

- 1. the overall width of the pole including the wooden cross arm ;**
- 2. the overall width of the pole including the three side mount arms;**
- 3. the proposed transmission site and major alternatives depicted on overhead photographs and land use culture maps.**

Response to #1. East River provides Exhibit 22 showing the structure with a wooden cross arm. The overall width of the structure, including the cross arm is fourteen feet.

Response to #2. East River provides Exhibit 23 showing the structure with three side mount insulators. The overall width of the structure, including the side mount insulators is ten feet 3 inches.

Response to #3. East River provides Exhibits 21 & 24 showing the proposed transmission line and major alternatives depicted on overhead photographs and land use culture maps.

1-22. Have all of the affected landowners and/or renters been contacted? Please provide documentation.

All the landowners have been contacted. Where landowners have agreed to provide an easement for the Project an easement has been completed. Where the landowners have not agreed to provide an easement, no easement exists. Renters have not been contacted.

1-23. Provide an overhead photograph plan view with the location of each proposed tower location clearly mapped for the entire route. Also, please provide geographic coordinates for each pole.

Please provide the statutory authority for this request.

Final pole locations have not been determined at this time. Additionally, East River would note that, with respect to pole locations, we either are on private property with landowner permission, or in the public right of way with a review by the affected governmental entity.

1-24. Provide a map showing landowners and property locations that will require easements for the construction of the proposed line.

East River has concluded its right of way acquisition process. Exhibit 25 lists the various landowners along the proposed Project and Exhibit 26 shows the property locations and indicates where easements have been obtained and where easements were not obtained.

1-25. Provide the number of feet of easement that is necessary to place the facility on private right-of-way and describe the anticipated number of feet from the public right-of-way that the poles will be placed.

A 50 foot wide easement was sought for the proposed Project. There were however some landowners that only granted a 30 foot wide easement.

Where East River has landowner permission, the transmission line is designed to site poles parallel to the road along the road right-of-way line on the private side. The poles are located to generally touch, or, recognizing occasional minor variances that result during construction, be within inches of touching, the road right-of-way (which typically will also be the fence line).

Where East River does not have landowner permission, the transmission line is designed to site poles parallel to the road along the road right-of-way on the public side. Again, the poles are located to generally touch, or be within inches of touching, the road right-of-way/fence line.

1-26. Per SDCL 49-41B-11(4), provide the potential short and long range demands on any estimated tax revenues generated by the facility for the extension or expansion of public services within the affected areas.

East River expects the proposed transmission line will place no demands on public services, so there will be no short and long range demands.

1-27. According to SDCL 49-41B-22, the proposed facility “shall not unduly interfere with the orderly development of the region with due consideration having been given to the views of governing bodies of affected local units of government.” Describe the communication you have had with applicable local bodies of government regarding the proposed facility.

The proposed Project does not enter any city or town boundaries. The proposed Project does cross through the rural areas of Lincoln and Turner

Counties. East River has requested county franchises from both Lincoln and Turner county for the propose Project. The franchise requests are scheduled on July 22, 2008 commission meeting agendas for both Counties. During the meetings, East River will present an overview of the proposed Project to the two County commissions and request approval of the respective franchises.

- 1-28. Provide the calculated electric fields at nominal voltage and magnetic flux density at peak and average system condition for the proposed transmission line for the following distances in feet to the proposed centerline: (300), (200), (100), (50), (37.5), 0, 37.5, 50, 100, 200, and 300.**

East River provides as Exhibit 27 a pamphlet entitled “Electric Magnetic Fields Facts” produced by the Western Area Power Administration. The pamphlet provides answers to many of the questions asked by the general public.

On page six of Western’s pamphlet the Electric and Magnetic fields for a typical 115 kV overhead transmission line

	<u>Centerline</u>	<u>Edge of ROW</u>	<u>100ft</u>	<u>200ft</u>	<u>300ft</u>
Electric Field kV/M	1.0	0.5	0.07	0.01	0.003
Magnetic Field mG	30	6.5	1.7	0.4	0.2

For comparison, on page 4 of the same pamphlet various home appliances are listed along with their respective Magnetic Fields.

- 1-29 Provide a color copy of Figure 1 attached to Exhibit 10 of the application.**

Provided as Exhibit 28

- 1-30 Provide a copy of any additional report(s) that were performed by Cultural Heritage Consultants for the proposed facility.**

Subsequent to East River’s initial Application the landowner of the northwest quarter of Section 19, R51W, T99N provided an easement to site one half mile of transmission line on his land. East River has contacted the Cultural Heritage Consultants to perform an archeological review of this one half mile. East River has also requested that two other locations along the proposed Project route, where easements to place anchors maybe forthcoming, be reviewed. The review findings will be forwarded onto the South Dakota State Historical Society for their concurrence prior to commencement of construction of the Project. East

River will provide both the Cultural Heritage Consultants report as well as the State Historical Society's concurrence to the PUC staff once they are received.

Other than the initial study performed by Cultural Heritage Consultants (provided as Exhibit 10 in the initial application) and the subsequent study that is described here, there are no other reports to provide.

1-31. Provide the applicant's position on any potential biological responses or health effects related to electric and magnetic fields and stray voltage for the project.

Based on the research that has been conducted over the past 30 years, exposure to normal 60 Hz electromagnetic field levels found in 115 kV transmission line design is not a major human health issue. The same is true for electric fields.

In the agricultural area of the Midwest, stray voltage problems are typically associated with distribution and service lines directly serving cattle operations on farms. Where a transmission line has been shown to contribute to stray voltage, the electric distribution system directly serving the farm or the wiring on a farm was located directly under and parallel to the transmission line. This is mitigated by not placing transmission lines over or parallel to the electric distribution system serving the farm or the wiring on the farm.

2007 Load Forecast



2007

Load Forecast

*East River Electric
Power Cooperative*

INTRODUCTION

The purpose of the 2007 Load Forecast (Load Forecast) is to develop a load forecast of East River Electric Cooperative's (East River) future electrical requirements.

East River is a transmission cooperative headquartered in Madison, South Dakota, whose service area covers eastern South Dakota and western Minnesota. East River's distribution cooperative members are listed below:

South Dakota 27, Bon Homme	Bon Homme-Yankton Electric Ass'n., Inc.
South Dakota 51, Central	Central Electric Cooperative, Inc.
South Dakota 32, Charles Mix	Charles Mix Electric Association, Inc.
	City of Elk Point
South Dakota 3, Clay	Clay-Union Electric Corporation
South Dakota 18, Clark	Codington-Clark Electric Cooperative, Inc.
South Dakota 50, Dakota	Dakota Energy Cooperative, Inc.
South Dakota 39, Douglas	Douglas Electric Cooperative, Inc.
South Dakota 36, Edmunds	FEM Electric Association, Inc.
South Dakota 17, Hamlin	H-D Electric Cooperative, Inc.
South Dakota 30, Kingsbury	Kingsbury Electric Cooperative, Inc.
South Dakota 20, Day	Lake Region Electric Association, Inc.
Minnesota 80, Lincoln	Lyon-Lincoln Electric Cooperative, Inc.
South Dakota 21, Brown	Northern Electric Cooperative, Inc.
South Dakota 37, Hughes	Oahe Electric Cooperative, Inc.
Minnesota 72, Renville	Renville-Sibley Cooperative Power Ass'n.
South Dakota 12, Minnehaha	Sioux Valley Southwestern Electric
South Dakota 51, Southeastern	Southeastern Electric Cooperative, Inc.
Minnesota 84, Traverse	Traverse Electric Cooperative, Inc.
South Dakota 6, Union	Union County Electric Cooperative, Inc.
South Dakota 16, Grant	Whetstone Valley Electric Cooperative, Inc.

This Load Forecast was prepared in accordance with the Rural Utilities Service (RUS) general guidelines and the procedures specified in the 2007 Load Forecast work plan submitted to and approved by RUS.

The Load Forecast process represents a joint effort by the distribution cooperatives, the generation and transmission cooperatives (G&T's) and Basin Electric. In order to assure that all segments of the cooperative structure were involved in the Load Forecast process, a Load Forecast steering committee was established consisting of representatives from the distribution cooperatives, the G&T's and Basin Electric.

The Load Forecast steering committee established the schedule and developed procedures used in preparing the 2007 Load Forecast. RUS attendance and participation at the committee meetings provided a forum for the cooperatives and RUS to exchange ideas and discuss problems.

This Load Forecast represents a forecast of East River's total requirements for the period of 2006 through 2021. It was prepared by integrating the results of East River's individual distribution member Load Forecast's. Each of East River's members Load Forecast's was prepared utilizing consistent methodologies and assumptions that are explained in detail in each distribution cooperative study. The distribution cooperative's Load Forecast analyzed service territories for historical and projected developments, which have an influence on past and future load growth.

Summary and Comparison Graphs

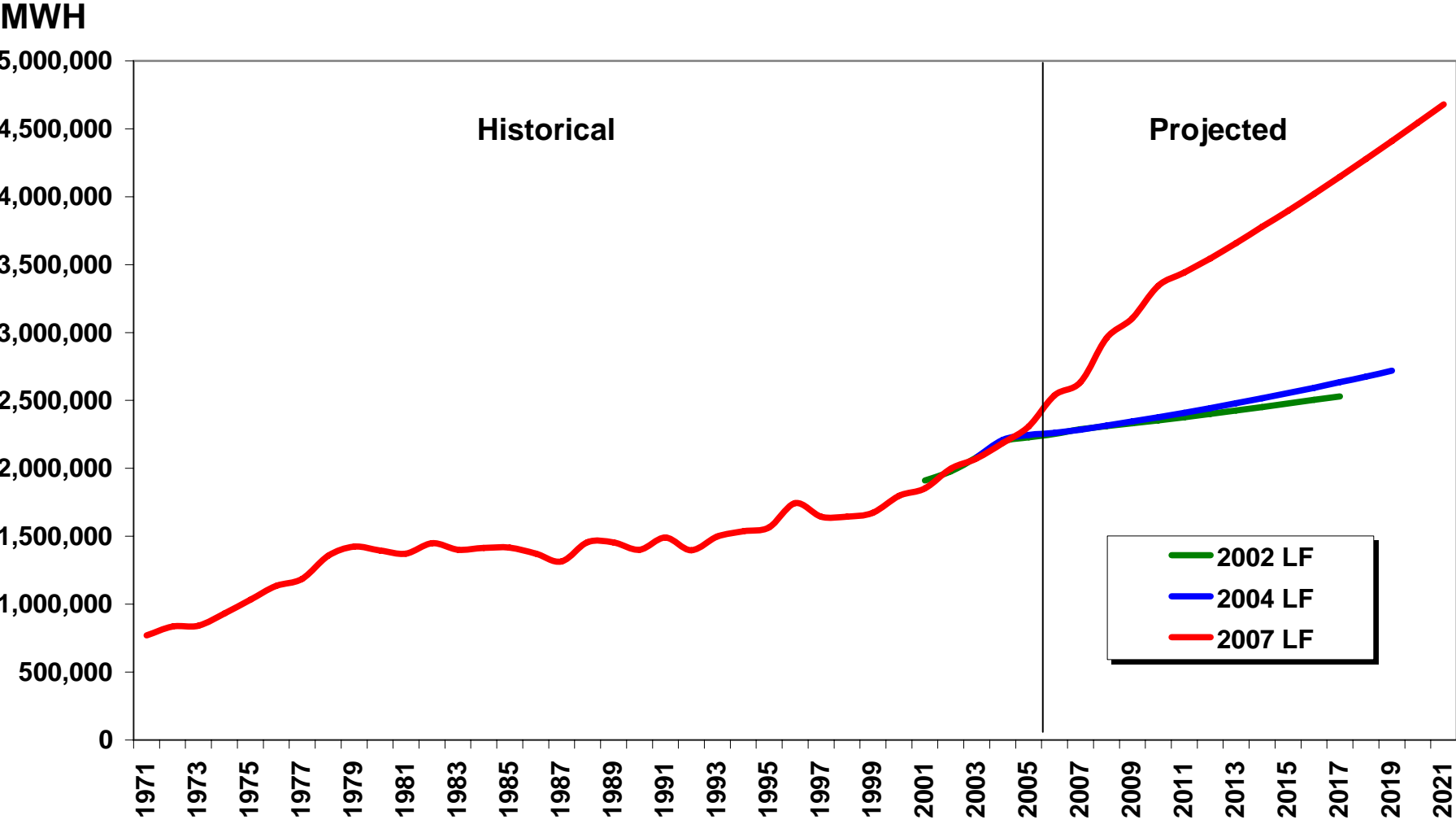
Three graphs were developed to summarize and compare the results of the 2007 Load Forecast to prior load forecasts. Graph A compares the total energy requirements for East River. Graphs B and C compare the peak demands for the winter and summer seasons, respectively.

COMPARISONS
2007 Load Forecast

East River

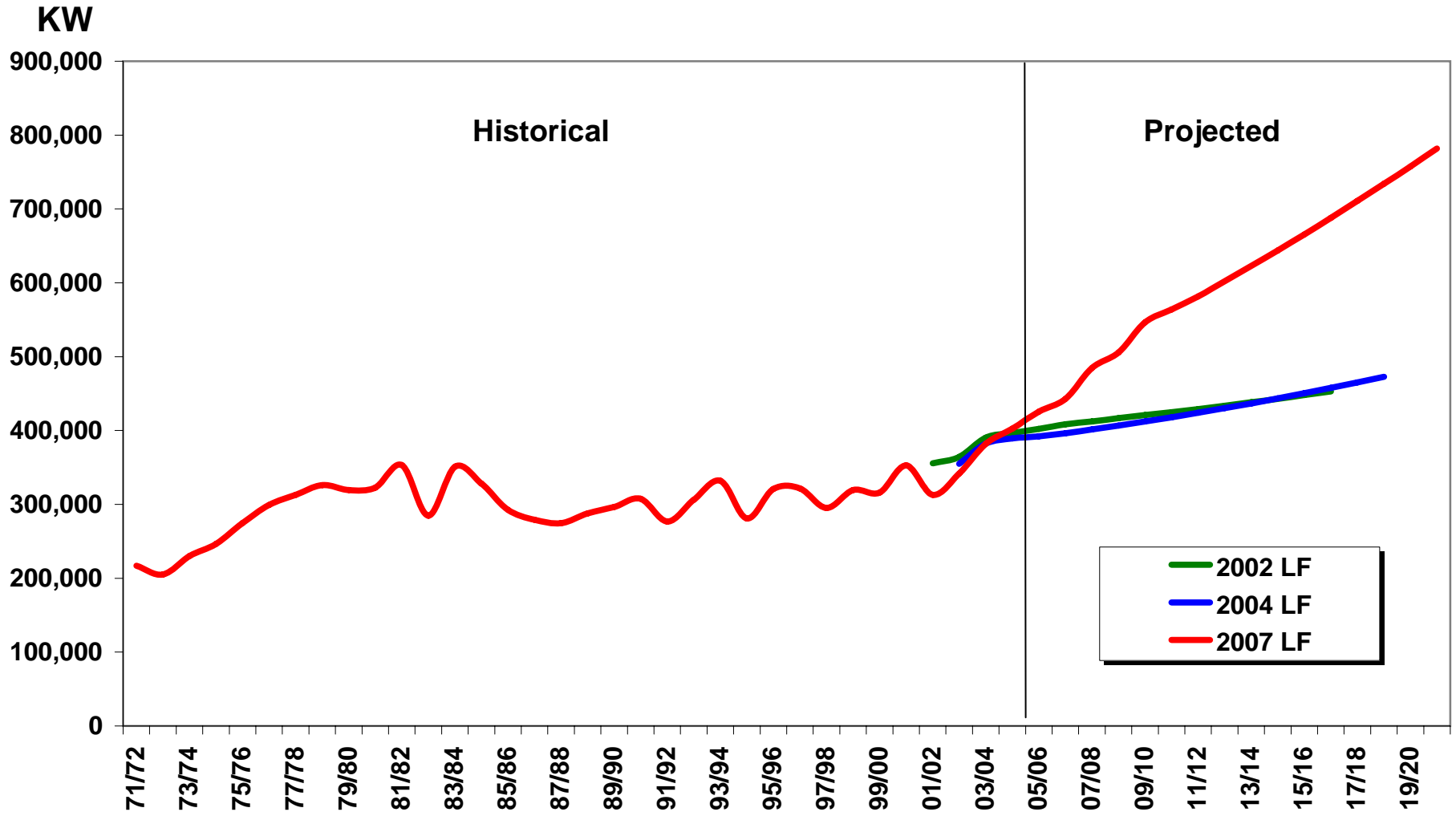
East River Total Energy Requirements

Graph A



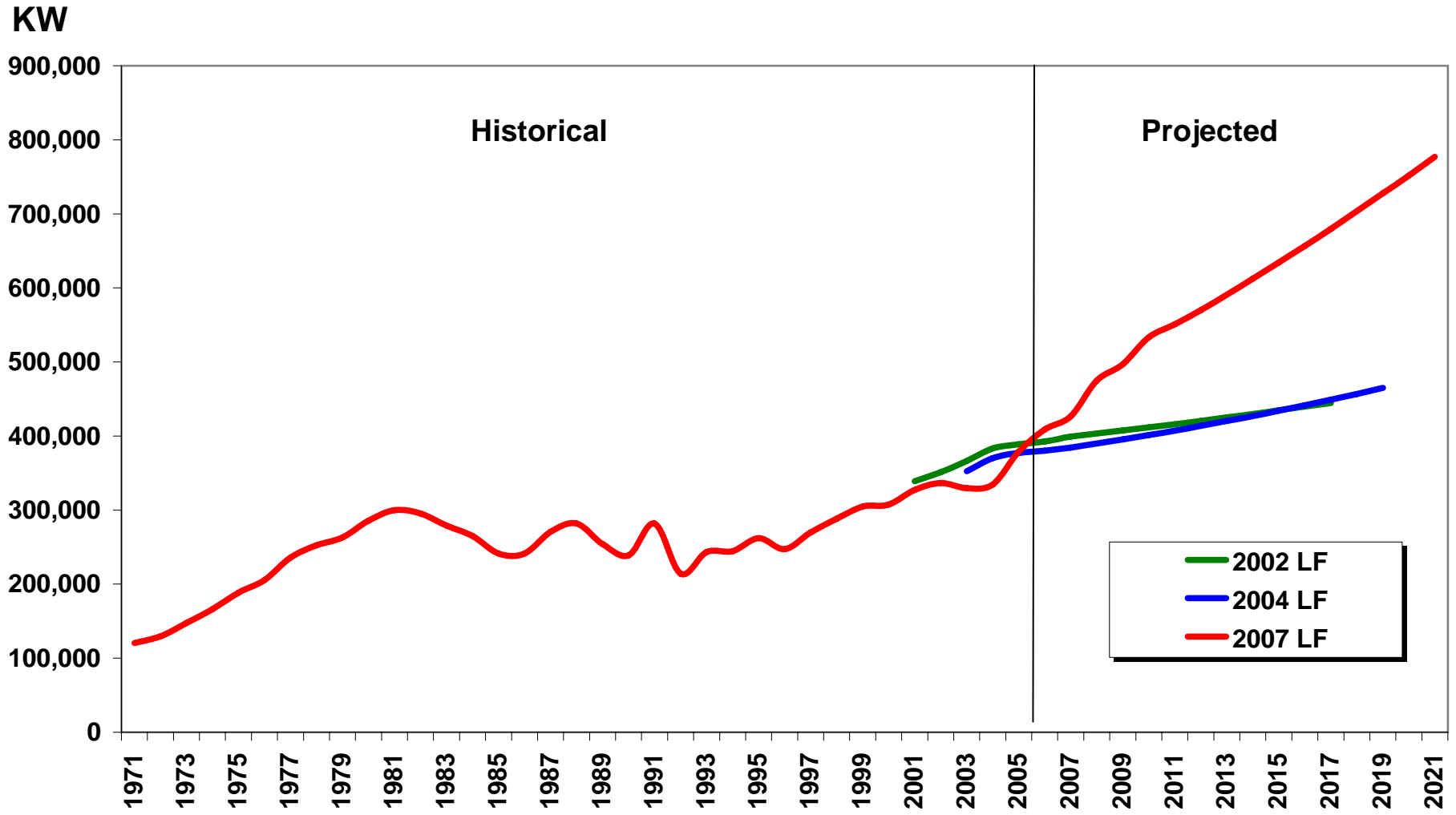
East River Peak Demand Winter Season

Graph B



East River Peak Demand Summer Season

Graph C

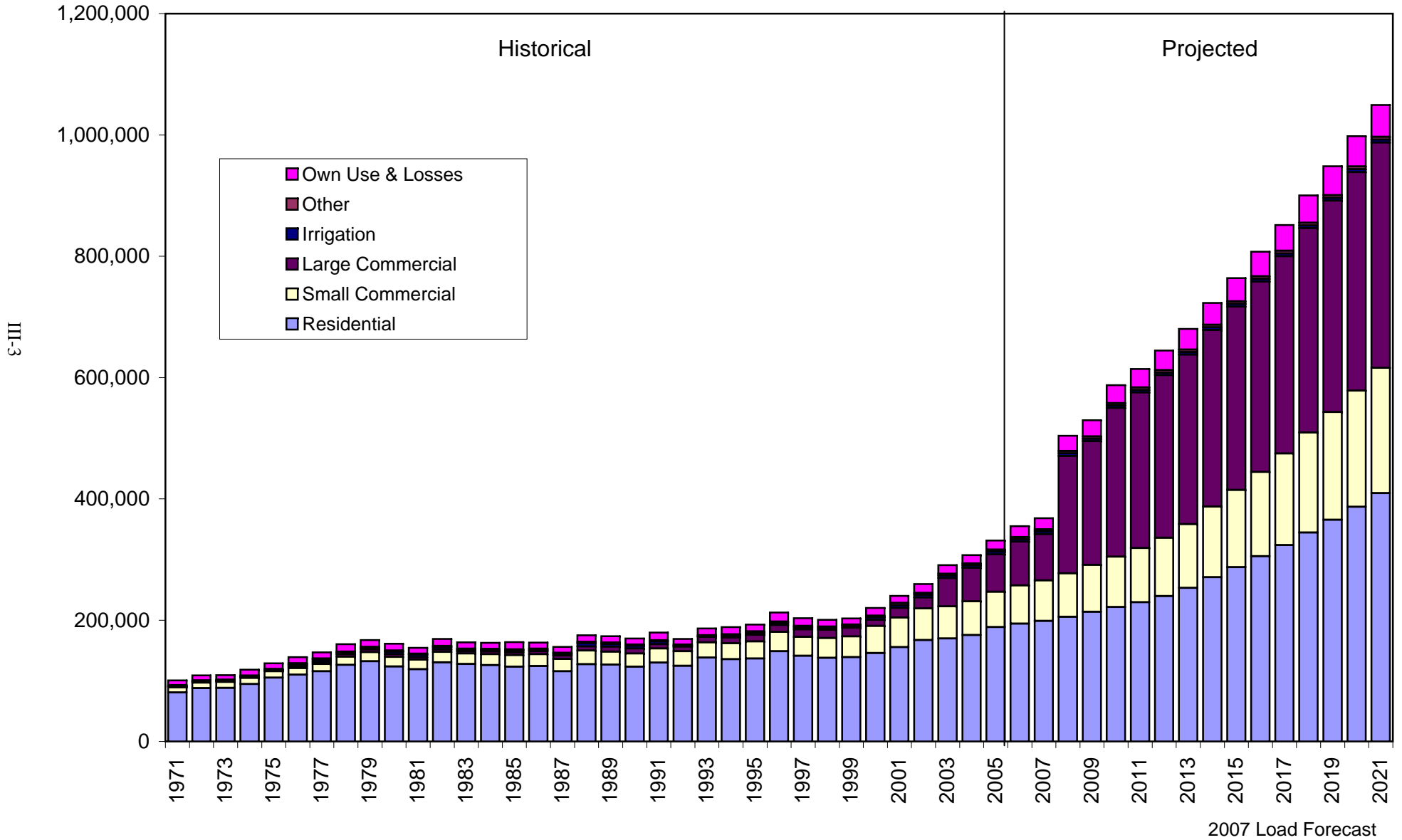


Southeastern Electric

Annual Energy Requirements

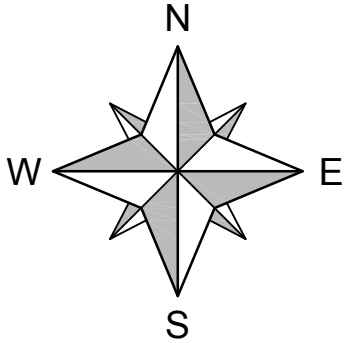
MWh

Graph 1



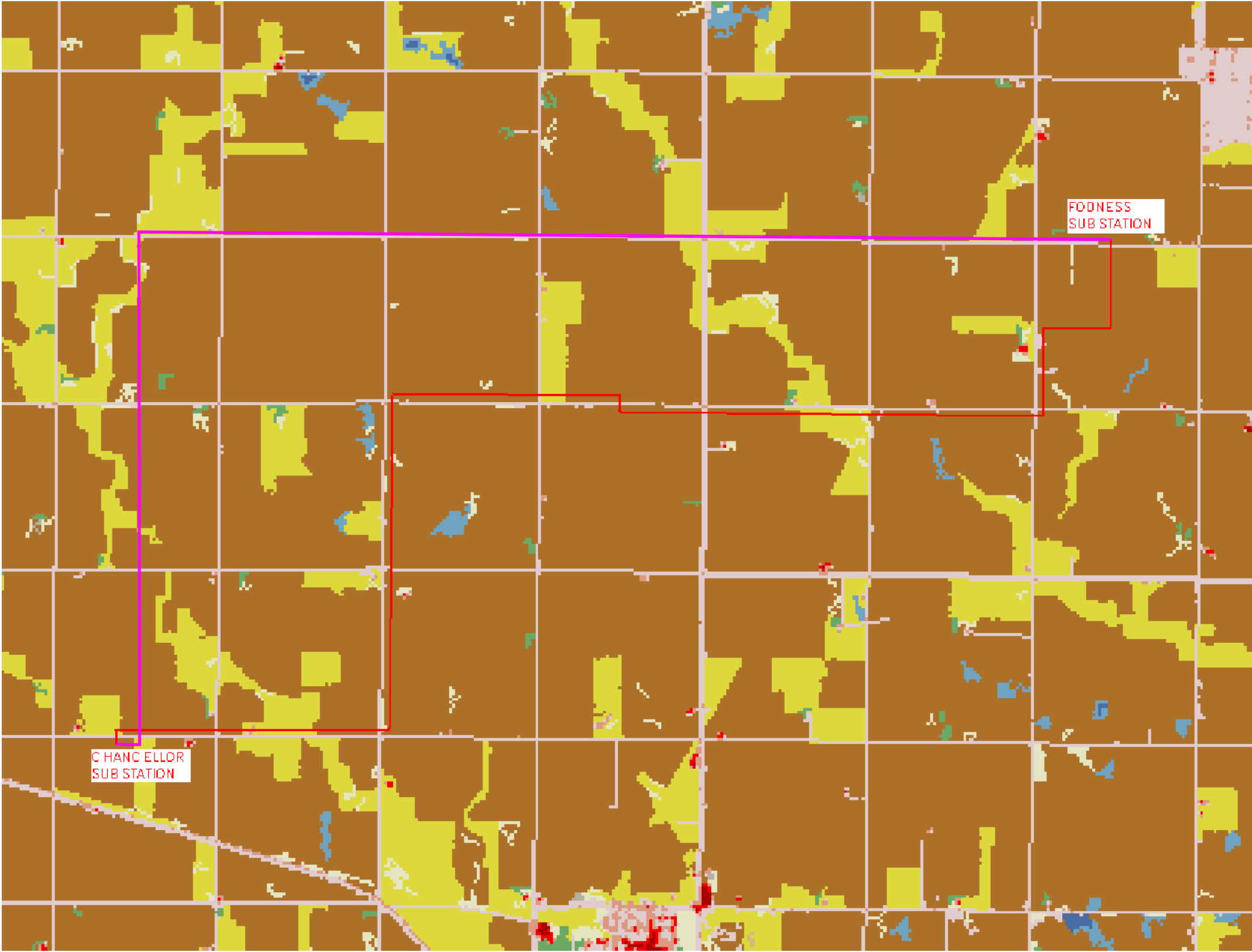
EAST RIVER ELECTRIC POWER COOPERATIVES CHANCELLOR LINE TAP

LAND USE

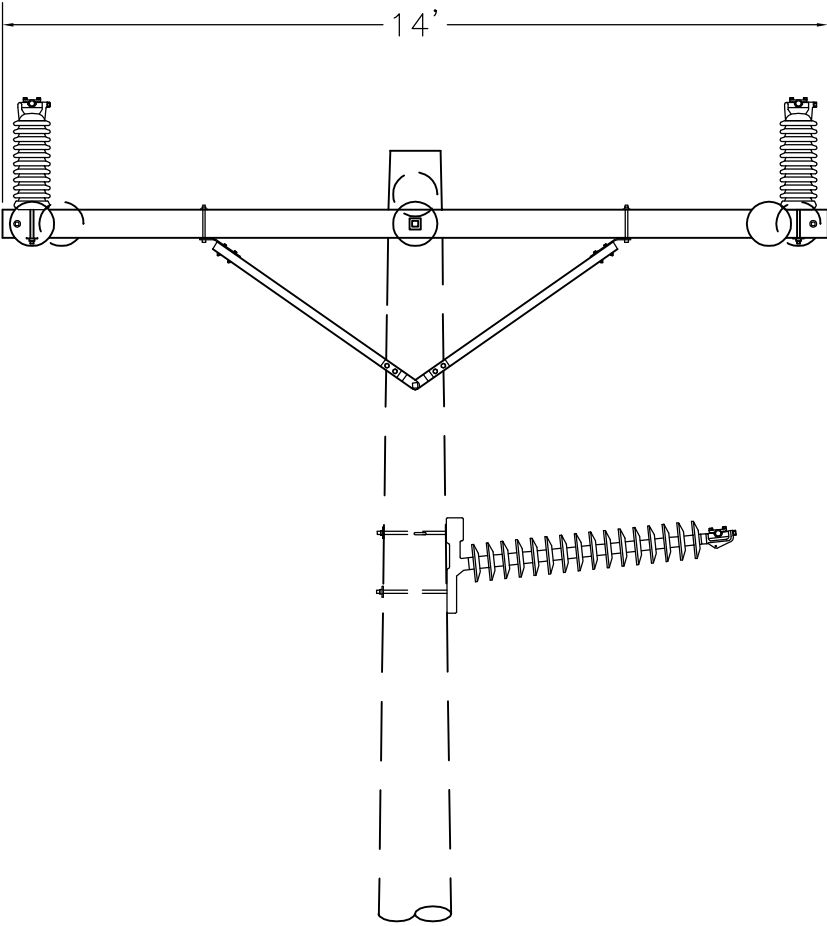


LEGEND

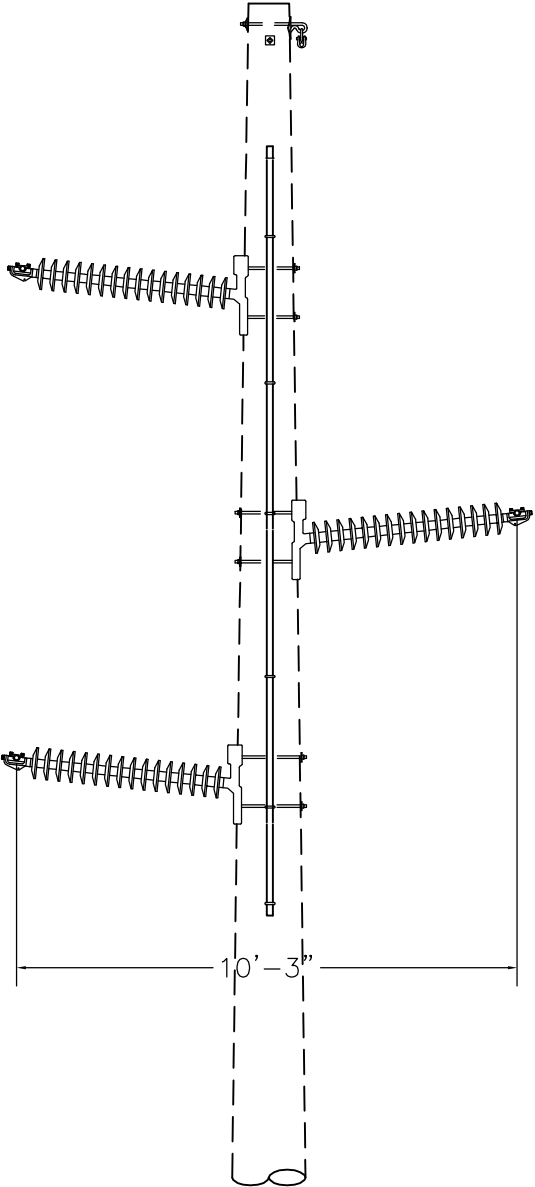
- PROPOSED 115KV
- ALTERNATIVE 115KV LINE
- OPEN WATER
- PERENNIAL ICE/SNOW
- DEVELOPED, OPEN SPACE
- DEVELOPED, LOW INTENSITY
- DEVELOPED, MEDIUM INTENSITY
- DEVELOPED, HIGH INTENSITY
- BARREN LAND(ROCK/SAND/CLAY)
- UNCONSOLIDATED SHORE
- DECIDUOUS FOREST
- EVERGREEN FOREST
- MIXED FOREST
- SHRUB/SCRUB
- GRASSLANDS/HERBACEOUS
- PASTURE/HAY
- CULTIVATED CROPS
- WOODY WETLANDS
- EMERGENT HERBACEOUS WETLANDS



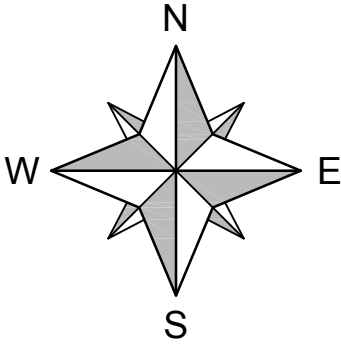
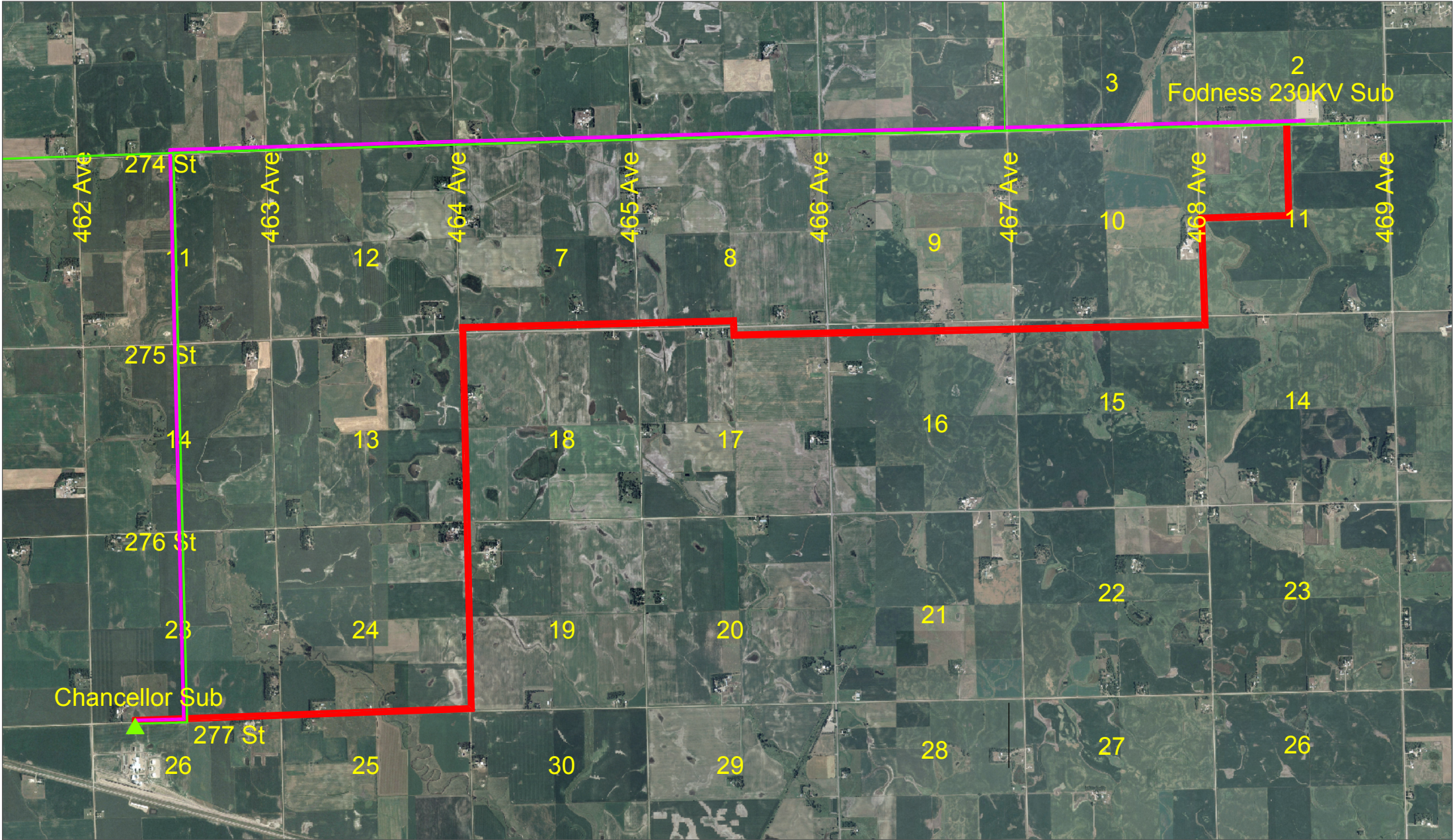
EAST RIVER ELECTRIC POWER COOPERATIVES CHANCELLOR LINE TAP



EAST RIVER ELECTRIC POWER COOPERATIVES CHANCELLOR LINE TAP



EAST RIVER ELECTRIC POWER COOPERATIVES CHANCELLOR LINE TAP



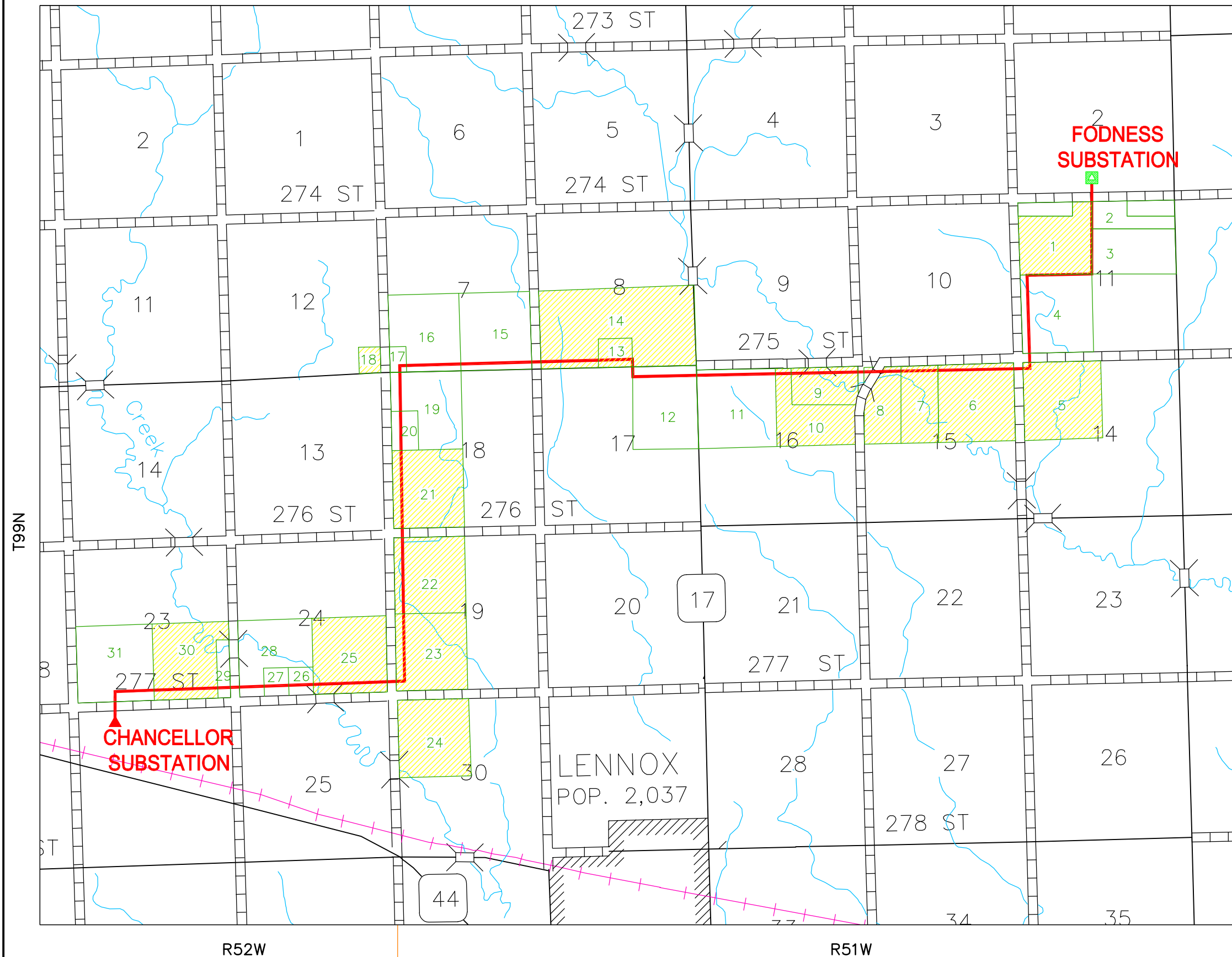
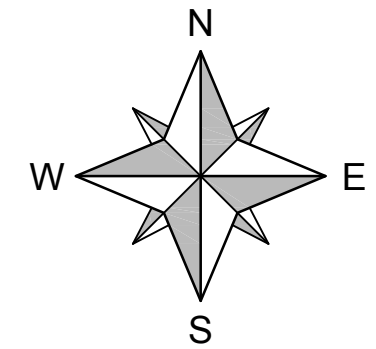
- LEGEND**
- EXISTING EAST RIVER 69KV LINE
 - PROPOSED EAST RIVER 115KV LINE
 - ALTERNATIVE 115KV LINE
 - - - WAPA 230KV LINE

AERIAL PHOTO

SCALE: 1" = 1 Mile

EAST RIVER ELECTRIC POWER COOPERATIVES CHANCELLOR LINE TAP

EASEMENT PARCEL MAP



LEGEND

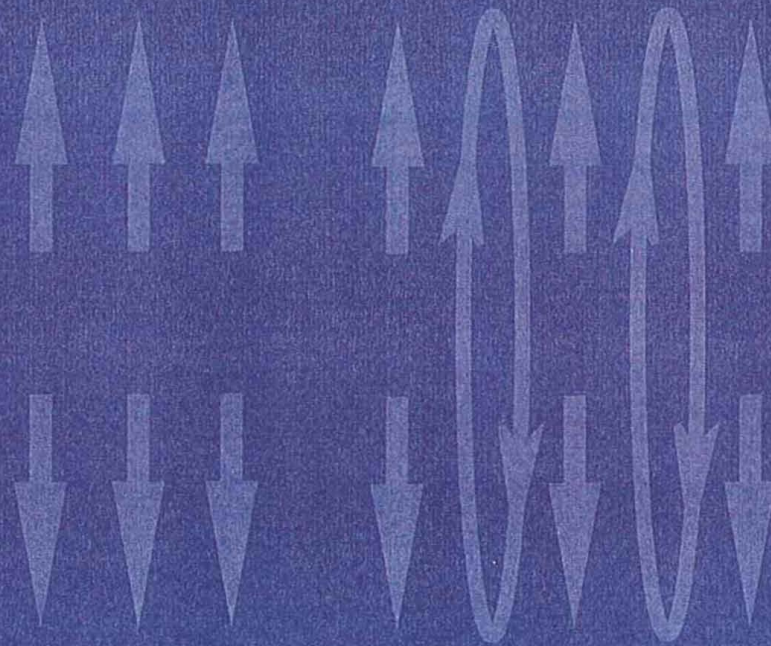
- EAST RIVER 115KV LINE
- EASEMENT NOT ACQUIRED
- EASEMENT ACQUIRED

June 25, 2008

Parcel Number	Name	Legal	Easement Acquired
1	Robert and Karen Sproul	NW1/4, 11-99-51	Acquired
2	Arlon Knock	NW1/4 NE1/4, 11-99-51	Not Acquired
3	Buus Family Trust	SW1/4 NE1/4, 11-99-51	Not Acquired
4	Glenn VanNingen	SW1/4, 11-99-51	Not Acquired
5	Robert and Lydia Poppens Trust	NW1/4 ,14-99-51	Acquired
6	Mavis Steever	N1/2 NE1/4, 15-99-51	Acquired
7	Gene and Nancy Kuper	E1/3 NW1/4, 15-99-51	Acquired
8	Lola Steever	W2/3 NW1/4, 15-99-51	Acquired
9	Leon Lawrence	Smit Tract 1 in the NE1/4, 16-99-51	Acquired
10	Dennis Reiners	NE1/4 except Smit Tract 1, 6-99-51	Acquired
11	David Hoogestraat	NW1/4, 16-99-51	Not Acquired
12	Ruth Hoogestraat	NE1/4,17-99-51	Not Acquired
13	Billy and Marilyn Beddow	E608' of the S471'SE1/4, 8-99-51	Acquired
14	Bessie Hoogestraat Trust	SE1/4 and the SW1/4 except E608' of the S 471', 8-99-51	Acquired
15	Wendell Johnke	SE1/4, 7-99-51	Not Acquired
16	Lowell Rost	SW1/4, 7-99-51	Not Acquired
17	Duane Christensen	SW1/4 SW1/4, 7-99-51	Not Acquired
18	Dorothy DeVries	SE1/4, 12-99-52	Acquired
19	Cleland Trust	NW1/4 Except the W37 rods of the S70 rods, 18-99-51	Not Acquired
20	Laurel and James Peterson	W37 rods of the S70 rods, 18-99-51	Not Acquired
21	Merlyn and Diane Steever	SW1/4, 18-99-51	Acquired
22	David and Julaine Stratmeyer	NW1/4,19-99-51	Acquired
23	Norma Reiners Trust	SW1/4, 19-99-51	Acquired
24	Norma Reiners Life Estate	N56.5 rods of the NW1/4, 30-99-51	Acquired
25	Plucker Trust	SW1/4, 24-99-52	Acquired
26	Barry and Terri Hermanson	E1082' of the S730' SW1/4, 24-99-52	Not Acquired
27	Marianne Plucker Trust	E303' of the W1102' S 473' SW1/4, 24-99-52	Not Acquired
28	Plucker Family Partnership	SW1/4, 24-99-52	Not Acquired
29	Dana Roelfsema	Tract 3R of Johnsons Tract SE1/4, 23-99-52	Not Acquired
30	James Poppinga	Johnson's Tract 1 SE1/4, 23-99-52	Acquired
31	Frank and Jennie Haan	SW1/4, 23-99-52	Not Acquired

Electric Magnetic Fields

FACTS



NEXT PAGE

Electric power lines are familiar to all of us. They have different shapes, different sized poles and varying numbers of wires. We may not be able to guess how much power they carry, but we all know what they do: they bring electric power to our homes and businesses.

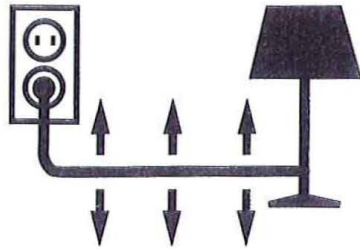
Many of the dramatic improvements in health, safety and quality of life that we benefit from today could not have happened without a reliable and affordable electric supply. But could electricity be bad for our health? Electric and magnetic fields are present wherever electricity is used. Do these fields cause cancer or any other diseases, as some have suggested?

These important and serious questions have been investigated thoroughly during the past three decades. Several tens of millions of dollars have been spent worldwide.

Research on EMF still continues because no clear answers have been found. The balance of scientific evidence to date indicates that these fields do not cause disease. This discussion outlines the EMF issue, summarizes the research conducted to date, and describes what Western Area Power Administration is doing to address concerns about EMF.

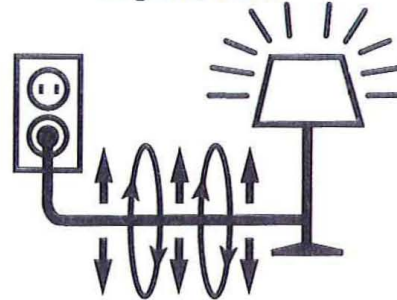
into a wall socket applies voltage to the cord, surrounding it with an electric field. Electric fields are strongest closest to the source and with higher voltages, but decrease rapidly within a short distance from the source. Walls, roofs, trees and vegetation also weaken or shield electric fields. Electric fields are measured in volts per meter.

Electric fields



1. Produced by voltage.
Lamp plugged in but turned off.
Voltage produces an electric field.
2. Measured in volts per meter (V/m) or in kilovolts per meter (kV/m).
 $1 \text{ kV} = 1000\text{V}$
3. Easily shielded (weakened) by conducting objects like trees and buildings.
4. Reduced in strength with increasing distance from the source.

Magnetic Fields



1. Produced by current
Lamp plugged in and turned on.
Current now produces a magnetic field, also.
2. Measured in gauss (G) or tesla (T)
 $1 \text{ milligauss (mG)} = 0.1 \text{ microtesla } (\mu\text{T})$
 $\text{milli (m)} = 1 \text{ thousandth}$
 $\text{micro } (\mu) = 1 \text{ millionth.}$
3. Not easily shielded (weakened) by most materials.
4. Reduced in strength with increasing distance from the source.

Magnetic fields

Magnetic fields are produced by current, which is the flow of electricity. Current is measured in amperes, or amps, and is similar to the volume of water flowing in a hose when the nozzle is open. Current must be flowing before magnetic fields can be produced. For example, turning on an electric appliance causes magnetic fields to surround the cord and appliance. Magnetic fields are strongest closest to the source, and increase with higher current flow; they also decrease with distance from the source. Unlike electric fields, magnetic fields are not affected by walls or trees, and primarily depend on distance from and strength of the source. Magnetic fields are commonly measured in milliGauss (mG) and in microTeslas (μT).

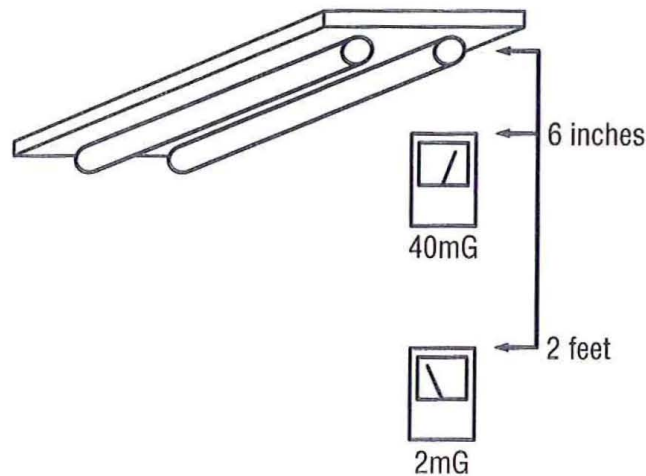
for electric fields and 200 mG for magnetic fields. In most cases, the values are maximum fields that existing lines produce at maximum load-carrying conditions. Researchers have used 2 mG in several studies as the threshold magnetic field value to differentiate between average exposed and more exposed persons. This is based on average fields found in homes, and not for any scientific reason.

Natural sources

The earth's fields are static, or 0 Hz frequency. The earth's magnetic field which everyone is constantly exposed to is about 500 mG. The earth's electric field is about 100 V/m, but thunderstorms can temporarily increase the field in a given location to several thousand V/m.

Sources within the home

In the home, in addition to the earth's natural fields, there are power frequency fields. All electric appliances produce electric and magnetic fields with a 60 Hz frequency. Fields are greatest closest to the surface of the cord and appliance and drop rapidly in just a short distance. The average household background 60 Hz magnetic field is about 1 to 2 mG. The average background 60 Hz electric field is 1 to 20 V/m.



Typical field level

Underground lines

Underground lines can produce higher magnetic fields directly above them than an overhead line would produce at ground level, because the buried cable is closer to the ground surface. Magnetic fields fall away more rapidly than from overhead lines because of some shielding from the earth. There are no external electric fields produced because of the shielding from the earth. Underground lines are more expensive to install and more difficult and expensive to repair than overhead lines. Because of heat generated at higher voltages, most underground cables are lower voltage distribution lines, such as those that provide power to residential neighborhoods.

Substations

EMFs are produced within electric substations, but due to the spacing of electrical equipment measured field strengths are low outside the fence line. Fields close by a substation are mainly produced by the entering power lines.

Other field sources

We are surrounded daily with fields from many other sources having frequencies different than 60 Hz. These sources include emissions from computers, radio and television towers, cellular telephones, weather and air traffic control radar, military and commercial communications systems, household and industrial remote control devices, intrusion detection equipment and many others. Fields from 60 Hz electrical systems are a very small sliver of the total natural and man-made electromagnetic spectrum environment we live in.

Stray voltages

Sometimes, cattle and dairy farmers express concern about a herd's behavior, weight loss or decreased milk production and blame EMFs from nearby transmission or distribution lines. Investigation of the situation normally shows the cause to be stray voltages. Stray voltages are from deteriorating wiring, or defective, or improperly wired or grounded, equipment. While standing on damp earth or other conductive ground, the animal receives a small electric shock when contacting parts of milking equipment, electrically heated or pumped watering facilities or other electric equipment around the farm. Electric companies usually offer stray voltage diagnosis services.

Theoretical

Theoretical research looks for a possible mechanism that can demonstrate how the fields could react with living systems. A variety of theories have been put forth over the years but no such mechanism has been found that would operate at the levels of fields seen around homes or near power lines.

Biological

The test of any proposed theory or proposed health risk is biological research in the laboratory to observe the effects of EMFs on cells, tissues and organisms. Scientists look for effects that can be successfully replicated in different laboratories for proof that a cause-and-effect relationship exists. Hundreds of EMF-related biological research projects have been conducted. In 30 years of research, there have been no such reproducible results. The evidence from the laboratory is that low EMF levels of the kind experienced by the public do not cause the diseases that have been claimed.

Our use of electricity has increased exponentially over the past 100 years, likely resulting in greater daily exposures to power frequency EMFs. In general, it has been found that rates of cancer, considering improved diagnostic methods, have remained level or decreased somewhat. While many other variables are unaccounted for, these two observations would suggest that exposure to normal 60 Hz field levels is not a major human health issue.

Limiting Exposure to EMF

Research has not determined if exposure to EMFs could be a health risk. Scientists are studying long-term exposure to low fields, exposure to certain transient waves and other kinds of EMFs. You may prefer to take low- and no-cost steps to limit your exposure to strong fields as a way to reduce potential risk. Some scientists call this "prudent avoidance." For instance, you might:

- Move your motor-driven electric clocks or other electrical devices away from your bed.
- Stand away from an operating microwave oven or other appliances that use a lot of electricity.
- Sit away from the TV and at least an arm's length away from the computer screen and processing unit.
- Decide to use a safety razor instead of an electric one.

While steps like these may lower your exposure to 60 Hz fields, it is far more difficult to limit exposure to EMFs in the rest of the vast electromagnetic spectrum. It is virtually impossible to reduce exposure to broadcast frequencies and radar, for instance. Some scientists have recommended limiting cell phone use as a prudent avoidance measure, however.

For more information about Western or EMF, call or write your nearest Western office:

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E-mail: CorpComm@wapa.gov

Phone: 720-962-7000

Fax: 720-962-7200

CRSP Management Center

Mailing address: P.O. Box 11606, Salt Lake City, UT 84147-0606

Phone: 801-524-5493

Fax: 970-240-6295

Desert Southwest Region

Mailing address: P.O. Box 6457, Phoenix, AZ 85005-6457

Phone: 602-605-2525

Fax: 602-605-2630

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Sierra Nevada Region

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[NEXT PAGE](#)

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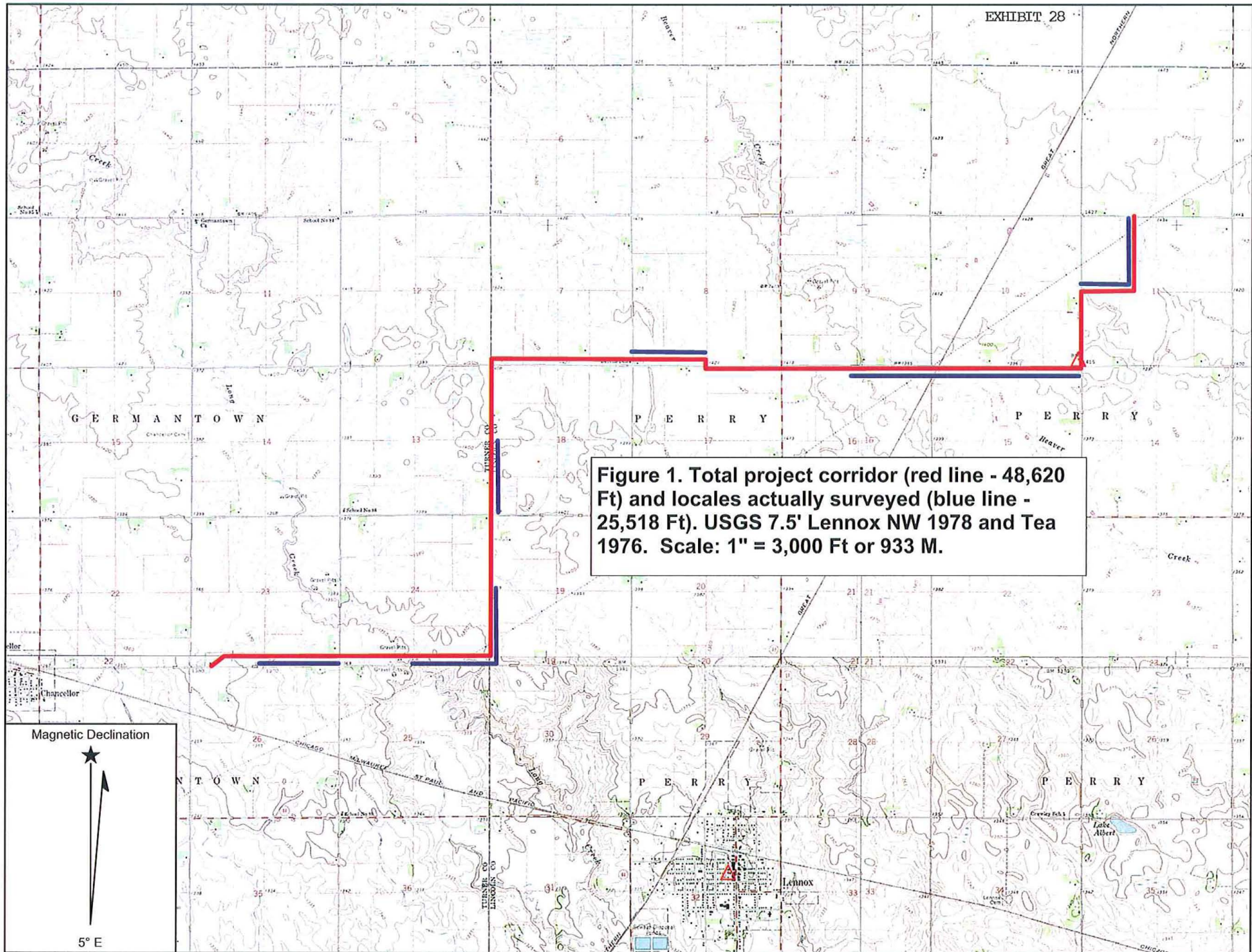


Figure 1. Total project corridor (red line - 48,620 Ft) and locales actually surveyed (blue line - 25,518 Ft). USGS 7.5' Lennox NW 1978 and Tea 1976. Scale: 1" = 3,000 Ft or 933 M.

