

Applications of GIS in Electrical Power System

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OUTLINES:

- **Objective**
- **Importance of GIS**
- **GIS data development**
- **Application of GIS**
- **Findings**
- **Conclusions and Recommendations**

Objective:

- To show the possible applications of GIS in electrical power system

Importance of GIS to the Electrical utility:

- Accurate up-to-date information of the network assets.
- Improving system visualization by associating spatial data with the network elements.
- Connects database information such as billing, material account, distribution analysis and outage reporting in power utility.
- allows the simultaneous assessment of technical, financial, and environmental factors.

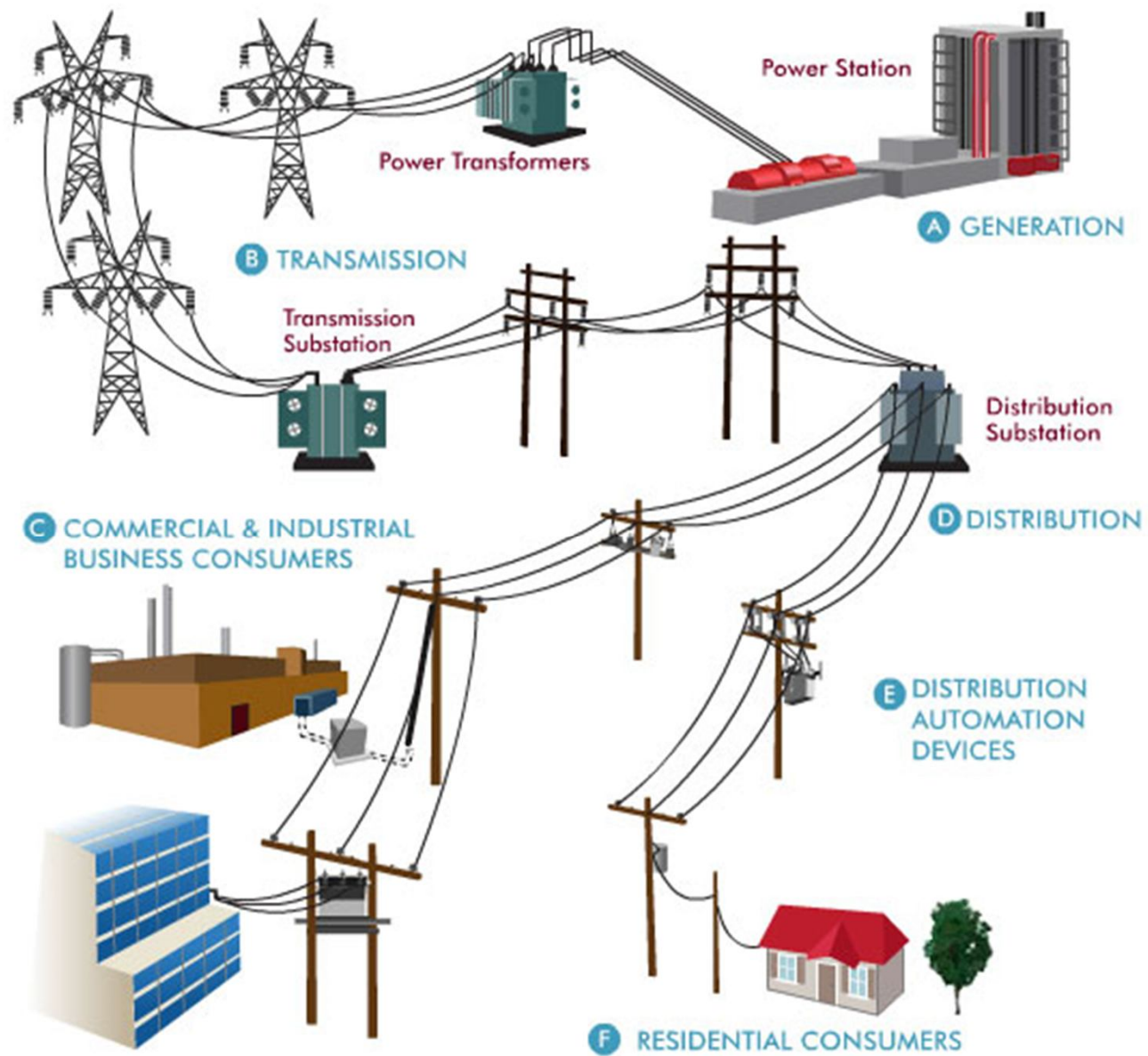
GIS Database Development:

(1) Digitization Process:

- GPS survey of electrical consumers and network assets.
- Digitization of electrical network assets.
- GIS mapping, indexing of electrical consumers and network assets

(2) Data Collection:

- GPS Base Station & adequate number of GPS Receivers.
- Surveyors walk along and capture the spatial position.
- Collect attribute data.
- The digital base map must show the important landmarks For better visualization.



Application of GIS in Electrical Power System:

(1) GIS Integration:

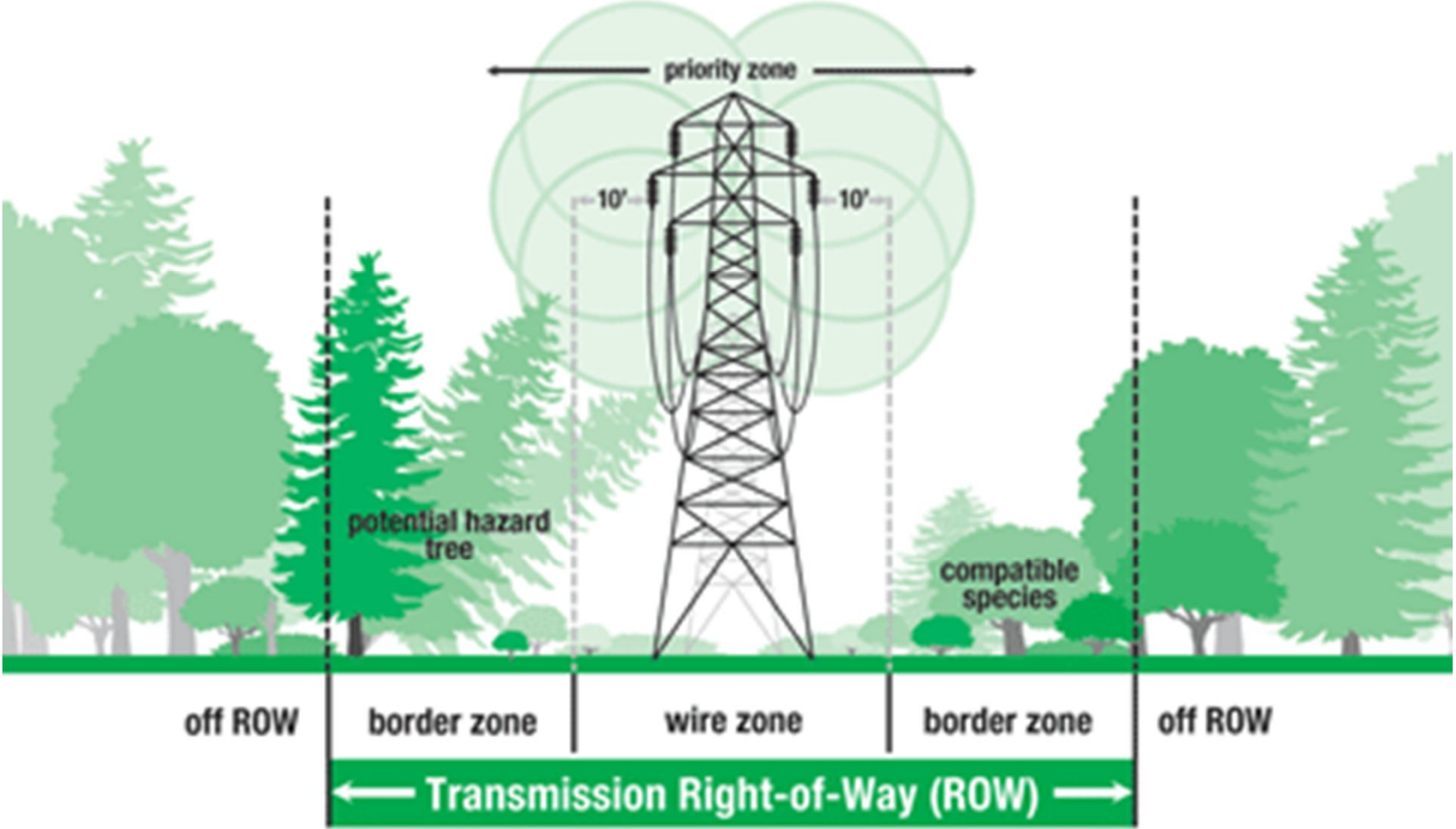
- Integrates the spatial data with various utility applications(customer information, assets management, outage management and billing System).
- The GIS must display now the particular network element and their attributes (from the consumer to the utility).

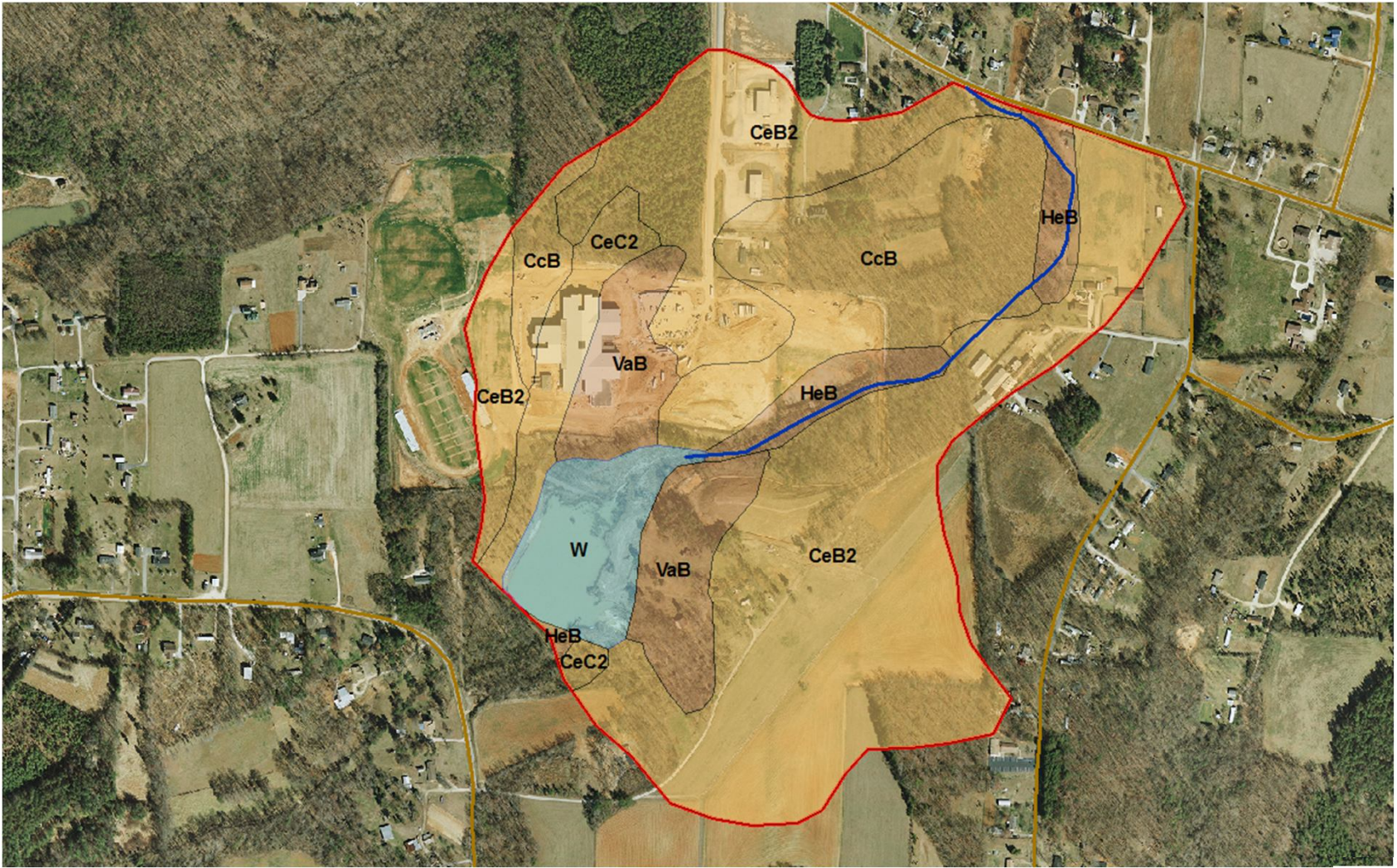
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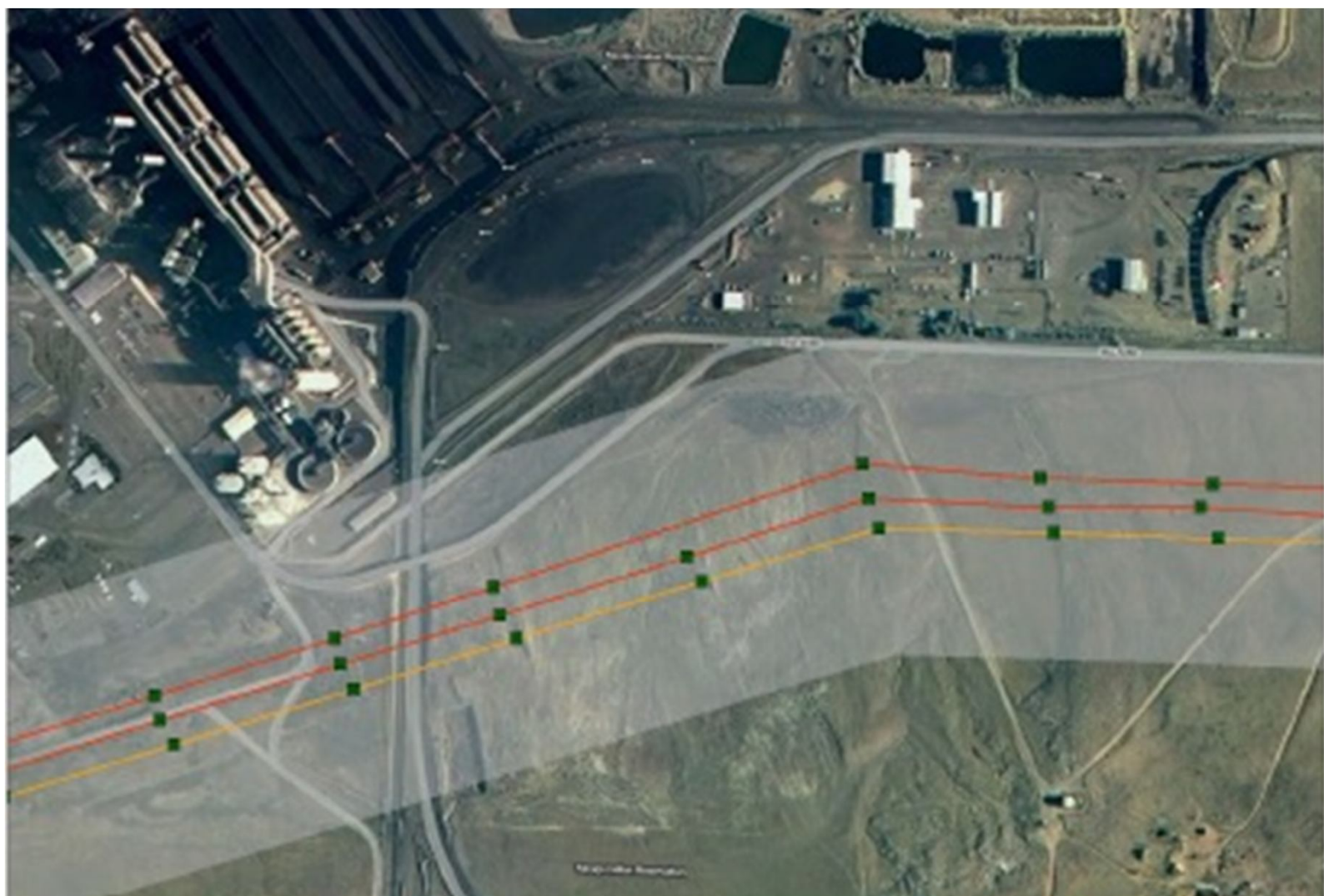
(2) Optimizing Electrical Lines Routing:

- Installing transmission lines is very expensive.
- Straight route with minimum curves is desirable.
- Parameters should be considered.
 - Population around the area
 - Environment (soils/trees/geologic features)
- GIS used to analyze the areas for transmission lines with minimal environmental disruption, no health risks





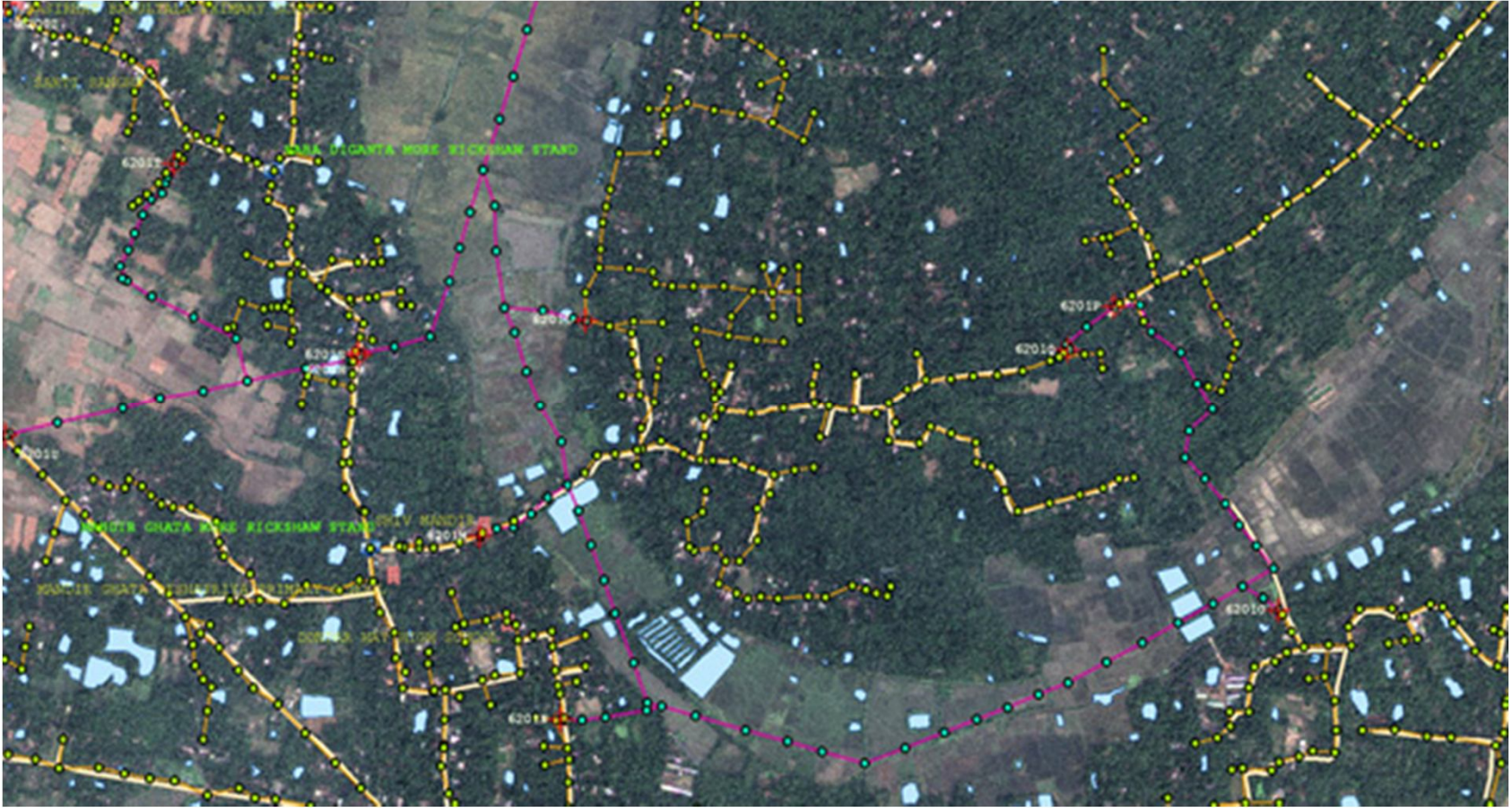




Application of GIS in Electrical Power System:

(3) Load Forecasting:

- Predicting the amount of future load growth and the location of load increment .
- Very important for power planning .
- GIS technology merge distribution system data with current land use data , transportation infrastructure, and urban centers data.



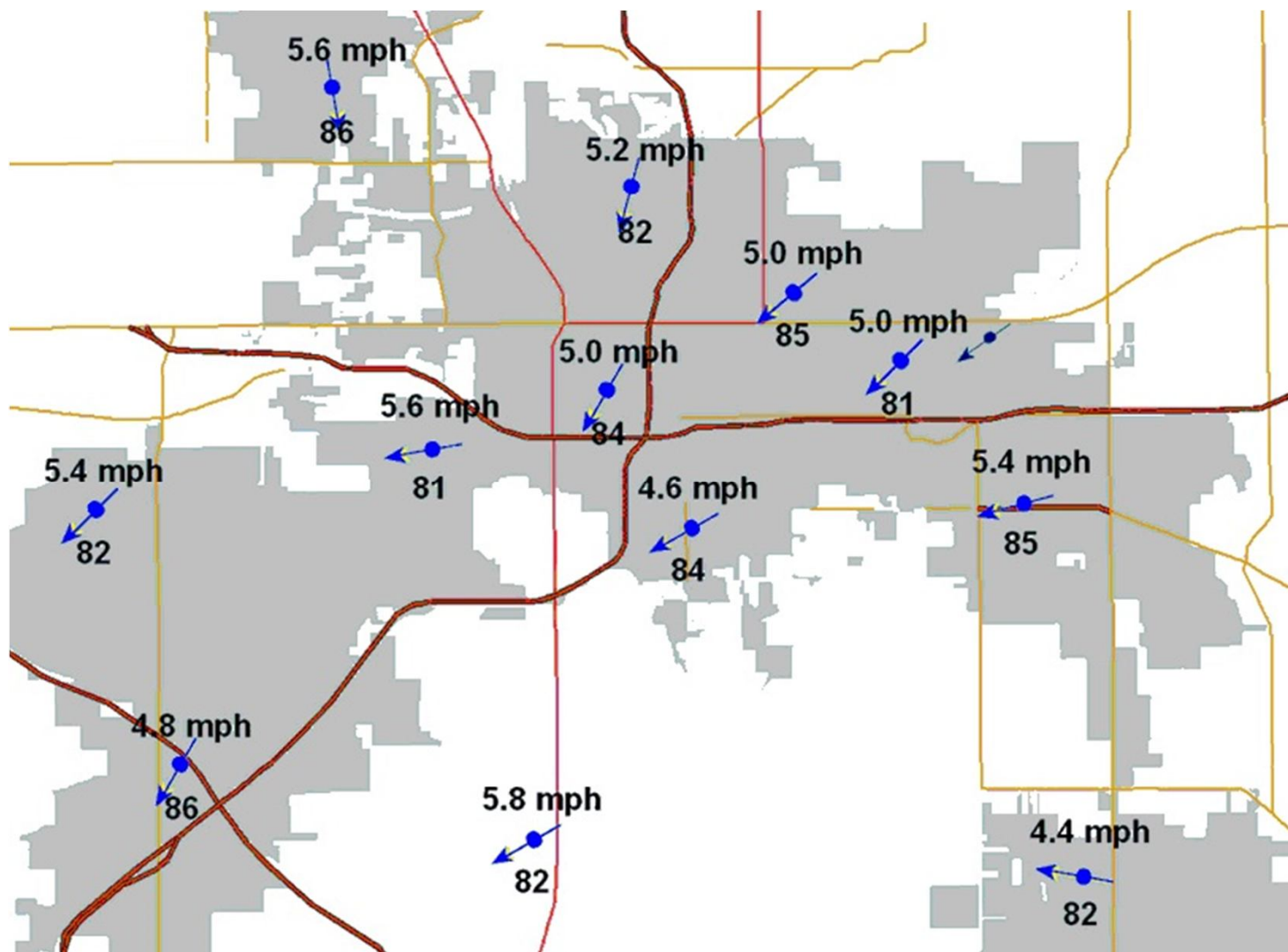
Application of GIS in Electrical Power System:

(4) Disaster Management and Locating Faults:

- GIS relates transmission network conditions with other relevant information such as weather, vegetation growth, and road networks.
- Identification of a weather moving towards an area enables to determine transmission facilities in risks
- Necessary actions will be taken after determine the location of contingency (emergency).









Findings:

- (1) To utilize GIS in power system, power system data (load flow, network assets, customers' information, billing system, etc.) must be integrated with GIS.
- (2) Planning transmission lines and disaster management are affected by residential and environmental conditions, so GIS plays significant role in study and analyze these factors.
- (3) GIS very useful in electrical power system , when we connect the information that we have with the maps, we get better visualization.

Conclusions:

Application of GIS can be conclude as:

- (1) Integrating between system data and GIS can be used for Energy Audit, Load Management, Network Planning and analysis
- (2) Determining the optimum, shortest, and most economic path for transmission lines
- (3) Forecasting and predicting the amount of power needed in the future.
- (4) Locating the faults and prevents the disasters

Recommendations:

- (1) Train some of the electrical engineers in the power utility on the use of GIS, since it has been very useful and has several applications.
- (2) GIS and GPS can get more involved in more application in electrical system in future, like real-time wide area measurements using GPS as a trigger.

THANK YOU