GIS and Transmission Siting:
Easy, Reliable, Defensible, and Repeatable Process

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What is CapX?
Why is it an important project?

- Joint initiative of 11 transmission-owning utilities
- 4 projects – over 600 miles
- Meeting increase demand of 4,000 to 6,000 megawatts (MW) by 2020
- Updating transmission infrastructure last done in 1970s
- Meet Minnesota State Renewable Standard (RES) of 20% by 2025
Why GIS is needed?

Initial project corridor 6-12 miles wide, 240 miles long, 15 counties (Huge!)

- Efficient data management system: data collection and analysis
- Inherently spatial in nature
- Transparent and repeatable process

GIS best process to accomplish
Project Background: South Dakota to Twin Cities, MN

- Project corridor cross 11 Counties and 23,000 landowners
- Define endpoints and intermediate connections
- Refine route corridors and route segments
- Compare and evaluate route section chains
- Develop Preferred and Alternate Route
Field Data Collection

- Fieldwork observations of over 15,000 data points
- Gather data from local, state, federal agencies
- Gather data from general public and non-profit organizations
- Over 100 data layers
Public Involvement: Data Collection

- Traditional maps
- Interactive maps and data collection
Public Involvement: Scoping / Agency Task Force

- Keep count of map requests by export to PDF
  - Identify areas of large public interest
  - Gauge interest across project area
- Use mobile ArcMap stations to record data
- Provide feedback to Agency Task Force on alternatives identified
Public Involvement: Public Education

- Over 25 years since last large transmission project
- Visualizations are worth 1000 words
Route Development: Make it easy from the beginning

- Digitize segments: west to east, south to north
- Segments assigned unique identifier; ie BL123, LV10
  - Geographical (substation to substation)
  - Sequential number (0 →)
- Assign single right-of-way category (1T, 2A, 3)

West to East

Left

Right

Brookings County Substation (B)

Lyon County Substation (L)

ROW Type – 1T
(Township Road)
Route Development: Compare route sections by mega segments

- Weed thru over 1800 route segments
- Evaluate suitability of each route segment: the good, the bad, the ugly
- Daisy chain segments to create mega segments and route sections
- Compare preliminary route sections
Model Builder: Take it to the next level

- Flexibility to multi-task and run process
- Analysis completed in consistent manner
- Output is renamed to 8 character file based upon analysis; R1 = route, W9 = ROW, W0 = centerline
- Keep processing to objective, not subjective

Reassign to 8 character

Proposed “Intended” Centerline (W0)

ROW Corridor (W9)

Route Corridor (R1)
Route Development: Access Database becomes a power tool

- Link Model builder DBF output to Microsoft Access
- Establishes standardized nomenclature (streamlines)
- Define route in a single master table (mega segment)
- All GIS data based on segments
Route Development: Access makes it easier

- Consolidate route into one table, all queries updated
- Easy to compare sections
- Flexibility to expand based upon GIS segment
  - Preliminary segments = over 1300
  - Final segments = over 1900
- Access 2007 advanced forms (end user output)
Final Routes

- Based on MN State Routing Criteria
- Based on data (natural and human environment)
- Route Permit Application
  - Route impact tables list individual segments
  - Segment map and impact table
  - Transparency
  - All segments considered
Conclusions

- More efficient
- Regulators liked it
- Public approved
Conclusions

- Lessons learned
- What more we should do
Conclusion

- Questions?

- Thank you

www.capx2020.com

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