

WHITE PAPER / **TRANSMISSION LINE ROUTING PROCESS**

A BETTER ROUTE: HOW TO CONDUCT A TRANSPARENT, DEFENSIBLE EVALUATION PROCESS

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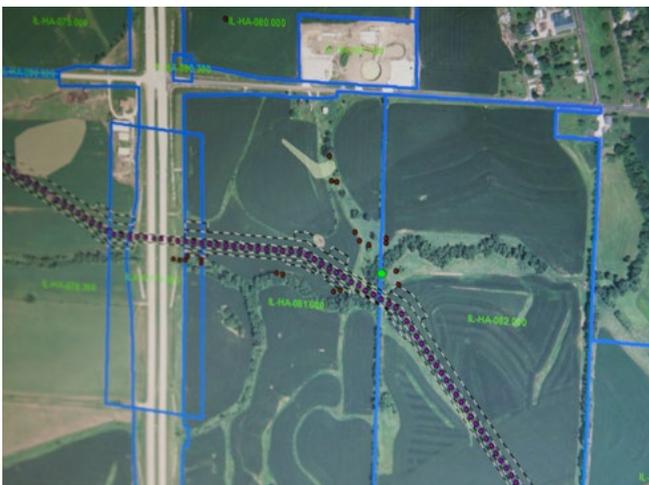
Choosing the optimal route for a new electric transmission line can be complex and controversial. To achieve transparent, defensible results, a wide range of social, environmental and economic issues must be addressed in a balanced evaluation process that identifies viable alternatives and leads logically to the selected route.



To be effective, the team involved in a transmission line route selection project should never jump to conclusions. Rather, route selection calls for a comprehensive, methodical process that begins with the team establishing its objective.

From a customer service perspective, all route selection processes have a common objective: They should identify a route that will deliver reliable service to the point of need. Multiple social, environmental and economic issues complicate this objective and must be considered as the selection team further refines its objective. In other words, the route selection process should not just satisfy customer service needs. It should also yield an economical route that minimizes social and environmental impacts while meeting the project's engineering requirements. Because no single route can satisfy everyone, the team also must be pragmatic and select a route that is generally acceptable to most parties.

The specific steps that must be taken to reach this conclusion often vary from one project to the next. While flexibility is key, these eight basic steps serve as a model process to garner the necessary support.



Preliminary route alternative identified as part of a routing study.

STEP 1: DEFINE THE PROJECT/ STUDY AREA

Basic project parameters should be defined before route selection begins. Routing specialists must know the project parameters for voltage, structures, end points and intermediate points, if applicable. They also must know the primary considerations that will define the study area, including the location of possible alternatives, those alternatives' likely zone of impact, and the boundaries of affected political jurisdictions. These study area boundaries are important because they limit the range of alternatives considered and define the participants in public involvement.

STEP 2: INVESTIGATE AND COLLECT DATA ON THE STUDY AREA

After the study area boundary is established, the next step is to collect information on the study area. The objectives of this investigation are twofold: to inventory area resources and to identify potential routing issues of concern. Data collection typically involves the use of maps, aerial imagery, existing reports and internet searches.

STEP 3: SEEK AGENCY AND PUBLIC INPUT

It is important to seek input from local, state and federal agencies and the public throughout the routing process. The public can include area residents or landowners, local agencies, officials and special interest groups. To achieve effective public involvement, it is essential to:

- Establish and communicate the need for the project.
- Provide an avenue for public input.
- Demonstrate that input is used in decision-making.

Public involvement can take many forms, from formal presentations to telephone hotlines. It begins with contacting government agencies, often continuing through regulatory hearings as needed, and may continue throughout the project. Sometimes it may continue throughout the project. Public workshops are an especially effective way to obtain routing input. These involve a publicly advertised project open house event consisting of stations with route maps, aerial photographs,

typical structures and other exhibits. The primary benefit of an open house is that it allows for personal, one-on-one conversations. It also facilitates more constructive interaction and personal information-gathering than a traditional podium-style setting. Participants can be invited to provide input, such as completing project questionnaires.

STEP 4: IDENTIFY OPPORTUNITIES AND CONSTRAINTS

The preliminary investigations described above serve an important purpose: They help routing specialists identify suitable areas for the project routing, as well as areas to avoid. Data collection also can identify opportunities and constraints that should be considered when developing preliminary route alternatives.

Routing opportunities include railroads, roads, transmission lines and other existing linear infrastructure where new routes potentially can be co-located, minimizing their impact to society and the environment.

This step also should identify areas of constraint that could affect the location of route alternatives. Areas of constraint typically can be categorized as one of the following:

- **Prohibitive:** Constraints such as airports, critical habitats and landfills must be avoided because of regulations or inherent problems associated with them.
- **Restrictive:** These constraints include national forests, historic districts and other regulated lands that might require significant mitigation.
- **Prudent:** To minimize controversy, schools, local landmarks and other sensitive properties are typically avoided, when possible, despite no regulatory restrictions governing them.

STEP 5: IDENTIFY PRELIMINARY ROUTE ALTERNATIVES

Armed with knowledge of the study area's issues and resources, along with agency and preliminary public information findings, a routing specialist's next step is to identify preliminary route alternatives. The objective here is to find routes that avoid constraints as much as possible, while co-locating along or running parallel to existing linear infrastructure where feasible.



Route alternatives that avoid all constraints are rarely found. It is important, therefore, to focus on those areas with the fewest constraints and identify multiple alternatives so an adequate number of choices is available later.

STEP 6: CONDUCT A FIELD REVIEW OF ROUTES

After preliminary routes are identified, the project team typically conducts a field review of the routes along publicly accessible roads. The purpose is to verify route feasibility and facilitate further screening and evaluation. This review should be conducted with the social, engineering and environmental impacts of each route alternative in mind. For difficult-to-reach areas, aerial reconnaissance also can be used.

STEP 7: EVALUATE SELECTED ROUTE ALTERNATIVES

Route evaluation begins once a defined set of route alternatives is identified. Depending on the project's complexity, many techniques are available for comparing routes. For most route evaluations, the process begins with identifying and quantifying the evaluation factors (e.g., engineering, social and environmental impacts) and/or issues driving decision-making. Weights typically are assigned to reflect their relative importance to the project. The analysis should also incorporate other, nonquantifiable factors.

Public input should be incorporated into route evaluation. Public questionnaires and comments can help improve the data, define issues, refine factor weights, adjust routes and support decision-making. An effective public involvement program enables better input, better decisions and less opposition.

The techniques commonly used to compare routes fall into the following categories:

- Route data comparison
- Ordinal ranking (first, second, third)
- Relative scoring

The choice of analysis technique depends on a combination of factors, including project complexity, level of controversy, state public utility commission requirements, and the number of identified alternatives. When using weighted formulas to score each alternative, it can be tempting to use these scores as the determinant for selecting the final route. These techniques, however, should be viewed as screening tools. They help narrow the route options to a few relatively good choices.

While the analysis process should be efficient, extra scrutiny is needed if the project is considered highly controversial. When there is greater potential controversy, extreme diligence should be exercised in following a well-documented, defensible and transparent methodology.

STEP 8: MAKE THE FINAL SELECTION

When the route evaluation is complete and public input has been incorporated into the routing process, a final route alignment is selected. This decision often is made difficult by explicit or implicit trade-offs between the final route alternatives. At this point, unique situations

and other intangibles can come into play. Not sure we need future land use here. The final decision is usually an intuitive process. It requires consideration of all the quantitative and qualitative information the routing team has gathered over the course of the study. The more comprehensive the project team and the more disciplines represented on the team throughout the routing project (i.e., legal, environmental, engineering, land acquisition, construction, operations and maintenance, etc.), the smoother the project should go once appropriate approvals are granted to construct the project.

In the end, routing is a complex process that seeks an ideal route that balances multiple competing goals. Because it involves both quantitative and qualitative factors, there is no single rigid system or formula that delivers a universally acceptable result.

The key to effective route selection is to make an honest effort to determine and respond to the issues that matter and minimize the potential adverse impacts. People appreciate transparency and fairness. Success depends on it.

BIOGRAPHY

CHRIS WOOD, a principal and project manager, serves as department manager for environmental studies at Burns & McDonnell. His responsibilities include client and agency coordination, report writing, field studies, data collection and analysis, project and department management, public involvement, permitting, and expert testimony. Over the past two decades, his work has included transmission line routing, site selection, land use, and other environmental studies and analyses for projects across the country.