

Providing Data Sets that Enable Accurate Planning, Scheduling, Measuring and Reporting

Surerus Murphy Joint Venture (SMJV) uses Geographic Information System (GIS) technologists and analysts find novel solutions to business challenges, mapping an entire project footprint with layered information that helps decision-making, finds cost and scheduling efficiencies, and helps with environmental and regulatory compliance. GIS data can be isolated, compared, tracked and measured to populate dashboards that support:

- Business intelligence
- Project planning and execution
- Client collaboration

GIS IS USED TO DRIVE COST AND SCHEDULING EFFICIENCIES:

- GIS data is used in the bid phase to better understand the work, enhance bid accuracy and execute the project more efficiently.
- GIS provides thousands of real-time data points to workers on site on their mobile devices, saving time and money and improving safety.

GIS IS PROVIDING A COMPLEX, LAYERED, HOLISTIC INFORMATION OF A PROJECT FROM THE LENS OF KEY INFORMATION POINTS:

- **GIS maps provide historical and current data to give insights on every aspect of a project, including:**
 - Construction progress
 - Welding productivity and repair rates
 - Human resources required for particular tasks
 - Terrain-specific earthworks progress and costs
 - Field locations of consumable materials and fleet equipment
 - Consumption rates for materials
 - Environmental data (weather, stream flow rates, locations of ecologically-sensitive areas, etc).
- **Real-time data mitigates execution risks and supports compliance with design, stakeholder commitments, environmental and regulatory commitments, and more.**

Investing in GIS demonstrates one way of providing assured delivery as GIS enables better information that informs better decision making.

“Everything is related to everything else, but near things are more related than distant things.”

— Tobler’s First Law of Geography

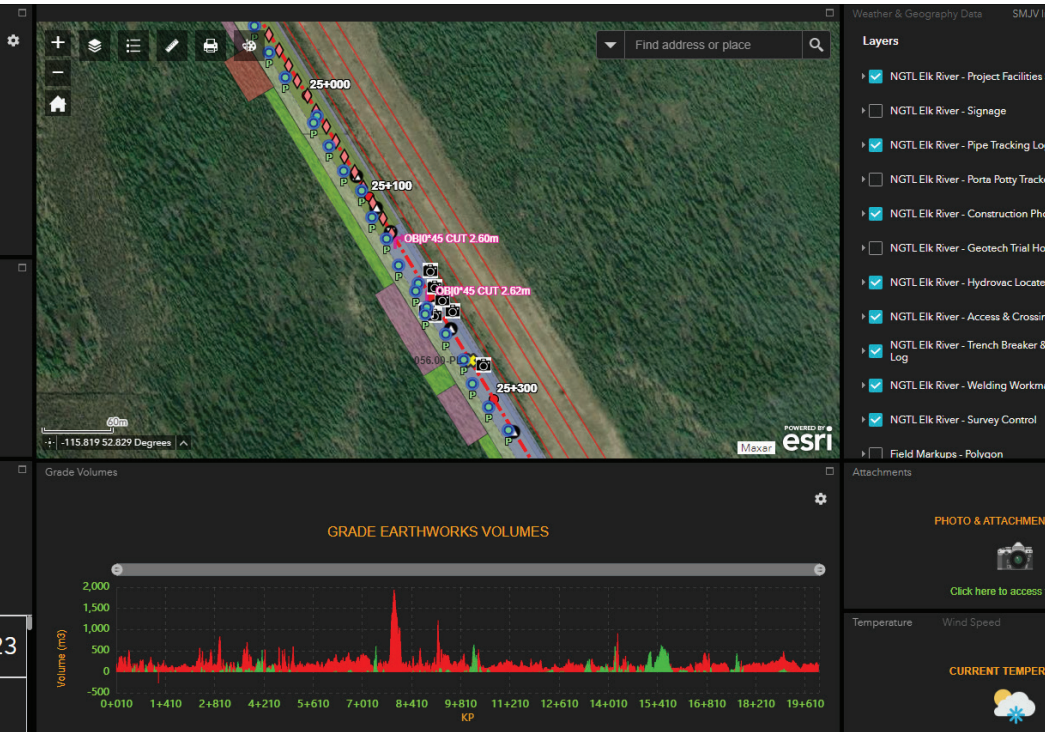


Project Support

Surerus Murphy project teams interact with real-time construction and project data. Customized dashboards streamline traditional data management, project statistics and reporting.

PROJECT AREAS THAT GIS SUPPORTS INCLUDE:

- Compliance reporting and responsibilities to meet environmental standards and commitments
- Construction progress
- Actual versus estimated costs
- Clean-up and reclamation
- Project site navigation and wayfinding

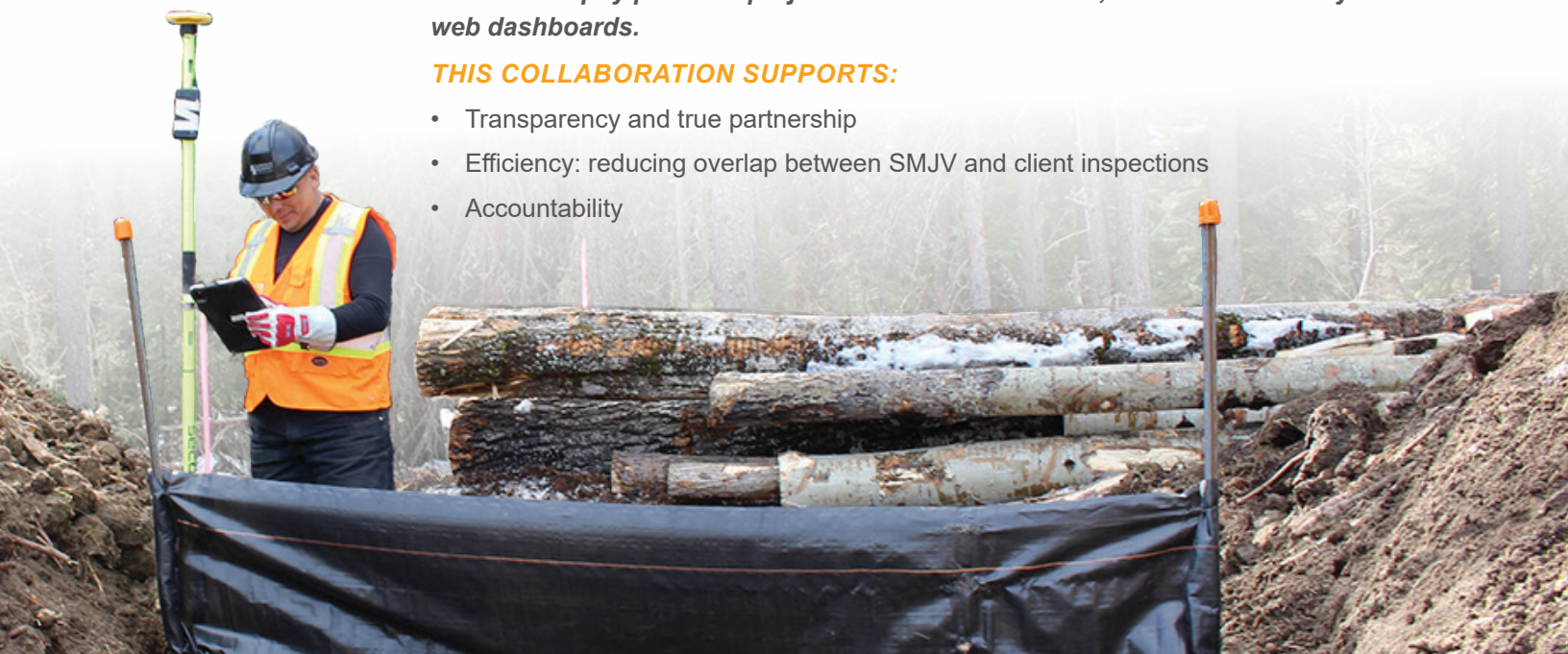


Client Collaboration

Surerus Murphy provides project owners with GIS data, statistics and analytics via live web dashboards.

THIS COLLABORATION SUPPORTS:

- Transparency and true partnership
- Efficiency: reducing overlap between SMJV and client inspections
- Accountability



Stories from the Field

GIS REPORTING TRIGGERS SAME-DAY REPAIR ON A DAMAGED SILT FENCE

On TC Energy's Elk River Project, results of water course inspections were entered in the GIS database, providing documentation, photos, and timestamps of current conditions. The inspections were shared with the client in real-time via a digital dashboard, rather than waiting for the next project meeting. One particular inspection of a silt fence protecting a creek crossing revealed the fence to be damaged, allowing fine granular material to run off into the waterway during a rainfall. The GIS reporting triggered a same-day response to replace the silt fence and resume its protection of the fish-bearing creek.

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USING GIS TO PROVIDE DIGITAL WELDING REPORTS DRIVES PRODUCTIVITY AND EARLY MAINTENANCE OF IRREGULARITIES

Digital reporting of welding progress on mobile devices eliminates paperwork and allows welding inspectors to be more productive and work full days in the field, rather than return to project offices early to complete paperwork. Welding data also quickly reveals trends in failed welds that allow for an early intervention to correct an issue, be it personnel-, terrain-, equipment- or material-related. The data can provide early insights when problems arise and enables the team to perform analysis on repair rates against benchmarks.

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GIS USED TO INFORM A PROJECT APP FOR BETTER COLLECTING AND REPORTING OF INFORMATION IN RURAL AREAS

On the Elk River Project, Surerus Murphy's engineering technology team created an iOS- and Android-compatible mobile app that supports navigating, collecting, and editing project data, and replaces the traditional workflow using Google Earth on mobile devices. Documents can be attached to features in the map and taken "offline", allowing continued functionality in limited cell service areas. This app allows project managers, foremen, crews and subcontractors real-time access to important project updates and maps. Soon, the team will have all of this data run through machine learning and Artificial Intelligence (AI) systems, aiding SMJV's management and estimating teams to make swift and precise data-driven decisions in almost all aspects of its operations.



OUR USE OF GIS ENABLES US TO SERVE OUR CLIENTS WELL

Surerus Murphy's innovation in using GIS is just one way the organization demonstrates its commitment to being the contractor of choice for its people and its clients by delivering safe and quality work. Surerus Murphy's shared values: "Never Harm, Trust, Integrity and Assured Delivery" make the organization a staple in the pipeline industry and every community in which it works.

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