McElhanney
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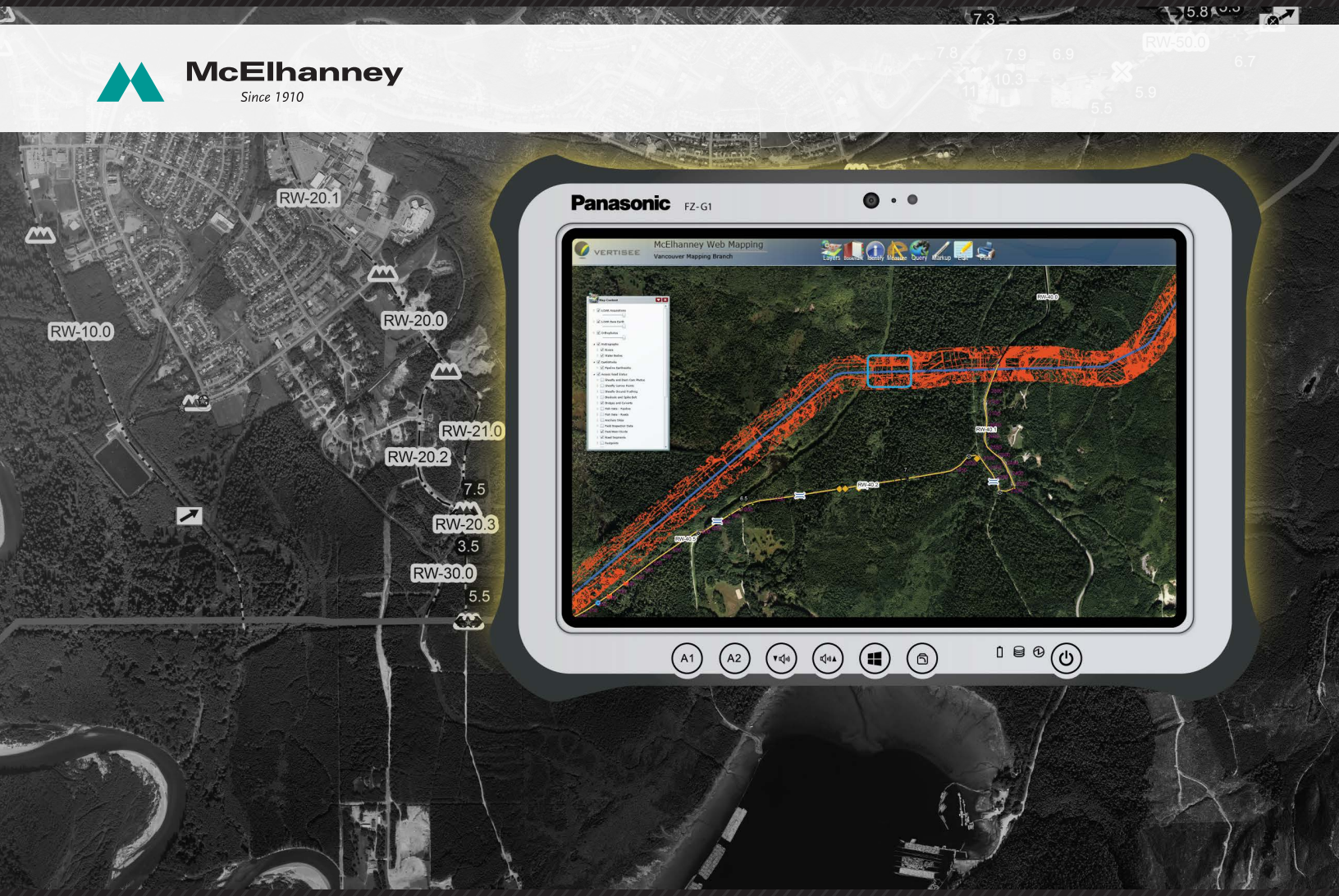


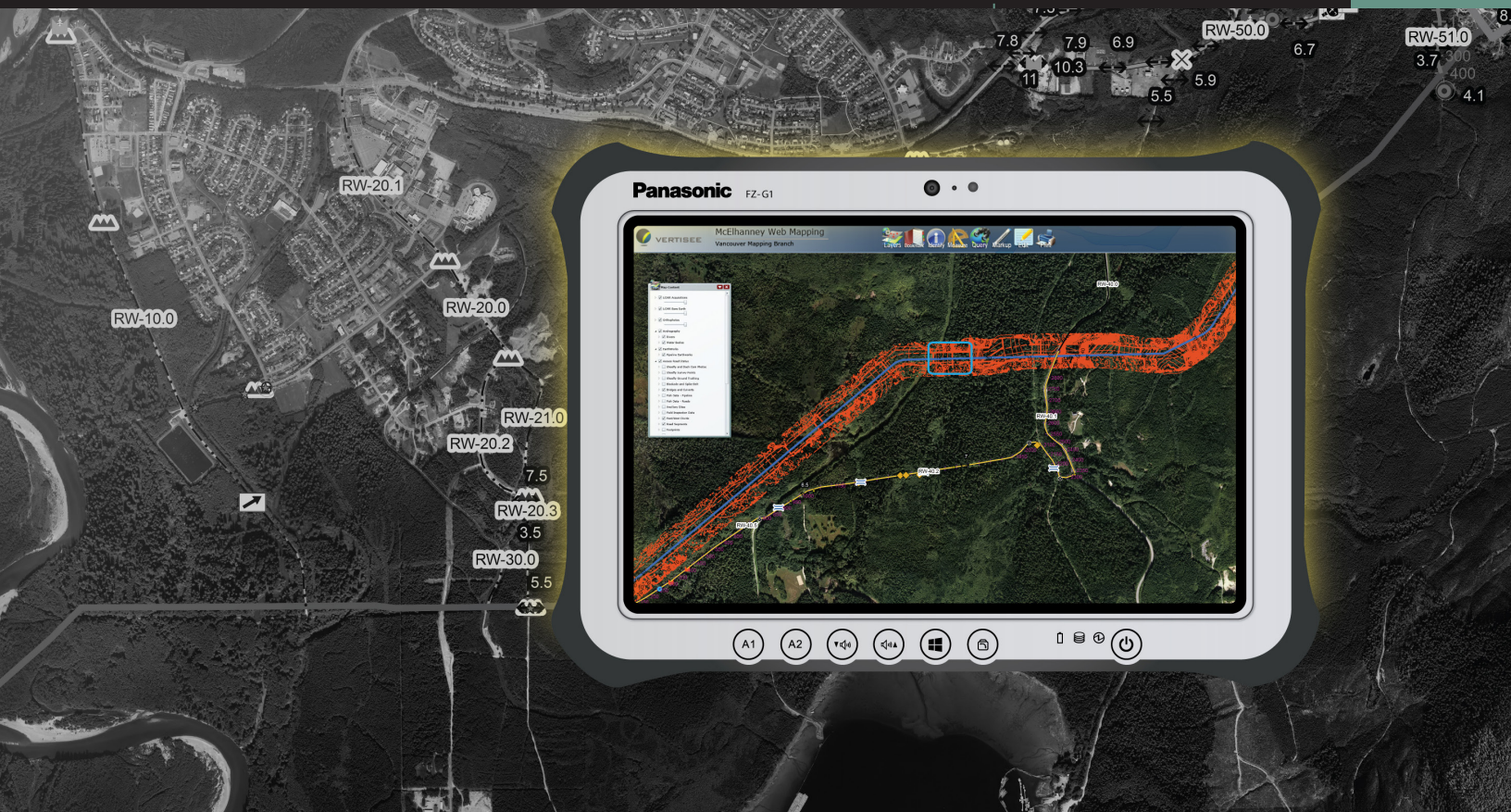
Canadian Consulting Engineering Awards 2015

Mobile GIS for Coastal GasLink Project

Client: TransCanada

Award Category: E. Natural Resources, Mining, Industry & Energy

Contents



Mobile GIS for Coastal GasLink Project

Full Project Description

SUMMARY

TransCanada PipeLines Limited required an inventory and assessment of over 2,000km of road network adjacent to a 650km pipeline corridor across northern BC. Critical project milestones required that large amounts data be collected with minimal site visits, processed rapidly, and made available to decision-makers within a short time frame. McElhanney met this challenge with a unique combination of mobile mapping and GIS technologies.

Vertisee was a great tool to have up to date information at our fingertips and allowed us to be able to be looking at the same information at the same location with everyone. Vertisee allowed efficiency to be greatly increased by having all information up to date readily available with a graphical base that allowed for better interpretation…

-TransCanada Corporation

PROJECT HIGHLIGHTS

1. INNOVATION

TransCanada is developing the Coastal GasLink Pipeline, which will transport liquefied natural gas (LNG) from northeastern BC to a proposed facility near Kitimat, BC.

TransCanada needs to ensure reliable road access to the pipeline corridor for project planning, design, construction, and ongoing maintenance. McElhanney was retained to assess and inventory the 2,000km access road network and related infrastructure – including hundreds of bridges and culverts – and present the data in a format useful to decision-makers.

McElhanney met the challenge with a unique combination of mapping technologies and diverse skills in environmental, engineering, surveying, and geographic information systems (GIS). GPS-enabled tablet computers were used to collect data and asset photos, and georeferenced route photos were automatically captured by dashboard cameras. The data was delivered using Vertisee, McElhanney's in-house, web-based mapping software.

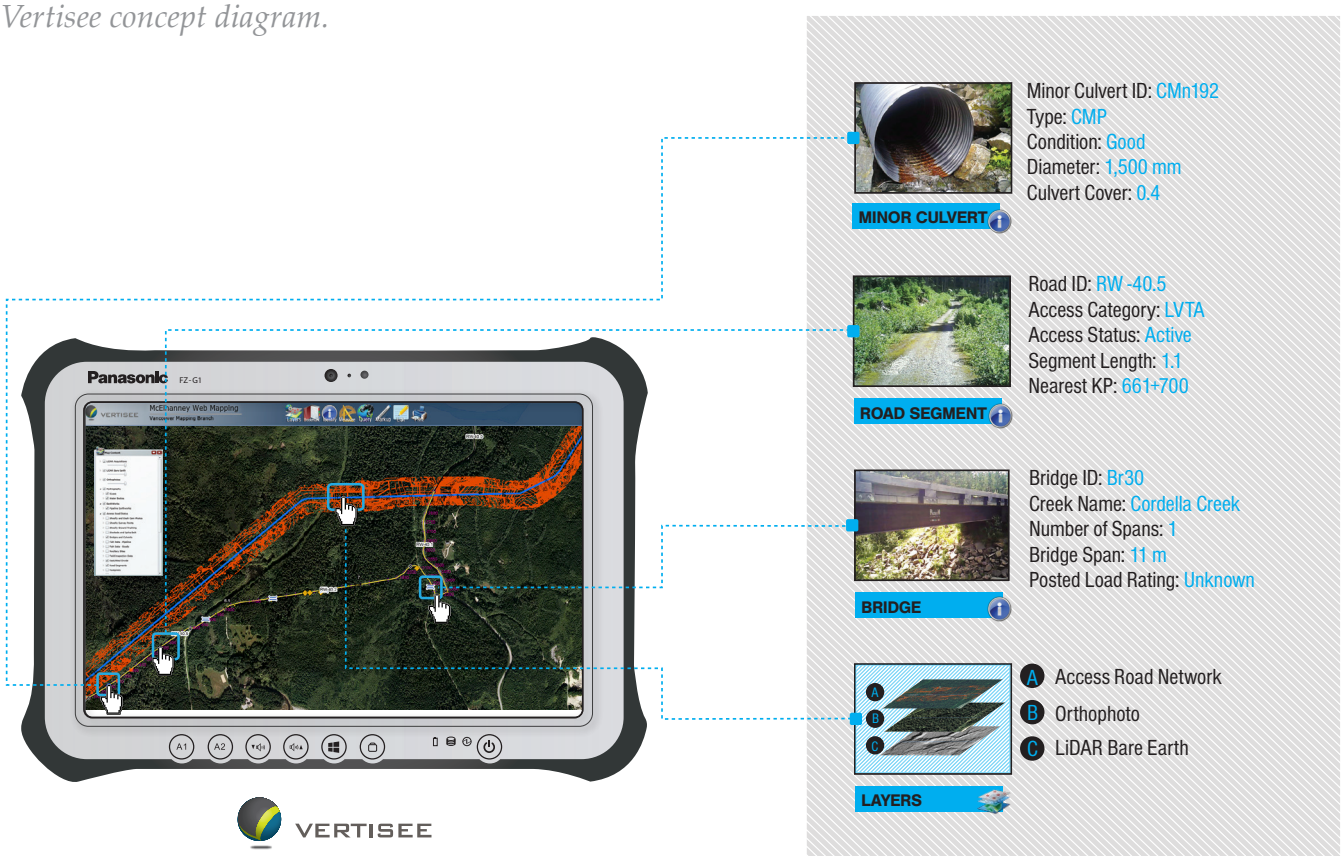
Complex project requirements dictated the involvement and coordination of over 80 employees from eight different McElhanney branches, the majority of whom did not have a GIS background and included engineers, surveyors, and biologists. This was mitigated by developing a customized interface for Vertisee, such that minimal training was needed for data collection and delivery.

The success of the project relied heavily on the combined disciplines and expertise, both technical and regional, from multiple branches of the company.

The project serves as a model for future multidisciplinary projects requiring a large, time-sensitive, and minimally invasive data collection effort. No engineering project undertaken by McElhanney previously had made use of workflows combining mobile mapping and automated dashboard cameras for data collection, GIS and multiuser database technology for data processing, and Vertisee web-mapping for data delivery and presentation. The integration of these elements was critical to the success of the project. Additionally, McElhanney was able to customize Vertisee to meet the specific needs of

the client and the project, resulting in rapid data delivery to TransCanada. It has also resulted in the proliferation of new and highly efficient technology across McElhanney's branches, extending its benefit to many of our clients. This demonstrates the expanding role of engineers to integrate GIS and other technologies and knowledge, particularly for engineering and surveying projects spanning large areas.

Vertisee concept diagram.



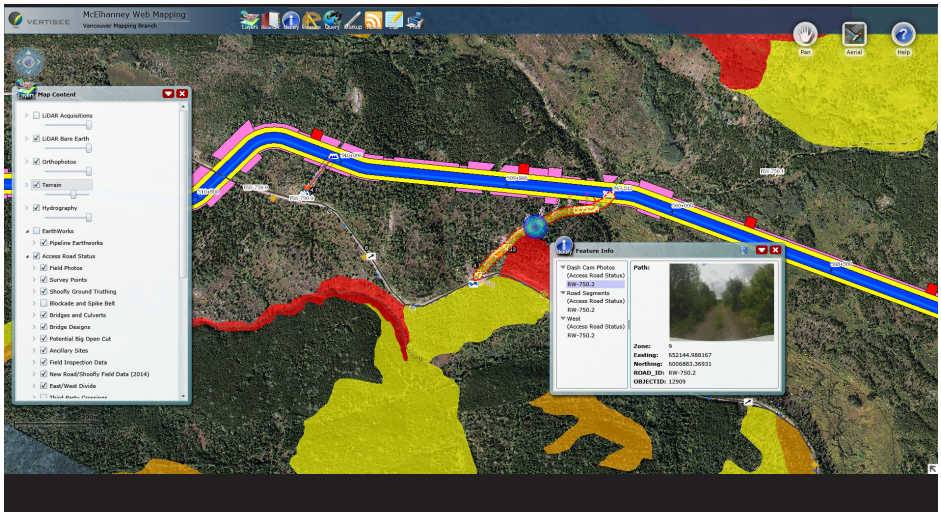
McElhanney collected data for 14,000 unique assets along the pipeline corridor, including 26,979 photos and storing 1,000,000,000,000 bytes of data.

2. COMPLEXITY

This was a very complex project, requiring involvement from multiple professional specialties and numerous McElhanney branches. It is the largest interdisciplinary project that McElhanney has undertaken to date. This involved a massive data collection effort within a very short time frame and across a vast geographic area to meet critical project deadlines. McElhanney collected data for 14,000 unique assets along the pipeline corridor, including 26,979 photos and storing 1,000,000,000,000 bytes of data.

McElhanney's GIS specialists developed a unique interface to simplify data collection, cataloguing, and sharing. Field crews used mobile GIS tablets to locate, record the condition of, and photograph 22 different asset types, such as roads, bridges, and culverts. All data was uploaded directly into Vertisee, making it available to the entire project team. McElhanney implemented a highly efficient and streamlined workflow, from data collection and processing to delivery. The use of Vertisee allowed decision-makers in multiple locations to view the data within minutes of it being processed.

Although GIS technology was used in all aspects of the project, the majority of employees involved did not have a GIS background. This was mitigated by developing a customized interface for Vertisee, such that minimal training was needed for data collection and delivery. This also achieved greater standardization and decreased time needed for site visits or for revisits. GPS dashboard cameras were used to automatically capture route photos, thus eliminating the need to stop for photo acquisitions. In-office data processing time was reduced through multi-user database technology, which allowed for simultaneous data editing.



Vertisee allows users to choose which layers and features to display

3. SOCIAL AND/OR ECONOMIC BENEFITS

The Coastal GasLink Pipeline Project has created numerous jobs across British Columbia and will boost the overall economy of the province. McElhanney alone has hired more than 80 new staff over the last year, many attributable to this project and related work.

McElhanney collected data for on 221 bridges, 239 major culverts, and 2,000km of access roads. All assets are displayed in Vertisee, within their geographic contexts, and are viewable on a basemap of orthophoto imagery and/or LiDAR data. Users can easily click into any asset to view all available information – or, the “data behind the data.”

McElhanney placed real-time information in the hands of project managers, designers, decision-makers, and other stakeholders. Regardless of their location, users can instantly access data through any web browser and generate inventory, condition, and other reports to make decisions for day-to-day operations and long-term planning. All project data is maintained in one location and is always live, dynamic, and up-to-date.

By giving decision-makers such as engineers, designers, and contractors access to the most current and accurate data, they can make the best decisions that save both time and money and support good safety practices.

4. ENVIRONMENTAL BENEFITS

All data was collected digitally, which greatly reduced the amount of paper products used for this project.

Because the pipeline crosses environmentally sensitive areas, TransCanada has made a strong commitment to environmental stewardship. McElhanney's data collection methods were selected to be minimally invasive. Additionally, the use of technology reduced field time, resulting in a lower environmental footprint from the data collection effort. An example of this was the use of LiDAR technology to obtain accurate terrain information reducing tree-cutting required by conventional survey.

By using the mobile mapping tablet technology, McElhanney did not have to continually print paper maps as would have been done with traditional survey data collection. All data was collected digitally, which greatly reduced the amount of paper products used for this project.

The project's carbon footprint was significantly reduced through the use of the mobile mapping tablet technology coupled with the dash cameras mounted on each vehicle. If something was missed in the field, it was often already captured in an image or data plotted onto the Vertisee web map, reducing the need for follow-up field visits. By using this technology, the consumption of fossil fuels and release of greenhouse gas emissions from traveling to sites was greatly reduced.

Field crews collecting data on GPS-enabled tablet computers

This project recently won an Award of Merit at the 2015 ACEC-BC Awards for Engineering Excellence gala.

5. MEETING CLIENT'S NEEDS

TransCanada needed to ensure reliable road access to the pipeline corridor for project planning, design, construction, and ongoing maintenance. An up-to-date inventory and assessment was required of the access road network and associated infrastructure. The data will be used to identify potential transport routes, plan required upgrades and new construction, determine applicable design standards and guidelines, and procure any requisite permits.

To meet critical project milestones, the data needed to be collected and processed within a very short time frame, and then quickly shared in a format that was useful and easily accessible to decision-makers. Additionally, the data collection process needed to be cost-effective and minimally invasive. This required collecting geographically referenced data and photographs for 22 asset types, including more than 2,000km of access roads, and hundreds of bridges and culverts.

McElhanney met the challenge with a unique combination of mapping technologies and diverse skills. A project-tailored combination of software and hardware solutions resulted in a fast and minimally invasive field component and rapid in-office data processing and delivery of information to project decision-makers.

McElhanney's field staff used GPS-enabled tablets to quickly collect standardized data and associated asset photos. Georeferenced route photos were automatically captured by dashboard cameras at 200m road intervals. The data was processed in McElhanney's in-house GIS division and shared using the Vertisee platform. Vertisee was chosen for its customizability and ease of use, allowing decision-makers to leverage spatial data without the need for GIS training.

McElhanney receiving a 2015 ACEC-BC Award of Merit.
In the photo: Top row, left to right — Catherine Fritter (ACEC-BC), Jim Christie, Allan Russell, and Keith Sashaw (ACEC-BC). Front row, left to right — Brendan Walashek and Scott Reid (TransCanada).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