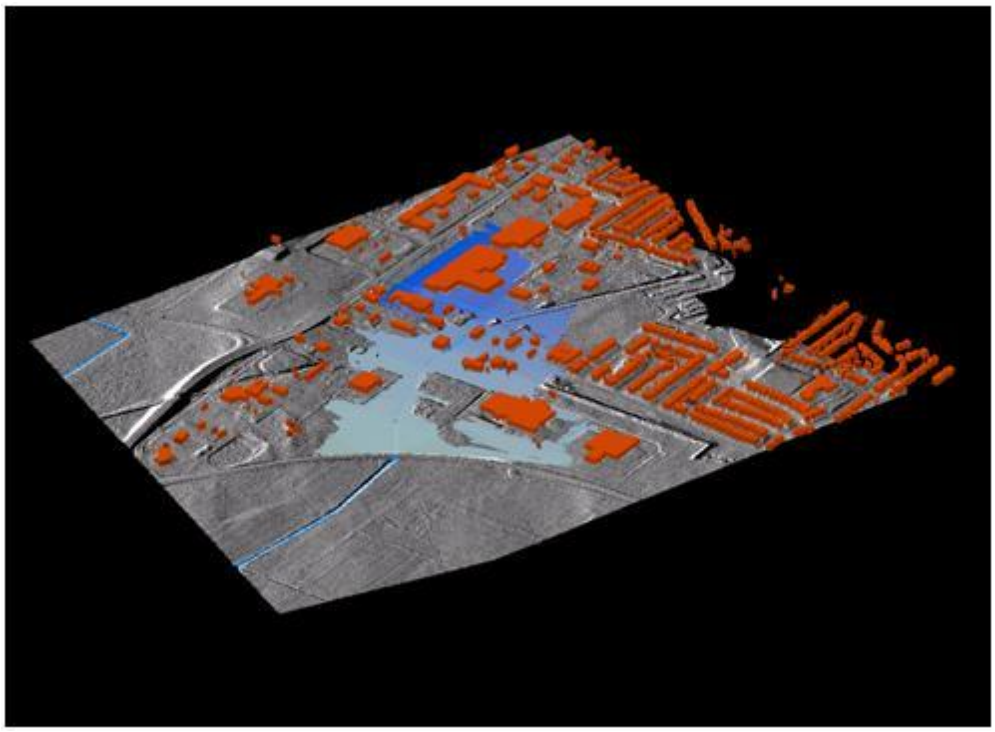
Innovative Approaches in Modernizing Floodplain Mapping

Solutions in Protecting People and Property



Oblique view of inundated areas in semi-urban floodplain (GRCA, 2013)

High Level Results

- Defensible flood lines produced using 3D geospatial data tied together at known and absolute levels of accuracy
- Dynamic data which allows for updating and the modeling of multiple flood events using the same underlying data
- Highly accurate 3D geospatial flood model enabling for advanced water resource engineering analysis

Ganaraska CONSERVATION

"Flood line mapping is an important tool which a community can utilize to protect its people, property, and economic prosperity. The accuracy of the flood lines produced is of the utmost importance."

Ian Jeffrey
GIS/Remote Sensing Specialist, Ganaraska Region Conservation Authority

Project Context

The management of flood susceptible areas (floodplains) begins with the identification of which areas should be classified as such. Flood line mapping is a multi-disciplinary analysis with the objective of understanding how areas may be flood prone under certain flood events. Flood lines produced are required to be of the highest accuracy as they are at the very core of efforts in protecting people and property.

Challenge

Floodplain management is an important practice in protecting people and property from disastrous flood events. Traditional approaches to flood line mapping have included manual and analog procedures which, though effective in the past, do not offer the same levels of accuracy as newer technologies.

Project Goals

Under the Ontario Ministry of the Environment's Showcasing Water Innovation program, the purpose of this project was to use modern 3D modeling tools to cost-effectively meet and exceed traditional flood line mapping standards. This project worked to achieve a thorough understanding of the strengths and limitations of modern geospatial data acquisition techniques.

Example of final flood lines in residential area (GRCA, 2013)

Solution

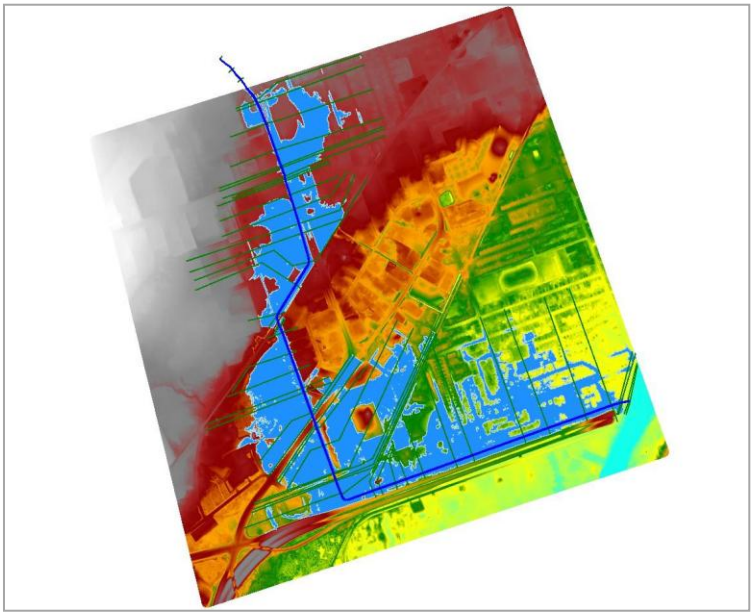
Quality control of geospatial data to be used for floodplain mapping was identified as being crucial in obtaining effective results. Through a combination of modern technologies, an innovative approach to floodplain mapping was established, using:

- Cutting-edge 3D topographic modeling
- LIDAR
- Digital photogrammetry
- Survey-grade Real-Time Kinematic (RTK) GPS surveying
- Precise Point Positioning location data service (provided by Natural Resources Canada)

For further information on the 3D geospatial modeling approach, please refer to the technical report and how-to manuals at: http://www.grca.on.ca/downloads/showcasingwaterinnovation/Supporting_Sustainable_Water_Management.pdf

Results

Geospatial components captured using the latest technology were shown to meet and exceed traditional floodplain mapping standards, thus, providing engineering analysis with a new stable footing for analyzing results. This floodplain mapping approach allows the production of highly defensible results, using unprecedented levels of accuracy and precision.



Geospatial model of urban flood area (GRCA, 2013)

Next Steps

The approaches developed during the completion of this SWI project will be further refined and used to deliver effective and efficient floodplain management options for the Ganaraska Region Conservation Authority as well as continue to provide support to other agencies.

Application for Ontario communities

The need for cost-effective and high quality flood line mapping is prevalent across Ontario. The approaches employed in this project are easily transferable to Ontario communities of all sizes in addressing common flood risk challenges.

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