

## Eliot Sinclair and Partners LiDAR Analysis

END USER: SCIRT  
CLIENT: Eliot Sinclair and Partners  
START DATE: 2011  
COMPLETION: 2012

### SCOPE:

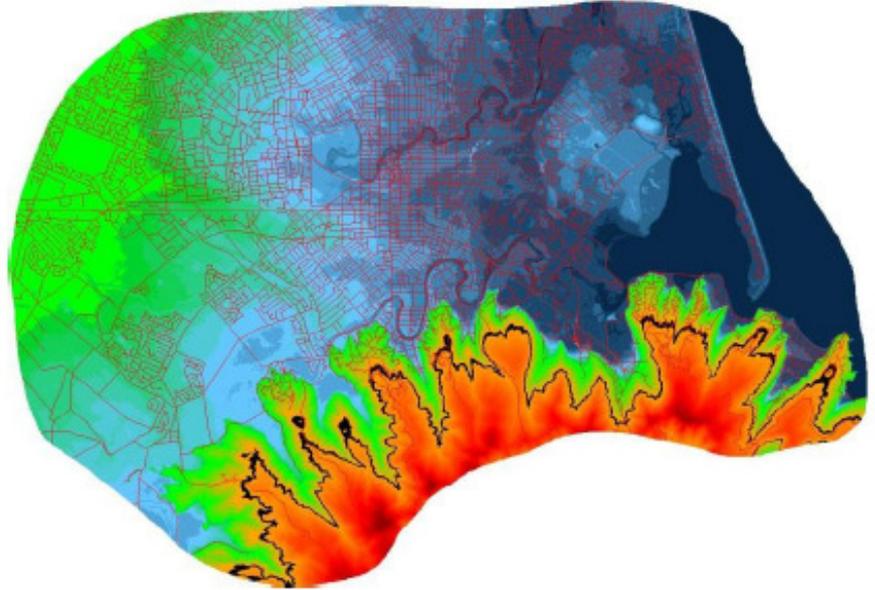
Analysis of large LiDAR datasets

### 12d DIMENSIONS:

- Survey

# Christchurch LiDAR, New Zealand

LiDAR Verification post Christchurch earthquake  
(2011)



LiDAR using 12d Model coloured depth polygons illustrating changes in elevation

## Project Summary

During the 2010 and 2011 earthquake sequence in Canterbury, a series of LiDAR (Light Detection and Ranging) surveys was commissioned to enable analysis with a pre-earthquake baseline LiDAR dataset collected in 2003.

As a result of the ongoing seismic activity, five LiDAR surveys were carried out by the end of 2011. These surveys followed each major earthquake greater than magnitude 6.0.

## The Challenge

The effective use of LiDAR datasets is dependent on an understanding of the inherent errors. Consideration of these possible errors when analysing datasets enables levels of confidence and limitations to be applied for specific uses.

Preliminary comparisons by the client between the LiDAR datasets and the published levels of official control marks suggested that the supplied LiDAR dataset was outside its stated accuracy tolerance.

Inherent problems arise when comparing the levels of control marks to LiDAR points, as the LiDAR points may not have been secured on the same ground surface as the control mark. Control marks are often buried under trees or vegetation and therefore not measurable by LiDAR.

The number of official control marks available after earthquake events reduced from 3500 to just 30 marks.

## The Solution

Computer upgrades to 64-bit operating system and 32GB RAM were necessary to allow the import and processing of 2 billion points.

12d automated macros were developed to complement 12d Model's TIN reporting functions to compare and report differences between LiDAR TINs and known topographical control points.

The height difference between LiDAR and topographical points was presented on plan using height range files to represent and illustrate the variance in colour.

## Result

*"We used 12d Model to not only achieve good results from the analysis, [which was] made possible by the existing reporting and macros we developed. We were able to impress the client in our ability to respond to their needs and provide a solution to a problem with unique timeframes and [a unique] audience..."*

*"Our results have been peer reviewed by an independent party and one dataset has also been re-tested (in another package). The results from the peer review indicated 12d Model was the right choice on the software package used to undertake this analysis and confirmed our results match those of the GIS software."*

Sam Cech  
Eliot Sinclair & Partners

## For more information

To find out more about how you can create better designs faster with the 12d Model solution for civil engineering design, visit [www.12d.com](http://www.12d.com).



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## Roads and Highways

12d Model's design option is the smarter solution for the design, modification and maintenance of Road and Highway projects.

Enjoy advanced 3D tools to design local and major roads, intersections, roundabouts, highways, interchanges and much more.



## Ports and Dredging

12d Model is the solution for port infrastructure and dredging, easily managing the very large datasets and complex volume calculations often required by these projects.

A complete range of flexible and customisable volume calculation tools allow teams to extract and present the information quickly and easily.



## Land Development

12d Model is the most versatile solution for the creation of sustainable land development projects, including residential, commercial and industrial developments, recreational areas, landfills, and agriculture projects.

Easily manage all aspects of your land development project from earthwork quantities, road design utilities and drainage design.



## Airport Infrastructure

12d Model provides a solution for the design, construction and analysis of new airports, as well as the upgrade and maintenance of existing runways and airport infrastructure.

Easily manage large airport infrastructure projects and share data across multi-disciplinary teams.



## Rail

12d Track has been specifically designed for the survey, design and construction of light, heavy and high speed rail projects.

Extensive railway tools in 12d Track allow the rail designer to quickly and easily design their projects. These options are built on the existing 3D modelling and design tools available in 12d Model.



## Mining Infrastructure

12d Model's powerful set of exploration, site investigation, survey and analysis tools are crucial for the initial design, construction and ongoing operation of mining projects.

Comprehensive tools for the survey, design and construction of access roads, railways, earthworks and services allow for the coordinated design and management of mining infrastructure from within 12d Model.



## Drainage, Sewer and Utilities

12d Model provides comprehensive tools for the design, analysis and optimisation of stormwater and sewer projects using rational, dynamic (hydrograph) and 2d drainage methods.

Powerful clash detection management allows for efficient 3D modelling of service networks such as gas, electricity, telecommunications and water prior to construction.



## Surveying

12d Model is a complete surveying package providing the tools to manage all facets of surveyed data including LIDAR, topographical, as-built, conformance, traversing, geodetics, data mapping, labelling and much more.

The 12d Field option runs on a ruggedized tablet and gives the user access to full 12d Model functionality, allowing you to take the entire project into the field with the most comprehensive pick-up and set-out tools.



## Oil and Gas

12d Model assists with the design, construction and mapping of oil and gas pipelines, original site exploration and the wide range of infrastructure required for oil and gas projects.

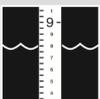
Accurate 3D modelling and the ability to share data between users allow teams to quickly and easily coordinate designs.



## Construction

12d Model is the ultimate software for construction with powerful set-out options, direct interfaces to machine control and detailed conformance reporting and auditing.

Manage 3D data and control volumes, quantities and progress claims with 12d Model. Set-out your project and undertake conformance and as-built surveys live on-site using 12d Field.



## Rivers, Dams and Hydrology

12d Model handles very large datasets and interfaces with a wide range of analysis packages, making it perfect for flood studies and the management of rivers and dams.

12d has partnered with industry leading analysis software, allowing users to apply 2D drainage analysis from within 12d Model.



## Environmental

12d Model's ability to handle very large datasets combined with flexible and comprehensive 3D analysis and modeling tools make it perfect for a wide variety of environmental projects.

Existing workflows can adopt 12d Model easily as it allows users to directly interface with GIS systems and most software packages and file formats.

## Why Choose 12d?

- **Powerful data processing & intelligent functionality.**
- **Modular, easy to update & completely customisable.**
- **Seamless integration with major industry software and hardware.**
- **Used in over 55 countries worldwide.**
- **Friendly support & training from industry experts.**

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