

Beca
Anna Collins

CLIENT: Christchurch City Council

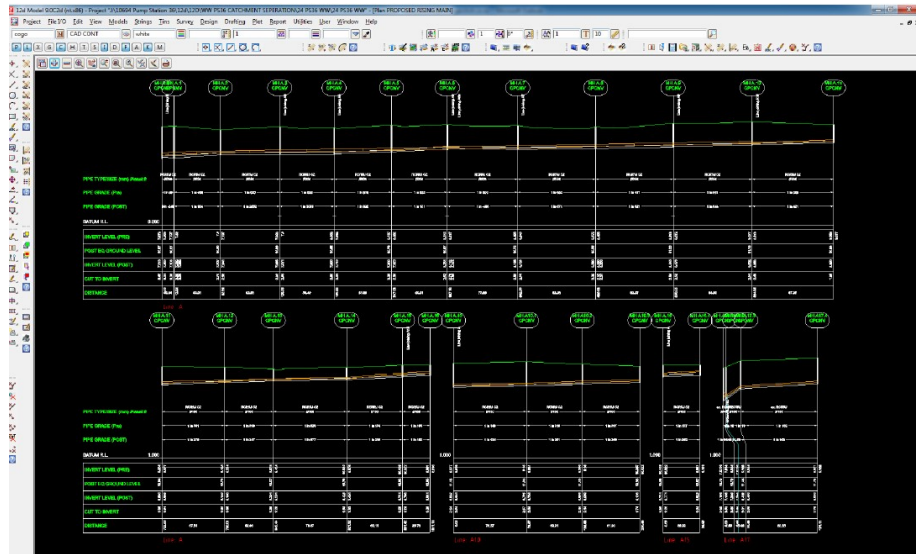
SCOPE:

Compare the post-earthquake grades of the network with the pre-earthquake grades and the pre-Infrastructure Design Standard grades.

12d DIMENSIONS:

- Design

Christchurch Infrastructure Recovery



Project Summary

The 2011 earthquake activity in Christchurch cause widespread liquefaction and seismic settlement resulting in considerable damage to the wastewater network. One of the greatest resulting concerns was loss of reticulation grade in the wastewater network (which in turn affects capacity of the pipe). In order to answer the question of how much loss of grade can be accepted before renewal of a gravity pipe is necessary; Christchurch City Council (CCC) implemented a policy which compared the post-earthquake grades of the network with the pre-earthquake grades and the pre-Infrastructure Design Standard grades.

The Challenge

Following the implementation of the CCC policy, it then became apparent that the team needed to find a way of comparing the original grades of the network “pre-earthquake” to the surveyed inverts and grade “post-earthquake”. Other designers had done this comparison by using Excel spreadsheets, but they wanted a visual means of representing the data which could easily be reviewed and form part of the concept design report for a particular project area.

The Solution

They decided to use 12d Model to build two wastewater networks for a particular project area - one to represent the pre-earthquake network and the other the post-earthquake network. The post wastewater network was

built using manhole lid and invert data provided by the survey team.

This model was then copied and pre earthquake data taken from the Council GIS maps were inputted to form the pre model. Using 12d Model’s exporting/importing functionality, pre-earthquake grades and inverts were copied from the pre model and included as separate attributes to the post model. Following this, pre and post long sections were plotted using a 12d plot file.

Result

The result was a quick and visual means to assess the loss of grade and settlement within the wastewater network and assist in the design of the network restoration.

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.



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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.

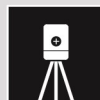
Comprehensive tools for the survey, design and construction of access roads, railways, earthworks and services allow for the coordinated design and management of mining infrastructure from within 12d Model.



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.

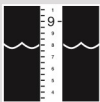
Accurate 3D modelling and the ability to share data between users allow teams to quickly and easily coordinate designs.



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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12d Model