

Lynton Surveys Pty Ltd

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PROJECT OWNERS:

Thiess Pty Ltd/QUU

SCOPE:

The construction of a 4.7km gravity trunk sewer main consisting of trenching and micro-tunnelling methods.

12D DIMENSIONS:

Roads and Highways, Survey and Construction.

WGTSM Woogaroo Trunk Sewer Main



travel to site and set out the new design locations even though they did not require survey accuracy for the purpose of walk through assessments. This was not cost effective, so a solution was sought.

The Solution

It is said the best ideas are often the simplest. As intermediate users of 12d Model, Thiess didn't want to 'reinvent the wheel', so they combined existing options. While not needing complex 12d functionality, they were still able to use 12d in an innovative way to solve the problem.

They simply output their 12d design data to a .kml format so the data can be viewed within Google Earth on smart phones on site using the phones' location capabilities. This allows engineers and designers to view design options on the ground without the need for survey to pinpoint locations for them.

To streamline the process, they made a toolbar that runs a .slf of a Helmert 2d Transformation that moves the data from the site coordinate system to MGA94 and then another .slf that outputs to kml. Hence, with 2 clicks they have a file ready to be viewed in Google Earth which can then be email off to selected recipients. This can be achieved from their survey office without the need for any field visits.

Some benefits over conventional handheld GPS include:

- Handheld GPS units do not allow this instantaneous upload of design and design changes from 12d Model
- Handheld GPS units have sky-view limitations where modern smart-phones can augment the positioning with network solutions allowing use in areas of dense vegetation and difficult topography beyond the reach of GPS
- Most engineers and construction managers have a smart phone

When a design change occurs, they can have the new design in the site personnel's pockets within minutes and opened in Google Earth. The use of a 12d *screen layout file* makes this a much faster process with and also eliminates the chance of gross errors or typos.

By using the location features on their phones (GPS and phone network location), they can 'walk' through the site and see the new design planning and moving on their screen.

The only limitations here are the accuracies of each phone's location capabilities, but checks have found they were usually within 2.0m. This is more than enough to allow the site personnel to see if the design is viable and will 'work' in the field.

There are mobile .dwg viewers on the market, but these don't allow the user to relate it to the ground, so that is why this 12d to .kml option is vastly superior.

Smart phones (or even Android/Apple tablets) are becoming common as an everyday business tool. They will be implementing this 12d to kml viewing on all our construction sites in the future.

This process has only been used to date on Android system smart phones running the *Google Earth* application and an additional app called *KMLZ to Earth* which allows KML files to be viewed in mobile Google Earth. The iPhone is fully compatible but has not been used by Thiess. Both apps are available free from the Marketplace.

Result

A Senior Engineer from the project stated, "The ability to not only view the design data but view it in real world is incredibly beneficial. This really needs to be experienced to fully grasp how useful this concept is and realise its full potential."

Project Summary

The WGTSM project is the construction of a 4.7km gravity trunk sewer main consisting of trenching and micro-tunnelling methods. The project location is Brookwater to Goodna, approximately 25km Southwest of Brisbane CBD. Half the project zone is in a residential setting and half green-field. Thiess was engaged as project surveyors from the early stages of design, right through construction.

The Challenge

In the early design phase, site engineers and project managers were finding it hard to relate the new design changes to real world locations. Because many of the new manhole positions involved green-field locations, it was hard to relate this to the ground. Often they would require survey to

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.

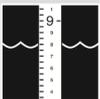
Accurate 3D modelling and the ability to share data between users allow teams to quickly and easily coordinate designs.



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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