Department for Planning, Transport & Infrastructure (DPTI)
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CLIENT: Golding

SCOPE: Rail Revitalisation involving 110km of Adelaide's rail network.

12d DIMENSIONS:
● Rail

The South Australian Department of Planning Transport and Infrastructure (DPTI), on behalf of the Rail Commissioner, maintains all rail infrastructure and provides tram and train services within metropolitan Adelaide.

Adelaide's passenger rail network comprises 132 kilometres of railway track on the Seaford, Gawler, Outer Harbor, Belair, Grange and Tonsley Lines, including 40 kilometres of electrified railway, 88 railway stations, 84 level crossings, 22 electric railcar sets and 70 diesel railcars.

The rail network also includes 16.5 kilometres of 600 volt tramline, 33 tram stops, 15 Flexity trams and nine Citadis trams.

(https://www.infrastructure.sa.gov.au/RR/rail_revitalisation)

Project Summary
This Rail Revitalisation project in South Australia was part of the state's $2.6 Billion upgrade to public transport services. The survey aspect of that involved over 110 kilometres of Adelaide's metropolitan rail network.

The Challenge
Annotation with lengthy descriptions was used in survey models which combined services, signals, numerous pieces of track equipment, and stations. Attaching photography to the survey data was required to better display the features. Due to the number of photographs taken (in the order of 1,000), an automated methodology was required to achieve the results.

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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Rail Revitalisation Project

General site and track condition assessments

In addition, the rail corridor contained a mass of assets unique to railways - a challenge for a department largely focused on road projects prior to this project.

The Solution
Using a GPS camera, the team added images and site photos into 12d Model in an automated process to supplement a standard survey model with information that would not be practical to key in as text.

Using the CAD Insert Image command to insert a JPEG into a 12d Model project allowed them to set a precedent for other images to follow - the first image was inserted as a sample only, with the manual process needing only to be done once.

Adding attributes to the point/inserted image allowed for attributed information either pertaining to or extracted from the image to be associated with the vertex.

Exporting the model with the sample image provided a base for the mail merge to be set up.

GPS-Photo Link camera software facilitated a CSV Export of the images with their associated coordinates and attributes.

Any attribute columns that needed to be populated manually were added, and needed to correspond with the field names in the 12d ASCII file, as created previously.

The mail merge document was created, merging the repetition of the single point, with a JPEG appended for each field photograph and creating a model of points for each.
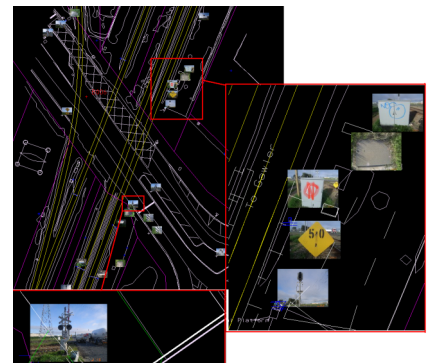
Initially, photographs were used to remove large quantities of text from the survey model, avoiding lengthy descriptions of assets cluttering the view. The uses for this quickly grew to include:

- Identifying signal numbers and types
- Determining track circuit frequencies
- General Site and track condition assessments
- Geotechnical bore log results

The finished product allowed for a virtual site visit capturing far more than just engineering survey breaklines. 12d Model managed datasets across multiple disciplines including Design, Signalling, Geotech, Contamination, and asset management.

Result
The finished product can be seen here:

12d® Model

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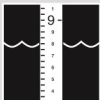
Accurate 3D modelling and the ability to share data between users allow teams to quickly and easily coordinate designs.

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.**

12d Model