



# REALITY CAPTURE CAPABILITY STATEMENT





# TERRESTRIAL LASER SCANNING (TLS)

ESO Surveyors owns and operates a number of TLS systems that provide comprehensive and cost-effective solutions for:

- Data capture as a prelude to design, and
- Work-as-executed data of constructed elements for the purposes of design comparison or record.

We use Z&F 5016 or Riegl VZ-400i hardware depending on the type of project. Our Riegl systems are also vehicle mounted to provide **stop-go** capability increasing data capture whilst reducing scanning time.

ESO Surveyors TLS surveys are based on accurately installed survey control prior to the scan to ensure the greatest integrity of the scan data.

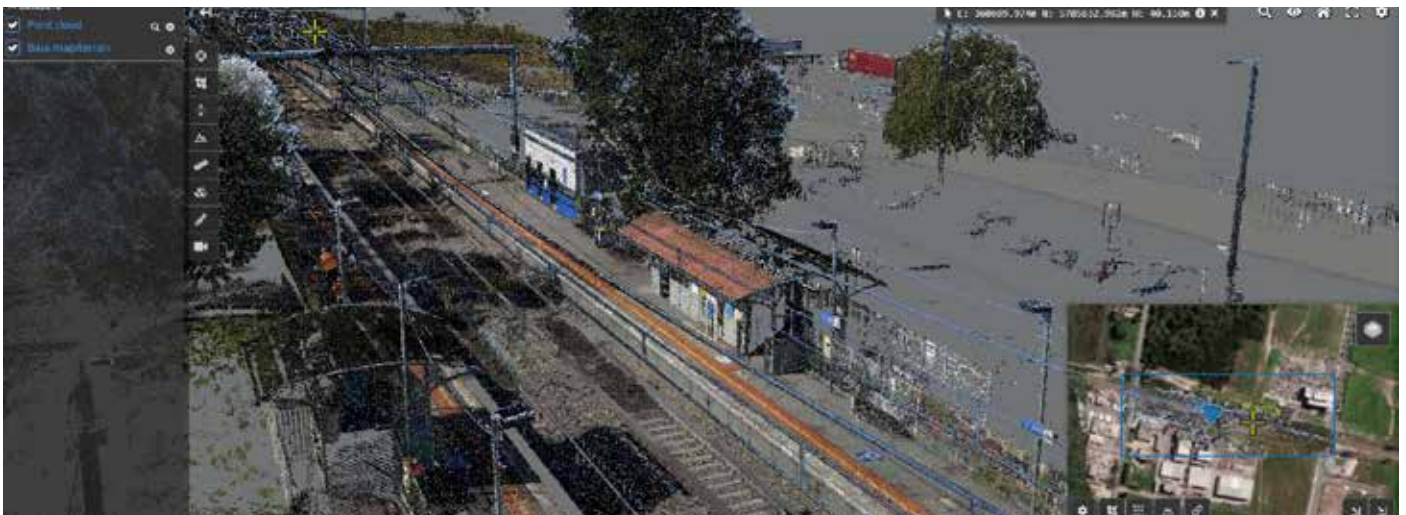
ESO Surveyors employs expert Data Managers focussed solely on processing scan data. Our processing and modelling is performed with the industry leading software CYCLONE 3DR and EDGEWISE.

Our data can be delivered as a point cloud, extracted linework or fully modelled surfaces depending on our clients' needs and purpose.





Our clients are provided with access to the scan data via the online **POINTERRA** platform, eliminating the difficulty in transferring extremely large data files and the need for our clients to purchase expensive software (example screen shot below).



Our reporting deliverables typically include an **Accuracy Report** and a register of the comparisons made to surveyed points.

Our project experience includes earthworks volumes, rail corridors, bridges, road surfaces, structural steel and architectural features.







# EXAMPLE PROJECTS

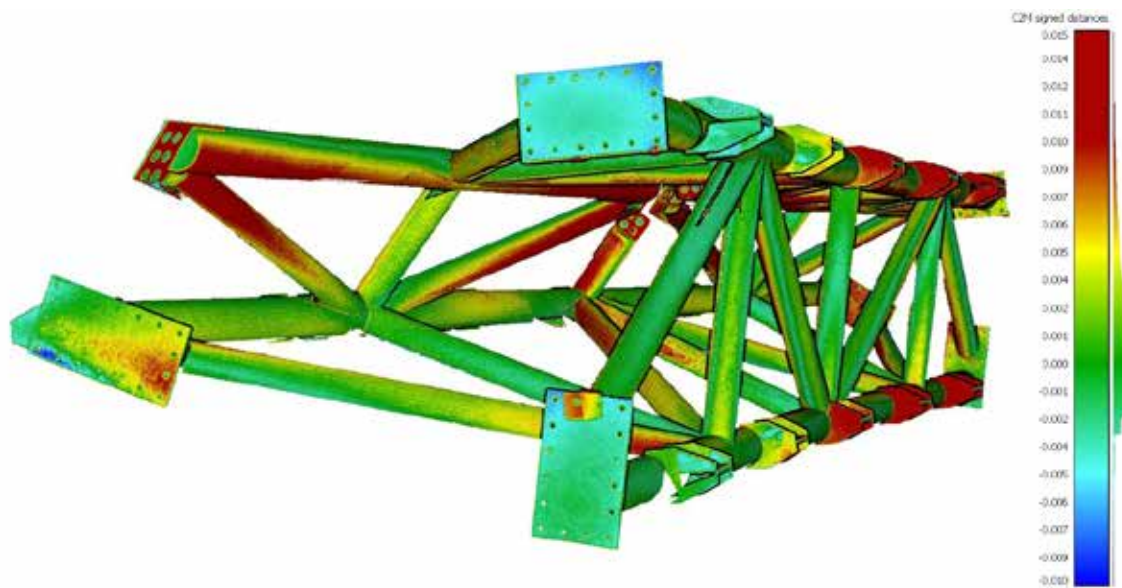
At ESO Surveyors, as infrastructure projects continue to roll out, our aim is to be the first, and best, survey choice for contractors anywhere in Australia.



Data capture of rail corridor and surrounding roadways. A fly through of the modelling can be viewed at <https://www.youtube.com/watch?v=lsvK0dTddXQ&t=8s>



Scan of bridge headstock steel reinforcement cage to determine compliance to specifications. A heat map was used to illustrate non-conforming areas.



Scan of large structural steel components with heat map illustration of conformance to design.

# UAV / DRONE SURVEYS

ESO Surveyors is a ReOC certified business with all our pilots being qualified surveyors. It is ESO standard practice to have at least one pilot on each of our projects.

As part of our continued involvement in large infrastructure projects, ESO conducts routine UAV surveys of project surfaces. The resultant terrain models are used to calculate volume changes or stockpile volumes for client payment claims.

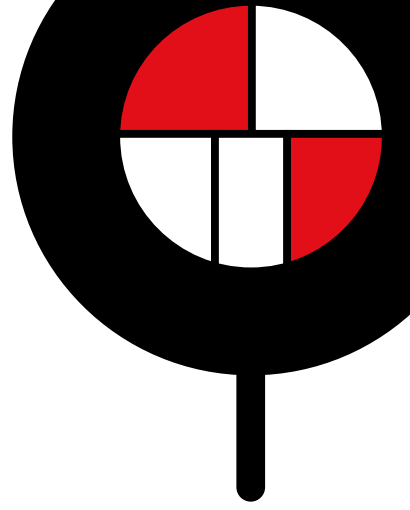
We process flight data using the best, fit for purpose, software on the market, PIX 4D. The processing and reporting can be either performed off-site, by our data specialists in each state office, or on site if the project requires.

ESO owns and operates a range of multi-rotor and fixed-wing drones. The type used will depend on our client's specific data requirements and geography of the site.

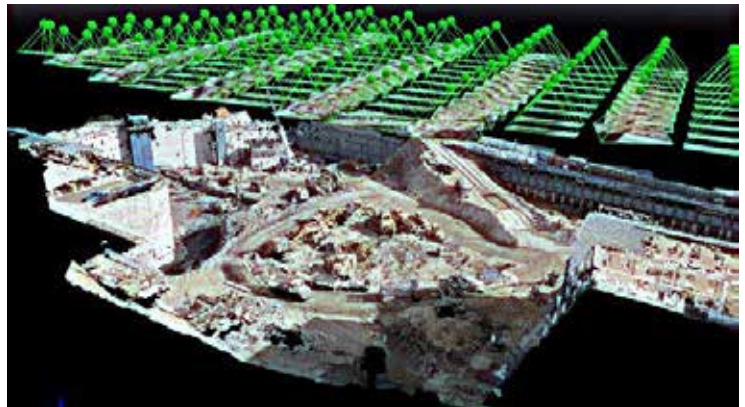
UAV data can be used to accurately create digital terrain models, provide volumes for end-of-month and to obtain high-resolution imagery.







## EXAMPLE PROJECTS



Daily excavation volumes for a major building construction client. High resolution imagery was also provided to monitor construction progress.



Aerial survey of 35km of rural road for a statutory authority. The deliverable was a Digital Terrain Model (DTM) and extracted 3D linework of the road edges and lane line marking.

# AUGMENTED REALITY SYSTEMS

At ESO Surveyors, we understand the dual necessities of high accuracy survey with quality control of the modelling process.

ESO Surveyors uses the augmented reality system, **Trimble Site Vision** to assist our clients in visualising design elements. The system superimposes the project design, or work-as-executed data, over real-time imagery of the site. Using GPS, the design and the natural surface can be seen together as the client inspects the site, on-ground.

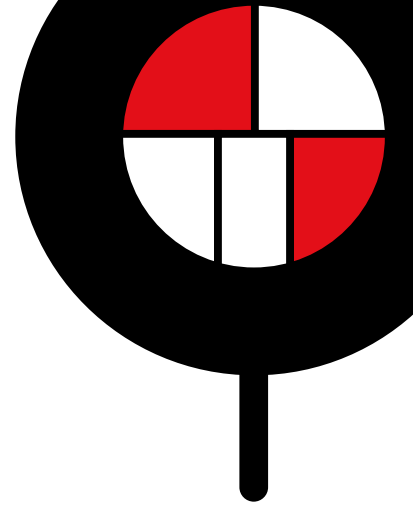
Such systems are becoming an invaluable site tool, particularly in understanding the degree of underground service clashes.

ESO Surveyors typically supplies one such system to a project and will take responsibility for maintaining the IFC design data being uploaded and visualised.

ESO use Trimble Site Vision on road and rail projects as well as commercial and residential buildings.





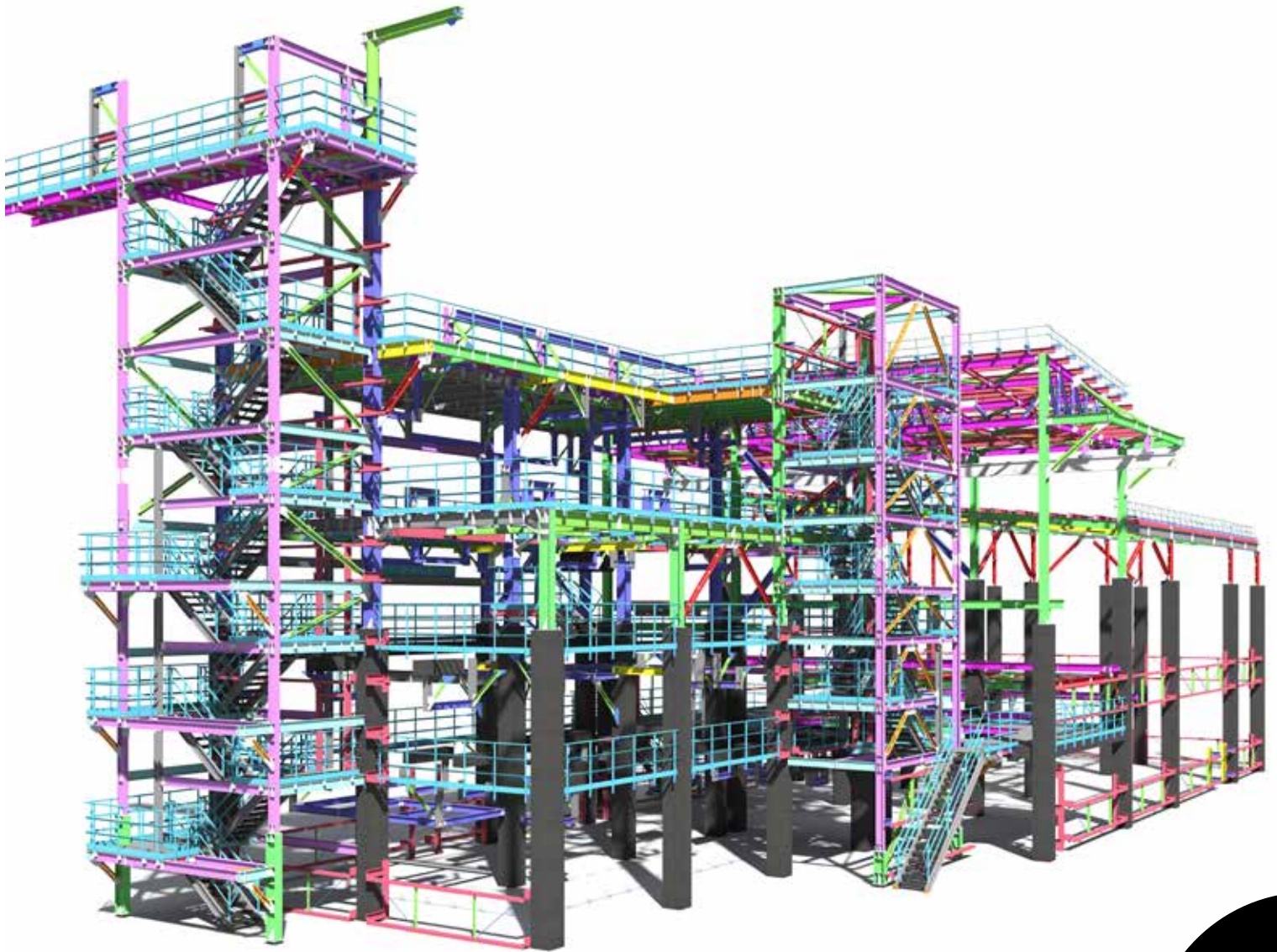


## EXAMPLE PROJECTS



Bridge design superimposed on an ESO major roadworks project.

From our offices in Sydney, Brisbane, Adelaide, Melbourne, and Perth, we provide specialist construction surveying services to sites throughout Australia.



# BIM

ESO utilises market leading software to provide BIM and DE support and have used DE on many recent projects.

Current Software Packages being used at ESO:

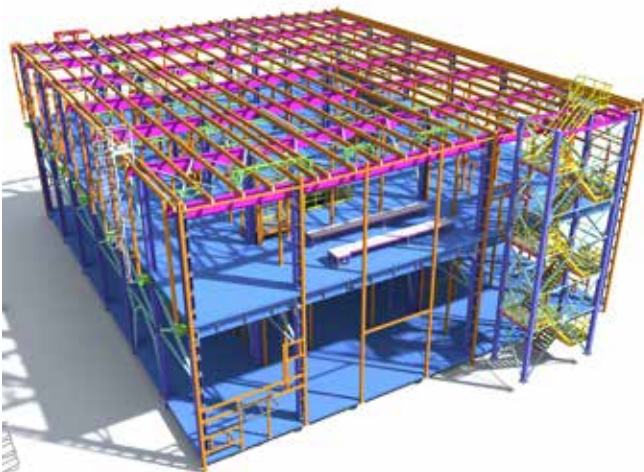
- 12D MODEL as the main survey package.
- AUTOCAD for drafting.
- REVIT for modelling.
- NAVISWORKS for confederated models.
- EDGEWISE and CYCLONE 3D for scan data modelling.
- VERITY for comformance of 3D scan information.
- PIX 4D for UAV processing.

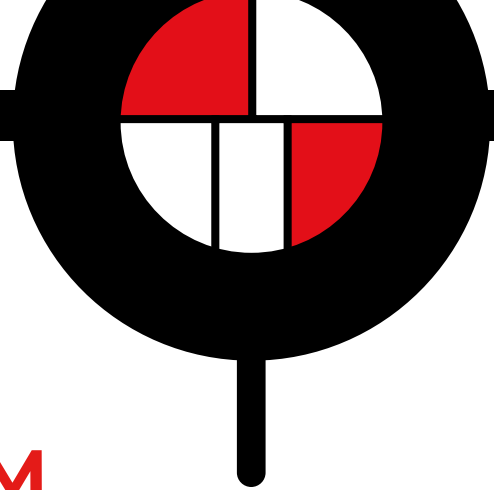




## These packages give ESO Surveyors the ability to:

- Export from 12D MODEL as IFC format for import to NAVISWORKS. 12D MODEL v14 has the latest IFC4 which contains all attributes that are added to points in 12D MODEL.
- Perform clash detection of design and as-built information.
- 12D MODEL v14 **Pickup** module allows additional attributes, relative to services location, to be added. This module permits editing of the code table to add attributes such as: pipe type (pvc, copper, RCP, etc); colour; diameter; justification; and use.
- Make all services **piped**. The ability to **edit map file** further enhances this function. Additionally, 12D MODEL v14 permits addition of pipe wall thickness.
- More easily model drainage pits within the **Drainage Package** in 12D MODEL.
- Scan data to recap for ease of viewing by the construction team.
- Provide aerial images and 3D DTM with **work as executed** overlays via regular UAV surveys.
- Provide work-as-executed/conformance verification of 3D elements using scan data.





# ESO MANAGEMENT TEAM

Working with ESO Surveyors, you can be assured our team understands the specific survey needs associated with your construction project.



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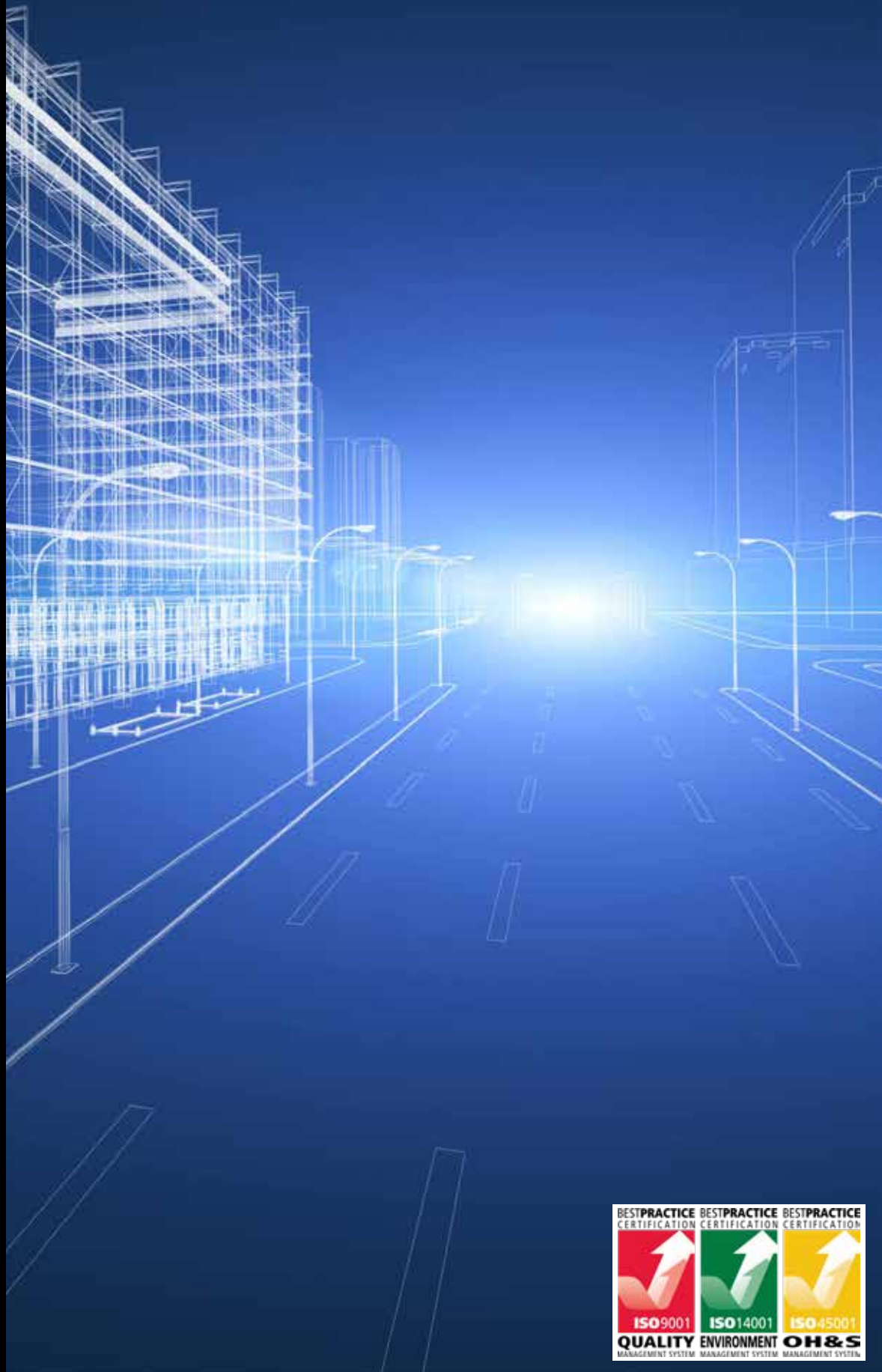


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