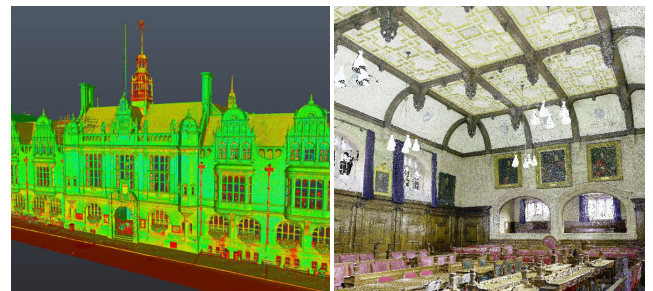


# The Full Laser Scan Survey of a Grade II\* Listed Historic Building

Ridge and Partners LLP is a multidiscipline Property and Construction Consultancy with over 650 employees working worldwide from 11 offices across the UK. In September 2019 their Geospatial team were commissioned by Oxford City Council to undertake a full laser scan survey and produce a Revit 3D Model of the Oxford Town Hall, a grade II\* listed building in the centre of Oxford. Completed in 1897, Oxford Town Hall is a Grade II\* public building located in central Oxford, England and is both the venue for public meetings, entertainment, events and the seat of Oxford City Council.

Using Autodesk Revit, a BIM (Building Information Modelling) software that produces high-quality 3D architectural designs and documentation, the specialist Ridge team created a 3D model to integrate information from a 30-year planned maintenance report and condition survey, which had previously been carried out by a team of professional building surveyors from Ridge. There were some key challenges faced during the project which predominantly revolved around the amount of data being processed. As the town hall is a large historic building (7 floors, approximately 18,000m<sup>2</sup>) with a great deal of detail, more than 1800 colour scans from various scanners were needed to register into a complete point cloud.

The city council required an accurate report and data on the current layout of the building, as much of their information was either outdated or inaccurate. The condition and maintenance information was to be integrated and easily accessible for asset maintenance by everyone, including the facilities team, and also an existing 3D BIM Ready model which could be used by design teams for any future planned work.



*Full-colour external and internal Point Clouds of Oxford Town Hall created using a Leica P40 and RTC360 Laser Scanners.*

The result was an accurately registered colour point cloud of the Oxford Town Hall which could be published in an Autodesk Recap format along with viewing capabilities for the client, (Jetstream). The point cloud would then be used to produce an accurate and highly detailed 3D Revit BIM-ready model of the building including the condition and maintenance information.



Autodesk Revit 3D model of internal room

Equipment Ridge and Partners LLP used on this project:

- Leica ScanStation P40
- 2 x Leica RTC360 Laser Scanners
- Leica Viva GS16 GNSS Smart Antenna
- Leica Viva TS16 Total Station

Ridge established a long term relationship with SCCS who were chosen to provide the surveying equipment, through hire and sale due to their excellent customer service, reliability and technical support. A Leica P40, a high-definition 3D laser scanner was used because of its increased range and accuracy. This performance provided highly detailed controlled data capture for external elevations and across roof areas. The scanner was also used to traverse through the building from front to back and from the roof to ground floor, giving an accurately constrained control loop. Due to its efficiency, a Leica RTC360 3D Laser Scanner was also employed to be used on internal offices, meeting rooms and function spaces, which was scanned quickly and accurately in full colour. The onboard VIS technology and Cyclone Field app saved processing time when the data made its way back to the office, meaning it could be exported to the modelling team



quicker. It also allowed Ridge to asset tag mechanical and electrical assets in the field to be included in the Jetstream file.

Ridge team scanning Oxford Town Hall, a grade II\* listed building with a Leica RTC360 Laser Scanner. Further internal scanning with a Leica RTC360 Laser Scanner

With the use of a Leica Viva GS16 GNSS Smart Antenna, the Ridge team recorded a minimum of two control points to orientate the scan data to OS and a Leica TS16 Total Station provided orientation over control points gathered by the GPS and used to set up a control network. It was also used to pick targets to register the laser scan data. At the end of the survey, the captured raw scan data from both scanners were then processed in Leica Cyclone 3D and Leica Cyclone REGISTER 360, to then output as E57 files to bring into Autodesk Recap.

*"I would highly recommend SCCS Survey Equipment who provided all of the equipment when we needed with it, with technical support on-site and in the office to help when processing data, which is invaluable on a project of this scale"*

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