

**Site/Project:**

Waterside Historic Railway  
Station, Derry  
Co Londonderry

**Industry:**

Infrastructure Project

**Client:**

Transport NI / Mott  
MacDonald

**Location:**

Derry, Co Londonderry

**Site Type:**

19<sup>th</sup> century historic railway  
station

**Deliverables:**

3D Laser Scan survey  
internal and external  
building survey for BIM  
modelling  
2-D output elevation, plan  
and sectional drawings

**Benefits:**

Cost Effective  
Quick turnaround  
Non contact – remote  
survey  
Unparalleled accuracy and  
detail  
Detailed CAD output

**Added Value:**

3D Data integration for BIM  
modelling

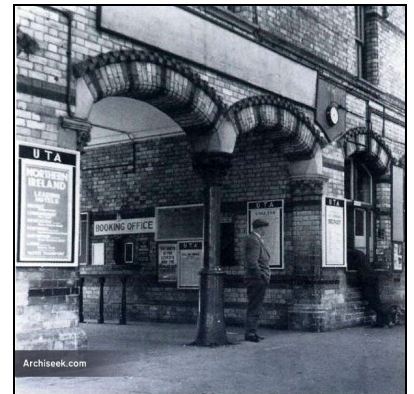
**This issue**

Measured Building Survey as  
an aid to BIM design and  
Historic Building Conservation

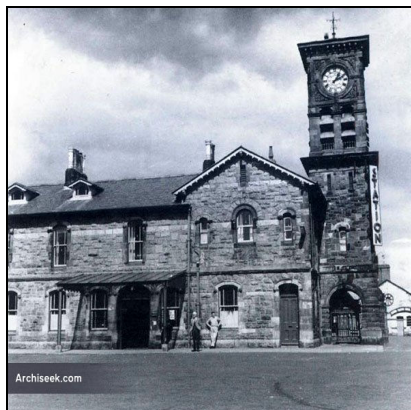
**Introduction**

The old Waterside Railway Station is a sandstone constructed building located at the terminus of the Belfast – Derry railway line having been designed in the mid-19<sup>th</sup> century by prolific local architect John Lanyon. The building was extensively bomb damaged in 1972 & 1975 during which time the central portion of the building was destroyed and subsequently replaced with a glass structure and internally re-enforced and modernised. After its closure in 1980 the building was subdivided and used as a modern office space. As part of ongoing development of the railway infrastructure in Derry, TransportNI have commissioned a feasibility study into the potential re-development of this old building as a modern transport hub for the city. As the building had previously been subject to bomb damage internally, resulting in structural deformities and extensive re-modelling an

accurate measured survey was carried out to assist consulting engineers to accurately model the structure as part of a BIM (Building Information Model) and provide detailed elevation and floorplan information for the project conservation architects to work off and design.



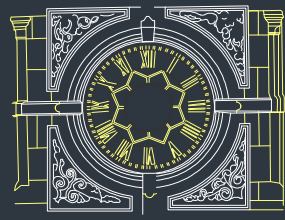
Waterside Station internal early 20<sup>th</sup> century



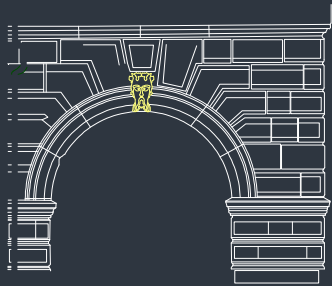
Outside Waterside Station early 20<sup>th</sup> century

**Measured Building Survey**

The measured building survey consisted of a 3D laser scan survey of both the external and internal building structure with a Leica P20 unit. The laser scan survey was carried out over a period of two days collecting 130 individual scans at a resolution of 3mm (at 10m) externally and within the historic warehouse portion of the site in order to obtain sufficient stone and structural detail, and at a resolution of 6mm (at 10m) internally for accurate floorplan production. Onsite control provided through GPS and total station survey related to Irish Grid.



Detail of clock face from scan data



Stone by Stone level detail drawing

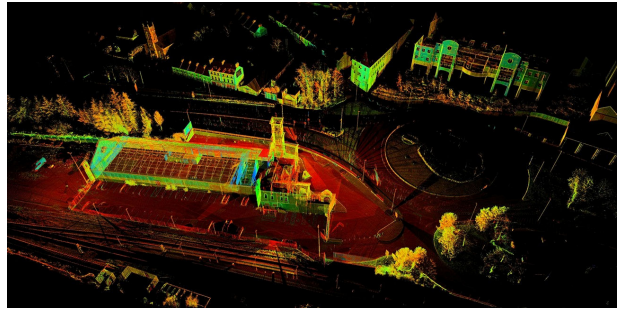
### Applications:

Accurate 3D data for BIM modelling integration

Invaluable aid to building restoration and design

Complete measured survey archive

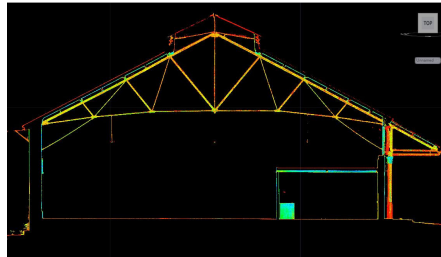
## CAD Analysis & 3D Output



Fully registered point cloud scan of Old Waterside Station

A total of 130 individual 3D point cloud scans were stitched together and registered to form a completed model of the survey area. The fully registered point cloud was exported to PTS/PTX/XYZ format for integration into BIM software for modelling and interrogation purposes and imported into CAD software for production of 2D drawings.

Within CAD software the point cloud data was sliced up along its X & Y Axis in order to derive an accurate footprint of the buildings and produce scale 2D elevation drawings at Stone-by-Stone level detail and associated floor plans and cross sections. Each drawing was also annotated with level information related to OD Belfast Belfast Lough.

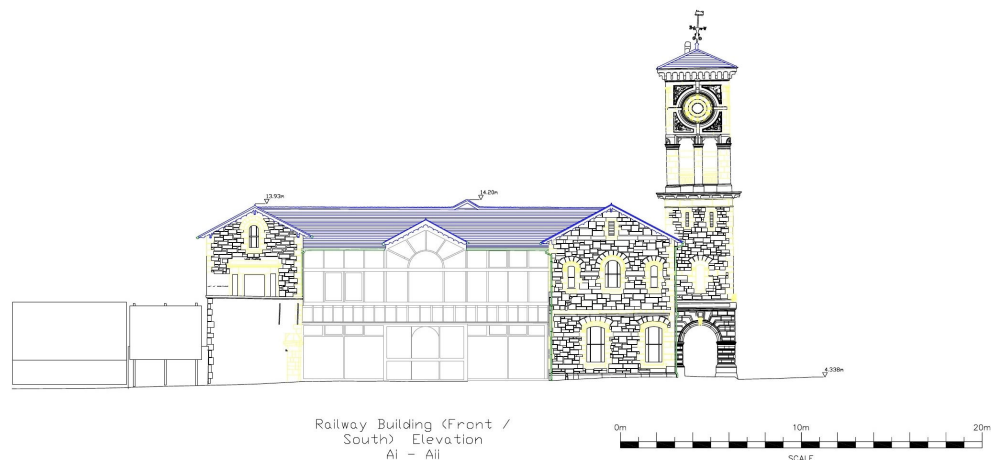


Section through warehouse structural detail



Section through railway building point cloud

While the data was used for the production of 3D modelling and 2D drawings production it also provided accurate information in relation to any structural deformation associated with the destruction of part of the building during the 1970's explosions.



External elevation drawing showing stone-by-stone level detail. Note the obvious lean within the clock tower.

The 3D BIM data was made available within 2 days of completion of onsite survey and final elevation and plan drawings were made available to the client within 2 weeks of completion of the onsite survey.