ISSUE
04

FarrimondMacManus Ltd

ARCHAEOLOGY - SURVEY - GIS

This issue

Measured Building Survey as an aid to Restoration Project

Site/Project:
Cormac's Chapel

Industry:
Public Heritage Sector

Client:
Office of Public Works – National Monuments Service

Location:
Co Tipperary

Site Type:
Ecclesiastic Monument

Deliverables:
3D Laser Scan survey
2-D output drawings

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

Detailed digital archive.
Value added applications such as production of scaled 3D models

Introduction

The Rock of Cashel, Co Tipperary is one of Ireland's most important heritage sites representing the remains of a substantial ecclesiastical complex dating from the early Medieval period including cathedral, church and round tower. Cormac's Chapel is the earliest ecclesiastic building within the enclosure, abutting the southern and eastern transepts of the cathedral.

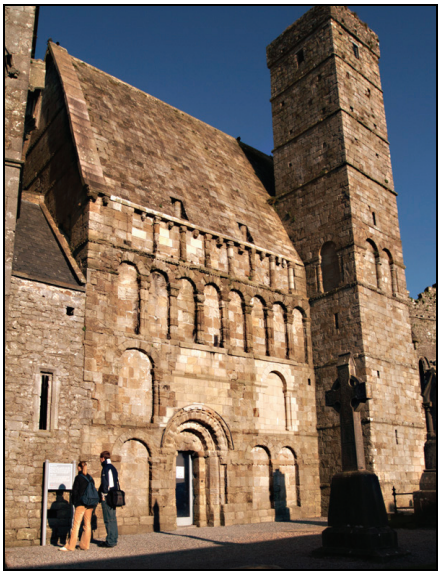
While archive scale drawings of the building existed, ongoing restoration works - both internal and external – necessitated more up to date building measurements and digital drawings. These were required for both for archival and stone conservation purposes and more specifically to allow for the design of scaffolding around the building.

As the site is a national monument open to the public all year round speed of survey and limited disruption to public access were a key concern.

Measured Building Survey

The building survey consisted of a 3D laser scan survey of the entire external façade and internal rooms of the chapel using a Leica HDS 3000 laser scanner to collect a sub centimeter accurate 3-dimensional measured survey of the building.

The survey was carried out with one operator and assistant over a period of 3 days with minimum disruption to public access to the monument and no need for expensive scaffolding.



Cormac's Chapel front elevation

Scanning of external facade

Scanning of internal chancel area

Applications:

Invaluable aid to heritage management and conservation

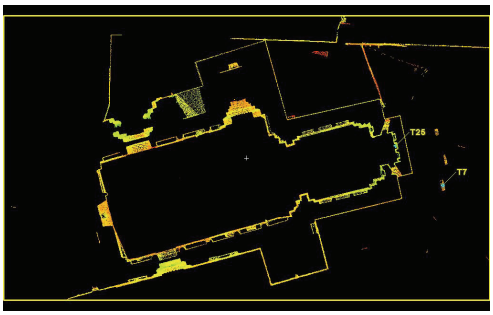
Complete and unique archive

CAD Analysis & Output

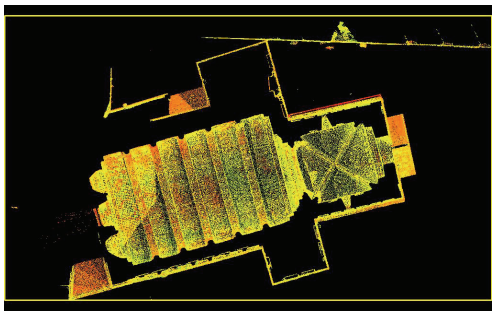
The completely registered 3D point cloud scans were imported into CAD software for interrogation and visualization analysis, and to generate accurate scaled stone by stone 2D plan, section and elevation drawings.

Rotation of the full 3D point cloud on any plane allowed for multiple viewing and measurement, while section slices were available through all planes i.e. x-y-z.

CAD standard measuring tools were used to make multiple point to point measurements analysis and interpretation and the digitization of 2D scale stone-by-stone drawings. 2-D scaled drawings were available within 1 week of completed on site works, while full elevation, plan and section drawings were completed within 4 weeks of completion of on site works.

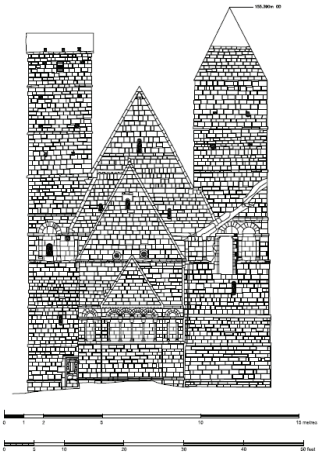


Slice through the x plane to show ground floor plan at window level

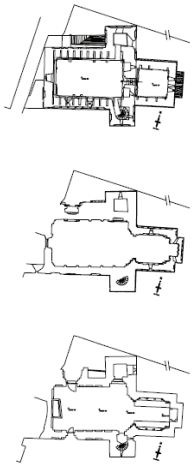


Slice through the x plane showing vaulted ceiling of ground floor

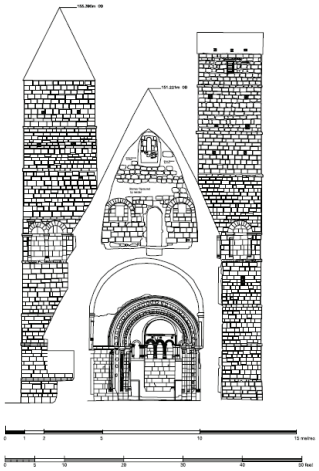
Not only does the scan provide very accurate information on the geometry of the chapel building, but it also allows for modeling of the building as an aid to scaffolding design and management. The scaled stone by stone drawings allow for very detailed annotation of drawings with respect to stone conservation.



North east external elevation



Chapel Floor Plans



Southwest section elevation