# FarrimondMacManus Ltd

ARCHAEOLOGY - SURVEY - GIS

Site/Project:

Thompson & Alexandra Docks

Industry: Private Sector

Client: Consarc Design Group

Location: Belfast

#### Site Type: Historic Docks

#### **Deliverables:**

3D Laser Scan survey 2-D output drawings Topographic & measured building surveys

#### Benefits:

Cost Effective – fast data acquisition over a number of days as supposed to weeks. Quick turnaround Non contact – remote survey Unparalleled accuracy and detail Detailed CAD output



This issue 3D Laser Scanning for large scale urban topographic and building survey

#### Introduction

Alexandra and Thompson Docks are iconic structures of Belfast's 19<sup>th</sup> century shipbuilding history with Thompson Dock famously housing the Titanic during its construction.

The lesser known Alexandra Dock is located adjacent to Thompson Dock and currently holds the HMS Caroline, one of the last surviving World War 1 functioning naval vessels. As part of ongoing development of the historic docks area it is proposed to develop a purpose built cruise berth facility, with coach parking and "welcome building" adjacent to Alexandra dock. Development plans include the renovation and upgrading of Alexandra dock and the provision of a bridge between it and the existing Thompson Dock as well as renovation of the remainder of the pump house building itself outside of the existing museum area.

A topographic survey of the 7ha site was required to inform the relevant engineering requirement for the project including the extents of both docks and in particular all structural and architectural detail of Alexandra dock itself. A measured building survey was also required of Thompson Dock Pumphouse as a means of informing renovation of this historic building into the "welcome building".

## Topographic & Measured Building Survey

The main topographic survey was carried out using a Leica C10 laser scanner to collect a sub centimeter accurate 3-dimensional measured survey of the docks and their surrounding landscape. A 3D meaured building survey of the Thompson Pump house was carried out concurrently as a means of accurately recording its footprint and upstanding elevations. The landscape survey was augmented with a GPS & total station survey to recording any fine detail which may have been obscured by buildings/vegetation/street furniture.

The survey was carried out with an operator and assistant over a period of 2.5 days within the confines of a busy dockland area.



Scanning in Belfast's historic docklands

# 07



**Total Station Survey** 



**GPS** Survey

#### Applications:

Invaluable aid development design and engineering solutions

Complete and unique archive

### CAD Analysis & Output

A total of 50 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 imported into CAD software for interrogation and visualization analysis, and to generate accurate 2D topographic, plan and elevation drawings. CAD standard measuring tools were used to make multiple point to point measurements analysis and interpretation and the digitization of 2D scaled topographic survey. Elevation data was supplied by the point could which was tied to Irish Grid from GPS data to provide an elevation grid across the survey area. The point cloud data was further sliced up along its X & Y Axis in order to derive an accurate footprint of the Thompson Dock pumphouse and produce accurate scale 2D elevation and sectional drawings at Architectural detail.



The external laser scan survey was further augmented by the use of professional MBS<sup>™</sup> Floorplan survey software to produce accurate and detailed floor plans of the internal building area. Laser scanning application for this project provided the ability to collect a large quantity of high quality, high accuracy survey data in a matter of days with output available within a week of completion of the survey.







Pumphouse Building floorplans & sections