

## Case Study

### Historic Air Raid Shelter, Orpington, Bromley, Greater London

#### A Combined Surface and Subsurface Laser Scan and UAV Photogrammetry Survey of an historic air raid shelter for M-AR & Bromley Council, near Orpington

##### The Brief

Geoterra was appointed by M-AR and Bromley Council to carry out a 3D topographical laser scan surface and subsurface scan survey as well as a remote UAV photogrammetry survey of an historic air raid shelter complex, recently discovered beneath a residential development site near Orpington, Greater London.

The survey data was required to assess the location & alignment of the historic air raid shelter complex as it runs beneath a proposed residential development site, as well as the condition and clearance between the top of the shelter and the ground above. M-AR were already in the process of clearing and carrying out groundworks on the site in advance of the new residential construction, so accurate mapping was required. The dimensions of the shelter complex was also assessed in order to aid calculations for potentially infilling the historic structure with a pre-mixed foam concrete product.

##### The Solution

Geoterra experienced geospatial engineers installed geo-referenced laser scan targets adjacent to the pre-exposed air raid shelter access points and then utilised a specialist Leica RTC 360 laser scanner and carried out a 3D laser scan from the surface locale to the shelter portals. Together with our partners Flythru we then utilised the ELIOS 2 UAV to fly through the historic air raid shelter complex from three separate access points taking a series of videos, that would be then used to create a 3D photogrammetry model during post-processing. Using both survey techniques would ensure that every feature of the historic complex would be surveyed in order to generate a complete 3D model of the subterranean feature.

The surveys were geo-referenced to OSGB OSTN15 National Grid.

##### The Deliverables

Geoterra provided M-AR and Bromley Council along with the archeologist a combined geo-referenced 3D laser scan point cloud model of the historic air raid shelter complex and surface locale, in RCS/RCP & LAS for viewing in Navisworks. The clients were also provided with an updated topo plan, HD flythrough video and approximate volumes of the complex prior to them being infilled with foam concrete so that construction on the new residential development can begin.



*making sense of our 3D world*