

Archaeological Services

An Archaeological Watching Brief and Building Record at the air-raid shelter, Regent College, Regent Road, Leicester

NGR: SK 5944 0346

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ULAS Report No. 2014-012 ©2014 An Archaeological Watching Brief and Building Recording at the Air-raid shelter, Regent College, Regent Road, Leicester NGR: SK 5944 0346

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Summary

An archaeological watching brief and historic building survey was undertaken by the University of Leicester Archaeological Services (ULAS) at the air-raid shelter located on the Regent College campus, Regent Road, Leicester between the 1st and 22nd of March 2013. The survey studied a large Second World War air-raid shelter constructed in 1940 for the use of pupils at the former Wyggeston Girls School. The shelter is a typical example of a standardised shelter design made using a cut and cover method with pre-cast concrete roof and wall panels.

Planning permission has been granted by Leicester City Council for the development of the school playing fields and construction of a new medical teaching building for the University of Leicester. The proposal requires the almost complete demolition of the air-raid shelter in advance of the development work.

Introduction

In accordance with National Planning Policy Framework (NPPF) Section 12 *Conserving and Enhancing the Historic Environment* this document forms the report of an archaeological watching brief and historic building survey on the former air-raid shelter within the grounds of Regent College, Regent Road, Leicester, NGR SK 5944 0346. Planning permission has been granted by Leicester City Council for the extension of the existing school playing fields over the current location of the air-raid shelter. This would then create free space for the construction of a new medical teaching building for the University of Leicester. The proposal requires the almost complete demolition of the air-raid shelter in advance of the development work.

Although of limited architectural importance the shelter does represent a significant period within the heritage of Leicester. Therefore, the planning permission contains a condition for a programme of building recording before or during the demolition work. The project was completed in accordance with the Institute for Archaeologists (IfA) *Code of Conduct* and adhered to their *Standard and Guidance for Archaeological Investigation and Recording of Standing buildings or Structures*. In addition, Leicestershire County Council's *Guidelines and Procedures for Archaeological Work in Leicestershire and Rutland* was followed.

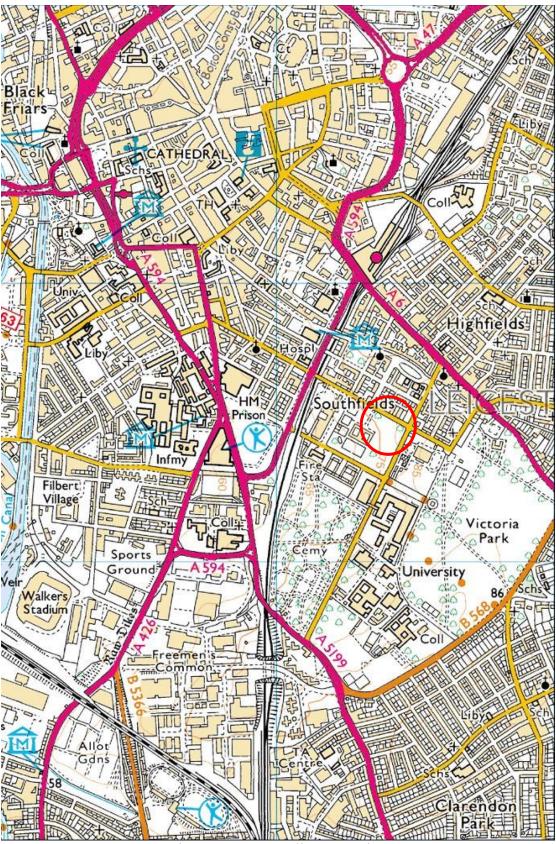


Figure 1 Regent College Location

Shelter highlighted in red circle

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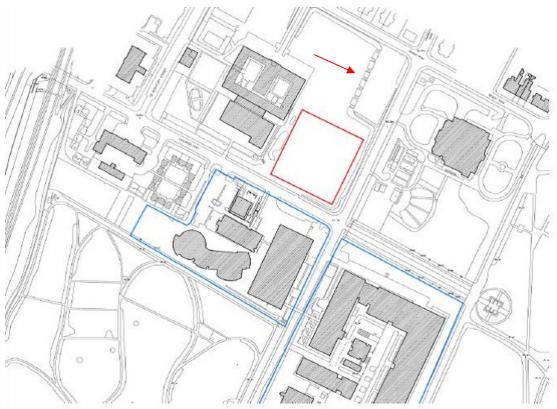


Figure 2 Air-raid shelter location Shelter indicated by red arrow. Blue outline shows University buildings. Red outline shows development area of new building

Background

The site lies to the south-east of Leicester City centre, and is located in the north eastern corner of the Regent College playing field at the junction of University Road and Regents Road at National Grid Reference SK 595 033 (Figs. 1 and 2). The airraid shelter occupies a raised rectangle of ground within the corner of the existing playing field (Fig. 3). The proposed new medical teaching building is to be located to the south west of the air-raid shelter. However, in order to increase the size of the playing field to compensate for the loss of space caused by the new building, it was necessary to remove the shelter.

Earlier recording work at this shelter included a heritage statement prepared by ULAS (Richards, ULAS Report 2010-225) and a photographic survey by Associated Architects (2010 3094 1.0). This work identified the need to fully record the structure either before demolition commenced, or during demolition depending upon the safest method.

Much of the background history covering the air raid precautions set in place both nationally and regionally is already recorded in the ULAS heritage statement. At the outbreak of war in September 1939 the city of Leicester began providing civilian airraid shelters with the majority being built in the early months of 1940, including, according to some sources, the shelter within the grounds of Wyggeston Girls School, now known as Regent College. In the book, *Wartime Leicester* (Beazley 2004) a photograph of the shelter shows timber and earth-filled blast walls (gabions) in front

of the main west facing entrances. The book also records that during November 1940 it became apparent that the structure was liable to flooding so pumps and heaters had to be retrofitted to keep it useable. An examination of the Civil Defence Committee minutes for October 1939 to August 1941 held by the Record Office for Leicester, Leicestershire and Rutland (ROLLR DE3277/36-44 & DE3667/7) suggests this was common problem experienced by a number of trench shelters, with tenders being received as early as June 1940 for 'the laving of stoneware & galvanised iron piping in connection with the installation of electric pumps in those trench shelters which are subject to flooding.' The tender of Messrs. Wright & Co of Wigston of £271. 10s 10d was eventually successful. This rather large sum, would suggest that the work was to be carried out in more than one shelter. An unknown contributor to the book Wyggeston Girls Centenary recalls the siren only sounding once during the school day, but numerous drills were carried out. She describes the air-raid shelter thus: 'We filed out to the trenches under the "hump" with great enjoyment and no fear and sat on wooden slatted benches in the narrow tunnels. The shelters were roomy and as we were never in them for any length of time it all seemed a great adventure'. Others no doubt had other feelings about being in such crowded confined spaces.

Although the shelter was obviously built during World War II cartographic evidence indicates that there was an earlier earthwork of a similar size even before the school was built (Fig 5). The Ordnance Survey 1904 edition clearly shows a rectangular earthwork on the corner of Regent Road and Victoria Road (the original name of University Road). It is unclear what the function of this feature may have been but it seems likely that it was employed as a useful starting point for the shelter to be dug into.

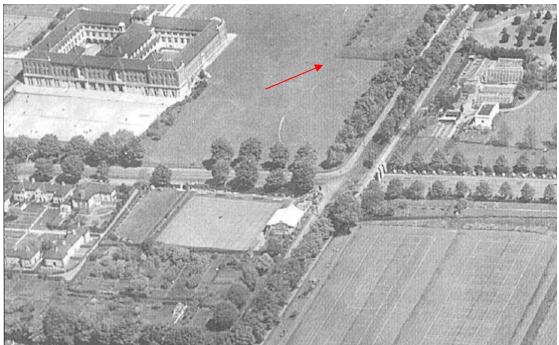
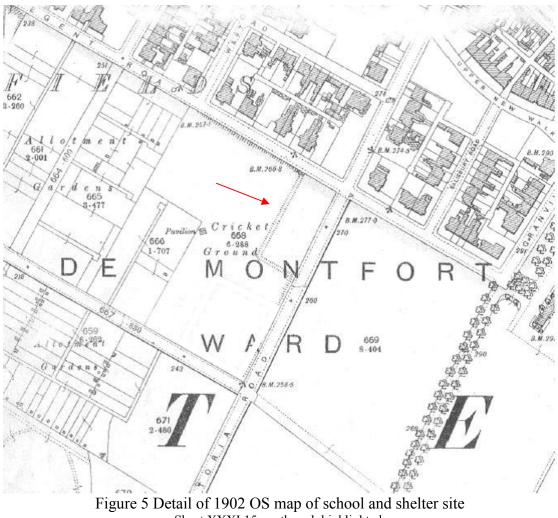


Figure 3 Aerial photograph of Wyggeston Girls School and air-raid shelter (Photograph taken in the 1950s. Shelter is marked with arrow) (from H. Boynton 2000)



Figure 4 Wyggeston School shelter during a practice drill Note steps in background leading up to Regent Road



Sheet XXXI.15, earthwork highlighted.

Prior to the commencement of the development the air-raid shelter consisted of an approximately rectangular turfed earth mound. The western and southern faces had similar sloping sides of approximately 20 to 30 degrees with a narrow terrace approximately half way up the face. At its eastern end the southern face swept outwards in a gentle curve to the south where it joined University Road. The eastern and northern side were on the same level as the adjacent Regent and University Roads. The top of the mound was generally flat although high points and ridges indicated the outline of the buried trenches below. On the western face were 7 concrete entrances, some of which were blocked with modern breeze blocks and others with plywood doors. There was no indication of any original doors or frames. The wooden framed blast walls which protected the doorways were no longer present. A gateway in the perimeter railings survives on Regent Road. Figure 4 shows a set of steps leading down from Regent Road which were, presumably, used for civilian access to the shelter out of school hours (Fig. 6).

During the visit to produce the 2010 Heritage Statement the following observations were made: Internal access to all of the tunnels is via the southernmost door, on which is a modern plywood door. Internally the structure consists of a series of trenches, approximately 1.42metres wide, shown during the limited visit to be laid out to a complicated design of right angle bends, junctions and dead ends, constructed of prefabricated steel re-enforced concrete panels, 385mm wide. This labyrinthine design was used to minimise blast damage travelling straight through the shelter. Localised patches of spalling could be seen in the concrete wall ribs. Towards the top of each individual wall panel there is a pre-cast seating in which the kerb lifter or slab lifter sat to assist in the manoeuvring of the panel either on site or during manufacture. These concrete panels were produced in abundance during World War II, most commonly by Stant Precast Concrete Ltd. However, it is virtually impossible to tell if these panels were manufactured by Stant or by another manufacturer using the same pattern. A number of emergency exits in the ceiling were also recorded at various points within the trenches, some original ladders were still in place. No evidence of these exits could be seen on the surface which indicated that they have been filled in. There is limited evidence that the floor was originally laid with concrete slabs, below which is compacted earth and concrete ribs. Because of health and safety issues of working in enclosed and confined spaces no further internal inspection was made.



Figure 6 Gateway leading from Regent Road to shelter Looking south east

Objectives

The purpose of the work was to record and advance understanding of the significance of the affected heritage asset.

The objectives of the Watching Brief and Historic Building Recording programme were:

To provide a comprehensive written, drawn and photographic record of historic fabric revealed by the work as this represents upstanding fabric of local, regional and national importance.

The project report would provide a review of the local and regional historical context of the structures recorded by the project, making reference to the appropriate regional research agendas. This will be adequately detailed to place the findings of the recording in their context and to be able to inform future conservation decisions and the subsequent management of the structures.

The project should produce a fully integrated archive suitable for long-term deposition in order to 'preserve by record' the buildings in their current form prior to conversion.

Methodology

All work followed the Institute for Archaeologists (IfA) *Code of Conduct* (2010) and adhered to their *Standard and Guidance for Archaeological Investigation and Recording of Standing Buildings or Structures* (2008) and *Standard and Guidance for Archaeological Watching Briefs* (2008).

The site-based element of the Historic Building Recording programme involved the validation and correction of any existing survey drawings and the compilation of photographic and written records. A summary report, suitably illustrated and incorporating relevant background research to place the site into context will be prepared. An ordered archive will be compiled for deposition with an appropriate body and an Online Access to the Index of Archaeological Investigations (OASIS) record completed.

The limitations of working in confined and enclosed spaces prevented a full internal survey from taking place. It was therefore decided that the safest method was to record the shelter as it was exposed during carefully controlled demolition. Because of safety issues of running a machine over what were likely to be unstable trenches a tracked machine was required to remove the overburden covering the shelter in a number of stages. To achieve this, the excavator had to stand on firm ground and reach over from one side (the south side) of the structure to remove topsoil and overburden to expose the roof structure of the shelter. A toothless ditching bucket was used to remove the spoil from around the structure. Once a sufficient area of shelter roof had been exposed the archaeologist recorded the plan of the structure using a Total Station Electronic Distance Measurer (EDM) after which this portion of shelter was demolished and removed using a toothed demolition bucket. Once the recorded area had been cleared the process was repeated in a step-wise fashion across the site.

In order to prevent damage to adjacent trees and University Road a small portion of the shelter and surrounding earthwork was retained along the eastern edge of the site. Because the structural integrity of the shelters had been compromised the remaining tunnels were backfilled with concrete to prevent any subsequent collapse.

Results

As noted above, the Regent College air-raid shelter forms a rectangular platform in the north east corner of the Regent College site (Figs. 7 and 8). Seven concrete-faced entrances are set at regular intervals along the west face of the shelter (Fig. 9). Shortly before demolition commenced a number of trial holes were hand excavated across the top of the earthwork to assess how far the roof of the shelter was below current ground level. This appeared to be surprisingly shallow with an average depth between 0.35 and 0.55m.

Demolition began at the southern edge by removing the earth bank to reveal the edge of the southernmost shelter tunnel (Fig. 10). The exposed structures were then photographed and surveyed before further demolition continued. The anti-blast zigzag pattern suggested by the lumps in the turf and from the brief inspection in 2010 was clearly visible during demolition. As demolition progressed it could be seen that, although each tunnel followed the same overall pattern of right-angled bends and dead ends, some tunnels were longer than others (Fig. 11). Although the shelter is made up of seven distinct tunnels they do interconnect at a number of points so that any part of the system can be reached, albeit in a circuitous fashion.



Figure 7 General view of the south and west elevations Looking north east



Figure 8 Shelter entrances Looking east



Figure 9 Detail of entrance



Figure 10 Demolition of Tunnel A Looking west

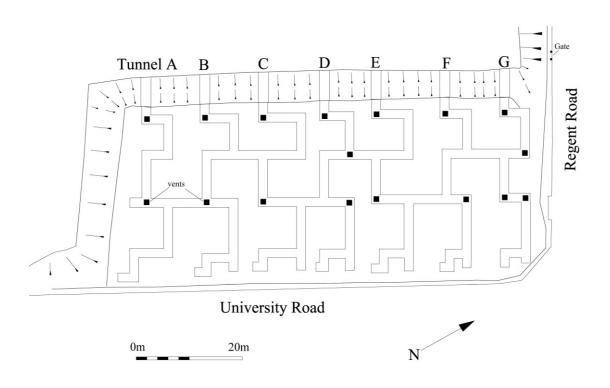


Figure 11 Overall tunnel layout as surveyed during demilition

The seven entrances were set at regular intervals along the eastern edge of the shelter facing downhill towards the school. The flanking concrete retaining walls are stepped to follow the slope of the earthwork and have been cast in-situ as clear lines between each pour of concrete could be seen in places. There appeared to be no form of flooring within the entrances until the actual start of each tunnel.

Initial inspection of the tunnel roof showed it to be built of sectional pre-cast concrete slabs sealed at each joint with tar which appeared to have been poured in when hot (Figs. 12 and 13). A 7-8mm (1/4 inch) thick layer of tar had also been poured over the entire roof to create a waterproof membrane. Rectangular holes in the roof indicated where air vents had been placed. These had been blocked, presumably soon after the war, to create a level ground surface. Seventeen ventilation holes were recorded (as in Fig. 11) but, as the final 7 or 8 metres of tunnels at the east end were left in-situ, it is probable that some holes remained unrecorded at the furthest extremities.

Removal of the roof showed it to have been located onto the wall using an interference fit with the upper edges of the wall panels. This was achieved using precast channels in the roof panels slotting over the top edges of each wall panel (Figs. 14 and 15). The roof panels measured 1.52m in overall width (5 feet) which gave an approximate internal tunnel width of 1.42m. Once the roof slabs had been removed it was possible to see into the tunnel structure which was remarkably dry and intact (Fig. 16).



Figure 12 Exposed shelter roof, Tunnel F Looking north. Note capped ventilator shaft near to vehicle track.



Figure 13 Tunnel D roof being exposed Looking west



Figure 14 Roof structure and vent Note original turf line running across the section at ceiling height



Figure 15 Removed roof and wall panels Roof panel in foreground. Arrow the shows foot of a wall panel



Figure 16 Partial demolition of Tunnel B Looking north

Each identical wall panel was joined to its neighbour using a simple tongue and groove system, with each joint being filled with tar. Small recesses at the top of each wall panel could be seen where a hoist or clip could be located to assist in manoeuvring the panel into position either during manufacture or on site during construction (Fig. 17). The 385mm wide (15 inches) panels had an I-shaped cross-section when viewed in plan. They had steel reinforcing bars running down each side where they were thicker to create the tongue and groove. Some steel rods had begun to rust and cause some spalling, but overall the condition of the panels was remarkably good. Each wall panel had a distinctive foot (see Fig. 15) which, as well as identifying top from bottom, presumably assisted stability during construction. The foot also supported the floor slabs as is discussed below. No cross-bracing had been used to prevent the whole structure from twisting out of alignment and it would appear that the overlapping joints and weight of surrounding earth were sufficient to maintain the structural integrity.

The floor was laid on bare earth with concrete spacers set at regular intervals to prevent the base of the wall panels from slumping inwards (Fig. 18). The tunnels nearest to the entrances had exposed earth floors, but deeper into the system remnants of the concrete slab flooring could be seen in places. The last few metres of tunnel nearest to University Road were almost completely slabbed (Fig. 19). The slabs were laid, apparently without mortar, onto the top of the concrete floor spacers leaving a small drainage gap beneath. Presumably after the war these rectangular slabs were sufficiently easy to remove and would be useful elsewhere. Below the floor and partially dug into the earth was a single ceramic circular section land drain running down the centre of each tunnel (Fig. 20). This would appear to be the drainage system added shortly after construction. No evidence of any pumping equipment was in evidence although it is possible that drainage relied on the natural slope of the land down to the north.



Figure 17 Tongue and groove joints on wall panels



Figure 18 Tunnel A Looking south east. Note concrete spacers on floor



Figure 19 Tunnel E floor slabs near to Universuty Road Looking south



Figure 20 Drain in Tunnel F/G Looking north east

Internally a number of fittings survived, although in poor condition. Near to many of the 17 ventilation shafts which were identified during demolition were the remains of large hand-operated paddle-like fans. They had hand cranks attached to a chain and gear wheel (Fig. 21) and were, apparently, housed within a simple metal, plywood and chicken wire structure. None of the fans survived in-situ and it would seem that the fans were simply pushed down into the tunnels when the ventilation shafts were removed and covered over. A variety of wooden and metal ladders were also seen near to the ventilators which might suggest that they could also be used as escape routes should the entrances become blocked. A simple electrical cable system with Bakelite fittings ran along the roof of each tunnel and was attached to timber cross members. The timbers were wedged at ceiling height into the recessed slots in the wall panels which were noted earlier (Fig. 22). The cables and fittings appeared to be the remains of the lighting system but no bulbs remained – possibly removed for use elsewhere during the post-war austerity period. A number of galvanised steel buckets were noted, some having perforated covers, and are likely to be soil buckets. No evidence of any form of seating was seen but as these would have been easily moved it would seem probable that they were taken away for use elsewhere.



Figure 21 Recovered fittings From top; ventilator housing, fan, soil bucket and lid, lighting cable



Figure 22 Lighting system in-situ, Tunnel G Looking north east. Note wooden cross members held in pre-cast slots

During demolition a number of wall markings were evident. The most prominent of these was a system of crudely painted yellow lines with numbers and letters identifying each segment of tunnel. These were noted during the visit for the heritage statement and it was suggested that these dated to the post war period when it was used for Fire Brigade practice. There is no reason to dispute this idea as in places it could be seen that they were painted over earlier red markings. The letter designations have been used for the purposes of this survey and are shown in Figure 11. Pencildrawn maps appear on the walls in various places, one appears to show a complete length of tunnel with annotations suggesting the location of ventilator shafts and, possibly, benches (Fig. 23). Interestingly, if the interpretation is correct, there do appear to be ventilators at the extreme ends of each tunnel. The maps are quite crude and do not show any of the interconnecting passages which link each tunnel. It is possible that these are a much later addition as one would assume that rather more permanent and visible maps would be used during the war.

As demolition progressed it could be seen that the surrounding earth mound consisted of a homogenous mid orange brown silty clay. Despite map evidence indicating that this feature dates back at least to 1902 there was nothing to indicate any former uses. Also, the tunnels must have been built using a cut and cover method but no difference could be seen in the main mound material and any potential back-filled material against the outer walls of the shelter. There was however a clear band of darker material at about roof height where the original turf line was and which was then buried by upcast from the excavated tunnels. Figure 14 most clearly shows this. The cut and cover method would seem to be the preferred method of construction for such a shelter as photographs exist of other structures being built elsewhere in Leicester (Fig. 24).



Figure 23 Sketch map on wall of Tunnel D Black squares probably indicate vents, hatching might show location of benches



Figure 24 Construction of an air-raid shelter Fullhurst Community College (formerly Newarke Girls School) (Record office for Leicestershire, Leicester and Rutland)

Discussion

The air-raid shelter at Regent College was a good example of a standard design of shelter used in many schools across the country. Despite being so shallow this type of design offered many advantages as it would be relatively easy and fast to construct and would offer good blast protection from all but direct hits or very near misses. Being so shallow would also help in any rescue operations. The use of the many ventilator shafts as potential escape hatches is evidence that this was prominent in the designer's minds.

Recording the structure during demolition was an extremely useful exercise in that all of the construction details could be seen. The use of two common components, the roof and wall panels, to create a large shelter shows a high level of skill and foresight on the designer's behalf. The use of multiple small pre-cast components also allowed the structures to be built relatively easily by hand. The components were also flexible enough to suit any individual location whilst still maintaining the general standard zig-zag layout.

The shelter appears to have been built by the cut and cover method as seen by the buried turf line showing the height of the original ground level. It is probable that rather than this area being a mound in the corner of the school grounds, it is actually the original ground surface and that the ground to the east and south was reduced for a cricket pitch. Certainly the top of the shelter structure was at a similar level as the adjacent roads. Such a readily available earthwork would have been viewed in 1939 as an ideal basis for a large school shelter which needed to be built as close to the school and as quickly as possible.

The fact that the ground drops away to the south and east should have helped drainage, however the presence of the land drain and the ROLLR records concerning drains would indicate that all was not well. Demolition took place during a cold but particularly dry period so that only condensation and slightly damp floors was seen. It would be easy to imagine significantly wetter floors in poor weather.

Publication

A summary of the work will be submitted for publication in the *Transactions of the Leicestershire Archaeological and Historical Society* in due course. A record of the project will also be submitted to the OASIS project. OASIS is an online index to archaeological grey literature.

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Appendix. Digital photographs taken during the work





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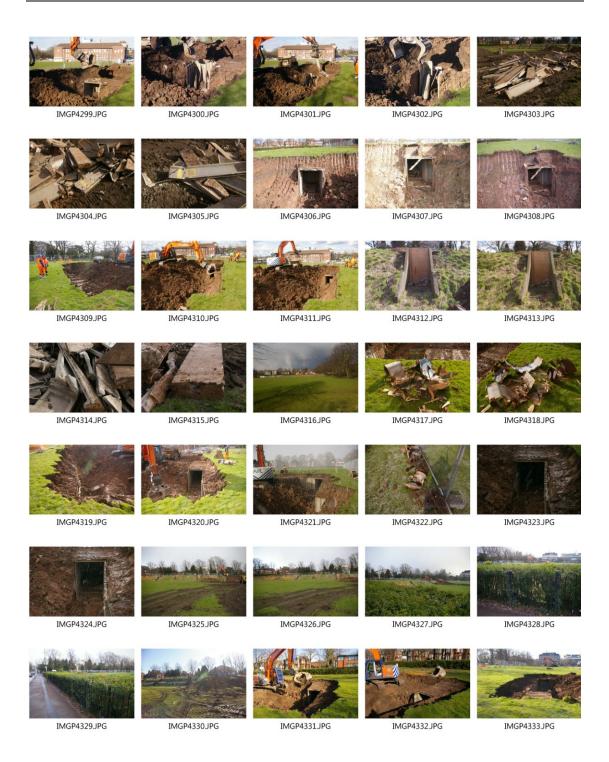
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