

**Shoreham Adur Tidal Walls, Reach W7,
West Sussex**

**HISTORIC BUILDING RECORD
(HISTORIC ENGLAND LEVEL 2 AND 3)
NGR: 520650,105520**

**ASE Project No: 160031
Site Code: ATW13**

**ASE Report No: 2017513
OASIS id: archaeol6-302744**



**By Justin Russell
With contributions by Hannah Samuels**

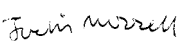
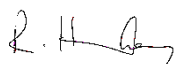
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SUMMARY

In November 2016 and October 2017 Archaeology South-East (a division of the Centre for Applied Archaeology, UCL) carried out a programme of historic building recording on 14 Second World War structures on the western edge of the River Adur (Reach W7), prior to the commencement of the Adur Tidal Walls flood defence scheme. Reach W7 is just one of a number of areas on the east and west bank of the Adur within the overall Adur Tidal Walls scheme.

The structures recorded here, located where the riverbank converges with the perimeter of Shoreham Airport, Shoreham-by-Sea, form only a part of the wider system of defence and airfield administration put in place from 1939, as well as being part of the defensive line along the River Adur. An archaeological evaluation of the site was previously undertaken (ASE, 2015) and additional Second World War structures were recorded as part of this work.

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1 INTRODUCTION

- 1.1 In November 2016 and October 2017 Archaeology South-East (a division of the Centre for Applied Archaeology, UCL) carried out a programme of historic building recording on 14 Second World War structures on the western edge of the River Adur (Reach W7) (Figure 1 NGR: 520650,105520).
- 1.2 The work was commissioned by J.T. Mackley & Co. Ltd to fulfil a condition placed on planning consent relating to the Adur Tidal Walls flood defence scheme works: the improvement and raising of the flood defences. The scheme has been divided into a number of 'Reaches' according to the nature of existing defences, land ownership and responsibilities for flood protection. There are seven reaches on the west bank and three on the east. Reach W7 is located where the riverbank converges with the perimeter of Shoreham Airport (Figure 1 and 2).
- 1.3 The impact upon the structures by the defence scheme varies: minimal impact from landscaping of the surrounding area (Structures 6, 7, 8, 9, 10, 11 and 12, also including the open fronted brick structure and pillbox/LAA base recorded in the evaluation), preservation in situ by burial within the flood defence bank (Structures 3, 4 and 5) and demolition and removal (Structures 1, 2, 13 and 14, also including the three concrete hut platforms recorded in the evaluation).

2.0 SCOPE & METHODOLOGY

- 2.1 The recording involved the survey of the structures to Level 2 and Level 3 as defined by Historic England (2016) and as set out in a written scheme of investigation produced for the work (Mott McDonald, June 2017). Level 2 recording was applied to Structures 6, 7, 8 and 9, as well as the concrete footpath, while Level 3 recording was applied to Structures 2, 3, 4, 10, 11, 12 and 13. Structures 1, 5 and 14, not included in the WSI were recorded at Level 3 due to the possibility of removal in the course of flood defence work.
- 2.2 The work was also carried out in accordance with the relevant ClfA standards and guidance (ClfA 2014a).
- 2.3 The site was visited by Justin Russell and Hannah Green on 25th and 28th November 2016 and then again (after access issues had been resolved) by Justin Russell and Chris Curtis on 27th September 2017, in order to carry out the recording work. This comprised the compilation of written notes and the production of a full drawn and digital photographic record. The structures were surveyed in using GPS.
- 2.4 A mini-digger was used to provide access to structures 1, 3 and 4 by clearing accumulated soil and vegetation in these areas under watching brief conditions.
- 2.5 The photographic record was compiled using high quality digital photography. Both interiors and exteriors of the structures were surveyed, including general views to illustrate their wider setting.

- 2.6 The site has previously been subject to a Historic Environment Desk-Based Assessment (Mott MacDonald, September 2015) and an Archaeological Evaluation (Archaeology South-East, 2015). Relevant information from these documents is included within the report. The analysis of the structures has been complimented by historic background research, including a visit to the Historic England photographic archive in Swindon and the National Archives at Kew.

3.0 SITE LOCATION

- 3.1 The site, Reach W7, is located on the western edge of the River Adur (NGR 520650,105520 – Figure 1) where the river bank converges with the eastern perimeter of Shoreham Airport (Brighton City Airport). It is essentially bordered by the main east - west railway line to the south and the 18th century wooden toll bridge to the north (Fig. 1). The riverbank merges on the landward side with a large drainage ditch, which runs parallel along the entire length of the bank. There are two crossing points over the ditch, allowing pedestrian access to the bank and footpath which runs along it (known erroneously as the 'tow path').

4.0 HISTORIC BACKGROUND

- 4.1 Brighton and Shoreham Aerodrome was officially opened in 1911, the land having been used for the two years prior to this as a site for aircraft development. In 1914 the airfield was requisitioned for the Royal Flying Corps and used for flying instruction but by 1920 was abandoned and returned to pasture.
- 4.2 Activity returned to the site from 1926 and in 1936 the Brighton, Hove and Worthing Municipal Airport was opened, with the (now iconic and Grade II* Listed) terminal building as its centrepiece.
- 4.3 The advent of the Second World War meant that once again Shoreham Airport was requisitioned for Military use and in June 1940 it was reopened as an advanced airfield in the Kenley sector (Kenley Airfield, Surrey) of No 11 Group, Fighter Command. Advanced airfields, in this context, were used as emergency refuelling and arming sites for fighter squadrons that were engaged in operations. Throughout the war, Shoreham's ownership changed hands a number of times, and its roles included air-sea rescue, participation in the Dieppe Raid, as a base for the Free-French during D-Day and as an anti-aircraft training facility. The airfield boundary was enlarged in 1941 by expanding west and flattening the embankment on which the New Salts Farm Road had been located as well as the demolition of Lees Barn. In 1945 and 1946 the airfield became a satellite of RAF Nether Wallop (Hampshire) until being handed back to the Ministry of Civil Aviation in March of 1946.
- 4.4 It is within the period of use from 1940 to 1945 that the structures within this report were constructed. Airfield defence was a major consideration after the fall of France, as it was feared a German land invasion might be preceded by paratroopers and glider landings at key sites such as airfields, ports and rivers. Shoreham Airfield's location beside the Adur and Shoreham Harbour,

as well as its proximity to the Operation Sealion landing grounds of the Sussex coast made it a high priority for defence.

- 4.5 Airfield defences were built around the perimeter and performed a number of different roles – pillboxes guarding access points onto the airfield and providing fire into the centre of the airstrip (targeting an enemy force making an attempted landing), light anti-aircraft positions for use against low flying fighters and bombers attacking the airfield and breastworks and trenches for additional fire support. In this context, anti-aircraft weaponry can be divided into two types – heavy anti-aircraft (essentially artillery, using 3.7inch and 4.5inch guns) and light anti-aircraft (light machine guns, 20mm cannons and 40mm Bofors artillery). The former was considerably more effective against aircraft, especially high flying bombers, and there were at least three HAA batteries around Shoreham town, to protect the harbour from bombers. Light anti-aircraft weapons (the Lewis light machine gun, for example) were considerably more prevalent at the time and though less effective against aircraft than the higher calibre weapons, were used in quantity for airfield defence.
- 4.6 A Battle Headquarters (BHQ) was built in the south-east, to coordinate the defence in the event of an invasion and was later re-sited to the north of the airfield, on higher ground (these were underground structures with an overground observation cupola).
- 4.7 Given the placement of the airfield close to the vulnerable areas noted above, it was later selected as one of an initial nine airfields on which pipe mines were to be laid in 1941. Known as the Canadian or Mcnaughton pipe mine, these consisted of pipes bored beneath the airfield and filled with explosives which could then be detonated in the event of an enemy landing. The total number of airfields defended in this manner rose to 32 and Shoreham had its mined areas extended. Pillboxes and anti-aircraft sites along the eastern perimeter of the airfield functioned in the dual role of not only defending the airfield but in slowing the feared invasion coming from the coast.
- 4.8 Rivers, acting as natural barriers to a mechanised assaulting force, were enhanced by pillboxes, minefields, anti-tanks blocks and ditches to provide 'stop lines', areas where the invasion might be slowed sufficiently to muster further mobile defenders into position. There were various categories of stop lines, the largest being the GHQ line, which formed a line through south-west England, around London and on to the north of England. On a smaller scale, were Divisional and Corps lines, dividing large areas of the country into defensive zones manned by specific units. The Adur 'grid' line (a north-south linear, dividing the divisional areas into 'grids'), ran from the mouth of the Adur, up the river to Bines Green (where it passes into an area under a different divisional control. The grid line featured a number of hardened defence points, notably concrete field artillery positions, unique to the Adur and Arun rivers.
- 4.9 Included in this report are some structures that do not fall within the defence role: air raid shelters, a guard hut, a storage/utility hut and two unidentified brick rectangular features. Air raid shelters were common features from the late 1930's on to the end of the war and personnel not required to man the defences would be able to shelter in these during raids. During the war utility

huts were placed around the perimeter of the airfield, (dispersal being the favoured tactic in preventing air raids from being overly disruptive) and structure 2 represents a rare survival of one of these. Concrete platforms of other huts from the period were found during the evaluation (ASE, 2015).

5.0 DESCRIPTION

5.01 The Written Scheme of Investigation (Mott MacDonald, June 2016) originally identified 13 structures (including the footpath), two of which (an open fronted brick structure MM240 and the base of a demolished pillbox MM238) were previously recorded during the archaeological evaluation of the site (ASE, 2015). Three additional structures were subsequently identified during initial reptile habitat clearance works and walkover of the site (ASE structures 1, 5 and 14).

5.02 Consequently the structures recorded in this report have been assigned numbers 1 to 15 – this is an arbitrary numbering system starting at the southern-most structure on the airfield perimeter and on the western side of the drainage ditch, heading north to the toll bridge and returning south on the eastern side of the drainage ditch, on the bank of the River Adur (Fig. 2). The numbers originally assigned in the WSI are also noted below for clarity.

5.1 Structure 1 (MM249): Air Raid Shelter (Figure 3)

5.1.1 The most south-eastern structure on the airfield site, Structure 1 is an air raid shelter of a semi-sunken design. It is rectangular brick structure (9.88m by 2.50m) on a concrete platform. The walls are 370mm thick and laid in English Bond. The full dimensions of the platform were not visible but are likely to be of a similar size to the concrete roof which is 300mm thick and cast in-situ (the impressions of the supporting wooden planks on the interior ceiling are clearly visible). The brick shelter is within a mound consisting of material excavated from the construction cut of the original build and banked up against the walls to give additional bomb blast protection. The roof projects c. 100 – 200mm above the surface of the mound (Plate 1).

5.1.2 Two access points are provided on opposing corners, a safety feature to allow an escape in the event of a bomb blast blocking one entrance. A protective blast wall (2.73m by 1.34m) covers each entrance and access to the entrance can be made around either end of the blast wall. As originally built, the blast walls were 210mm thick (one brick, lengthways) supporting walls that ran perpendicular to the main axis, and diminishing in height as they extended from the blast wall. The thin walls provided extra support to the main blast wall and the exterior space between them was filled with an earth bund, further proofing the shelter from bomb blasts. Scars remain of these supporting walls, indicating that they were removed at some stage in the past. The south-west entrance (and the only one exposed during the watching brief) featured three steps (brick built, with a render finish) down from the surrounding ground level (Plate 2). The final step is immediately flush with the entrance. On the other side of the entrance, three further steps lead around to the other side of the blast wall, with another brick supported earth bund projecting out from the main shelter wall (Plate 3). The height of the blast wall is flush with the roof of the shelter, both 2.47m from the

concrete floor of the shelter, giving an interior height of 2.17m. The north-eastern entrance is blocked by the blast wall which has collapsed onto it.

5.1.3 The main chamber of the shelter is itself protected by an interior brick blast wall (1.27m long) and measures 6.62m by 1.8m (Plate 4). The blast wall creates a corridor into the main chamber (Plate 5) and with the insertion of two anti-gas curtains, would provide an air-lock in the event of a gas attack. The interior walls are rendered up to the ceiling, presumably as a method of preventing moisture ingress.

5.1.4 The elevation at the top of the shelter (3.42mOD) is 1.52m higher than the ground level from which the mound projects – this combined with the known height from interior floor of the shelter to roof (2.17m) with an additional 0.3m to account for the concrete base (2.47m) it means that the shelter is excavated to a depth of only 0.88m below the surrounding ground level, presumably due to the extreme proximity of sea level, water table and the river (a mere 20m to the east), meaning that there is the potential of flooding and ground water saturation at depth. Even with this caution, the shelter was partially flooded at the time of survey.

5.2 Structure 2 (MM248): Store (Figure 4)

5.2.1 The store is rectangular (7.5m by 5.4m externally) structure with a pitched roof and is built with a single skin of brickwork, strengthened by four internal engaged piers on the long walls and one on the southern wall. It is built onto a concrete platform, which extends 130mm outward beyond the brick walls in all directions. A large doorway, fitted with a large steel door with a small internal door at the time of survey is located in the northern wall, the full aperture measuring 2.55m wide and 2.27m in height. Two window frames in the western wall look out onto the airfield, and though the frames are not original the openings in which they are set would appear to be (Plate 6, Plate 7 and Plate 10).

5.2.2 The interior of the structure has been altered by the addition of insulation over the ceiling interior, loft space and an internal 'office' partition (Plate 8 and Plate 9). In the southern wall, blockwork was noted west of the engaged pier, extending from floor to the inserted lowered ceiling, suggesting that at one time there may have been a doorway here. The exterior wall at this location is masked by sheet of plywood covering the area of the 'door' in its entirety.

5.2.3 In the southern end of the east wall a section of re-instated brickwork measuring 0.94m wide suggests the former location of a window. A large extractor fan is located in the centre of the east wall, in an aperture measuring 0.5m by 0.5m. It is unclear whether the fan or the aperture are original features.

5.3 Structure 3 (MM242): Air Raid Shelter (Figure 5)

5.3.1 A second air raid shelter (Plate 11) is located 95m north of Structure 1 and is virtually identical in form. The only significant difference between the two is that there are four steps down to the entrance from the original ground level, compared with three at Structure 1. The reason behind this would seem to be that the structure roof has an elevation of 3.08mOD, indicating it is set 0.34m lower into the ground than Structure 1, and therefore closer to the ground

water level. While it was possible to excavate the access steps beside the blast wall on the south-eastern corner (Plate 12), the entrance corridor was blocked with soil and silt and it could be seen that the interior chamber was flooded. Indeed, the water very quickly began to seep out and submerge the recently excavated steps. Having not had the fortune of being cleared out in the recent past (as had Structure 1), full access to Structure 3 was not possible due to 70 years of silting and retained water (Plate 13).

5.4 Structure 4 (MM241): Pillbox and Light Anti-Aircraft Post (Figure 6)

- 5.4.1 This pillbox, 11m west of the riverbank, faces west into the airfield and with a roof height of 2.78mOD, views to the east are obscured by the riverbank, itself at a height of 4.00mOD at this location (Plate 14). The pillbox is hexagonal in plan (3.8m by 3.02m), with a square open-roofed light anti-aircraft post built onto the north-western wall (2.29m by 2.97m) (Plate 16). The concrete roof of the structure is 310mm thick and overhangs the 350mm thick brick walls of the pillbox by 30mm on all sides. The forward facing (south-western) side of the roof is exposed concrete, while all other sides were shuttered in a single skin of bricks, (which on the south-east and north-east walls have become displaced, exposing the concrete), suggesting shuttering on the south-western side was originally of wooden planks, removed once the concrete had set.
- 5.4.2 Access to the pillbox is from the eastern (rear) wall via a single skin brick blast wall (Plate 15), aligned north-west. At only 0.58m wide, the 'corridor' created between the blast wall and the pillbox wall proved too narrow for the machine bucket to access during the watching brief, so excavation in this area was discontinued and as a result, no sign of steps down to the entrance were revealed. The interior of the pillbox was seen to be flooded up to a height of 1m thus preventing full access, but measurements could be made. The height of the interior, estimated at 2m, is based on measurements of a similar pillbox, Structure 12. All internal walls are rendered, an unusual luxury in a pillbox, though the reason for this may have been as an aid to prevent moisture penetration, the structure being semi-sunken. Another unusual feature is the addition of an internal partition wall, creating two chambers.
- 5.4.3 The first chamber, accessed from the entrance in the east, measures 2.45m by 1.22m. Remnants of a wooden door and frame are set into the internal wall leading to the second chamber (Plate 17). The doorframe is set within the rendering of the wall and thus can be said to be at least contemporary with it, indicating it is not a more modern enhancement of the building. Whether the partition and door were original, is unclear. If original, the rear chamber may have been an ammunition storage area for both the pillbox and the anti-aircraft position or perhaps a temporary accommodation for crew manning the post.
- 5.4.4 The second (forward facing) chamber contains three loopholes in the north-western, western and south-western facing walls. Each loophole splays outward in plan, so that the smaller part of the aperture is on the interior – the south-western/central wall has the largest of these with an interior width of 0.48m and an exterior width of 1.08m. Above the loopholes are cast in-situ concrete lintels, 220mm thick and varying in length from 0.72m to 1.21m. There are signs of a wooden baton having been attached above and below

the aperture – iron fittings are all that remain but an outline of the batons is visible in the variable discolouration on the walls. The lower batons appears to have been joined together to form a continuous strip along the wall. These would have formed either part of a shutter system, to keep rain and wind out, or for the securing of a specialised mount for the light machine gun placed here.

- 5.4.5 A second entrance is provided in the north-west wall of the west chamber, giving access to the light anti-aircraft post (Plate 18). During the watching brief a small area was cleaned out within the southern corner of the anti-aircraft post, to make accessible this entrance and expose the floor of the secondary structure. The contrast in levels between the floor of the pillbox and that of the LAA post would undoubtedly mean a step would have been required to facilitate movement between the two areas, though none was evident.
- 5.4.6 The depth of the concrete floor of the anti-aircraft post to the top of the wall (flush with the roof of the pillbox) is 1.54m and the wall is made up of 350mm thick brickwork. Within the centre of the LAA post was a concrete plinth fixed to the floor (Plate 19). It measures 480mm by 490mm in plan and stands 490mm tall. The 'plinth' is hollow and contains a metal bracket bolted to the concrete base to which a wooden post was fitted, the remains of which were still present. The remains here constitute the base of the light machine gun mount, a format designed to allow a gunner, in standing position, to aim skyward with 360 degrees of observation, being able to manoeuvre around the central post. At the very base of the post, within the concrete plinth a single 30-06 cartridge (.300 inch calibre) was recovered (Appendix 3). The role of the hollow concrete plinth was probably to stabilize the wooden post and securely weigh the metal bracket down (despite already being bolted to the floor).

5.5 Structure 5 (MM number not allocated): Air Raid Shelter (Figure 7)

- 5.5.1 During clearance of the dense vegetation in autumn 2016, in the north-eastern part of the airfield boundary, it became apparent that an additional structure survived that had not been included in the preparatory work for the project. The structure is a partially demolished air raid shelter and though significantly smaller than the two in the south-east of the airfield, it is broadly similar in design (Plate 20 and 21).
- 5.5.2 The main rectangular building measures 3.77m by 2.54m and there are again, two entrances, on opposing corners, protected by blast walls. In the northern corner, partial excavation revealed three steps leading down to the entrance. The single remaining blast wall at 1.54m long is almost 1.2m shorter than those of the larger shelters. The second blast wall and the additional supporting buttress walls (Plate 23), while demolished to ground level, are visible as footings, allowing almost the full extent of these to be projected. During the attempted demolition, the roof was removed, most of it falling within the structure, but a measurement on surviving fragments suggests an original thickness of 300mm, similar to that of the southern structures. The internal chamber measures only 1.36m by 1.8m and presents a tiny space, standing room only one would presume. With the assistance of a mechanical excavator, the rubble filled base of the north-eastern corner

was excavated down to floor level, giving a wall height, from floor to ceiling of 2.05m (Plate 22). All internal walls were once again rendered.

5.6 Structure 6 (MM208): Field Artillery Emplacement (Figure 8)

5.6.1 Unique to the Rivers Arun and Adur, the concrete field artillery emplacement at the western end of the Shoreham Toll Bridge, is one of approximately 20 that are known to survive (Plate 24).

5.6.2 The structure is trapezoid in plan, the rear 7.79m and the front 3.84m, with the sides measuring 5.10m. It is notable for the large open rear (5.49m by 1.92m) (Plate 25), with capacity for wheeling the artillery piece through to its firing position. The embrasure on the front wall (2.46m wide by 0.92m in height) has a step in the vertical and horizontal ceiling sides to provide an anti-ricochet effect (i.e., projectiles hitting the interior faces will have less chance of ricocheting into the emplacement).

5.6.3 The front and rear walls are 1.06m thick, made of reinforced concrete, the wooden shuttering used in construction still visible imprinted on the surfaces. The roof is comparatively thin (300mm), though a lip on the rear wall extends a further 300mm into the rear access. Three ceramic pipes (with a diameter of 200mm) set into the roof, leading into the interior provide ventilation for the gases created by firing the artillery piece inside (Plate 27). In various places the reinforcing bars have suffered from corrosion, rusting and pushing out the concrete in front of them (Plate 26 and 28), revealing the spacing of the 10mm reinforcing bars to be set 150mm apart.

5.7 Structure 7 (MM239): Guard Hut (Figure 9)

5.7.1 Located at the northern entrance to the airfield, the guard hut represents the point at which authorised personnel alone would be allowed to pass into the site (Plate 29). Rectangular in plan (11.31m by 4.83m), only the west and north walls were visible at the time of survey, the others covered by vegetation. The interior was not accessible either in 2016 and in 2017 it was noted through a vandalised portion of the door that the building was completely full with stored items.

5.7.2 The door itself is in the northern end of the western wall and is relatively narrow (0.96m by 2.07m) with a concrete lintel, and a small step up to above the damp proof course (Plate 30). A large window is located in the same wall, though now sealed up with blockwork. There are air bricks in the lower four courses of bricks and ventilation grills in the upper four courses.

5.7.3 The north wall features a large window, broadly similar to that in the western wall. Vegetation in the area was dense and access was not possible at the time of the survey. Also noted adjacent to the window were the remains of what appeared to be a metal flag pole.

5.7.4 The southern 1.5m of the building features an unusual raised section of roof, a step of 270mm above the main roof which seems to correspond with two small windows, high up in the southern wall. These tiny windows, glazed and with wooden frames also feature a single external bar, set horizontally into the brick work (Plates 31 and 32). This is the location of two detention cells,

the guard hut essentially serving as the policing base for the airfield. Strikingly visible in the southern 3.5m of the building, is an extensive area of rebuild, from ground to roof, the rebuilt section constructed of distinctly paler coloured fletton bricks (Plate 33).

5.8 Structure 8 (MM209): Pillbox (Figure 10)

5.8.1 This hexagonal pillbox is situated on the riverbank at the north-eastern extremity of the airfield, just 10m from the guard hut, adjacent to / within the riverbank. Constructed of concrete with a large percentage of gravel inclusions, this is shuttered by brickwork externally and internally and capped with render (Plates 34 and 35). The external brick shuttering has suffered from damage and fallen away on the northern side revealing the concrete and the pouring/setting lines formed when it was built. Often the upper courses of brick shuttering were intentionally removed after the concrete had set, to disrupt the regular outline of a pillbox in silhouette. It might be that this was originally the case, but significant numbers of other bricks have subsequently fallen away. The overall thickness of the wall is 0.53m with the internal concrete composition being 0.31m.

5.8.2 Access is gained via steps on the eastern side (Plate 36), which turn 90 degrees to the west around the rear of the pillbox and continue to the entrance, which itself is protected by a brick blast wall (1.87m by 0.36m). The doorway (Plate 38) is a low 0.96m in height and leads to the small internal chamber from which there are four loopholes, facing west, north-west, north and east.

5.8.3 The northern two loopholes are splayed outwards, so that the larger part of the loophole is on the interior, while the more southerly two loopholes are the reverse of this. There would seem to be little reasoning behind this difference, other than perhaps to afford more space in certain locations – a loophole with a wide internal aperture requires the pivot point of the weapon used in it to be closer to the exterior of the pillbox, meaning the user of the weapon has travel through a greater arc of movement to turn the gun. Loopholes with a smaller internal aperture and a pivot point closer to the pillbox interior require less movement on behalf of the user, to turn the gun. All loopholes feature a thin (110mm) concrete lintel, of a similar thickness to the bricks, extending from the interior shuttering to the exterior. It is interesting to note that there is no loophole in the north-eastern wall, the one which faces the immediate access to the Toll Bridge.

5.8.4 Around each of the loopholes on the internal walls are screw fittings suggesting at some point there may have been weather proofing of some sort applied, perhaps of a shutter construction. The north facing loophole has the most complete example of this, with a wooden baton frame extending from the ceiling to immediately below the aperture, onto which a hinged shutter may have been fixed, or into which a board may have slotted (Plate 37). All four loopholes are currently bricked up. Floor to ceiling height of the interior is 2.03m and the internal area is a compact 4.2 square metres.

5.9 Structure 9 (MM207): Pillbox (Figure 11)

5.9.1 As originally built, this pillbox shares many similarities with Structure 8 and is

also located on the artificially heightened bank of the River Adur along the concrete slab path (Plates 39 and 40). Hexagonal in plan it was altered after construction, by the thickening of its walls - the roof of the pillbox shows clearly the original outline, denoted by the brick shuttering (Fig. 11). This original pillbox featured dimensions almost identical to Structure 8, though with a different format to the loopholes (here they are all externally splayed). The modifications included a further 0.42m of concrete applied to the exterior with an additional layer of brick shuttering, bringing the overall thickness of the walls from 0.52m to 1.06m. The later and outer segment of wall has small nodules moulded into the roof, either to act as some form of camouflage or to aid in the retention of soil applied to the roof to hide the pillbox from aerial observation (Plate 41). All exterior angles (that are not right angles) on the brick shuttering feature comb bonded brickwork (brick corners protruding beyond the wall, which might normally be chiselled flush). There are two types of brick used in the construction, both fletton brick – the contrast is visible most clearly on the western wall. It would seem to suggest that midway through the construction one set of bricks was used up and the next begun (Plate 39).

- 5.9.2 Four steps lead down from the concrete footpath to the low doorway (0.72m wide and 0.93m high) which is afforded protection by a blast wall (1.82m by 0.35m) (Plate 43). The blast wall and steps can be assumed to be replacements of the originals, which would have been removed when the pillbox width was increased and re-sited slightly further north. The steps may have continued past the door, some way into the drainage ditch, but the area was obscured by a thick layer of soil at the time of survey.
- 5.9.3 The external doorway seems not to have a concrete lintel, just an angle iron mortared in to assist in the support of the brickwork – the original doorway did however, have a concrete lintel, visible on the interior. Division between the original and extended walls of the pillbox can be clearly seen on the entrance wall (Plate 44). On entering the pillbox, there is a 0.6m by 0.9m rectangular area, on the same plane as the access corridor, before the floor steps up 30mm, at which height the majority of the floor is set. This device is presumed to limit water ingress during heavy rain, and to stop it spreading across the entire floor. The internal area is 4.25 square metres and the floor to ceiling height is 2.07m.
- 5.9.4 There are five loopholes within the six walls, with the predominant three pointing from south to east, while a fourth points out across the airfield and the fifth points north, over the entrance and blast wall. All of the loopholes are splayed from the interior outwards, so that the smallest part of the aperture is on the internal wall. Small concrete lintels cap the loopholes in the inside wall. On the outside, however, brick arches have been formed to support the shuttering while the concrete behind this seems to have been cast onto temporary wooden shuttering, which was removed once the concrete had set (Plate 42). The south-eastern facing loophole is notable for its external aperture extending 200mm beyond the point of the last brick in the supporting arch, suggesting its arc of observation was increased after the construction of the shuttering, perhaps even after the pouring of the concrete. In plan the wider aspect of this loophole can be seen, undoubtedly increasing the observation from it to the south along the river footpath. Surrounding the internal aperture of the same south-eastern facing loophole is an iron frame

fitted precisely to the opening, presumably to which was attached a hinged door to allow some form of protection from the elements. While none of the other loopholes display exactly this type of shutter, they all have a varied arrangement of screws within the wall suggesting wooden shuttering and perhaps shelves below the openings.

- 5.9.5 Three angle irons embedded on the eastern side of the riverbank path may well be residual anti-invasion pickets for holding barbed wire. The concrete slabs of the footpath are slightly displaced where they pillbox makes contact with the path and they may merely be acting as a form of securing the slabs in place.

5.10 Structure 10 (MM206): Light Anti-Aircraft Post (Figure 12)

- 5.10.1 Located 250m south of Structure 9 is the partially demolished remains of a light anti-aircraft post (Plate 45, 46, 47 and 48). Built into the western side of the riverbank (to afford some protection to the occupants) the structure consists of a 4.4m by 4.5m brick box above a 200mm thick concrete platform. The brick walls (0.35m thick) originally extended up from this floor to a height of 1.17m (see structure 11) and only the eastern-most wall survives to anything close to this height, where it is flush with the top of the riverbank footpath. There are no visible steps leading from the footpath to the entrance, but it can be presumed that there were (based on the evidence of the other structures) and they have been buried during the partial demolition.

- 5.10.2 A blast wall protects the entrance and follows the steps down towards the drainage ditch. With all the upper walls removed, except the eastern wall within the riverbank. A circular recess (radius 1.25m) in the concrete floor would have formed part of the housing for an anti-aircraft machine gun mount.

- 5.10.3 Three water drainage pipes exit from the west wall, directing water from inside the open roofed structure into the ditch. Joined to the southern wall of the main structure is an ancillary structure (2.82m by 2.82m) of which only the western foundation and east wall in the riverbank remain. This was the crew rest and ammunition storage area.

- 5.10.4 In September 2017 Archaeology South-East conducted a watching brief along the line of a new water pipe on the site and found a Bakelite telephone junction box and a lead coated cable heading in the direction of the rest area building. While it cannot be guaranteed this is the destination of the cable, it would suggest that the rest area and LAA post was connected to the main Control room of the airfield.

5.11 Structure 11 (MM205): Light Anti-Aircraft Post (Figure 13)

- 5.11.1 Structure 11 consists of a light anti-aircraft platform (4.6m by 4.6m) with a smaller structure (2.83m by 2.89m) abutting to the south (Plates 49 and 50). No steps were visible leading to the structure from the riverbank path but these are likely buried. A blast wall protects the entrance to the structure,

(3.88m long by 0.35m wide) and shows signs of having been built in two phases (Plates 52 and 54). The initial phase blast wall (1.83m long) covers only the entrance and is defined by the straight bonded brickwork between it and the western section, which follows the steps down and around the western wall of the main building.

- 5.11.2 Access to the open roofed structure is through a 0.65m gap in the north wall, which stands at 1.17m from the concrete floor (Plate 51). The top of each wall forming this square has a half brick recess set within it, three on each wall apart from the northern wall, which has four (to accommodate the door). Beneath the slots in the western wall are three further slots, 120mm below the top of the wall, extending to the exterior wall. The reason for these slots, which appear to have had wooden batons (long since rotted away) mortared into them is somewhat obscure, but may relate to camouflaging the structure from the air.
- 5.11.3 Within the square-walled interior is an octagonal structure (3.02m by 3.04m) in which the anti-aircraft gun was mounted. There are two 0.64m wide points of entry in the eastern half of the octagon, leading to the centre of the structure. This also shows two phases of use, the first being a circular recess 1.23m in diameter featuring at least four steel bolts protruding around the perimeter. On top of this, and now broken into fragments is a concrete slab (Plate 53) approximately 0.9m by 0.9m and 200mm thick with a recessed circle in its centre, though only 240mm in diameter, with evidence of at least three bolts protruding within this.
- 5.11.4 On the exterior western wall are three drainage features, essentially missing bricks, which allow water to drain from the interior. Drainage pipes, of the kind seen in Structure 10 may exist here but vegetation growth has covered the structure at that level. The building abutting the LAA post is also in good condition and consists of 2.66m by 1.8m room, with a door and window on the western wall – a temporary rest area for the LAA post crew. The roof is set 150mm below the top of the LAA post wall (placing it just below the riverbank) and is made of 150mm thick concrete – sloped render from the main structure extends in places onto the roof of the rest area building, to provide a water proofing seal for the room below. Sitting directly below the concrete roof, the door and window required no lintels, merely wooden frames extending up to the roof (Plate 55), a fragment of which survives at the top of the window. Slots for the frame are visible in the brick of the door jamb, which show sections where the mortar has been removed for the insertion of wooden fixings. There were no internal fittings for a telephone or an entry point for a cable.
- 5.11.5 On southern side of the rest area building is a tiny rectangular room, just 2.4m by 0.58m, with a doorway in the centre of the wall. A row of four half bricks sits above a slot made for a wooden lintel. This room would appear to be either a latrine or storage facility for the LAA weapon. Both rooms are rendered on the interior.

5.12 Structure 12 (MM204): Pillbox and Light Anti-Aircraft Post (Figure 14)

- 5.12.1 This pillbox, octagonal in plan, with a light anti-aircraft post on the northern wall, is of a similar construction to Structure 4 (Plates 56 and 57). The main

point on which the pillbox differs is that instead of being entirely focused on the airfield, this example has loopholes viewing not only the airfield but the river as well and as such, it has an extra protrusion on the eastern face to accommodate these.

- 5.12.2 The walls of the pillbox are constructed of brick 0.35m thick. A blast wall (3.96m by 0.35m) protects the steps down from the river side path and it should be noted that the steps continue on down past the doorway, suggesting that they led to an access point across the drainage ditch. The doorway (height 1.53m, width 0.71m) leads into the main chamber, which has an internal height of 2.00m.
- 5.12.3 Six loopholes, facing mainly south-west and north-east are all uniformly splayed from the small exterior aperture to the larger interior aperture (Plate 59). Each is capped by a 210mm thick concrete lintel composed of a high percentage of flint gravel.
- 5.12.4 Opposite the main entrance is the access point to the LAA post – an initial step up of 0.75m from the floor to the base of the doorway, is followed by a further step up of 0.46m to the concrete floor of the LAA post (Plate 60). With a missing wooden lintel supporting two rows of bricks above the doorway, this creates an aperture just 0.65m in height to squeeze through, suggesting that wooden steps of some form would be required to make progress from one compartment to the next a fluid movement.
- 5.12.5 The open-roofed light anti-aircraft post measures 1.75 by 1.82 m and has a depth of 1.05m to the concrete floor (Plate 58). Centrally placed on this floor is a square concrete slab (0.93 by 0.93m and 0.2m thick) with a circular hole (0.3m diameter) at its centre (Plate 61). Within the hole are four steel bolts for fastening the anti-aircraft weapon mount to. Visible beneath the concrete slab is an offset circular recess within the concrete floor, which may represent an earlier, albeit unusually placed, mounting.
- 5.12.6 Located 0.7m south-east of the blast wall, on the river footpath, are the tops of three heavy steel rails, 150mm proud of the sloping ground. These may be a revetment for the river path and the slabs forming it but it is possible that they are remnant additional defences from the Second World War, perhaps part of a barbed wire fence along the riverbank.

5.13 Structure 13 (MM242): Brick 'box' (Figure 15)

- 5.13.1 Located 21m south of Structure 12 is a rectangular brick box, set into the western side of the river wall (Plates 62 and 63). Measuring 3.89m by 1.4m the side walls are half a brick thick and the long walls a full brick thickness (Fig. 15). The structure, though filled with soil, would appear to be hollow, though whether that is by design or after the removal of an upper surface is not clear. A level area, at the western foot of the structure allows passage around the base, but whether this is intended or merely a result of the construction process isn't known.

5.14 Structure 14 (MM number not allocated): Brick 'box' (Figure 15)

5.14.1 The second brick box, 40m south of Structure 13, is almost identical to it, the only difference being it is a full metre longer (4.8m by 1.27m) and 100mm narrower (Fig. 15 and Plates 64-66). It has a full brick width wall at the front and rear and half brick side walls and there is no evidence of structural furniture on the interior.

5.15 Structure 15: Footpath (MM number not allocated)

5.15.1 The footpath that runs along the western bank of the Adur and the eastern perimeter of the airfield starts in the north from the Old Shoreham Road and runs to the railway bridge in the south (Plates 67 and 69). The path is made up of large concrete slabs (1.2m long and 0.6m wide), joined on their long edge and each featuring two large circular slots in opposing corners (much like the number '2' on a domino) (Plate 68). The slabs terminate 24m north of the railway and while a footpath continues under the railway bridge, Structure 15 is defined by the presence of concrete slabs. On either side of the path there is a continuous stretch of larger concrete slabs (approximately 2m), joined on the short end and laid at a 45 degree angle, lining the bank and reinforcing it significantly.

5.15.2 There are two areas of repair to the river bank which have resulted in the removal of a stretch of the slabs – one to the immediate south-east of Structure 8 and the other south of Structure 11 (Plate 70). All the structures along the river bank are accessed via the concrete slab path.

6.0 DISCUSSION

6.1 To further analyse the structures described in the above section, they must first be divided into groups relating to their original intended use. The groups are as follows:

- Airfield defences. Pillboxes and light anti-aircraft posts that were built and maintained for use in protecting the airfield from airbourne attack and capture. These structures would be built on the perimeter, at access points and often point inwards towards the landing area (Structures 4, 8, 9, 10, 11 and 12)
- Anti-Invasion defences. These are the structures built into the grid line defence scheme, along the River Adur, to hinder a German seaborne invasion force (Structure 6).
- Air raid precaution. Air raid shelters for the protection of site personnel during air raids (Structures 1, 3 and 5).
- Airfield technical and administrative buildings. Structures used in the day to day running of the airfield (Structures 2 and 6)
- Miscellaneous features (Structures 13, 14 and 15)

6.2 Airfield Defences

- 6.2.1 Shoreham Airfield was in use for many years prior to the start of the Second World War and as such did not benefit from a planned defensive layout (as those airfields built during the war did), rather expanding gradually over a period of thirty years and then having a defence scheme thrust upon it. The first reference located in the current study, dated May 1941, brings together the defences categorised in this group (TNA: WO 166/930), from the war diaries of the 25th infantry brigade. The list comprises six brick pillboxes, eight light anti-aircraft posts, seven trenches and two breastworks. The trenches and breastworks fall outside the scope of this study, but of the pillboxes and anti-aircraft sites referenced, all can be identified on historic aerial photography.
- 6.2.2 The LAA post identified by this method allows those structures that survive to be tied in with the original defence concept. There are, however, some interesting omissions from the list. Figure 16 shows the layout of anti-aircraft posts in May 1941, as well as those posts known to exist from current research. Pillboxes, where they are attached to a light anti-aircraft post seem to have been referred to predominantly as a light anti-aircraft posts, (perhaps regarded as 'defended' light anti-aircraft posts). Structures 4, 10, 11 and 12 fall into this category. The coordinates in the war diaries use the Cassini grid system, which though easily converted into the Ordnance Survey grid system, do contain some error, not least because the diary itself proclaims to coordinates to be approximate (the Cassini grid coordinate for Structure 12 was notably 150m in error and it is possible this is not the site the coordinates refer to - no other site is visible on the aerial photographs however). Airfields have been noted to contain a bewilderingly varied style of pillboxes and anti-aircraft posts (Osbourne, 2011). Often only two or three of any given style is present, which seems unusual, given that they were likely to have been built over a short period of time and possibly even by the same contractors. Shoreham certainly fits with this pattern.
- 6.2.3 Structures 10 and 11 though identical in construction, seem not to have been repeated elsewhere on site, the other LAA posts being square annexes to pillboxes, circular sunken posts or square structures with hexagonal annexes. Armament for these posts was listed as single, double or triple Lewis guns and as the 30-06 cartridge confirms, American calibre weaponry was in use here. The internal hexagonal wall within the exterior square wall is a complex design which is difficult to fully explain. Certainly, Structure 11 was built in two phases, as indicated by the extended blast wall and the crew 'rest' area, which is built onto the edge of the base of the main structure, rather than at the same level or contemporary with it. The difference in time between the construction of these elements may be a matter of weeks or perhaps up to a year. By the time of the earliest wartime photograph consulted in this study (April 1941) the post exists apparently fully formed. The demolition of Structure 10 appears to have happened prior to the 1980s though the reason for this is unclear.
- 6.2.4 The other undefended LAA posts (those without a pillbox annex) are shown on figure 16. The defended LAA posts, Structures 4 and 12, called here, for

simplicity, Pillbox and Light Anti-Aircraft Post are superficially similar, yet with differences significant enough to be classed separately. Structure 4, originally one of three of this type, is the only one currently known to survive in complete form. The other two structures, at the north end of Cecil Pashley Way, are both clearly visible on aerial photographs from the period. One, located in the north of the current car park for Ricardos engineering plant, may have been destroyed when the car park was constructed in the 1990s – vegetation in the area is dense and access difficult. The third structure of this type was identified and recorded in the 2015 evaluation (ASE, 2015), just south-east of the guard hut. In February 1944 a US B-17 Bomber making an emergency landing at the airfield, overshot the runway and crashed into the Guard Hut with its port wing and into the LAA post and pillbox with its starboard wing, seriously injuring the gunner manning the post. The LAA post in Ricardos car park is listed in the 1941 defence scheme, yet the post demolished by the B-17 is not, which ultimately adds confusion to the chronology of construction. Despite this, the three LAA posts with pillboxes attached only ever seem to have been constructed on the eastern side of the airfield.

- 6.2.5 Structure 12, differs in form to Structure 4 not only in the forward and rear facing loopholes (positioned high on the riverbank, it has this capability), but also in the splaying of the loopholes (the widest point of the apertures in Structure 4 are externally, while in Structure 12 they are internal). The concrete base mounting for the light machine gun is of a different form and the blast wall is significantly thicker (350mm compared to 110mm) and the comb bonded brickwork of Structure 12 is not present on Structure 4. That said, the similarities are striking and perhaps it is these which tie the two pillboxes together. The overall dimensions in plan compare well and they share the unusual 80 percent brick shuttered concrete roof. It is the wall construction that distances these from the more conventional pillboxes to the north – the walls are entirely built of brick, without a concrete core. This seems to have been the distinguishing factor between a pillbox and LAA post when the defence scheme was drawn up in 1941. The modern method of description would tend to place any structure of this type with loopholes as a pillbox first with the LAA capability being secondary.
- 6.2.6 The six pillboxes listed in the 1941 defence scheme are arranged in the corners of the airfield, one in the south-west corner, covering the access from New Salts Farm Road, one in the south-east, covering the footpath following the river under the railway bridge, two in the north-west on the remnant stretch of New Salts Farm Road (in 1941 then known as Haystack Lane) and finally two in the north-east corner, covering the main access point to the airfield from the Old Shoreham Road (Fig. 17). It is these latter two pillboxes that fall within the current study area. While functioning in defence of the airfield, these two pillboxes would equally serve in the event of an infantry invasion, with views down the river and across the Old Shoreham Road to the Old Toll Bridge. Structure 8 is orientated facing north and has three loopholes facing west, north-west and north, covering the approach road to the Guard Hut. A further loophole is placed in the east wall facing across the river to the bridge.
- 6.2.7 Structure 9, as originally built, was identical to Structure 8, apart from the splaying of the loopholes – in Structure 9 they splay outwards, with the

external aperture being the widest, while in Structure 8 they are equally splayed inwards and outwards. In 1941, recommendations were made that pillboxes constructed henceforth should have walls and roofs no less than 3 feet 6 inches thick and pillboxes already built with substandard wall thicknesses should be strengthened (TNA: WO 166/482). The reasoning behind this was that tank weaponry was advancing quickly and firepower was now effective enough to destroy inadequately defended pillboxes. Structure 9 is likely an example of this modification: it was strengthened with an outer shuttering of brick to bring the wall thickness up to 3'6", introducing various complications such as the need to reform the loopholes and re-site the blast wall. The roof thickness remained the same however, regardless of the recommendations. Structure 8, based on wall thicknesses would be described as bullet proof and Structure 9 as shell proof.

- 6.2.8 Military theory on defence was changing however and reliance on static hardened structures was out of favour. Slit trenches and breastworks, quick to dig or throw up were considered more effective, and were grouped together in defended localities (self-sufficient groups of defence sites, prepared to last a few days until relief came). With the demolished LAA pillbox, found in the 2015 evaluation, these three structures would have formed a well-sited defensive group, each with the capability of covering each other's weak spots. The static defence system here quite easily evolved into the defended locality model.
- 6.2.9 In 1940, with the threat of invasion at its height, airfields provided a weak link in preparations for defence. The perceived seaborne invasion would be preceded by airborne paratroopers dropped in key positions, to take airfields to both deny Allied fighter defence and allow German troop and equipment carrying aircraft to land. These troops would then be able to assist the main seaborne assault. Seen in this light Shoreham airfield no doubt had good reason to warrant the extensive defence sites spread around its perimeter.
- 6.2.10 An airfield plan, held in the RAF archives (AM 7372/54), however, complicates this vision somewhat. The plan is dated 1954 but by that time the RAF had long gone, so the date may only be an administrative checking date. The layout appears to match aerial photographs from 1945 (RAF 106G UK 559 3018, Historic England) so it would be fairly safe to assume that the map presents the site towards the end of the war. Shown on the map are four DPs (defence posts) and these include the two pillboxes on Haystack Lane, the defended LAA post in Ricardos car park and Structure 4. Also shown are the three Picket Hamilton Forts (pillboxes set in the runway, raised by hydraulics) and a machine gun post, near the Guard Hut. The omission from this map of the other LAA posts and pillboxes is unusual, but it might be that only those posts that directly relate to airfield defence, rather than anti-aircraft and anti-invasion, are shown. Further research, beyond the scope of this project would help to clarify.

6.3 Anti-Invasion Defences

- 6.3.1 Only one of the structures in the study area is classed officially as an anti-invasion site, (therefore not one manned by RAF personnel or those designated for airfield defence). Structure 6, a field artillery emplacement, is an anti-tank position designed to repel tanks advancing over the Old

Shoreham Road Toll Bridge. At the start of the war, the Boys anti-tank rifle was seen as an effective weapon for hindering tanks, but as German armour improved, it became quickly reduced to impotency. Large calibre weapons were required and the repurposing of artillery from the First World War was seen as the best, perhaps only, method of implementing effective anti-tank measures. The Defence of East Sussex Project has done much to dispel the long held belief that the contemporary artillery piece, the 25 pounder, was the intended weapon for these emplacements— the superb research done on this structure in particular is beyond the scope of this study (Hibbs, P. 2017). Not only were numbers of 25 pounders extremely low after the retreat from Dunkirk, they were essentially howitzers, capable of firing high and far – the embrasure in this gun emplacement has almost no capacity for vertical elevation of the gun barrel. More likely, 75mm French or American guns or the British 18 pounder were due to be placed in these emplacements, although it is not known if any ever were.

- 6.3.2 In the immediate vicinity of the airfield there were a number of hardened defence works (Fig. 18), including two further field artillery emplacement to the south, two to the north towards Upper Beeding and a cluster of pillboxes to the south, one covering the A259 Brighton Road and the other three forming a defended locality at New Salts Farm.
- 6.3.3 Visible on the 1941 aerial (and images thereafter) is a grey line running along the high tide line of the foreshore, from the railway in the south and up to the Old Shoreham Road, following the dog leg in the concrete path in the north, to Structure 8 (Fig. 18). This represents an anti-invasion fence, probably consisting of screw pickets or angle irons onto which barbed wire could be placed and laid in large spiral coiled lengths.

6.4 Air Raid Precaution

- 6.4.1 The 1954 dated Airfield Plan shows a total of 13 air raid shelters around the site perimeter. The amount of people they can accommodate is also shown for some, and it can be deduced that 6' square is the required space for one person. Using this calculation, the shelters without a capacity listed on the map have their presumed capacity shown. There are six variations in terms of size:

- 10' x 6' (10 men) - three examples
- 15' x 6' (15 men) – one example
- 20' x 6' (20 men) – one example
- 30' x 6' (30 men) – three examples
- 36' x 7' (presumed 42 men) – one example
- 30' x 10' (presumed 50 men) – four examples

The three shelters recorded within this document fall within the following categories:

- Structure 1 - 30' x 6' (30 men)
- Structure 3 - 30' x 6' (30 men)
- Structure 5 - 10' x 6' (10 men)

- 6.4.2 Structures 1 and 3 make up two thirds of the original quantity of this type of

30 man shelter (Fig. 19). The third example was situated on land currently used as a car park, to the south of Cecil Pashley Way, where it turns to the west towards the control tower, at the south of the airfield. While foundations may survive beneath the car park, it may be assumed that the shelter has been removed. An informative aerial photograph from 1953 (MAL 53070 7336) shows two of the shelters in detail and has provided the basis for reconstructing the buttress walls supporting the blast wall and the dog-legged arrangement of buttress walls around the entrances.

- 6.4.3 Structure 5, tiny in comparison to the two southern shelters, is again one of three of this type that were placed on the airfield. The second, just 70m north-west, would have serviced the Guard Hut and probably survives in the thick undergrowth here. The third example, now demolished was located on the north of the railway line, off New Salts Farm Road, in the south, visible in a 1953 aerial photograph (1953 MAL 53070 7343), with enough clarity to allow the buttress walls to be added to the plan of Structure 5. The location of Structure 5 places it to be accessible to personnel accessing the storage huts to the south along the River as well as the small arms range, located just 20m to the north. There are no surface features visible of the small arms range, it having been demolished sometime in the 1950s, giving the air raid shelter a somewhat isolated appearance.
- 6.4.4 Due to the practice of dispersal, aircraft were brought out of hangers at dawn and parked around the site perimeter, to limit the effect of bomb damage during a raid. This accounts for the handful of structures along the eastern perimeter of the airfield, shown on the 1954 airfield map – workshops, storage huts and air raid shelters. While airfield ground staff were expected to be able to man the defences during an attack, there would be more personnel available than could actually fit into the defence posts, so shelter would need to be sought, especially during a bombing rather than fighter attack. An entry in the war diary of the 578 field Company of the Royal Engineers, dated 8th May 1941 (TNA: WO 166/3815) details being machine gunned by an enemy plane, while installing an observation post in St. Mary De Haura church in Shoreham, indicating the kind of low flying hit and run attacks that might be expected at the airfield, only 1km to the east.
- 6.4.5 While the invasion threat had receded by late 1941, air raids were a continuing problem up until May 1944 and the shelters remained relevant while the anti-invasion defences had fallen into disuse.

6.5 Airfield technical and administrative buildings

- 6.5.1 This category encompasses a huge range of buildings on any war time airfield: vehicle sheds, workshops, stores and the operations buildings to name but a few. The Guard Hut (Structure 7) and the Store (Structure 2) fall within this category (Fig. 20).
- 6.5.2 Guard Huts (the term used on the 1954 map) also referred to as Guardhouses, were busy sites, processing all traffic entering and exiting the airfield, checking passes, organising transport and holding detainees. Due to there being two vehicular access points to the airfield, there were also two Guard Huts. The northern one (Structure 7) was the main site, located just off the Old Shoreham Road, while the smaller hut was situated in the south-

west, where the New Salts Farm Road passes under the railway line in to the site.

- 6.5.3 The B17 Flying Fortress that crashed into the Guard Hut on February 1944, (also demolishing the light anti-aircraft post 17m to the south-west) caused significant damage. The southern 3.5m of the building show a complete rebuild from floor to roof. The wingspan of a B-17 is 35m, which that more than fills the distance between the two buildings. The Guard Hut was rebuilt, being an important part of site operations. The light anti-aircraft pillbox was not rebuilt, however, as at that stage in the war defence had been significantly stepped down.
- 6.5.4 Listed on the Airfield Map, Structure 2 is categorised as an SAA store – a small arms ammunition store. This supplies ammunition to not only the aircraft, but perhaps also to the land defence teams manning the LAA posts. The building matches well with the ‘Temporary Brick’ hut in Military Airfield Architecture (Francis, 1996), though with the engaged piers on the interior rather than exterior. The hut, while listed as a SAA store may have seen a variety of uses through its life and certainly local mythology refers to it as a ‘scramble hut’, presumably indicating it was a pilot rest area. Whether this was actually the case, is not clear. There is no sign of the hut on the aerial photograph of 17 June 1942 (RAF HLA 600 6075) but by 22 April 1944 (US 7PH GP LOC314 5058) the hut and its sister hut are present. The concrete base for the sister hut, also a SAA store, was identified in the evaluation (ASE, 2015), some 330m to the north.

6.6 Miscellaneous features

- 6.6.1 Structures 13 and 14 are not visible on the earliest aerial photograph consulted in this study, dated 16 April 1941. The image is rather dark, and while other buildings appear, Structures 13 and 14 have very low profiles and cast minimal shadows, so it is possible that they existed at this stage. By 7 November 1941, however, they are fully visible, exhibiting the hollow interiors clearly. The role they played within the airfield is currently uncertain. Other buildings appear to the south in the 1941 photographs that do not reappear in later images - they have also left no visible footprint on the riverbank. It is entirely possible that the footings of these may have been fully removed and the bank rebuilt after this, if they were substantial enough to be anti-invasion or anti—aircraft sites. They may well have been ‘dummy’ pillboxes, designed to draw enemy fire away from the real defensive sites and perhaps Structures 13 and 14 represent footings of such features, though lack of evidence on the aerial photographs suggests this is unlikely. Other potential explanations are storage bins for ammunition/equipment or demolition chambers to destroy the riverbank (and flood the airfield during an invasion), but neither can be backed up by documentation. Their purpose must for the moment remain undetermined.
- 6.6.2 Dating the concrete slab footpath has not proved possible within this study, so it cannot be positively assigned to the early years of the Second World War. In the aerial photographs of April 1941, it would appear that the concrete path is in existence on the top of the bank, with start and end points matching the current configuration. The path not particularly ‘bright’ in these images, suggesting it may either have been camouflaged with soil or perhaps

that it had already been in existence for some years and experienced encroaching vegetation.

6.6.3 The presence of the circular slots in each slab is suggestive of a specific original use and perhaps the placement on the river path is a re-purposing of this. Various ideas as to the origins of the slabs circulate:

- That they are remnants of a pre-1914 boundary fence to the airfield (Mott Macdonald WSI):
- That the slabs were made as anti-landing scaffold bases, originally sited lower down the bank and raised to the higher position after the invasion scare had passed in 1941 (ACTA, Brighton City Airport Heritage Assessment):
- They were constructed as a tow path (Webb, 1996):
- That they were laid after 1922 from components of one of the anti-submarine towers constructed in Shoreham Harbour during the First World War (Bill Hargreaves, Steyning Downland Scheme, pers comm.).

6.6.4 Without evidence, none of the above can be seen to be anything other than interesting theories. The 1914 airfield boundary did extend to the bank of the Adur, but the arrangement of the slots in the slabs would create an unusually thin double fence.

6.6.5 Anti-invasion scaffold was not normally set into concrete bases and while there was an anti-invasion fence of some description in the Adur foreshore, this was in place contemporaneously with the concrete path.

6.6.6 The Adur at this point is very wide with the foreshore long and vegetated, which seems to discount it having been used as a tow path (canal tow paths, for example, are situated immediately beside deep water in the canal).

6.6.7 The two towers constructed in Shoreham Harbour were completed by the end of the First World War and while one was floated out to the Solent to become Nab Tower the second was dismantled, being too wide to exit the harbour entrance. The Harbour Board were keen to introduce a mooring charge so the tower was dismantled from 1922 and the components disposed of subsequently. It is possible that elements of these were incorporated into the river bank footpath.

7.0 CONCLUSION

Shoreham Airfield played an important role in the Second World War, hosting the air-sea rescue, Canadian Air Force, Free French Air Force, as well as the RAF. It may not have been one of the famous Battle of Britain airfields, such as Tangmere, Hawkinge or Biggin Hill but its location close to the coast, the River Adur and Shoreham Harbour made it a high priority for defence in the eyes of the War Office. This resulted in a rich and diverse group of military structures built within only a few short years and many of which survive to this date.

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WO 199/2154 Instructions for maintenance of McNaughton pipe mines and training of 'Bomb Disposal' units

Historic England Aerial Photographs

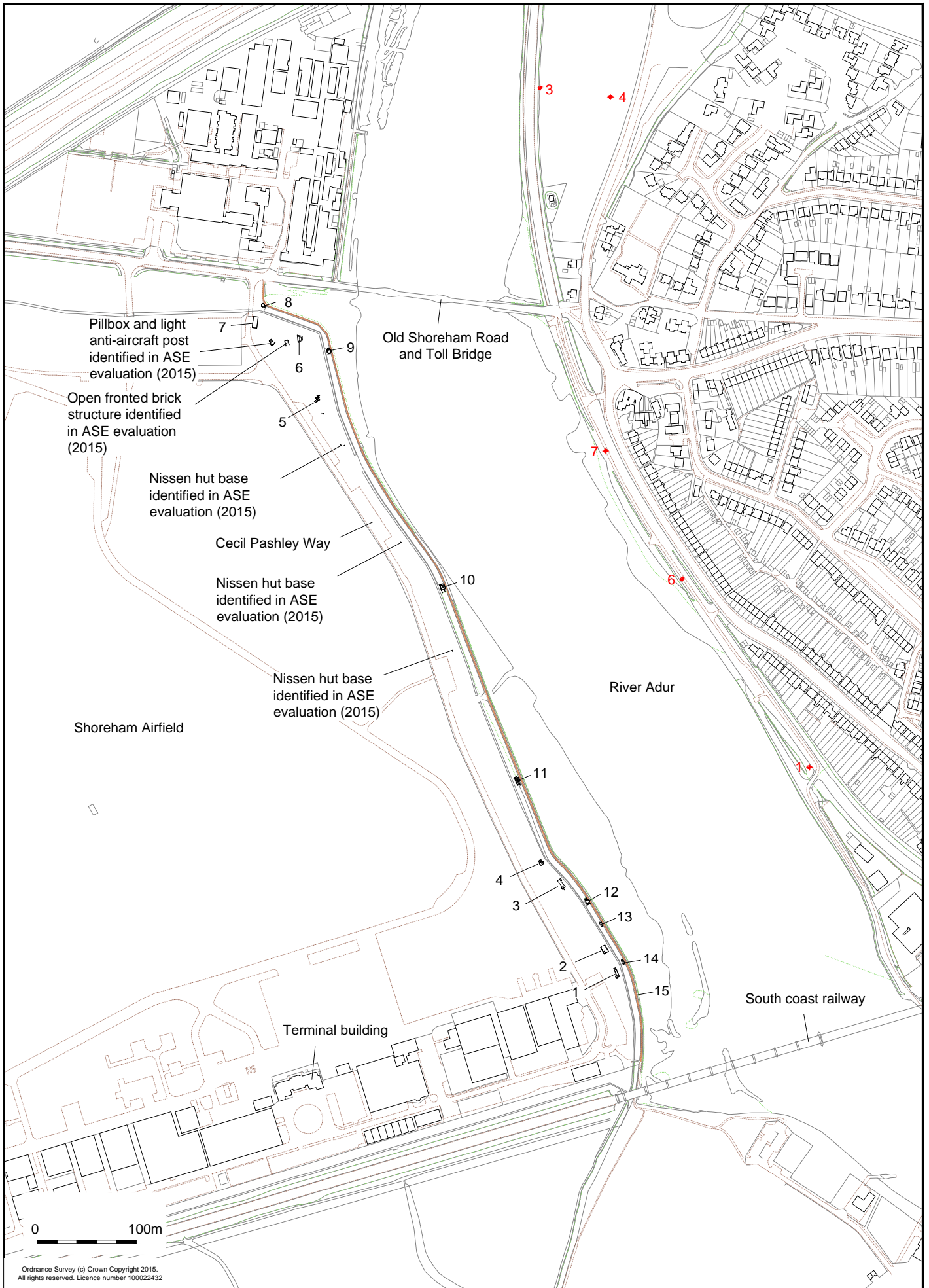
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RAF/400H/BR250 770 16 APR 1941
US/7PH/GP/LOC314 5058 22 APR 1944
RAF/HLA/600 6075 17 JUN 1942
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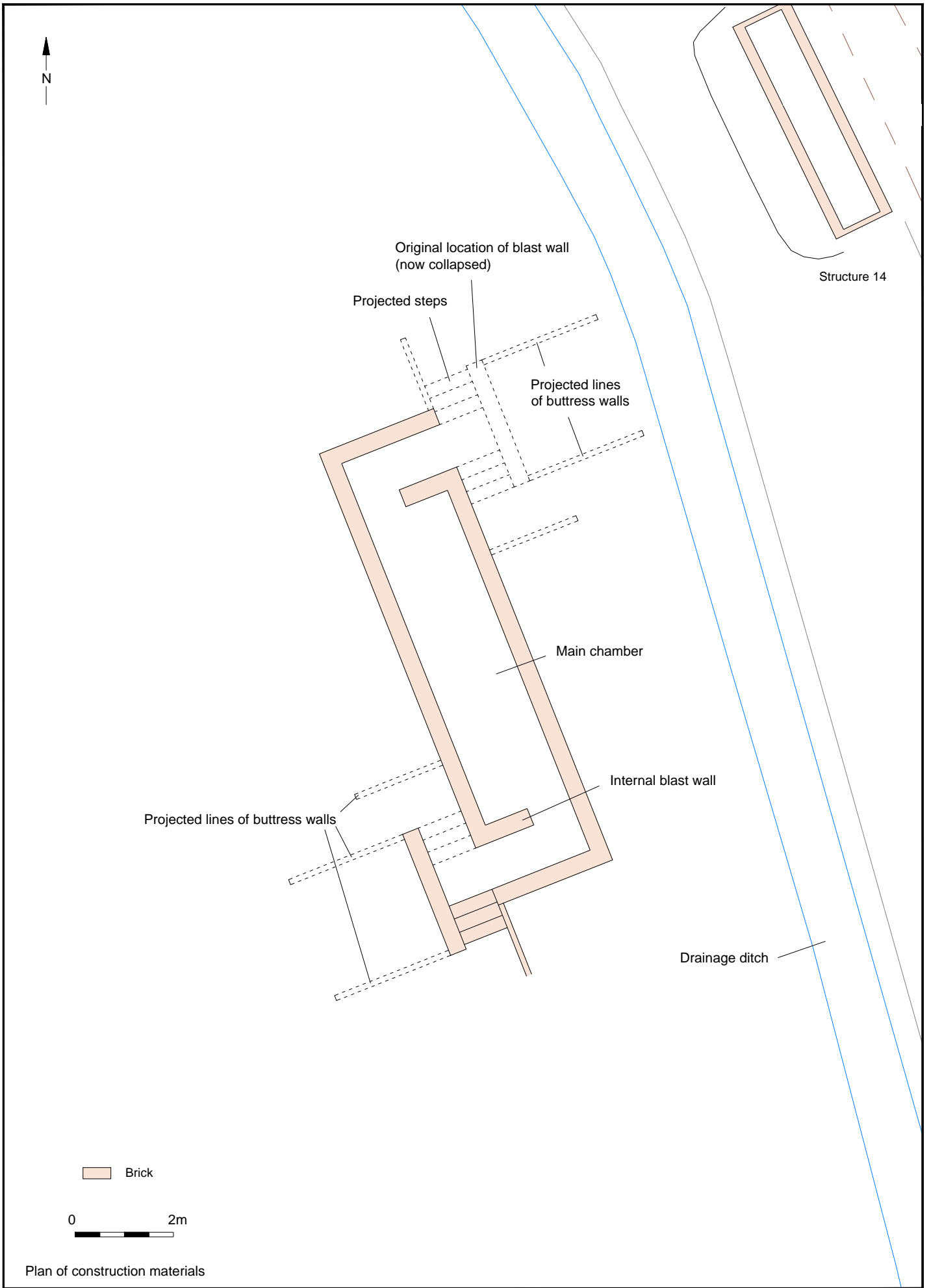
ASE would like to thank Mackley & Co Ltd (on behalf of the Environment Agency) for commissioning the work and for their assistance throughout the project. For specific information relating to the project, thanks go to Paul Francis of the Airfield Research Group, Peter Hibbs of the defence of East Sussex Project and Mike Osbourne, author of Defending Britain. Jo Short's 2005 thesis provided many useful references and was a fantastic starting point for this research.



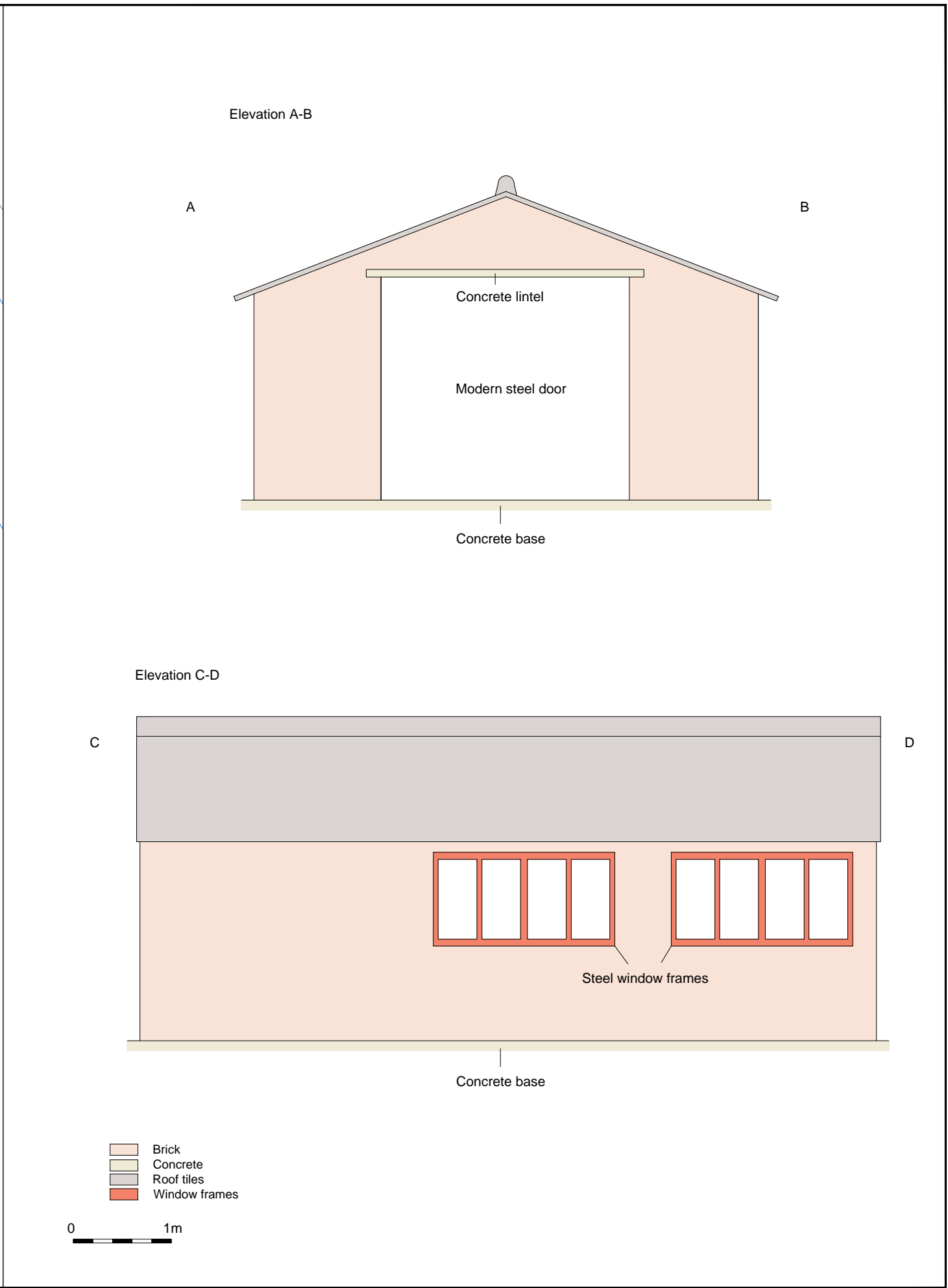
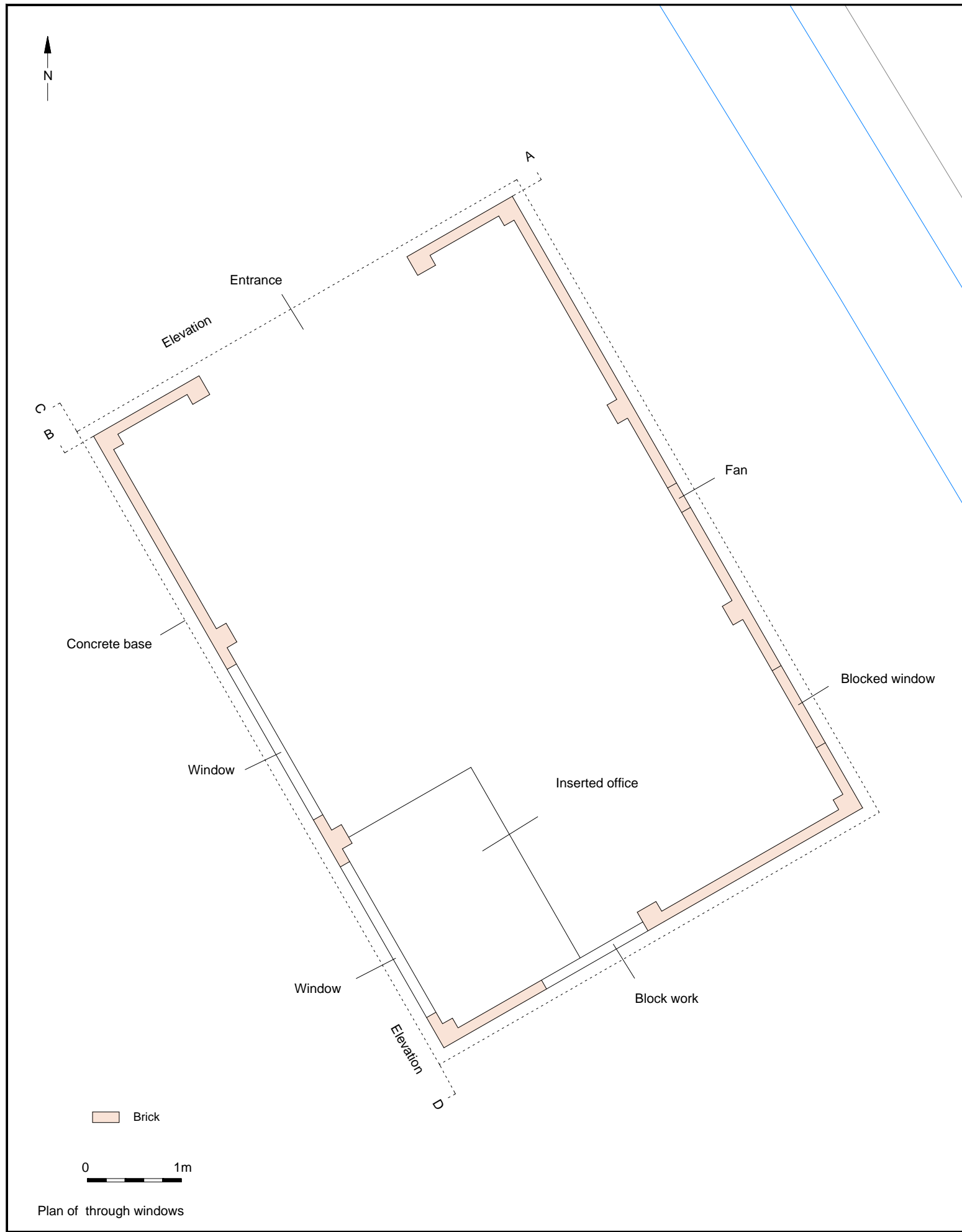
© Archaeology South-East		Shoreham Adur Tidal Walls, Reach W7	Fig. 1
Project Ref: 160031	Dec 2017	Site location	
Report Ref: 2017513	Drawn by: JLR		

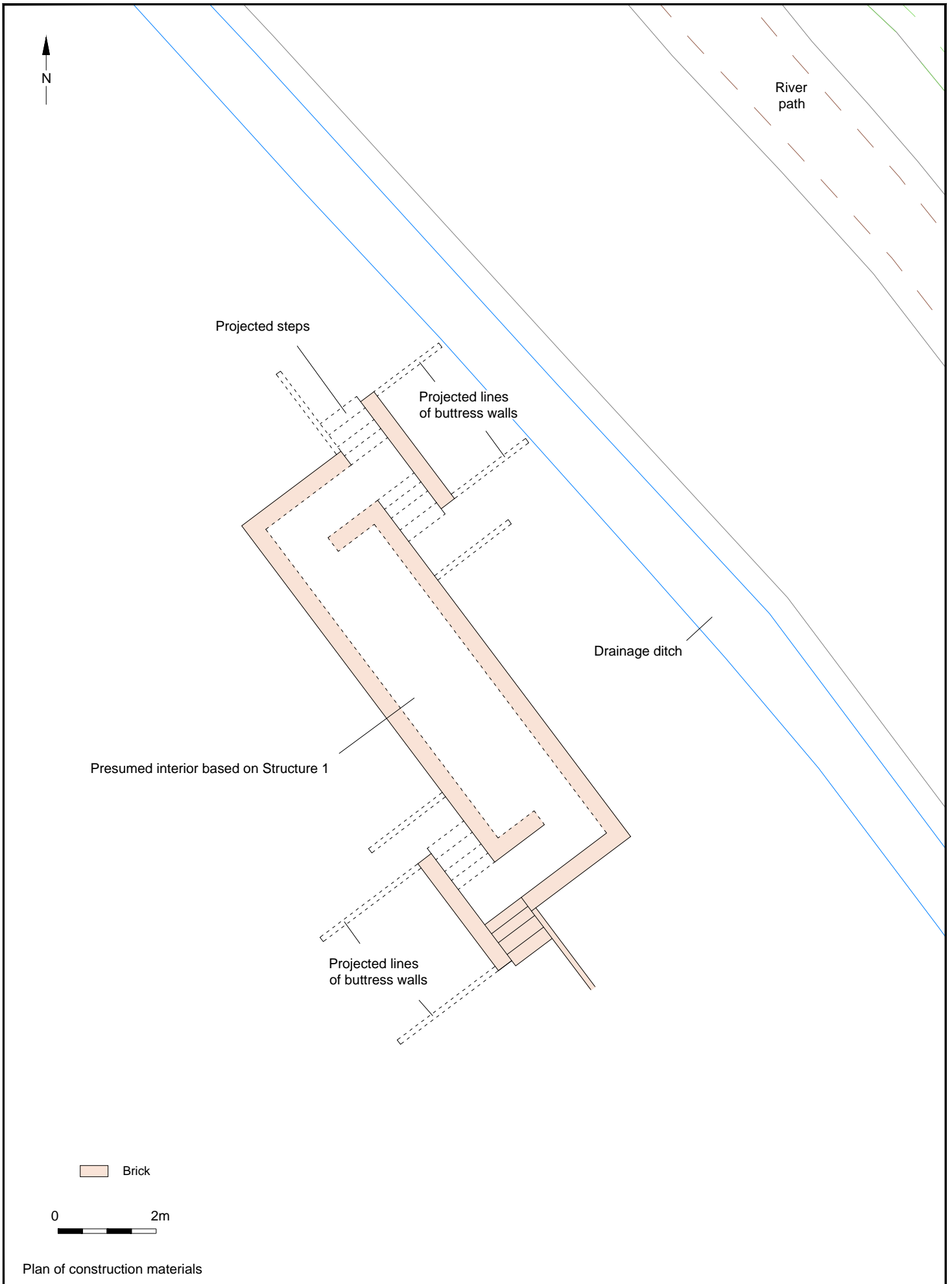


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Project Ref: 160031	Nov 2017	Location of structures 1-15	
Report Ref: 2017513	Drawn by: JLR		

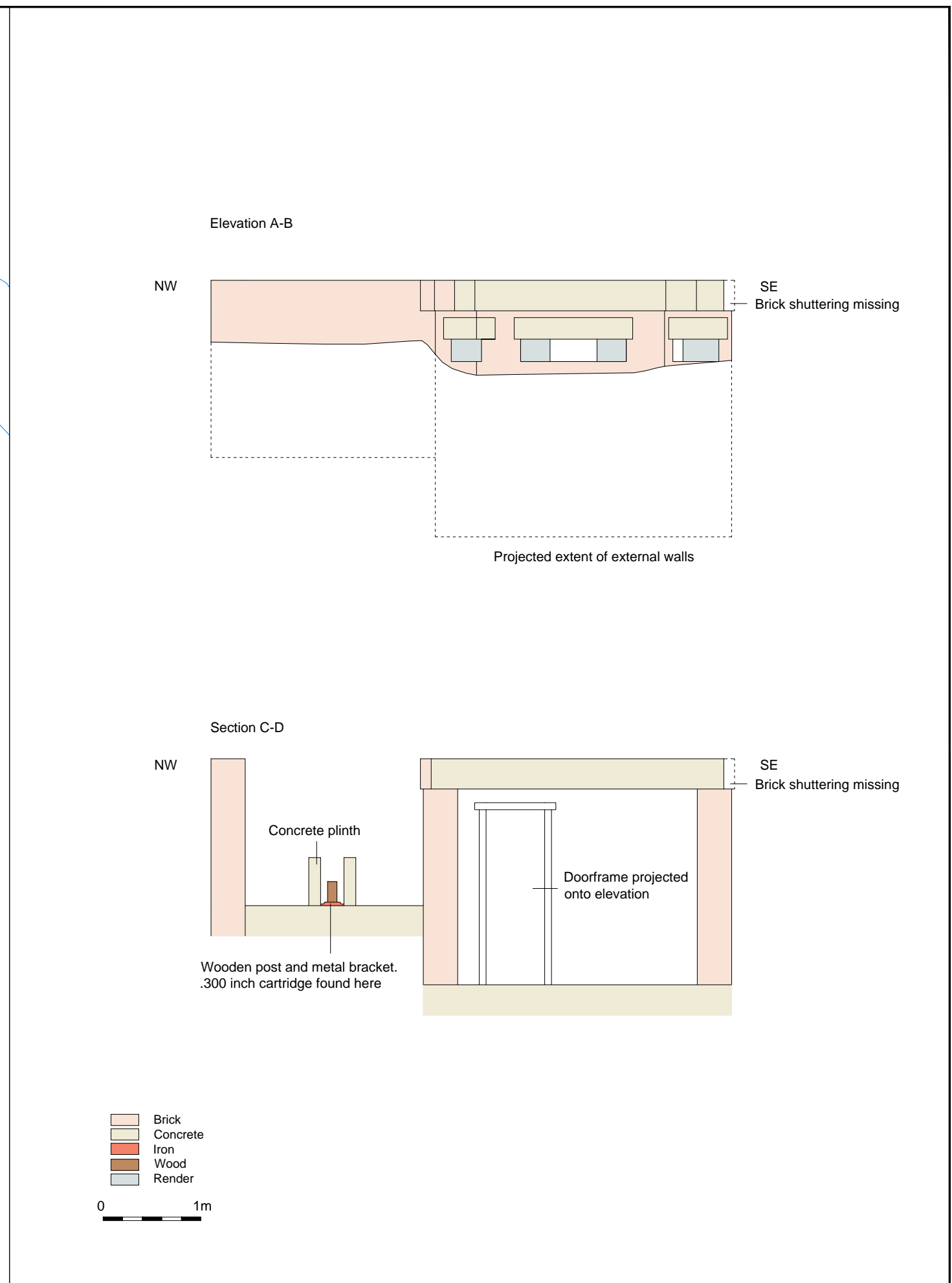
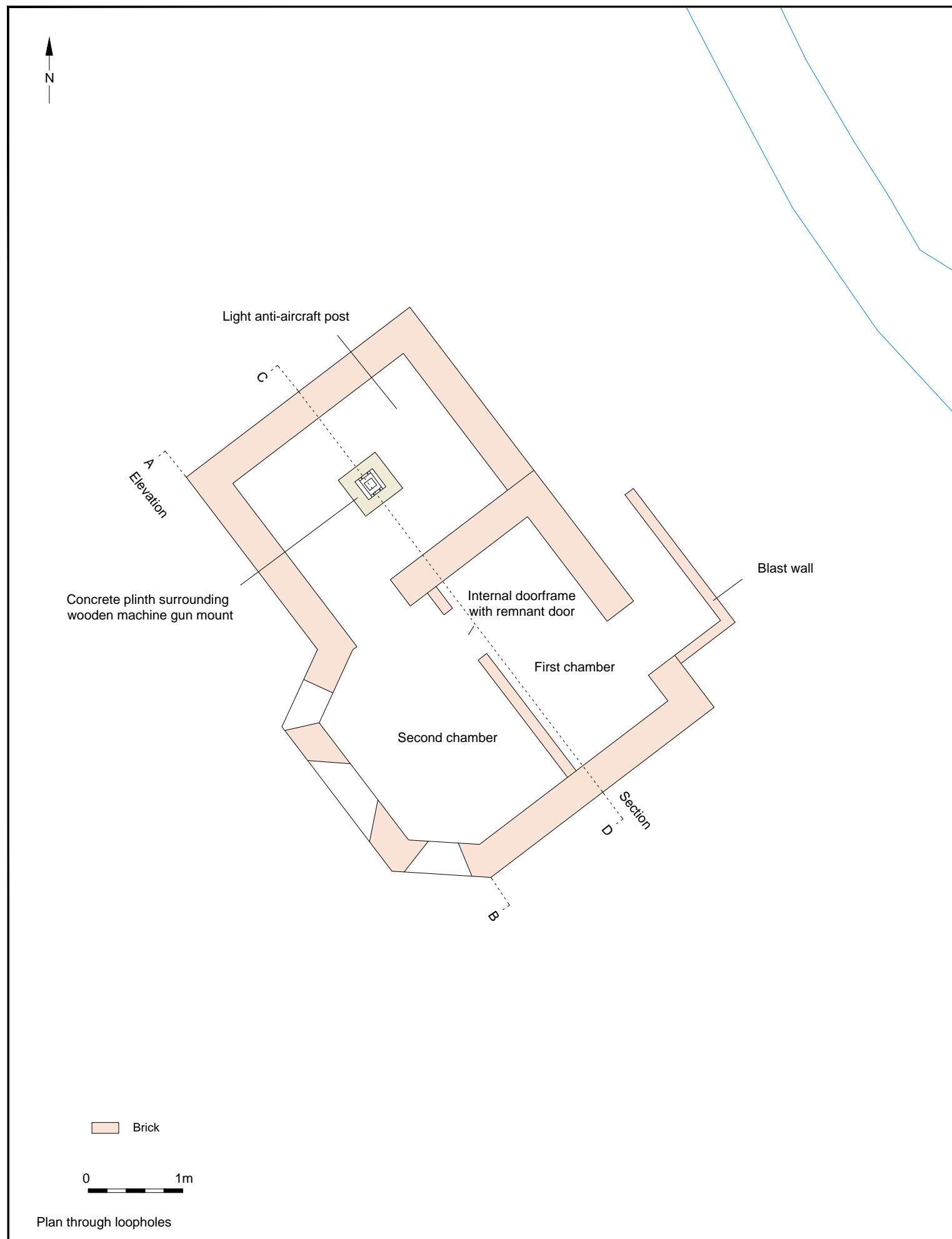


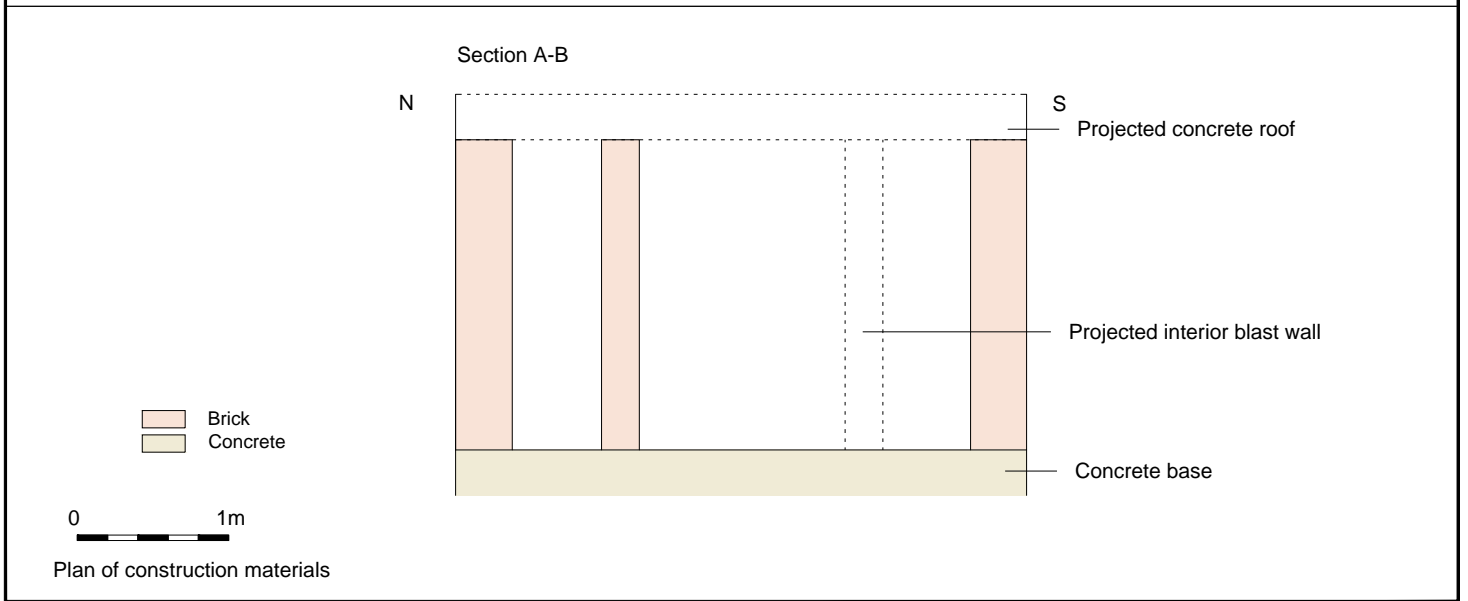
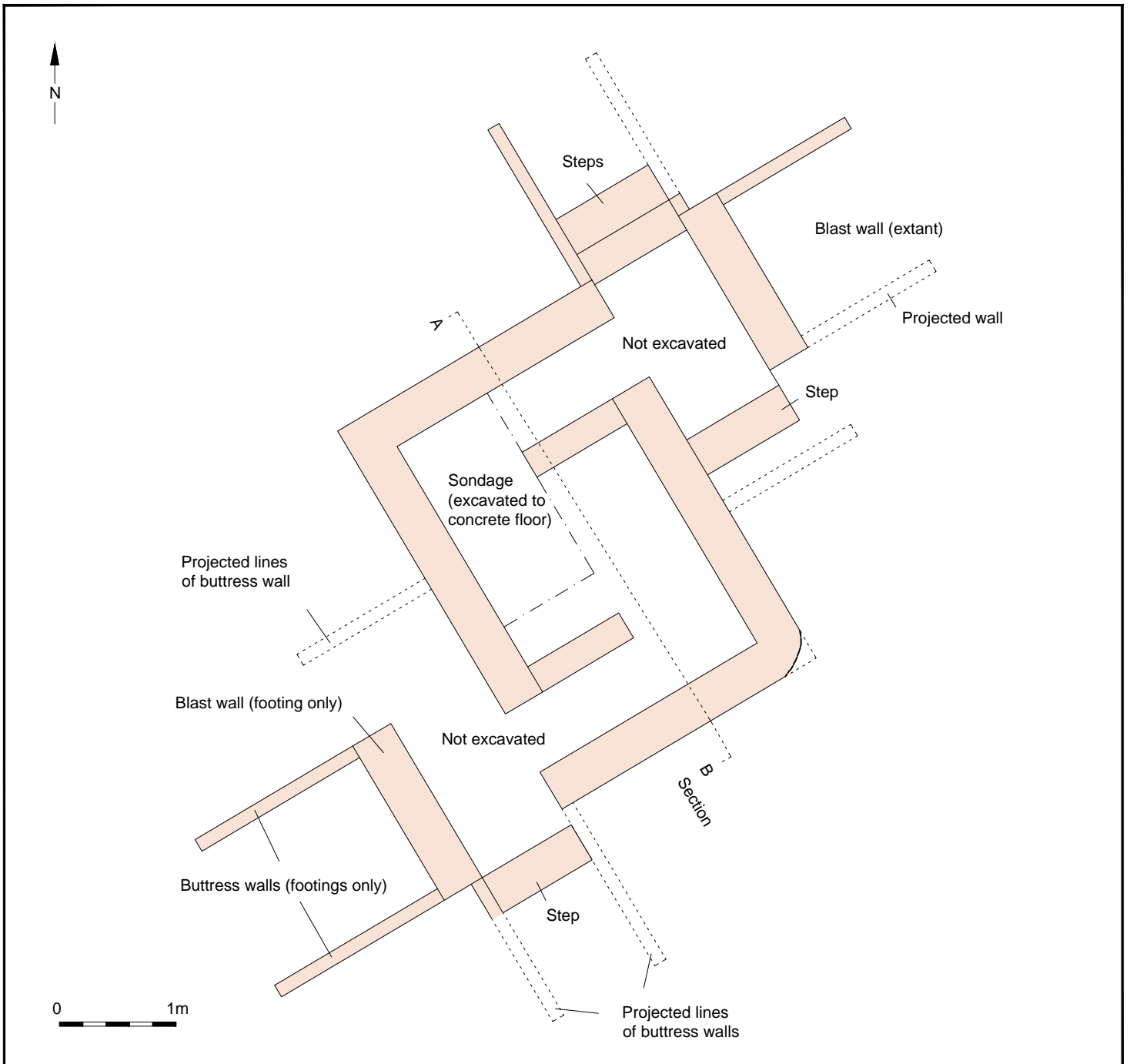
© Archaeology South-East		Adur Tidal Walls Reach W7	Fig. 3
Project Ref: 160031	Nov 2017	Structure 1 plan	
Report Ref: 2017513	Drawn by: JLR		



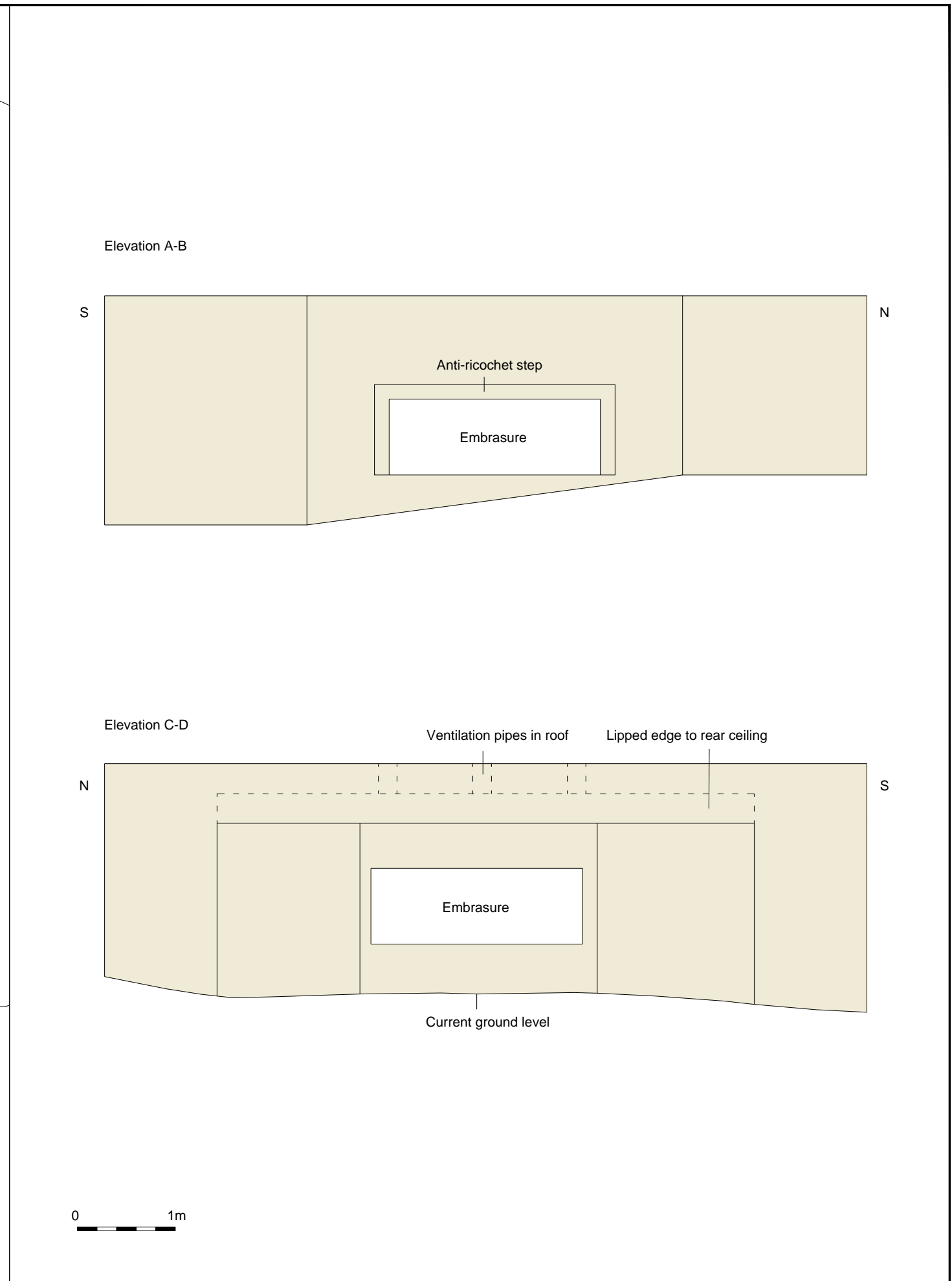
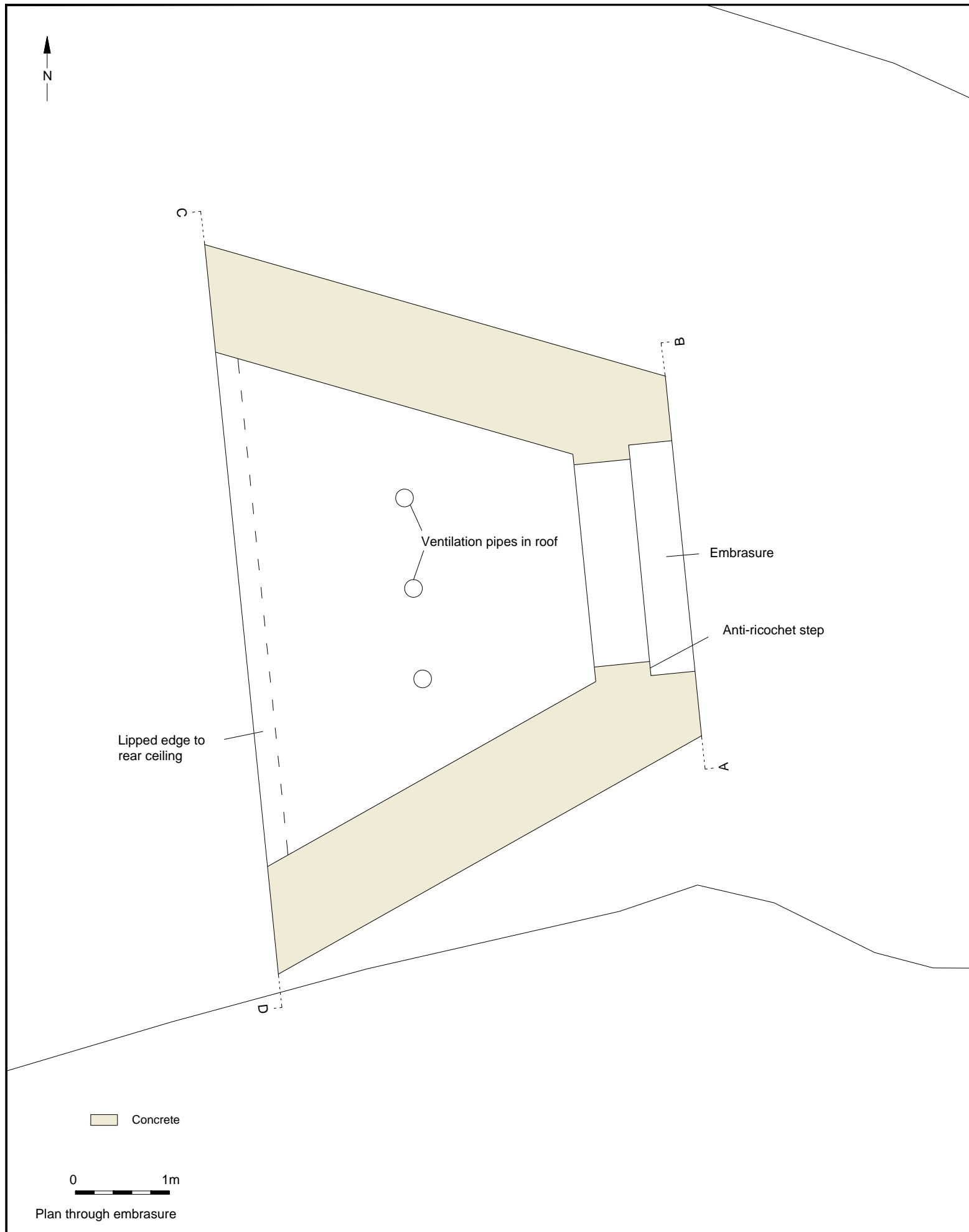


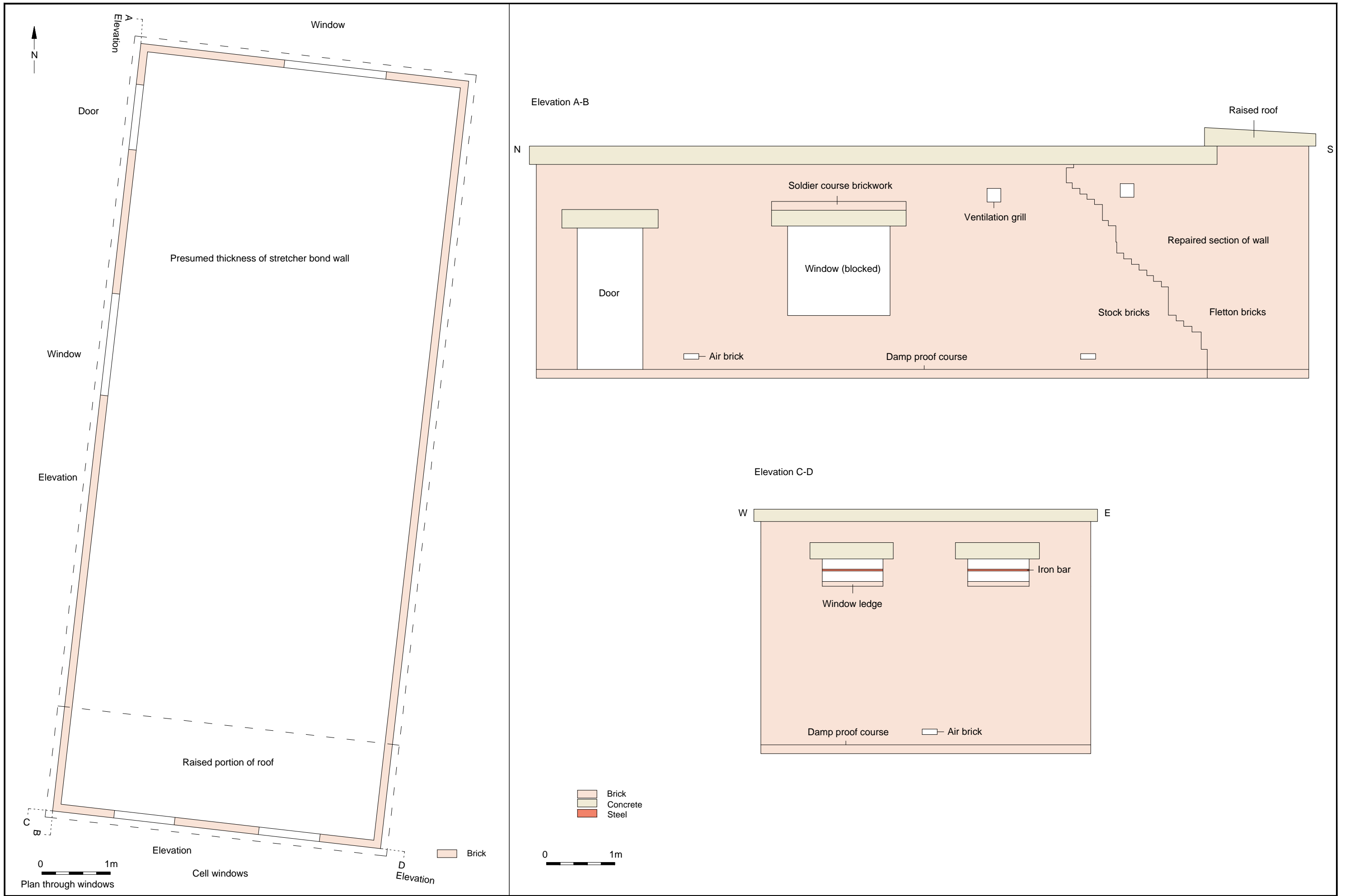
© Archaeology South-East		Adur Tidal Walls Reach W7	Fig. 5
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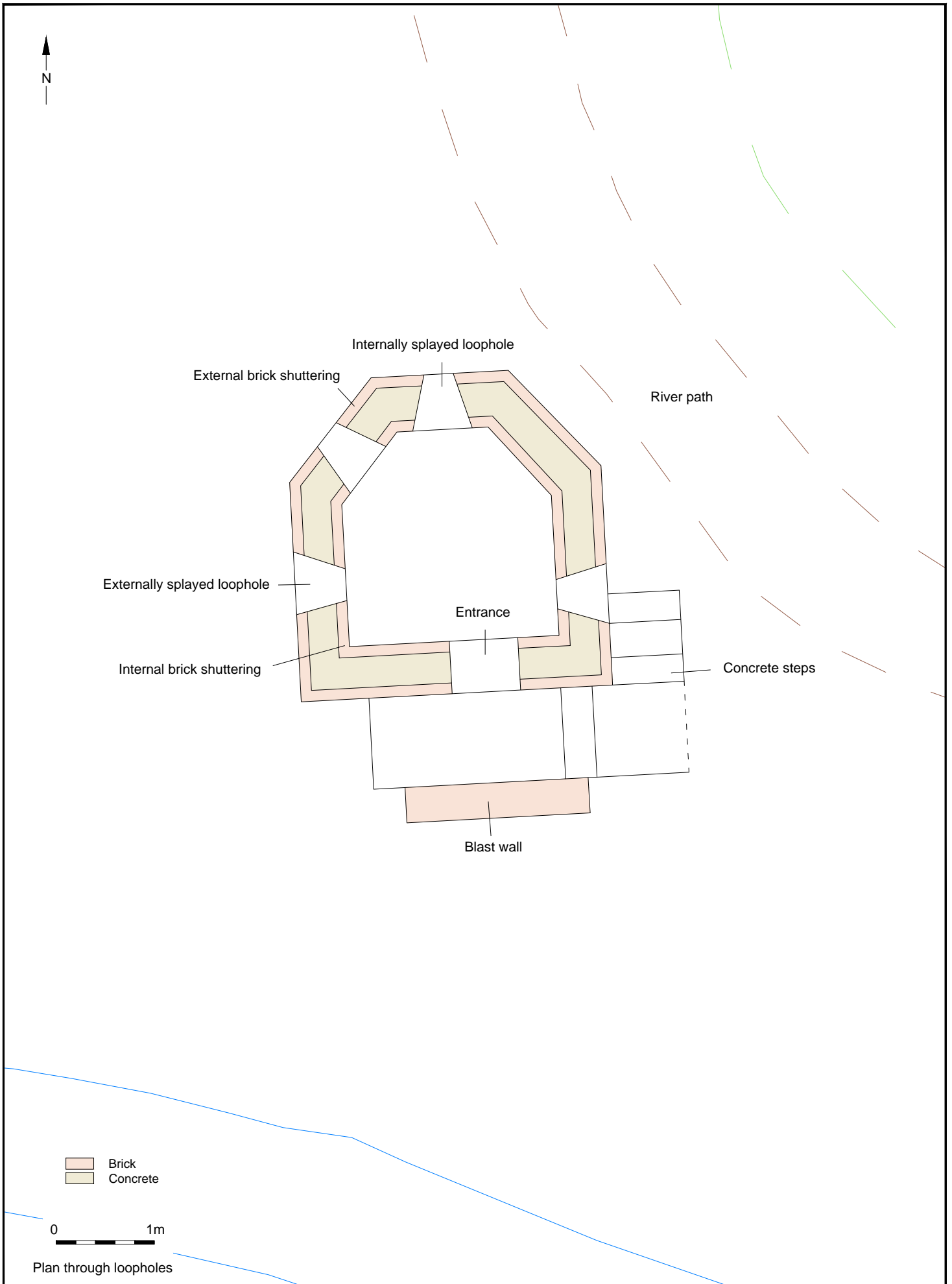




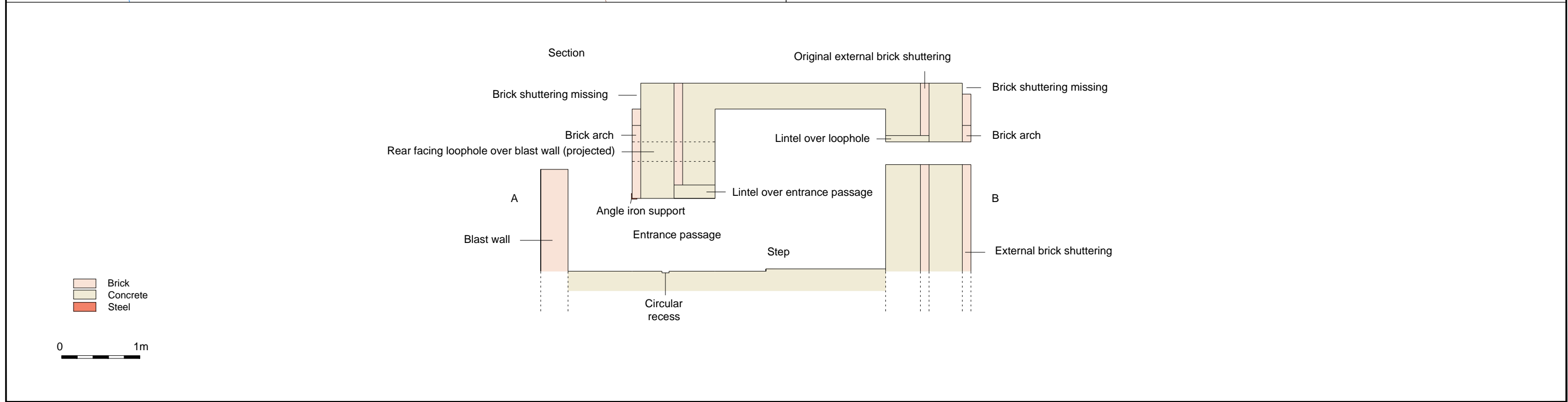
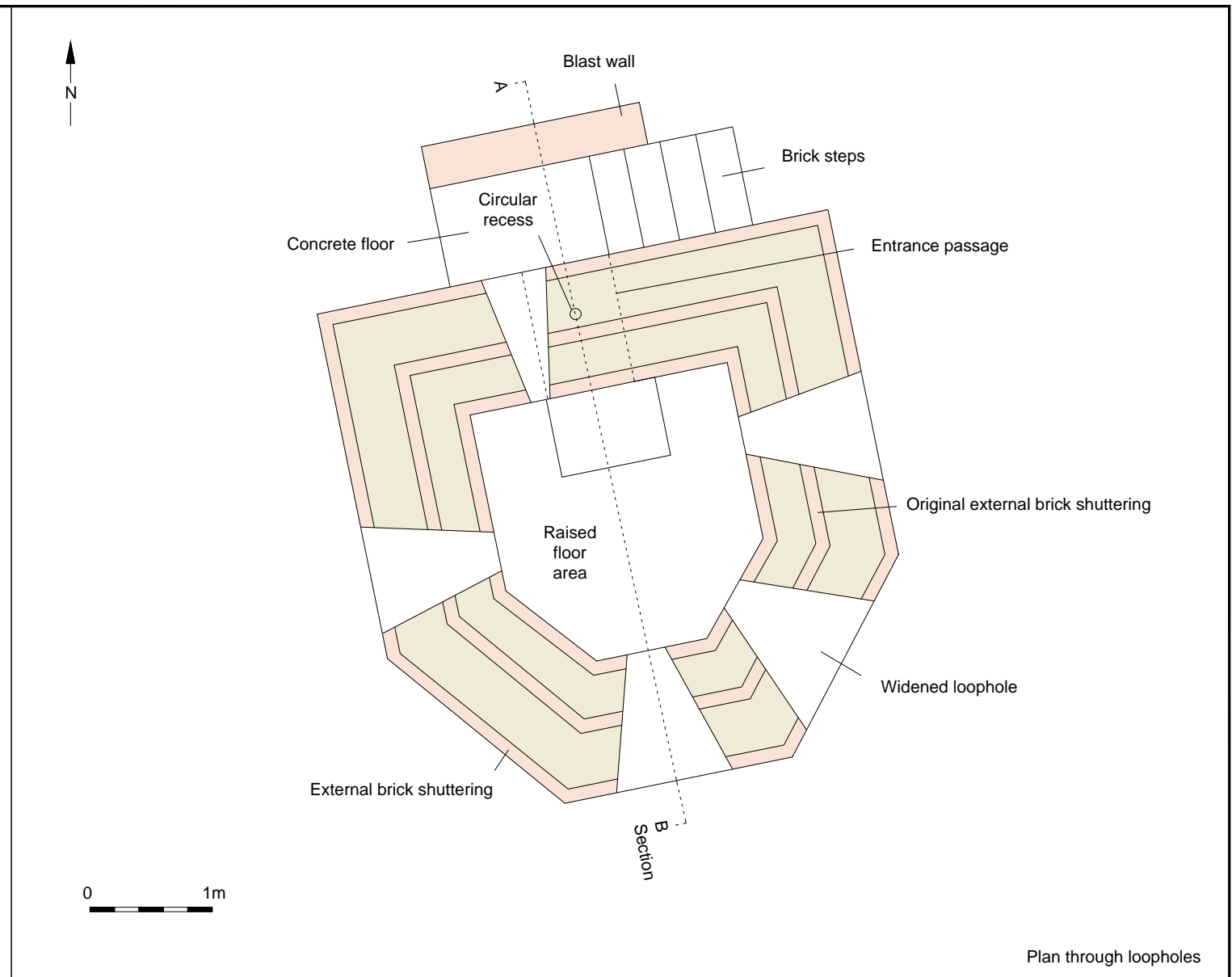
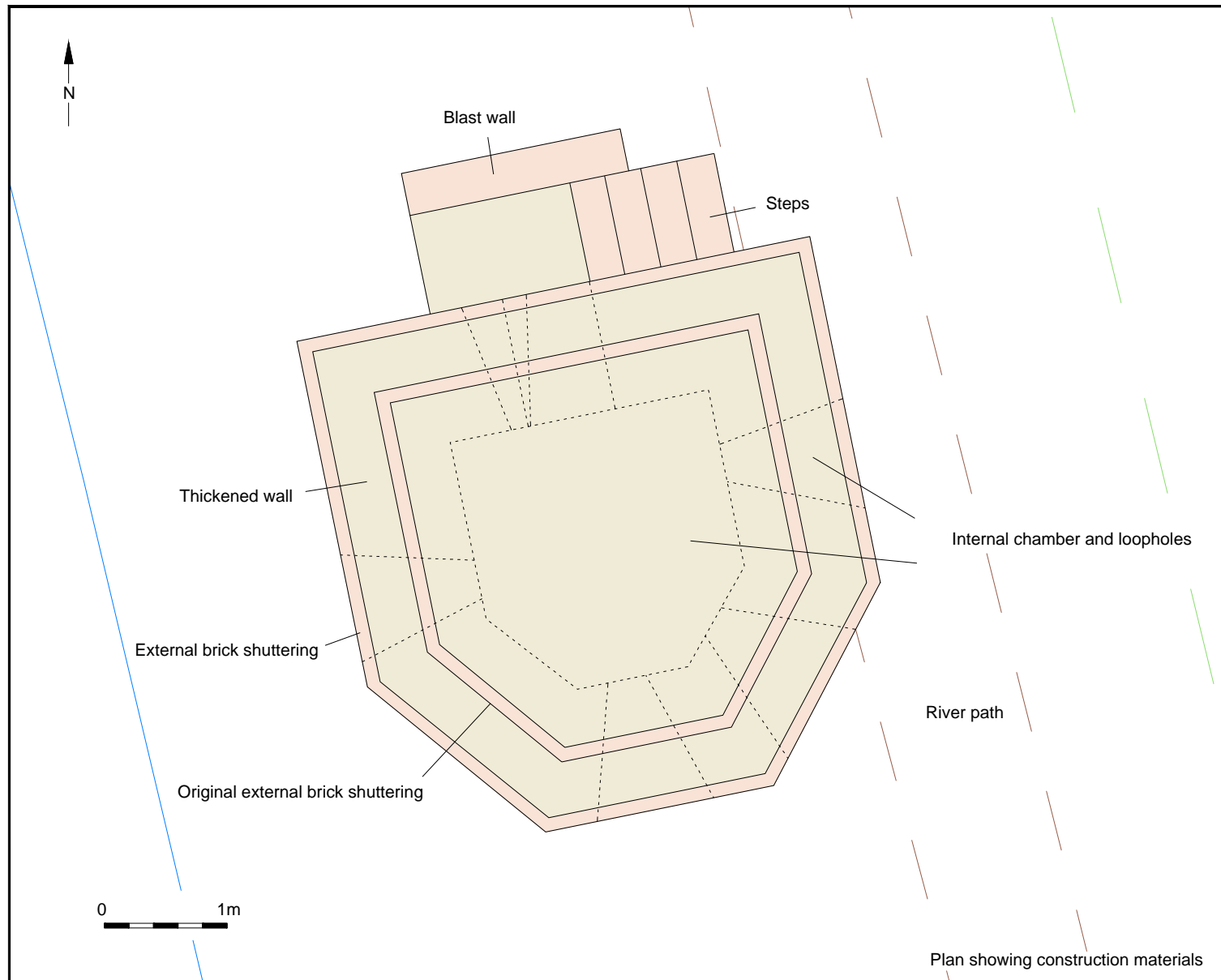
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Report Ref: 2017513	Drawn by: JLR		

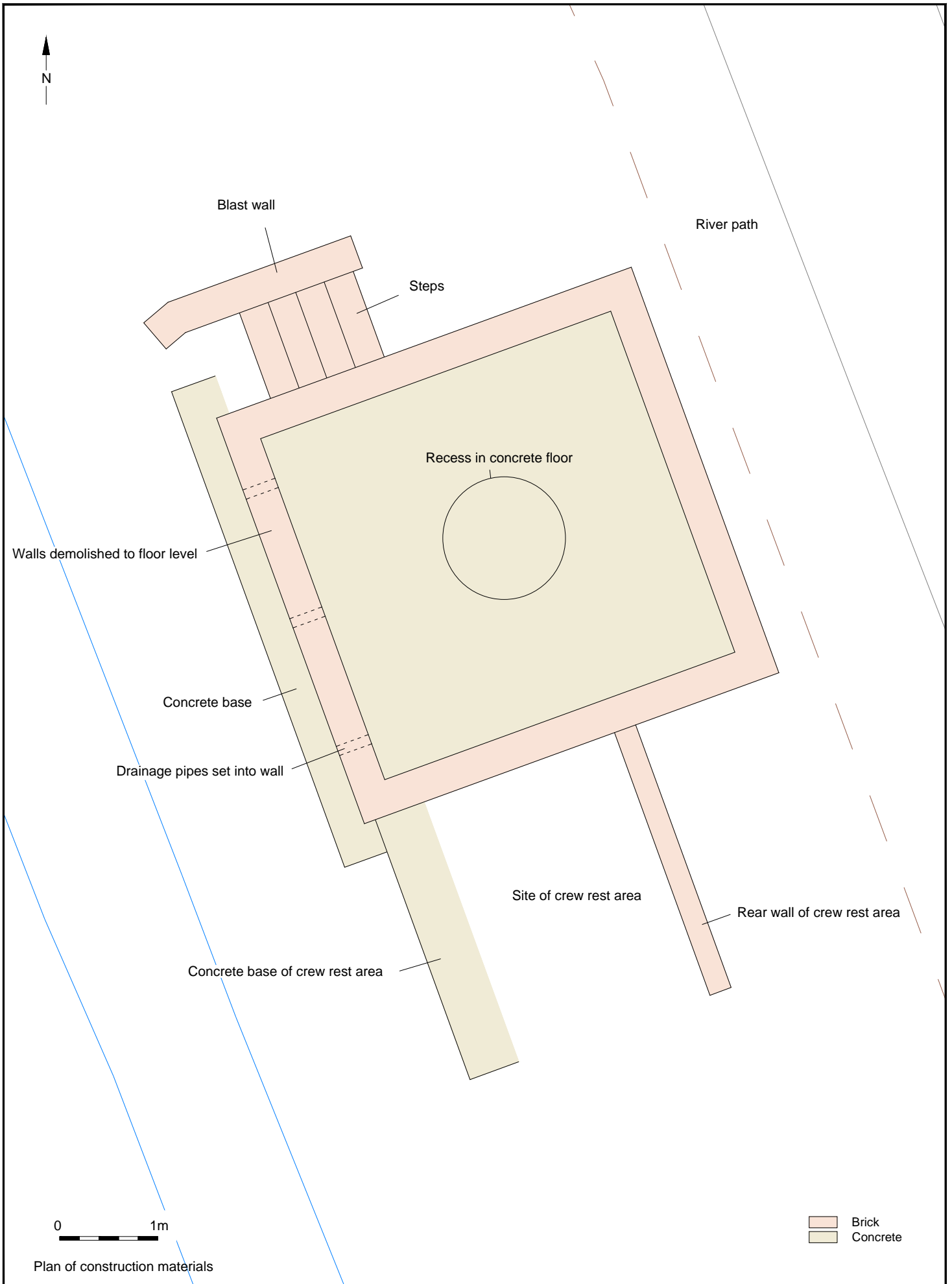




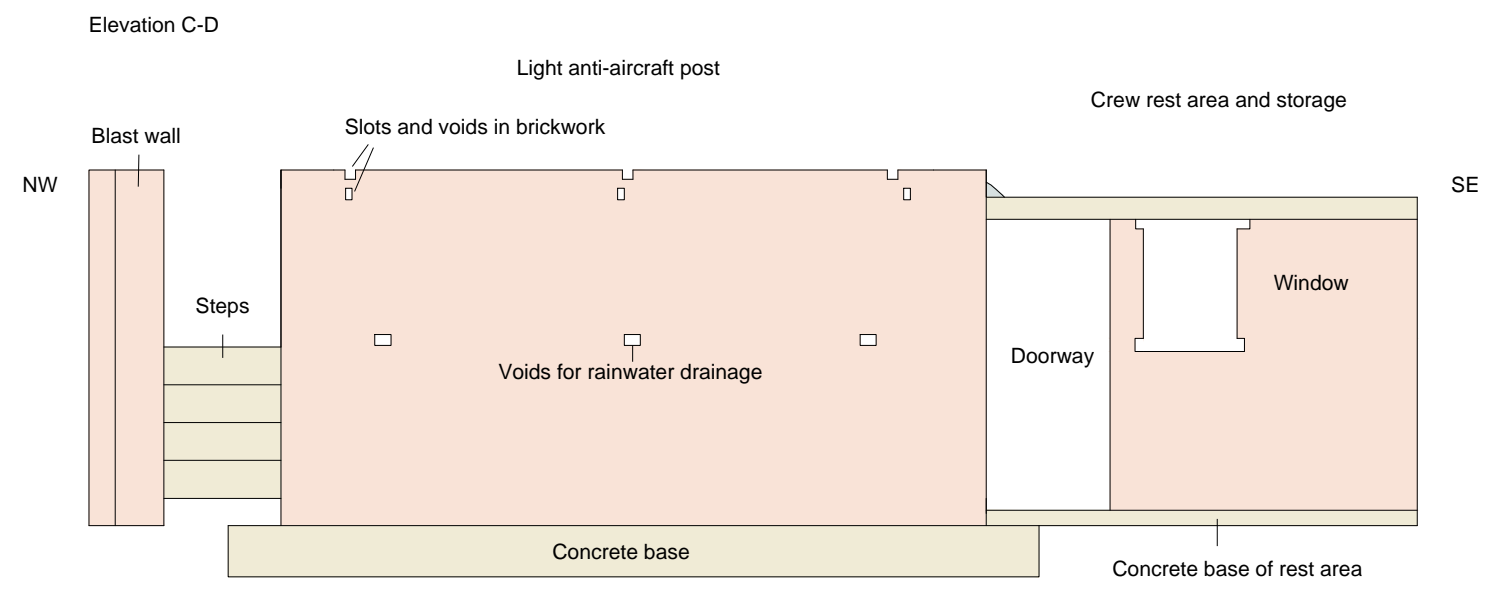
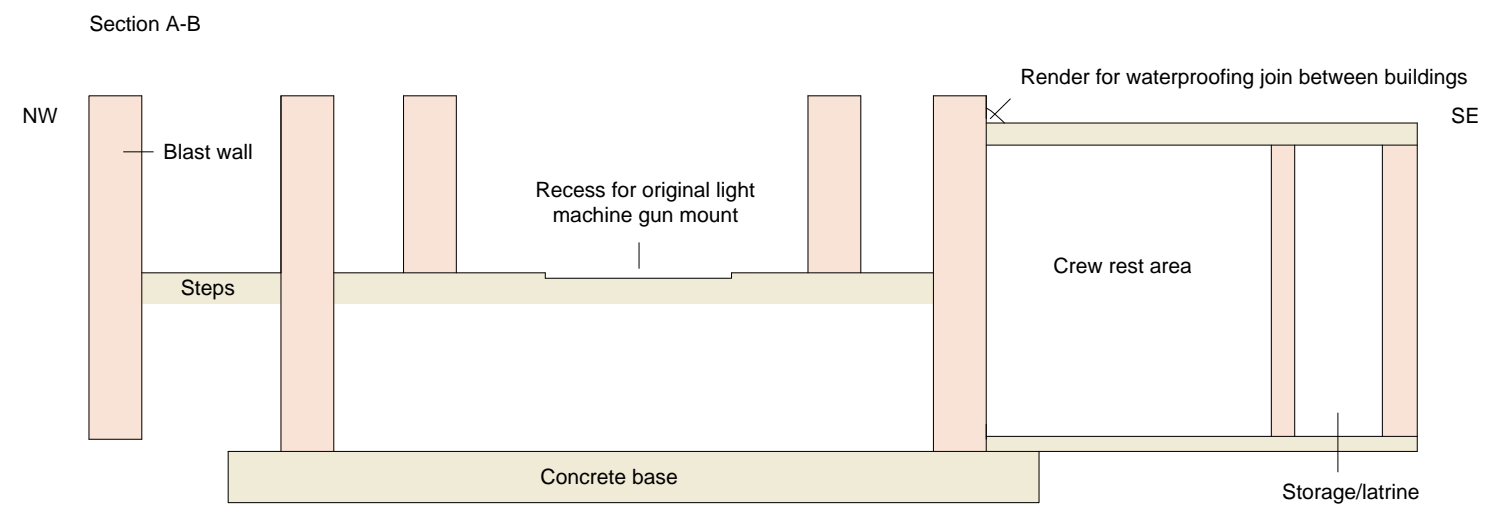
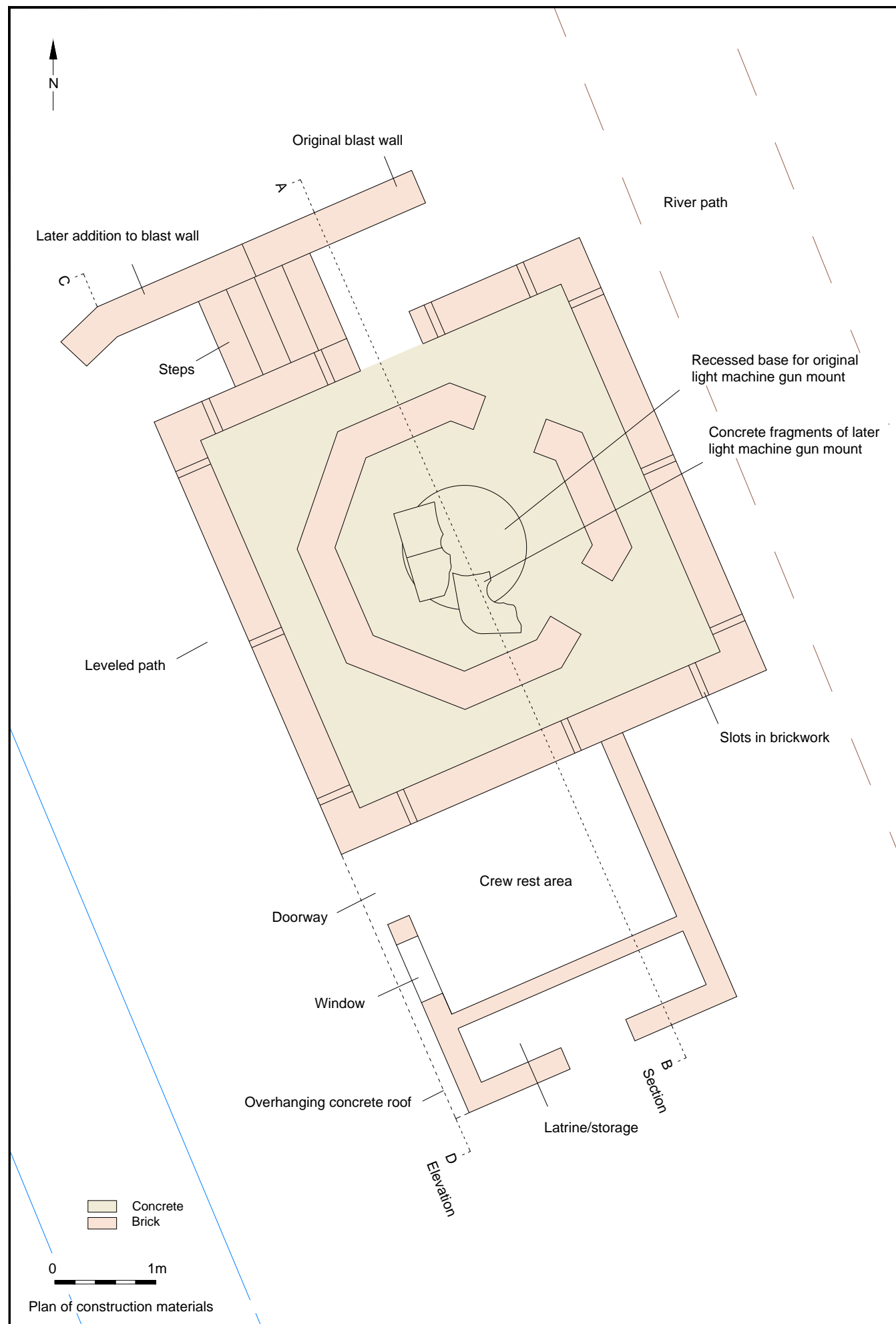


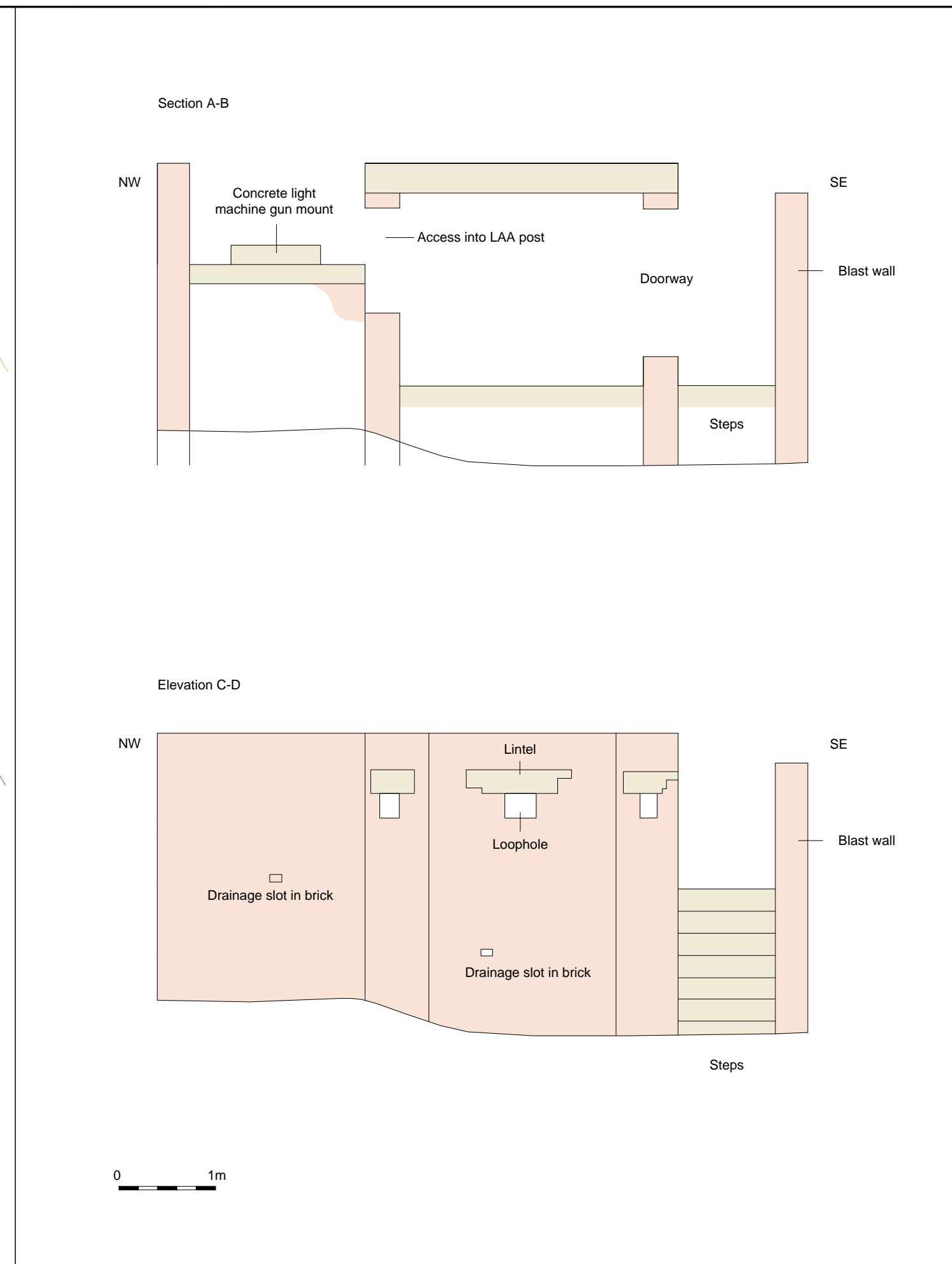
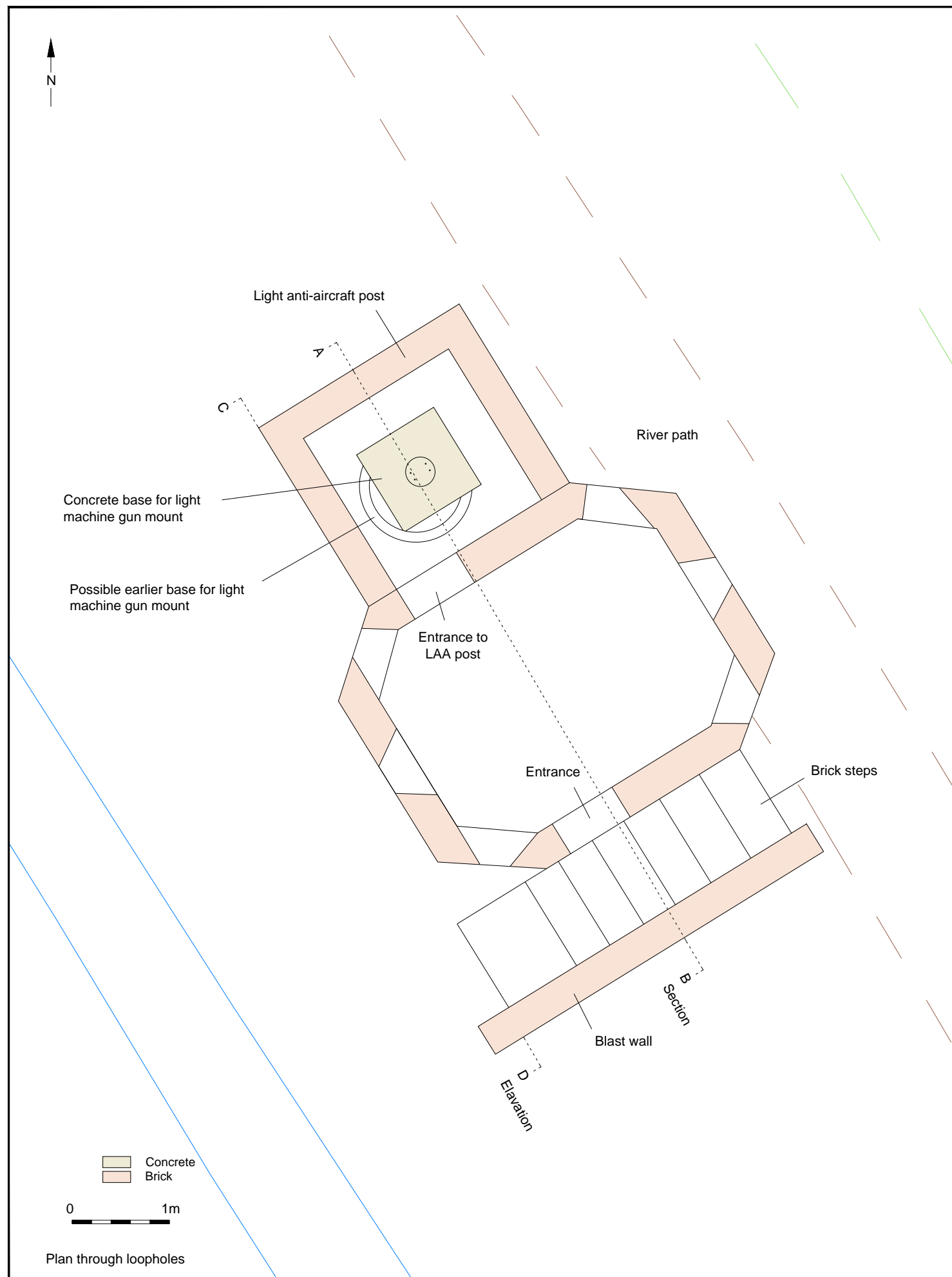
© Archaeology South-East		Adur Tidal Walls Reach W7	Fig. 10
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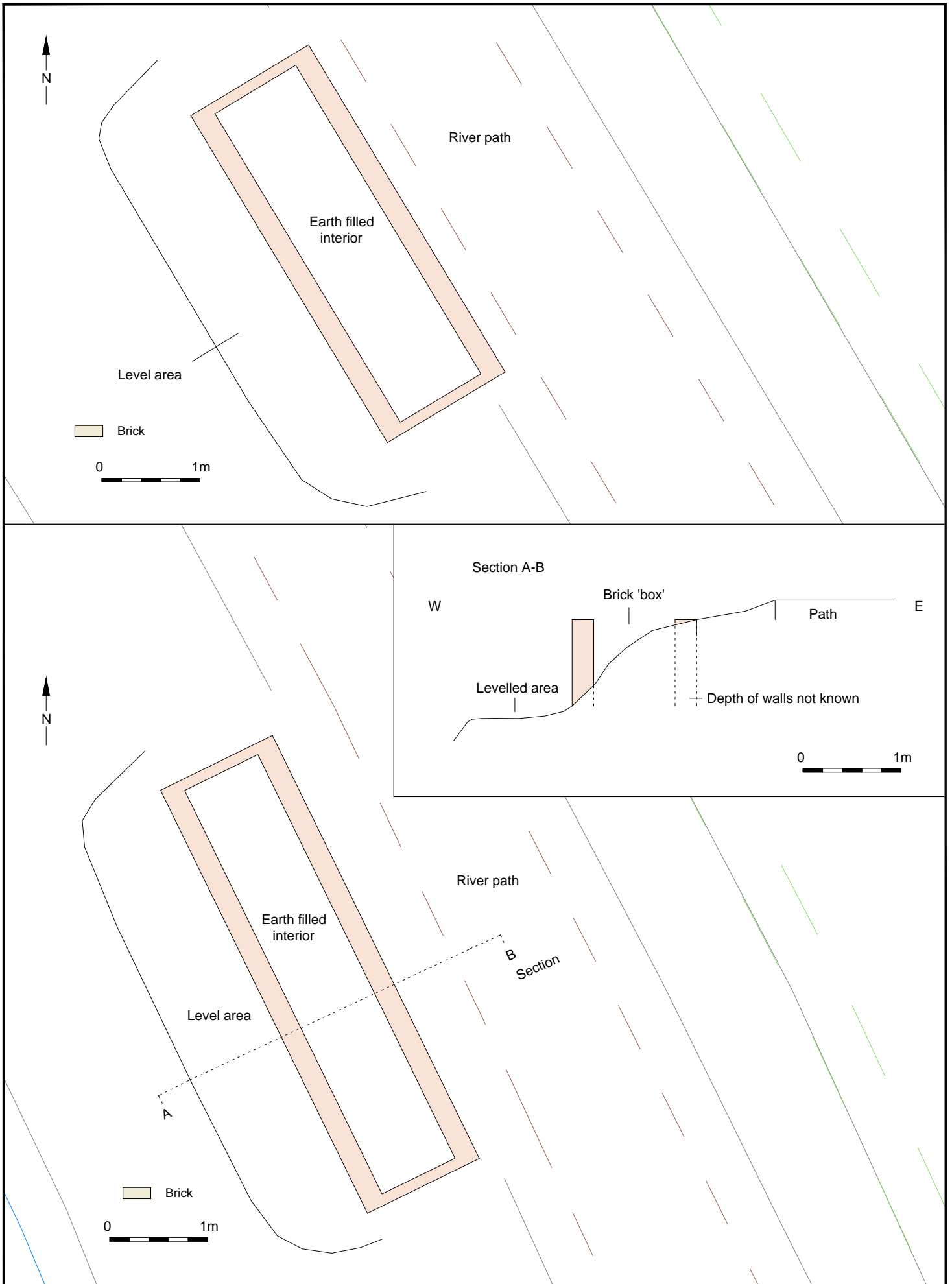




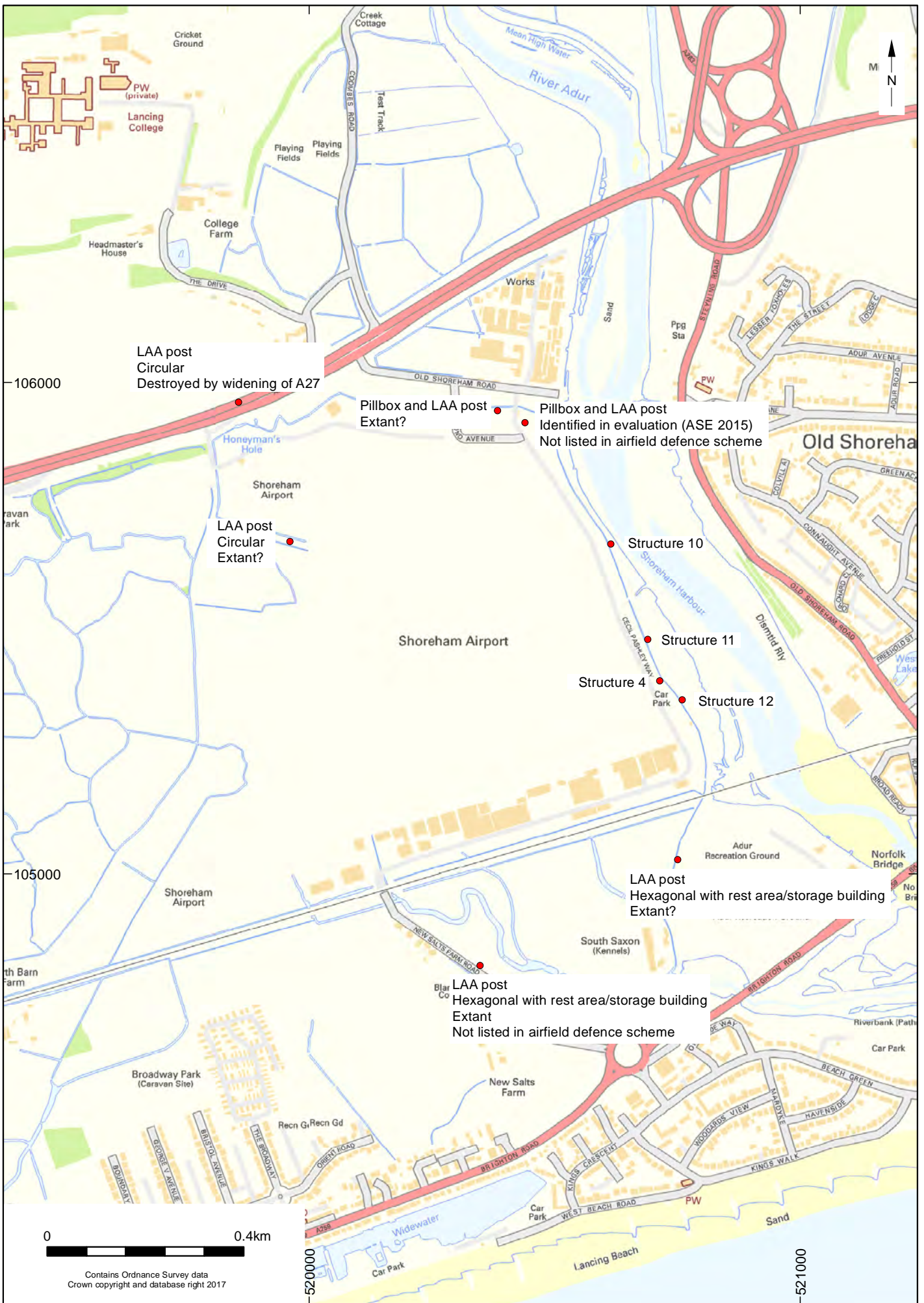
© Archaeology South-East		Adur Tidal Walls Reach W7		Fig. 12
Project Ref: 160031	Nov 2017	Structure 10 plan		
Report Ref: 2017513	Drawn by: JLR			





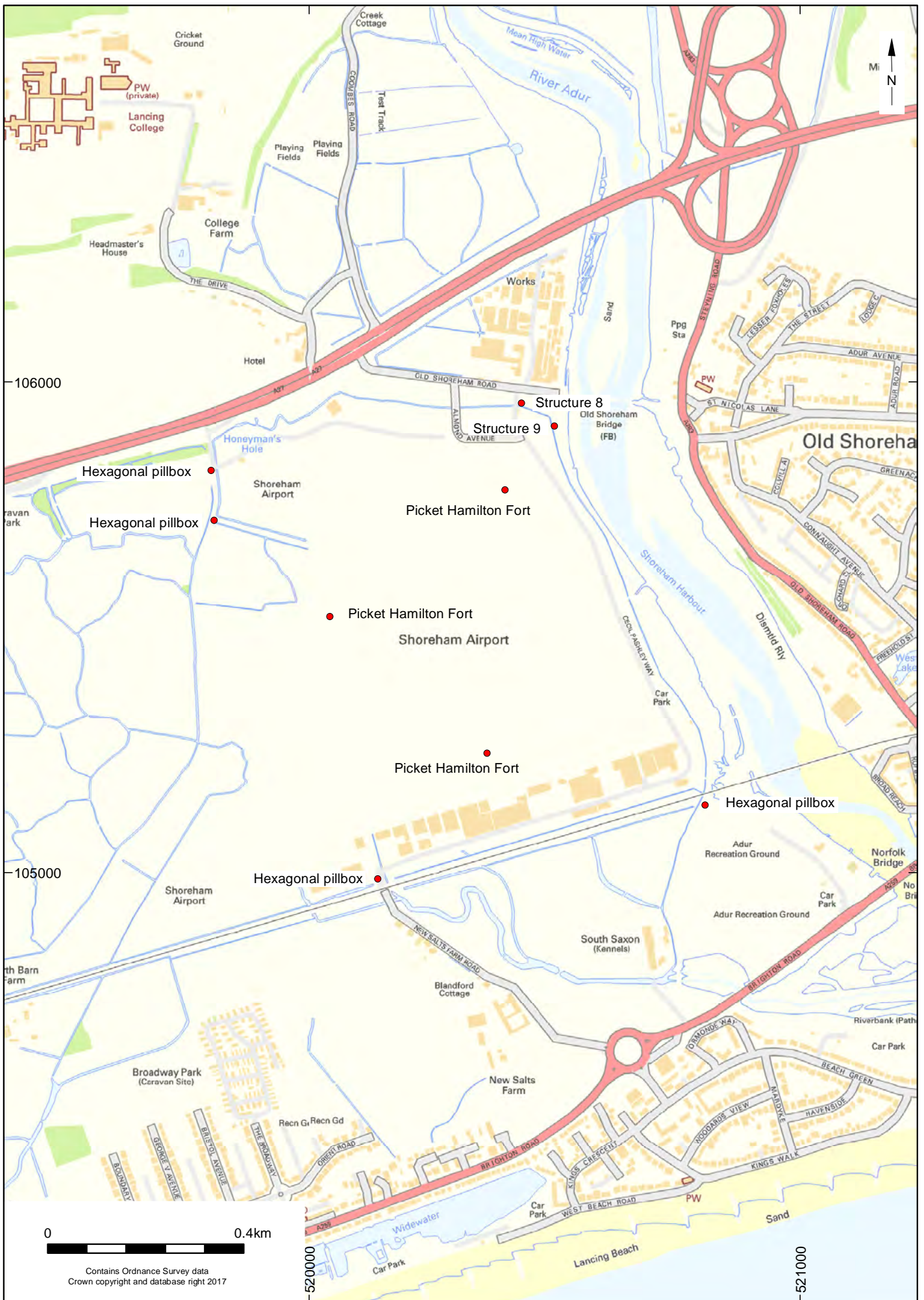


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Project Ref: 160031	Nov 2017	Structures 13 and 14 plans and section	
Report Ref: 2017513	Drawn by: JLR		



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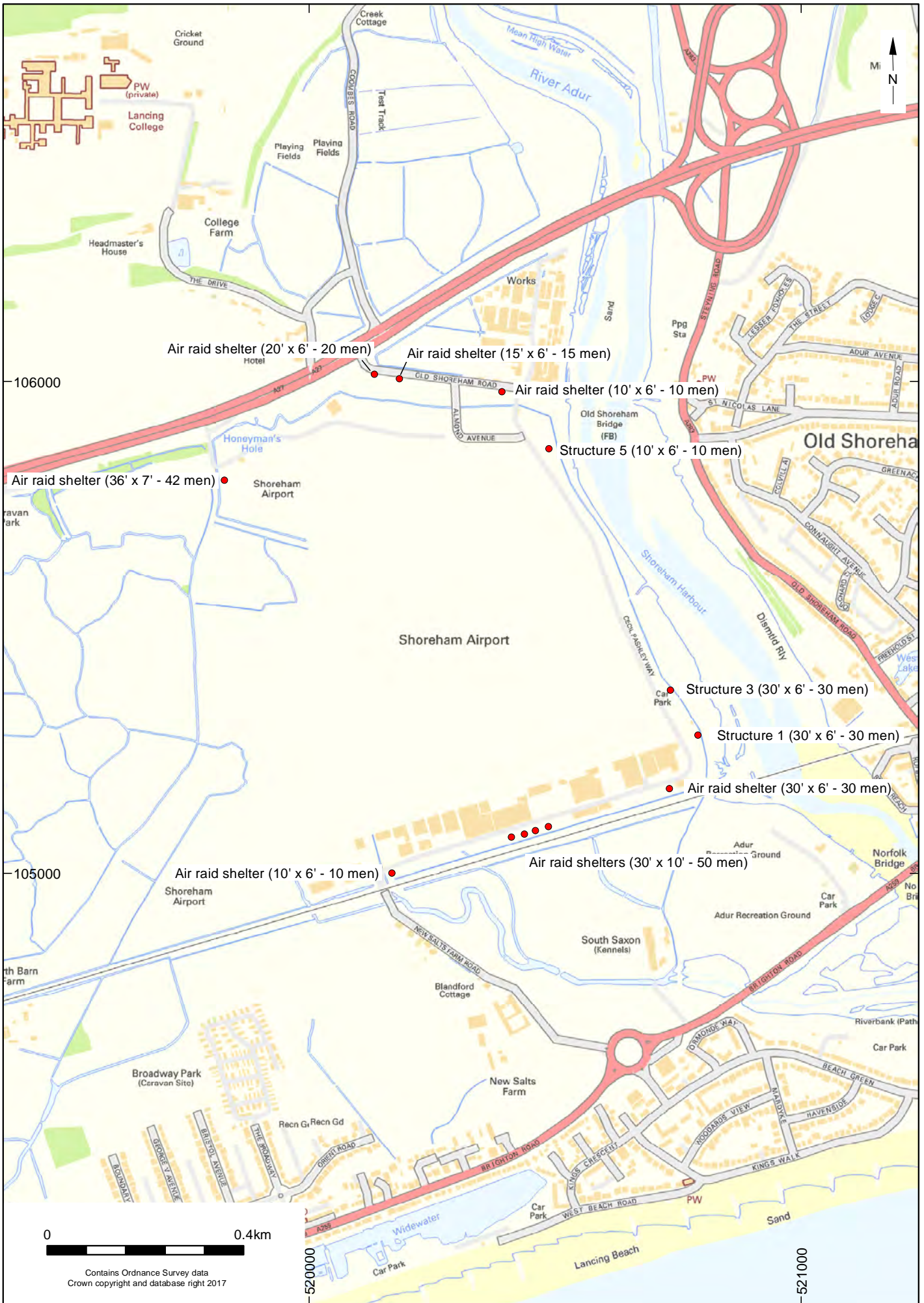
© Archaeology South-East		Adur Tidal Walls Reach W7	Fig. 16
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Report Ref: 2017513	Drawn by: JLR		



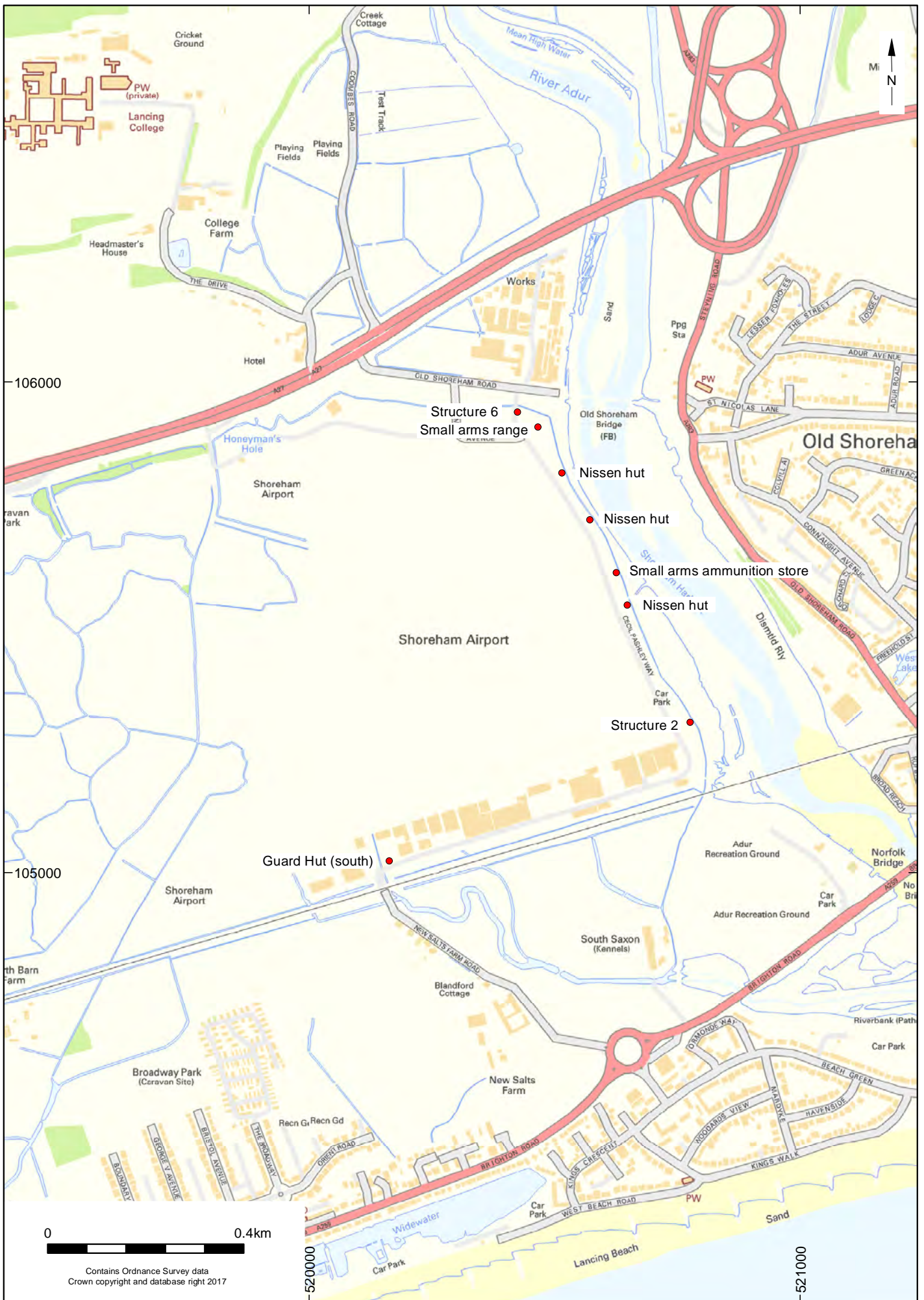
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Project Ref: 160031	Dec 2017	Airfield defences at Shoreham Airport: pillboxes	
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Project Ref: 160031	Dec 2017	Anti-invasion defences on the Adur Grid line	
Report Ref: 2017513	Drawn by: JLR		



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Project Ref: 160031	Dec 2017	Air raid shelters at Shoreham Airport	
Report Ref: 2017513	Drawn by: JLR		



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Project Ref: 160031	Dec 2017	Administration and technical buildings	
Report Ref: 2017513	Drawn by: JLR	on the western perimeter of Shoreham Airport	



Plate 1: Structure 1 looking west (0011)



Plate 2: Structure 1, southern entrance and blast wall, looking north-east (0003)



Plate 3: Structure 1, southern entrance, looking down to steps and entrance from blast wall (0015)



Plate 4: Structure 1, southern entrance, internal blast wall (0004)



Plate 5: Structure 1, main chamber, looking north (0005)



Plate 6: Structure 2, showing main entrance and boarded windows, looking south-east (0033)



Plate 7: Structure 2, after tree clearance, showing fan grill, looking north-west (0036)



Plate 8: Structure 2 interior, looking south, showing inserted loft space and office (on right) (0024)



Plate 9: Structure 2 main entrance and insert roof above door, looking north (0028)



Plate 10: Structure 2, windows in centre of west wall, looking west (0026)



Plate 11: Structure 3, looking north-east, with southern entrance on right (0044)



Plate 12: Structure 3, southern entrance and blast wall, looking north (0041)



Plate 13: Structure 3, southern entrance, blast wall and steps, showing flooding, looking south (0045)



Plate 14: Structure 4, looking north-east (0068)



Plate 15: Structure 4, entrance and blast wall, looking south-east (0073)



Plate 16: Structure 4, light-anti aircraft post and access door to pillbox, looking south-east (0075)



Plate 17: Structure 4, internal division and doorway, looking north-east from second chamber (0067)



Plate 18: Structure 4, concrete plinth for light machine gun mount, looking south-east (0059)



Plate 19: Structure 4, plan view of plinth window in-situ wooden post (0090)



Plate 20: Structure 5, looking south (0112)



Plate 21: Structure 5, looking south-east (0107)



Plate 22: Structure 5, interior, showing fully excavated floor, looking north-east (0103)



Plate 23: Structure 5, footings for southern blast wall and buttresses, looking west (0101)



Plate 24: Structure 6, looking south-west (0133)



Plate 25: Structure 6, rear view, looking north-east (0142)



Plate 26: Structure 6, stepped embrasure, showing exposed steel reinforcing bars, looking south-east (0134)



Plate 27: Structure 6, ventilation pipes in roof, looking north (0128)



Plate 28: Structure 6, interior, looking west (0136)



Plate 29: Structure 7, looking south (0158)



Plate 30: Structure 7, looking west (0152)



Plate 31: Structure 7, looking north-east, showing cell windows on right (0154)



Plate 32: Structure 7, detail of cell window (0156)



Plate 33: Structure 7, detail of repaired southern end, looking west (0157)



Plate 34: Structure 8, looking west (0168)



Plate 35: Structure 8, looking south-east (0169)



Plate 36: Structure 8, entrance, access steps and blast wall, looking west (0172)



Plate 37: Structure 8, north facing loophole and remnant wooden shuttering (0176)



Plate 38: Structure 8, interior view of entrance, looking south (0164)



Plate 39: Structure 9, looking north-east (0235)



Plate 40: Structure 9, looking north (0215)



Plate 41: Structure 9, detail of thickened wall from roof, looking east (0223)



Plate 42: Structure 9, widened loophole, looking north-west (0216)



Plate 43: Structure 9, blast wall, access steps, entrance and loophole over entrance, looking east (0199)



Plate 44: Structure 9 entrance passage, showing thickened wall on left and original wall on right (0229)



Plate 45: Structure 10, looking east (0236)



Plate 46: Structure 10 looking south-east (0238)



Plate 47: Structure 10 looking south (0245)



Plate 48: Structure 10 looking north (0249)



Plate 49: Structure 11 looking east (0267)



Plate 50: Structure 11 looking north-west (0279)



Plate 51: Structure 11, light anti-aircraft post, looking north (0256)



Plate 52: Structure 11, entrance, access steps and blast wall, looking west (0255)



Plate 53: Structure 11, concrete fragments of light machine gun mount, with trace of earlier circular mount visible below (0278)



Plate 54: Structure 11, blast wall, showing original segment, covering only the entrance (0281)



Plate 55: Structure 11, rest area interior, looking west (0271)



Plate 56: Structure 12, looking north-east (0330)



Plate 57: Structure 12 looking north-west, showing blast wall, entrance and concrete roof without brick shuttering (0290)



Plate 58: Structure 12, light anti-aircraft post, looking north-west (0295)



Plate 59: Structure 12, interior view of loopholes, looking north-east (0293)



Plate 60: Structure 12, interior view of access to light anti-aircraft post, looking north-west (0320)



Plate 61: Structure 12, concrete base of light machine gun mount (0296)



Plate 62: Structure 13 looking north-west (0341)



Plate 63: Structure 13 looking south-east (0343)



Plate 64: Structure 14 looking south-east (0351)



Plate 65: Structure 14 looking north-west (0356)



Plate 66: Structure 14 looking north (0357)



Plate 67: Structure 15 (footpath) looking north-west (0361)



Plate 68: Structure 15 concrete, slabs showing repeating holes (0363)



Plate 69: Structure 15 looking south-east from Structure 12 (0364)



Plate 70: Structure 15 looking north to Structure 11 (0365)

APPENDIX 1

OASIS Form

OASIS ID: archaeol6-302744

Project details

Project name	Shoreham Adur Tidal Walls, Reach W7, West Sussex - Historic Building Record Level 3
Short description of the project	<p>In November 2016 and October 2017 Archaeology South-East (a division of the Centre for Applied Archaeology, UCL) carried out a programme of historic building recording on a series of Second World War structures on the western edge of the River Adur (Reach W7), prior to the commencement of the Adur Tidal Walls flood defence scheme. Reach W7 is just one of a number of areas on the east and west bank of the Adur within the overall Adur Tidal Walls scheme. The 14 structures recorded here, located where the riverbank converges with the perimeter of Shoreham Airport, Shoreham-by-Sea, form only a part of the wider system of defence and airfield administration put in place from 1939, as well as being part of the defensive line along the River Adur. Preceding this phase of work, an evaluation was undertaken in 2015 (ASE project 6833) which contains information directly relevant to the current work. The recording took place in November 2016 and October 2017 and the impact upon the structures by the defence scheme varies: minimal impact from landscaping of the surrounding area, preservation on situ by burial within the flood defence bank and finally to demolition and removal of a few of the structures.</p>
Project dates	Start: 25-11-2016 End: 01-12-2017
Previous/future work	Yes / Yes
Any associated project reference	160031 - Contracting Unit No.
project reference	ATW13 - Sitecode
Type of project	Building Recording
Site status	Site of Special Scientific Importance (SSSI)
Current Land use	Other 2 - In use as a building
Monument type	WWII AIRFIELD DEFENCE SYSTEM Modern
Significant Finds	BULLET Modern
Project location	
Country	England
Site location	WEST SUSSEX ADUR SHOREHAM BY SEA Shoreham Adur Tidal Walls, Reach W7, West Sussex
Postcode	BN43 5FF
Study area	3 Hectares
Site coordinates	520650 105520 520650 00 00 N 105520 00 00 E Point

Project creators

Name of Organisation	Archaeology South-East
Project brief originator	J T Mackley and Co Ltd
Project design originator	J T Mackley and Co Ltd
Project director/manager	Ron Humphrey
Project supervisor	Justin Russell
Type of sponsor/funding	J T Mackley and Co Ltd

Project archives

Physical Archive recipient	local museum
Physical Archive ID	ATW13
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Appendix 2: Index of Digital Photographs



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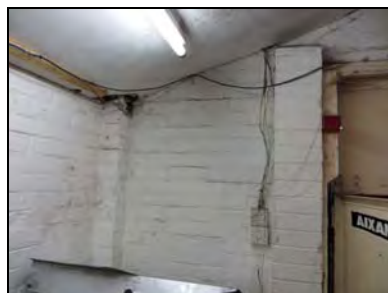
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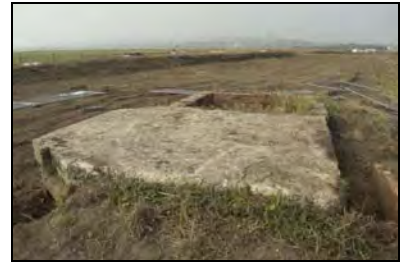
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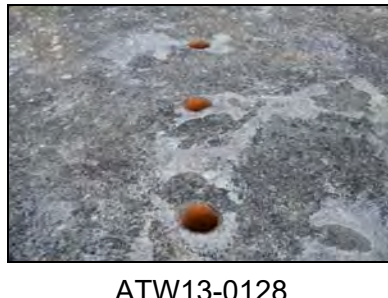
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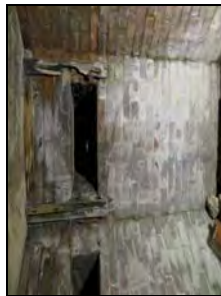
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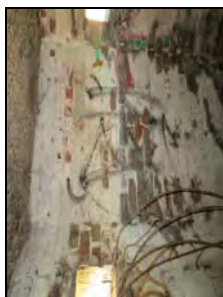
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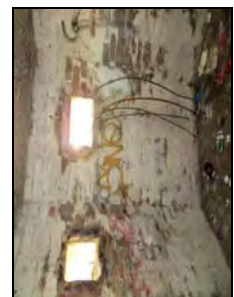
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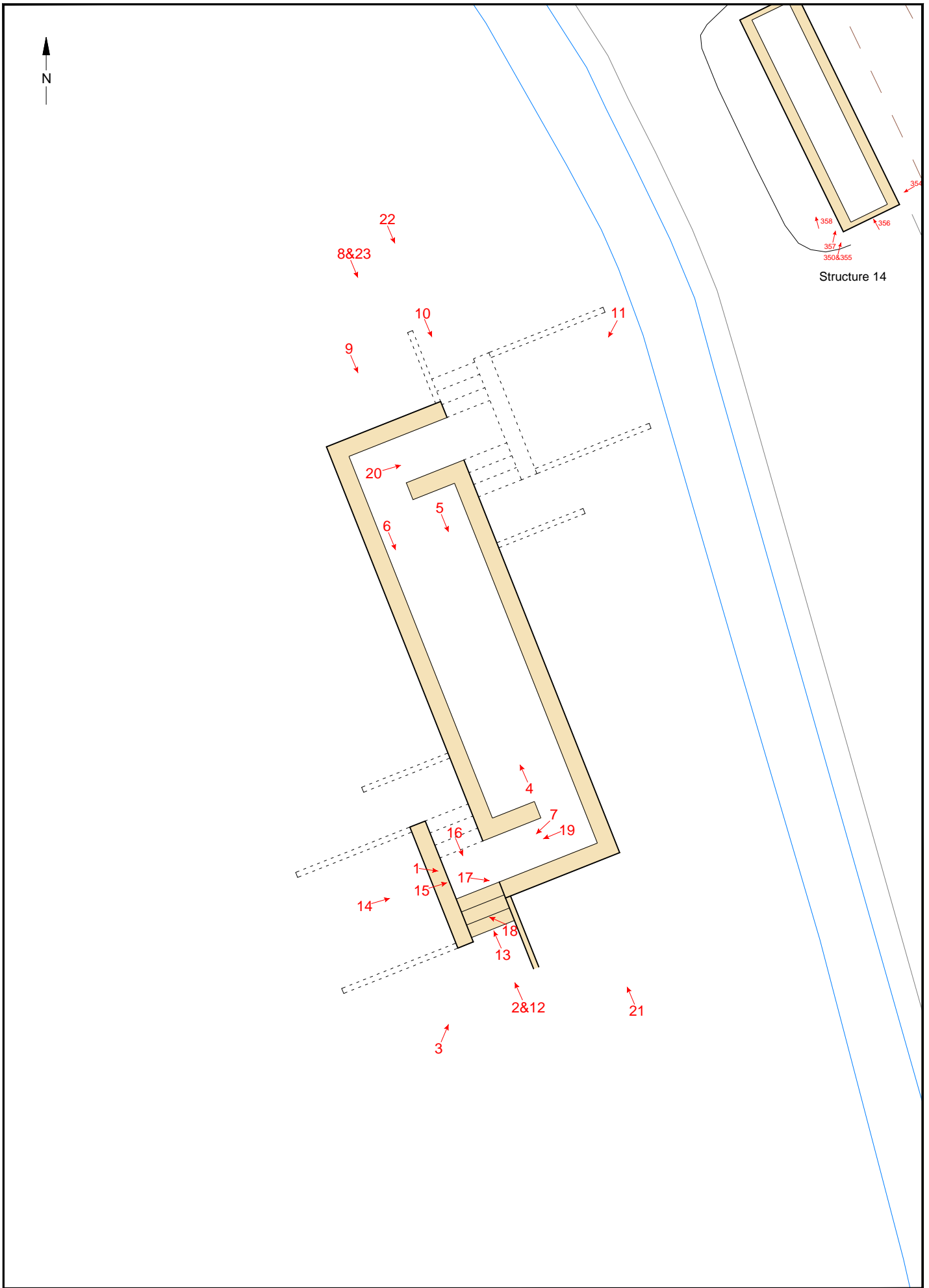
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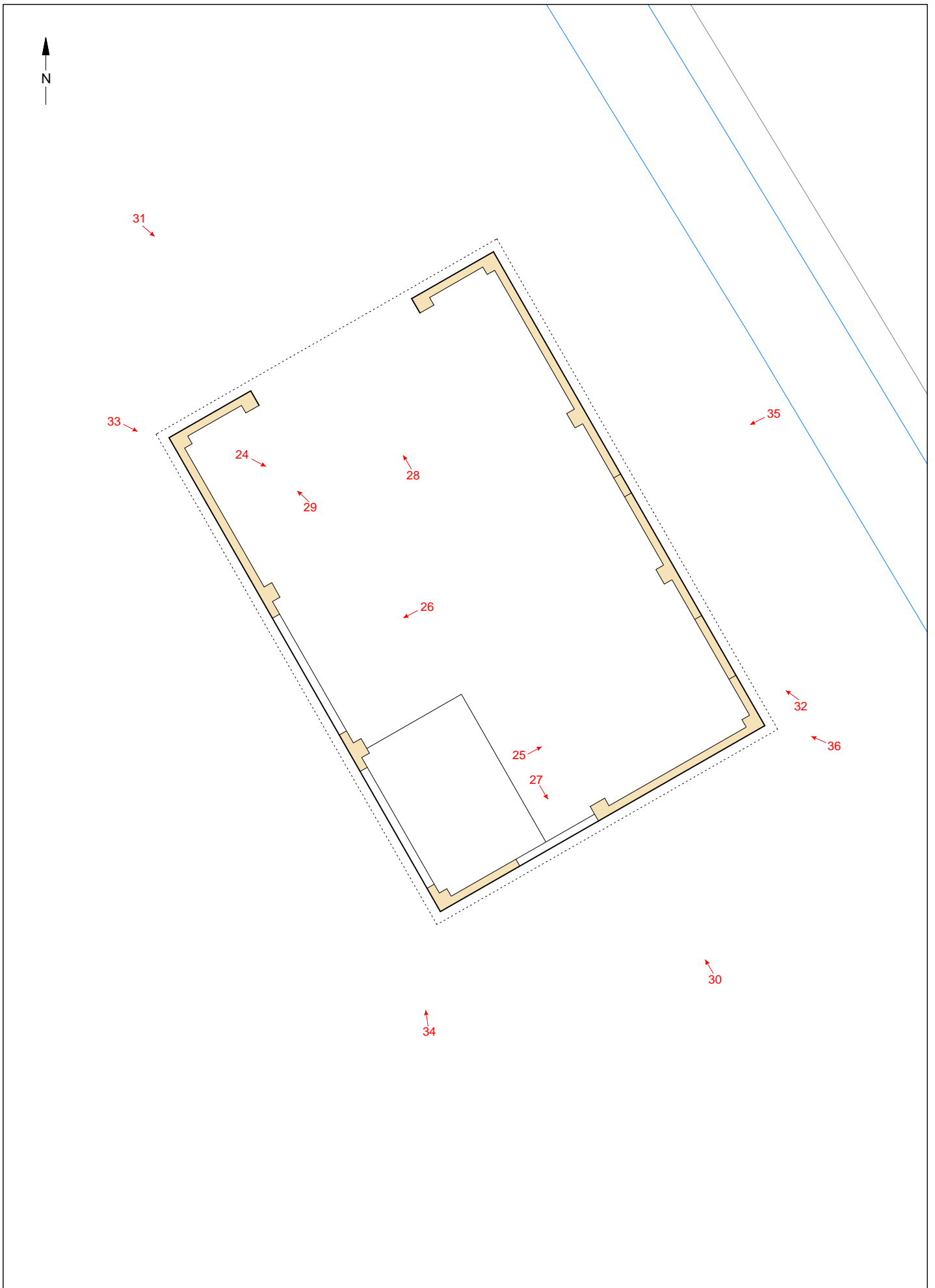
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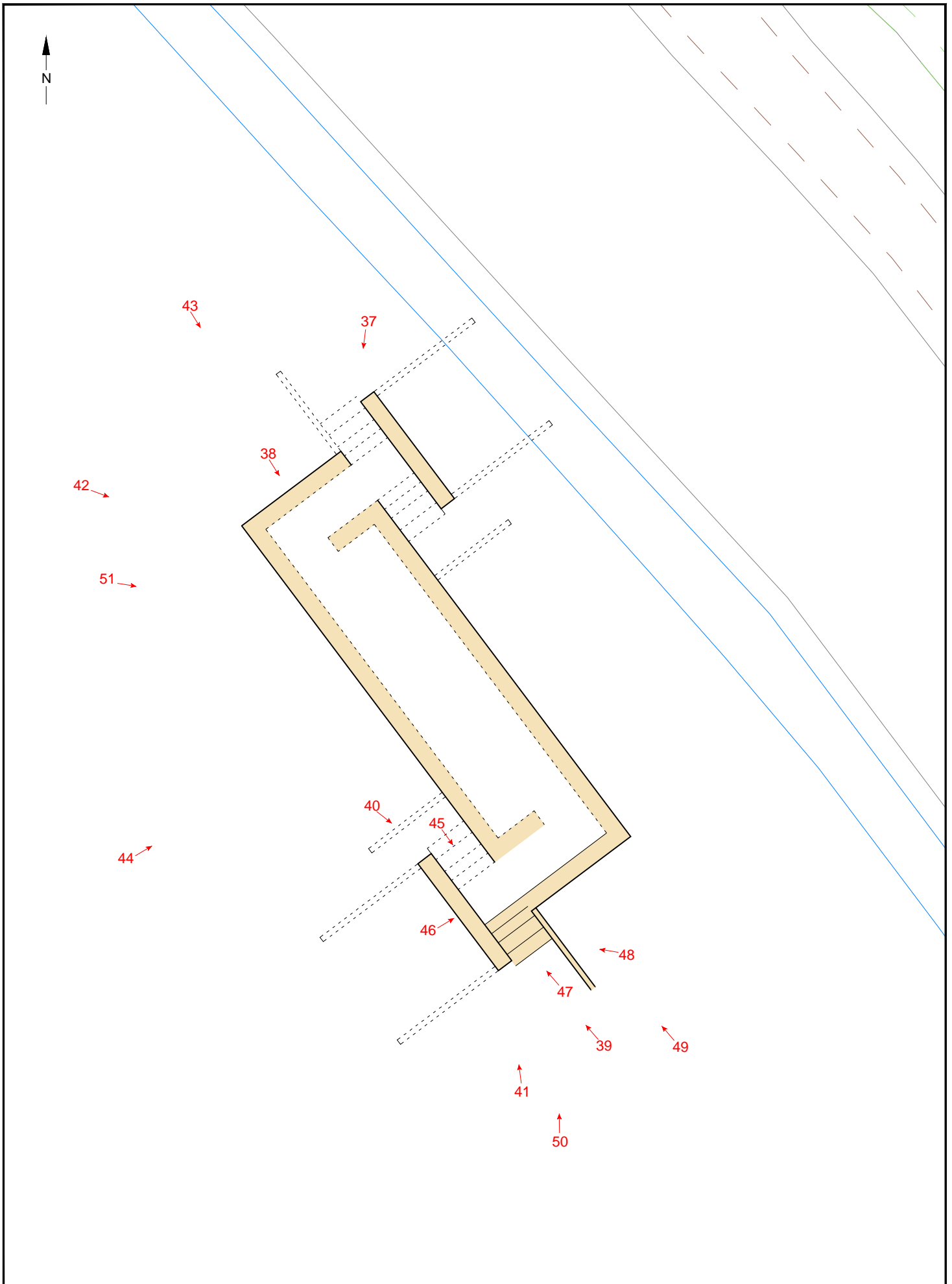
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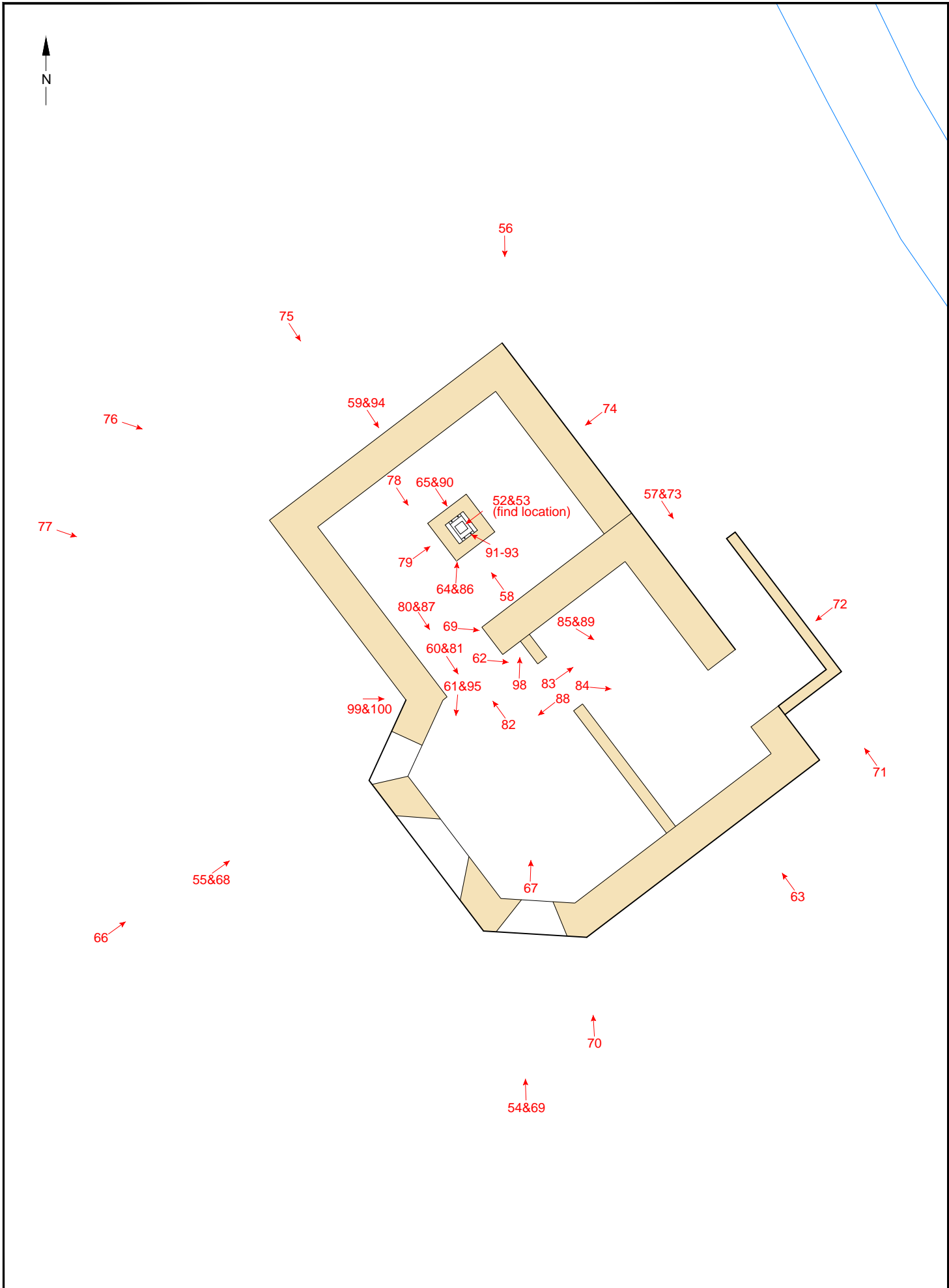
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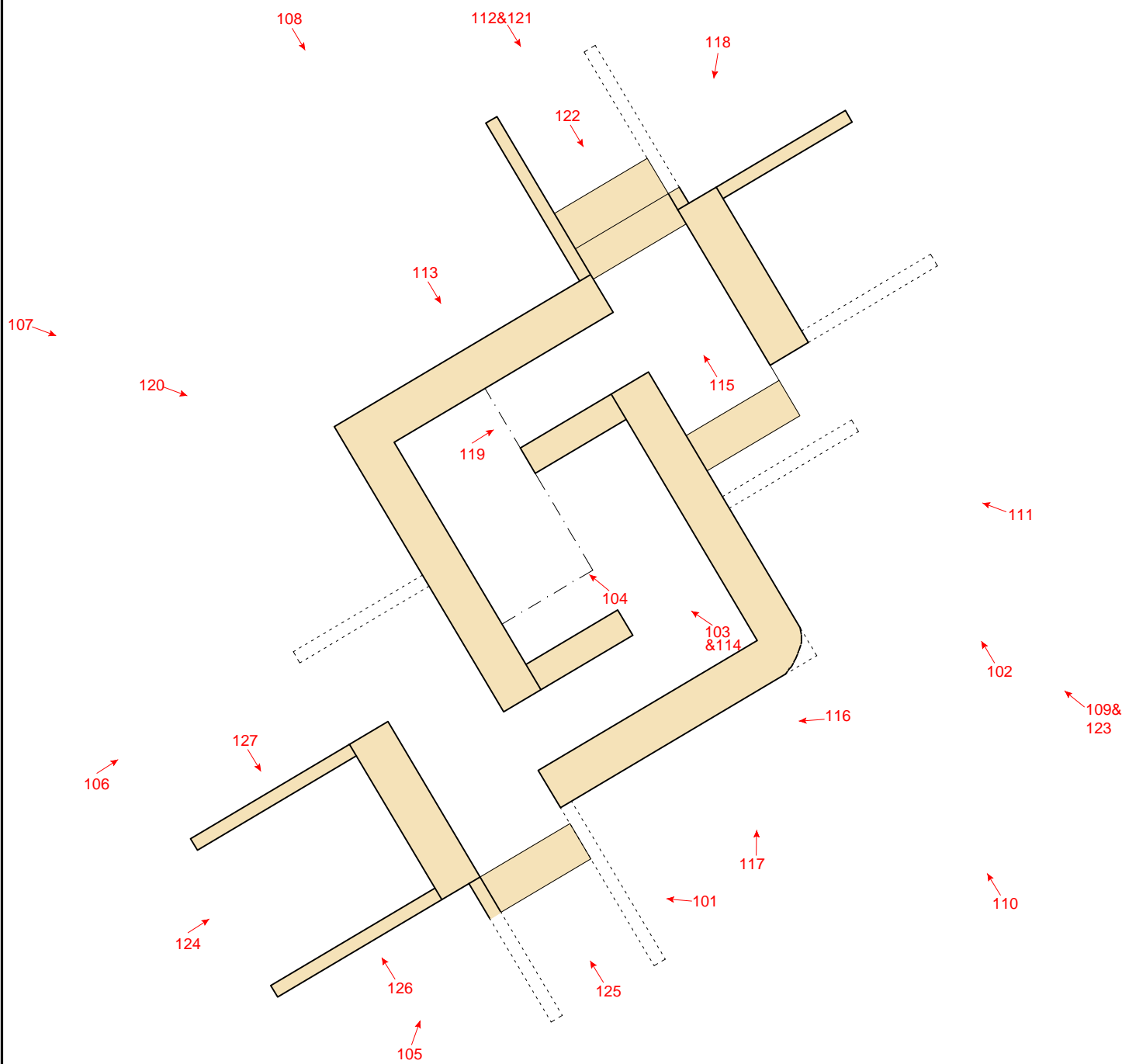
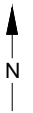


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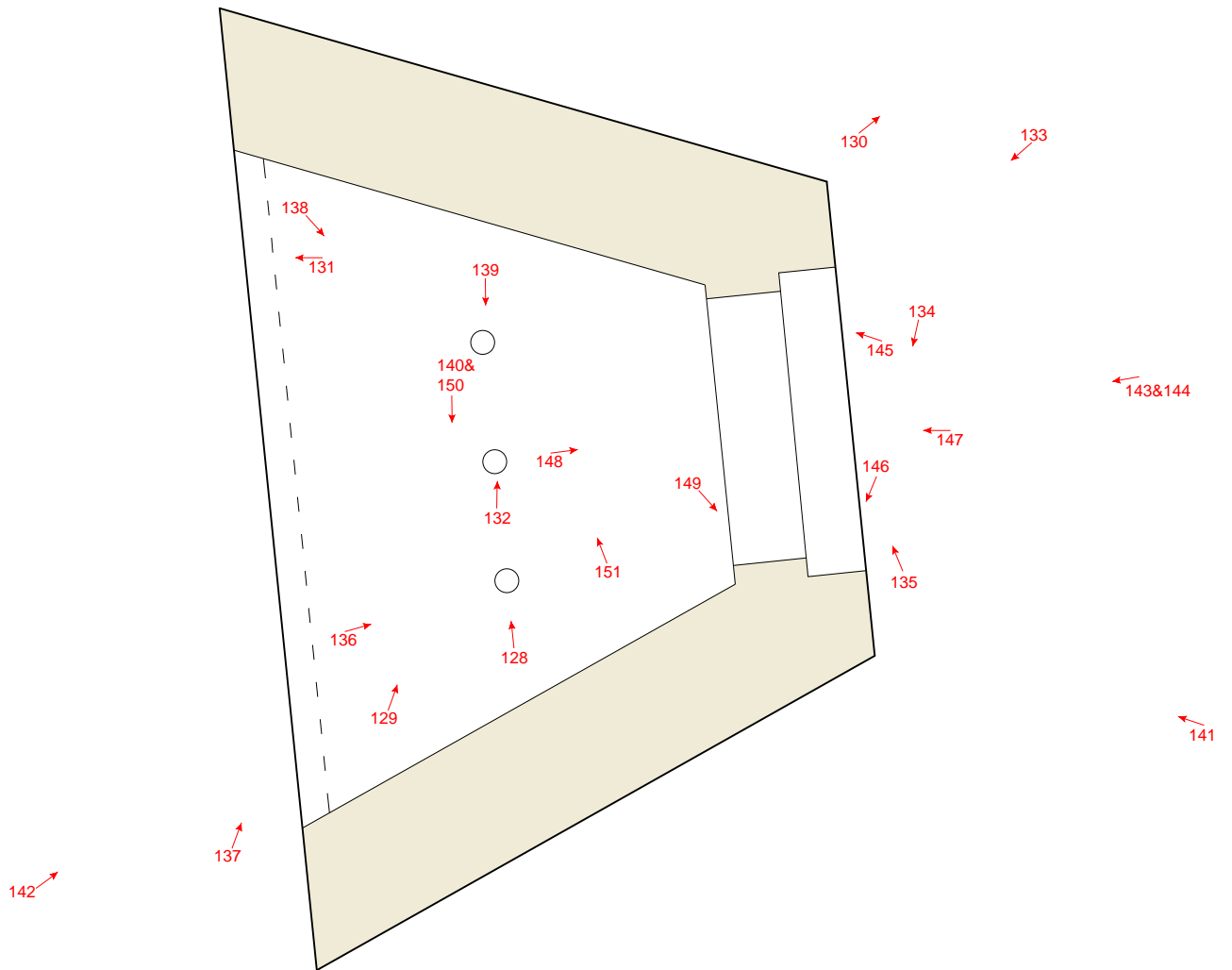


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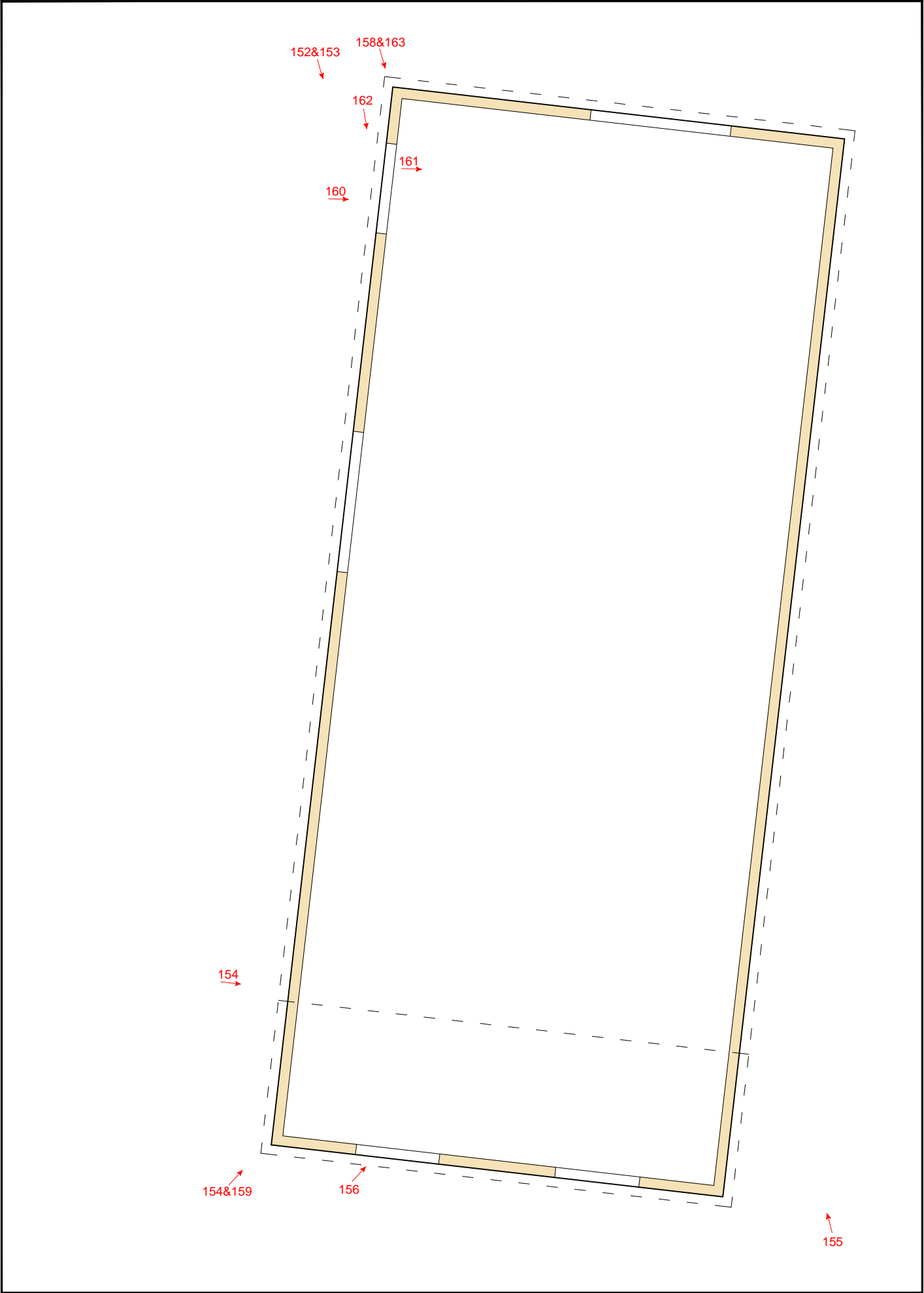




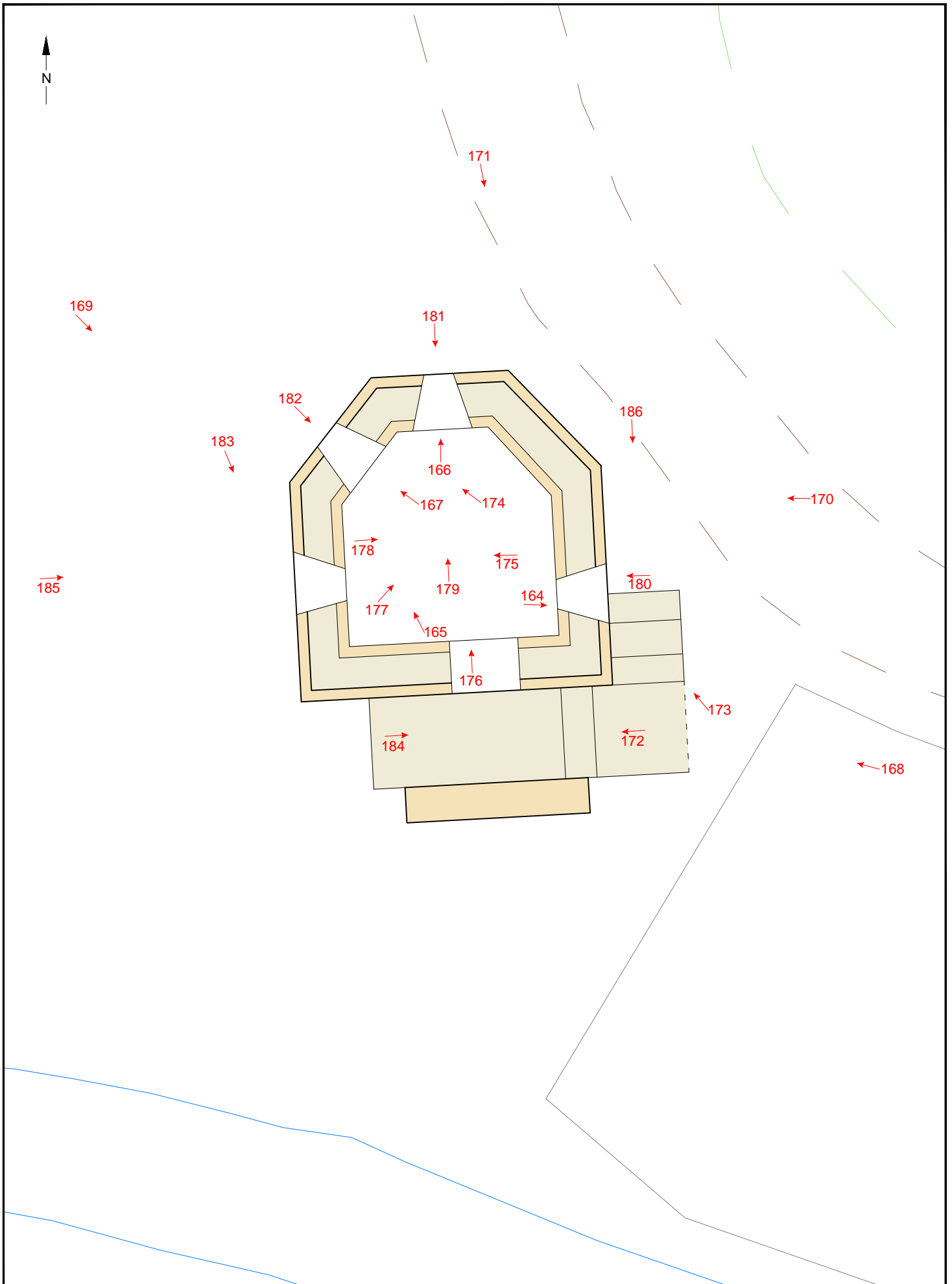
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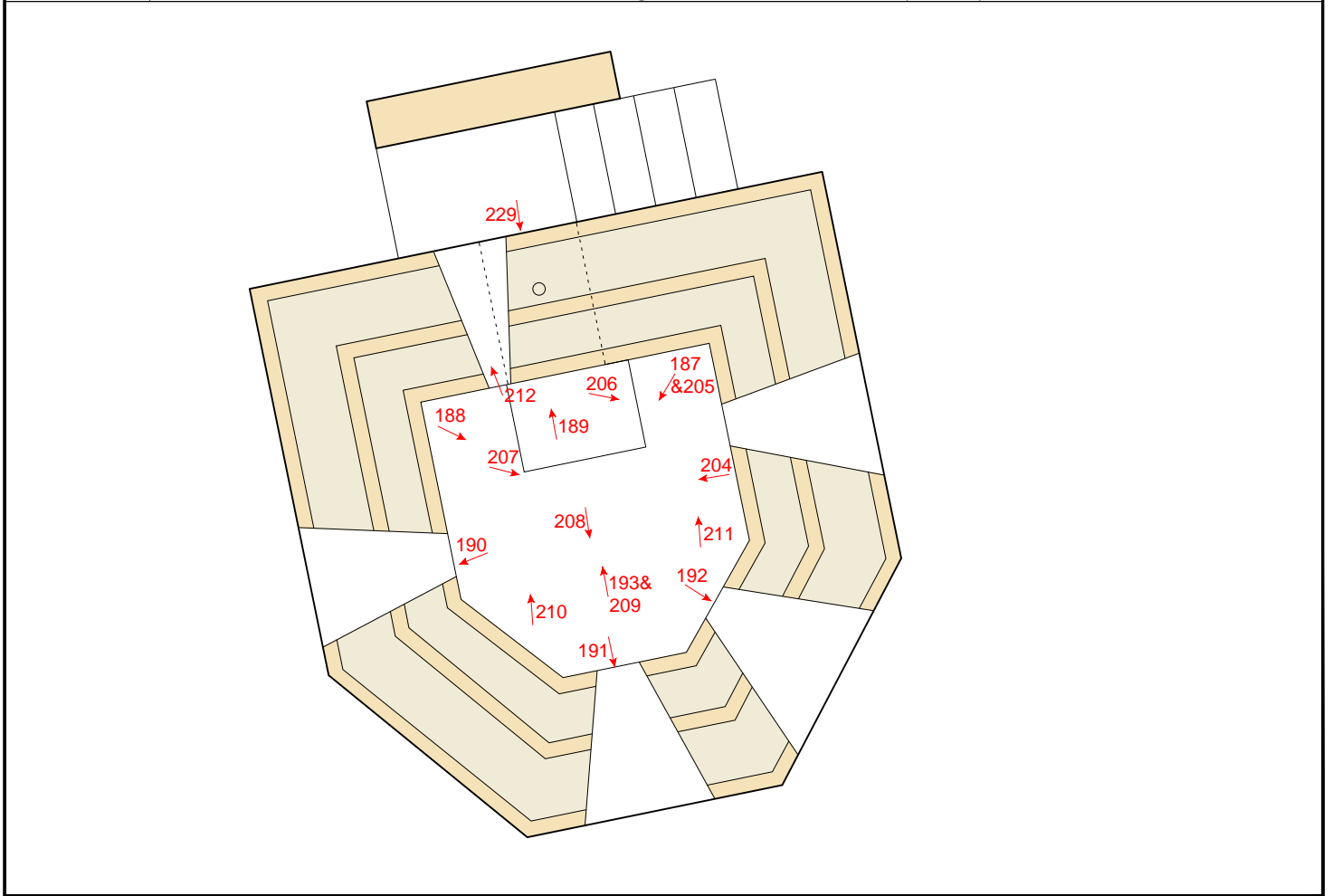
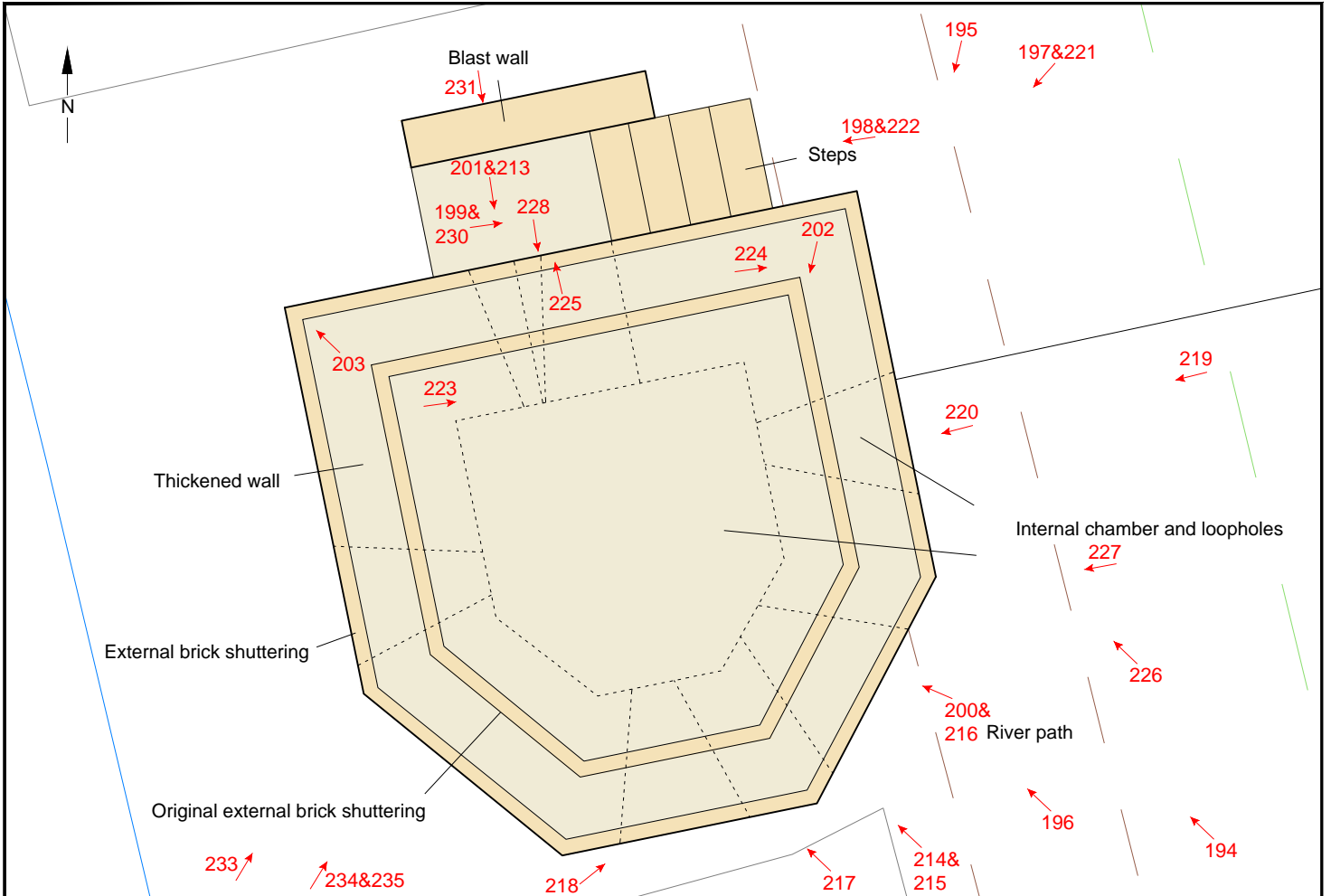
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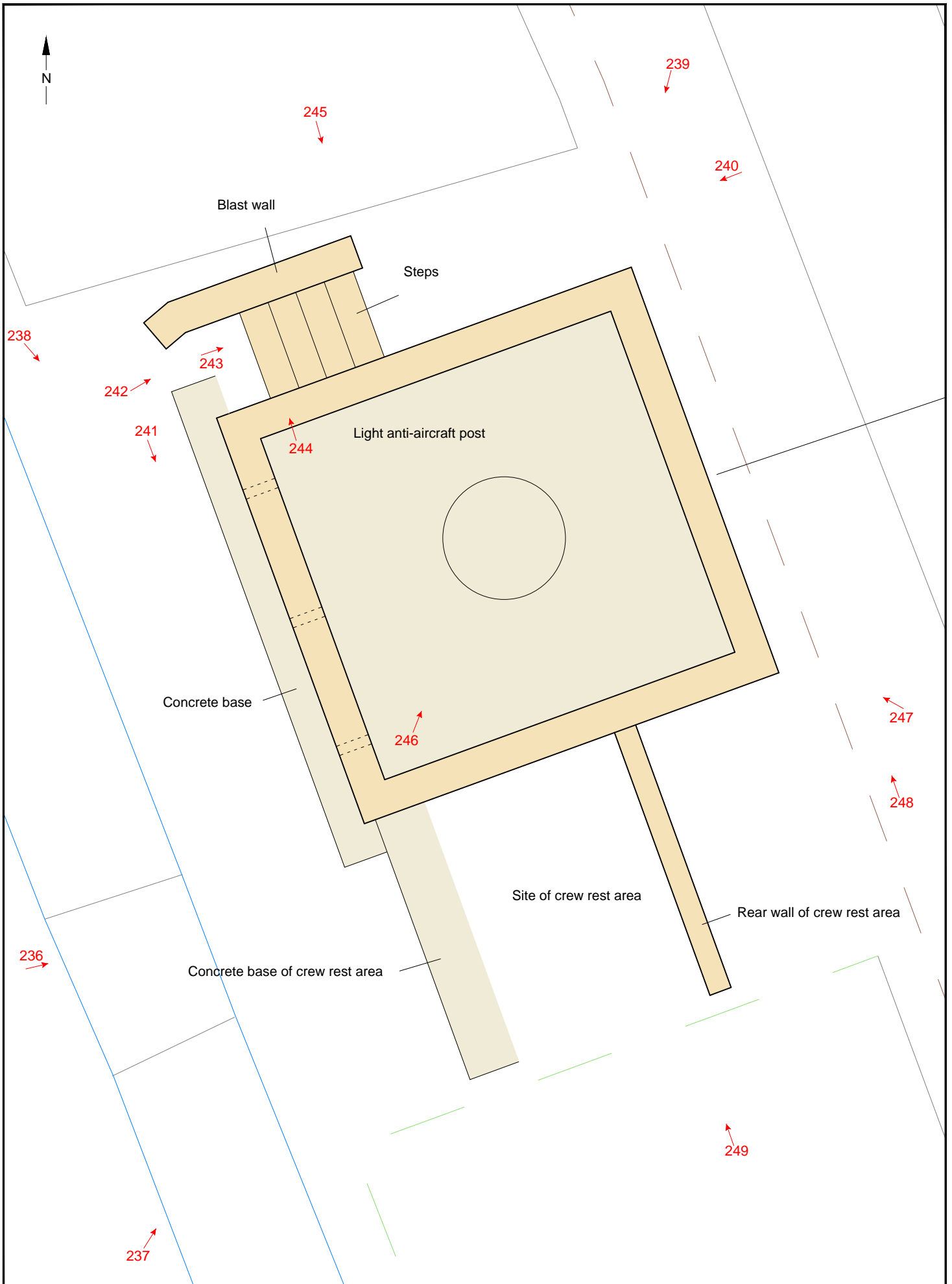


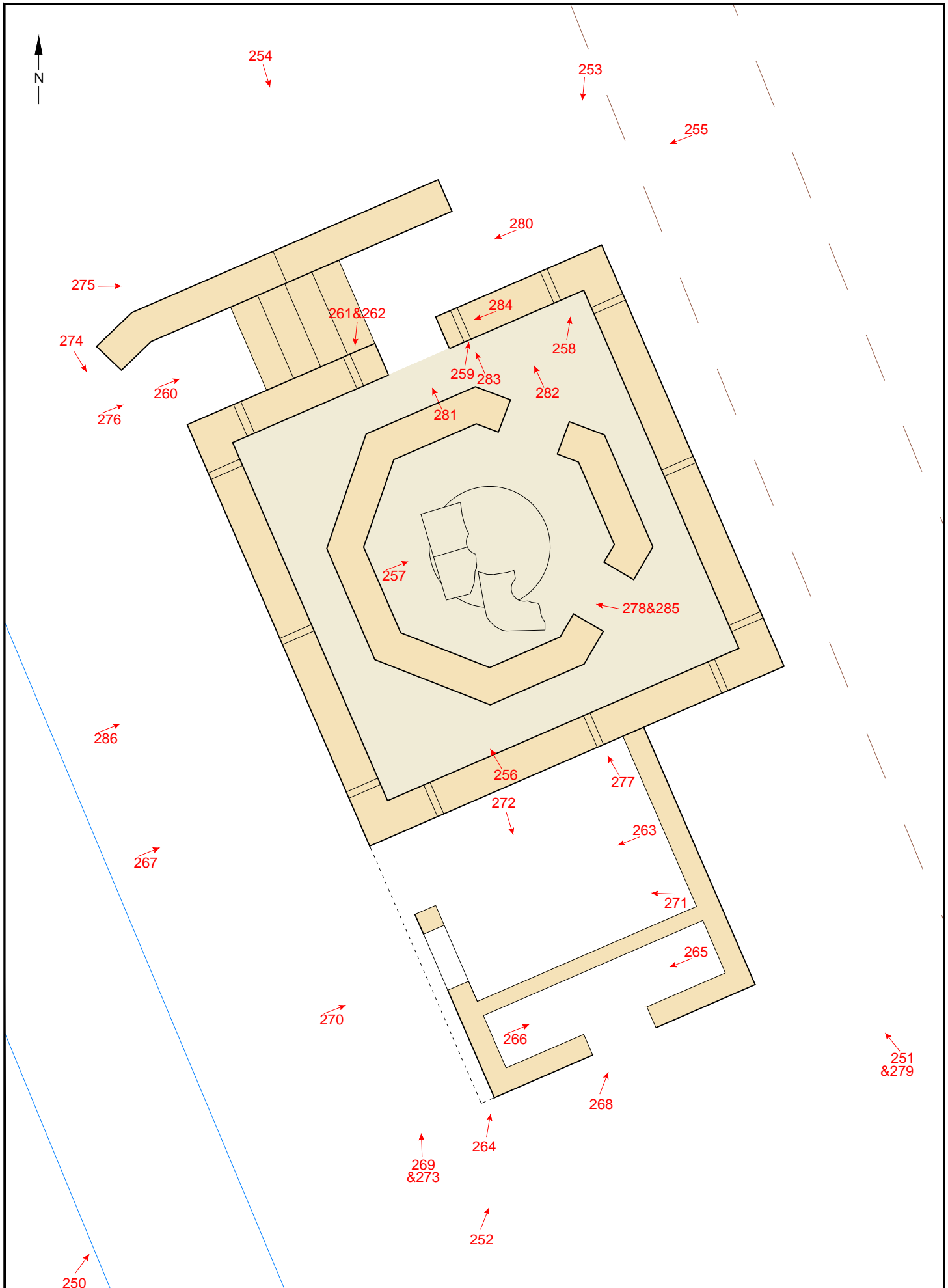
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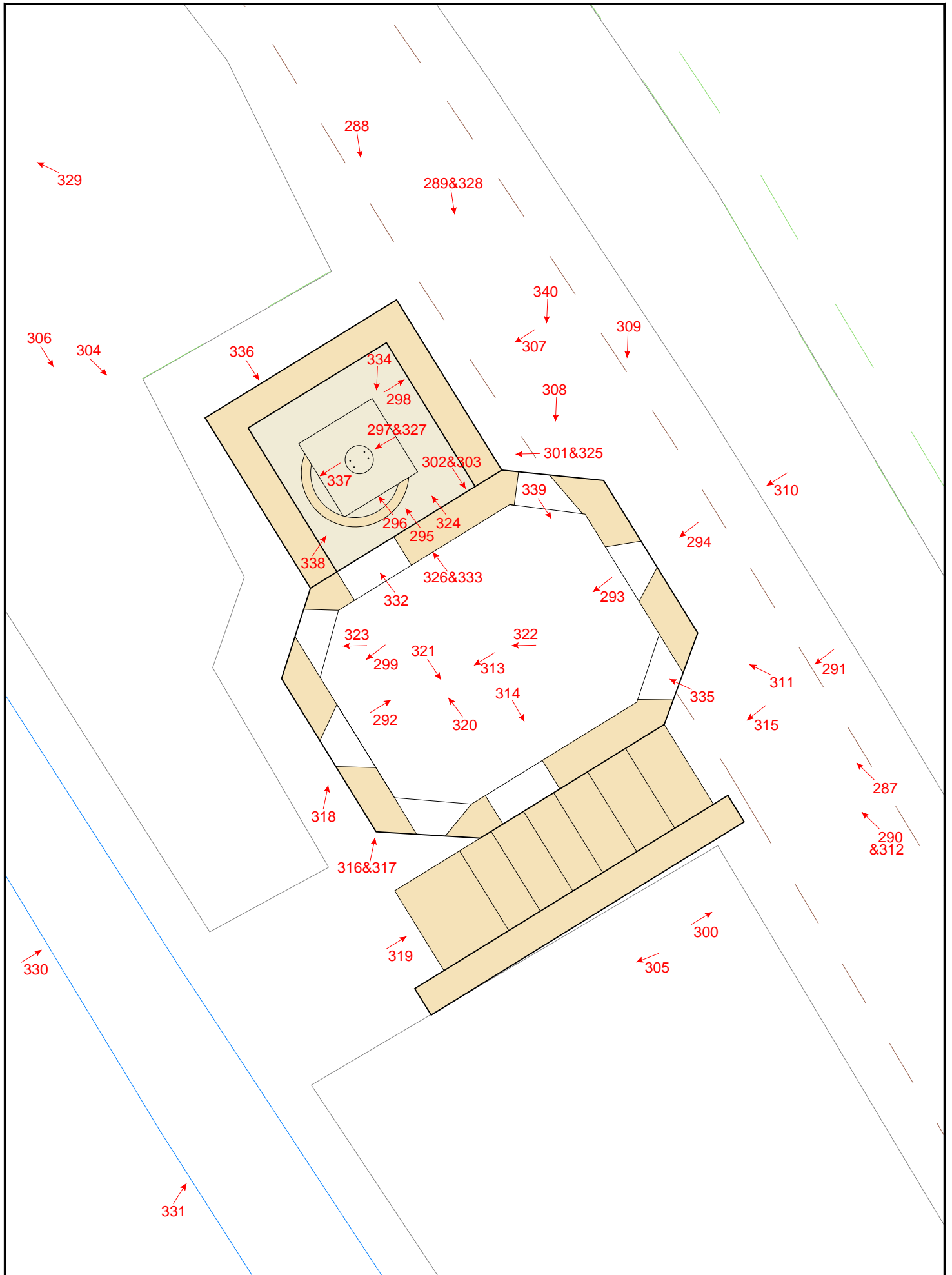
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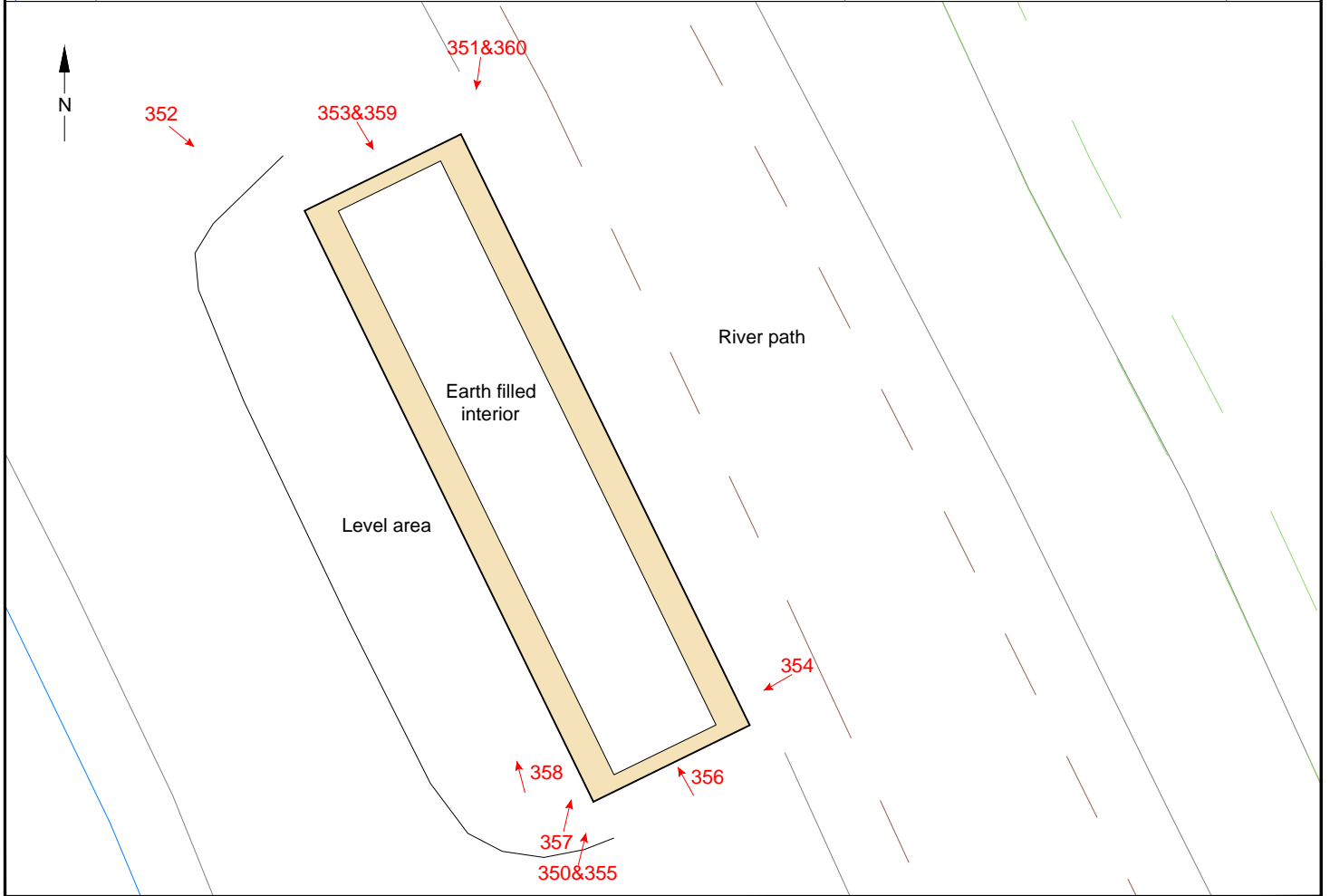
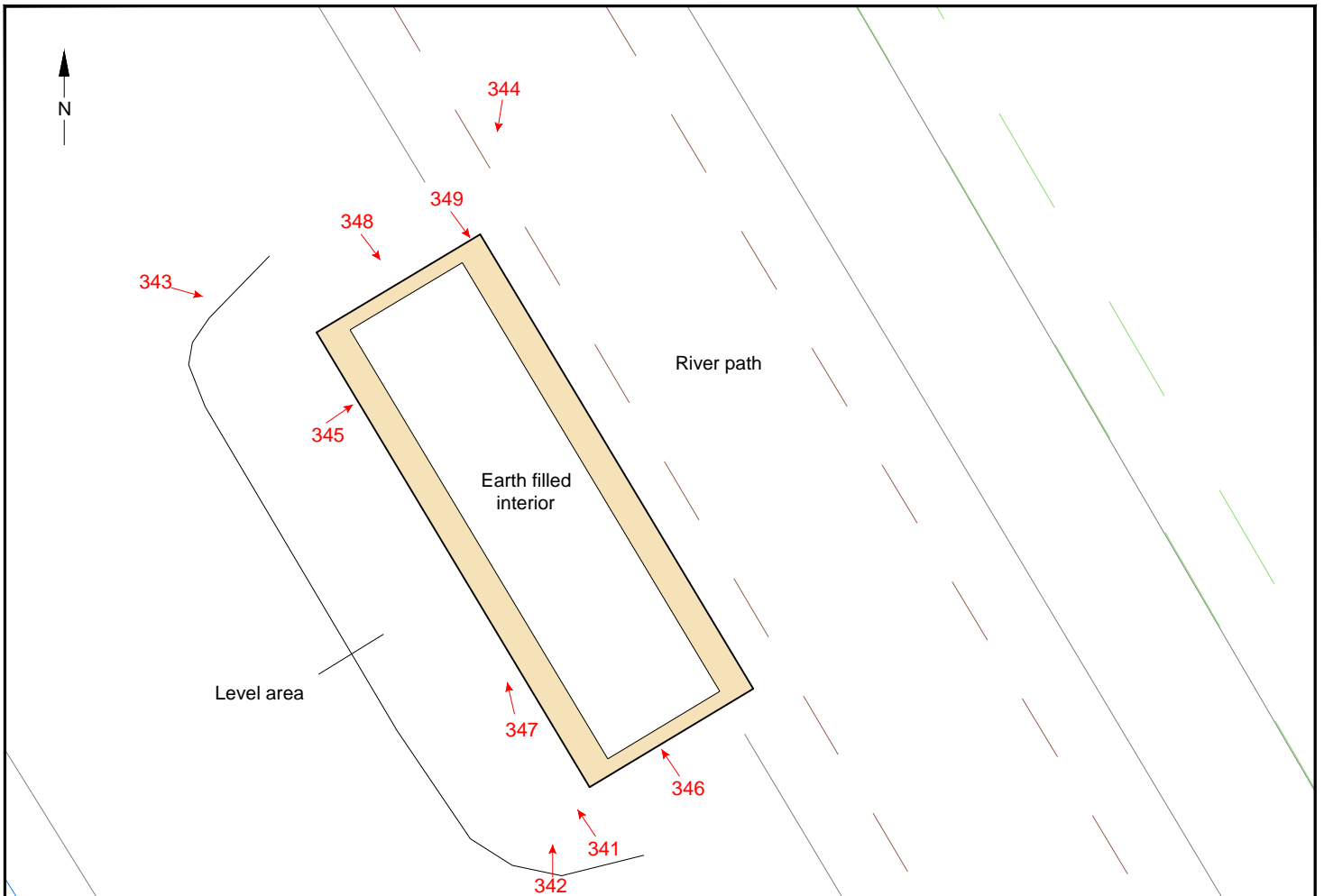




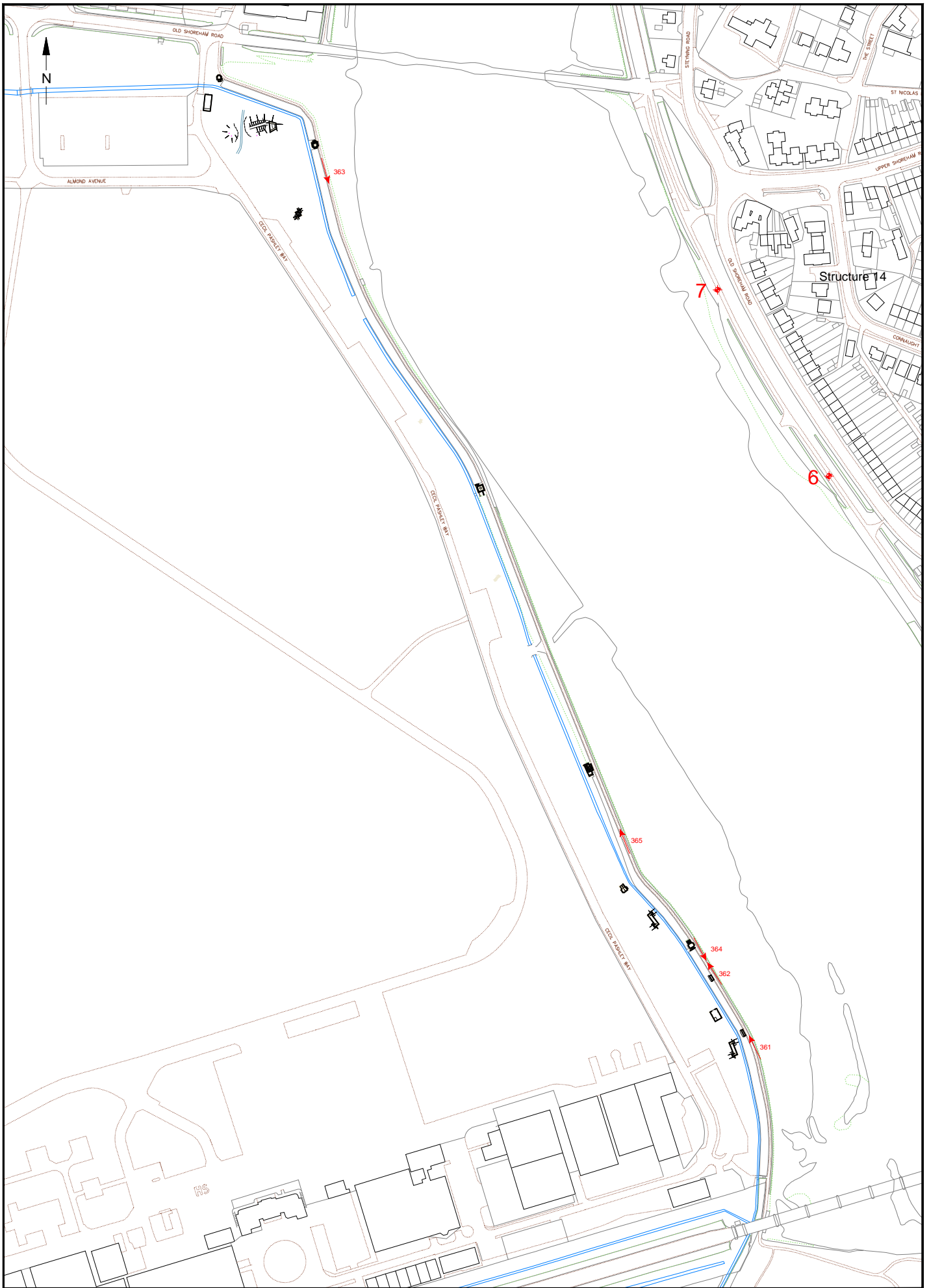
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Project Ref: 160031	Nov 2017	Structures 13 and 14 photograph locations		
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Appendix 3: Finds report

Recovered from within the concrete plinth of the light-anti-aircraft post of Structure 4 was a complete 30-06 (.300 inch) cartridge, un-fired. The headstamp reads 'PETERS 28', indicating it was manufactured by the Peters Cartridge Company in 1928. The bullets' boat-tailed base indicates it is an 'M1' 30-06. In 1926 the US Ordnance office gave out contracts to commercial cartridge manufactures, to allow these companies to gain experience in making cartridges to military specifications, in the event of a future war emergency. Called 'educational contracts' the Remington Arms Company, the Western Cartridge Company, the Winchester Repeating Arms Company and the Peters Cartridge Company took up the offer, with Peters producing cartridges from 1927 to 1928 (Hackley, Woodin and Scranton, 1998). In June 1940, with a German invasion looking imminent, Britain and France purchased 500,000 P17 rifles and 80,000 machine guns from the United States, with millions of rounds of ammunition, all in .300 inch calibre (Clarke, 2016). These weapons were issued to Home Guard units and static defence sites, but not the regular army (who retained British calibre weaponry), to avoid the problem of mixed ammunition within one service. It would seem that amongst the many millions of rounds of ammunition sold to the United Kingdom, a number of 'educational contract' rounds were supplied.



Photo: A. Reis

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