

## Ernest Trobridge, Air Raid Structures Consultant.

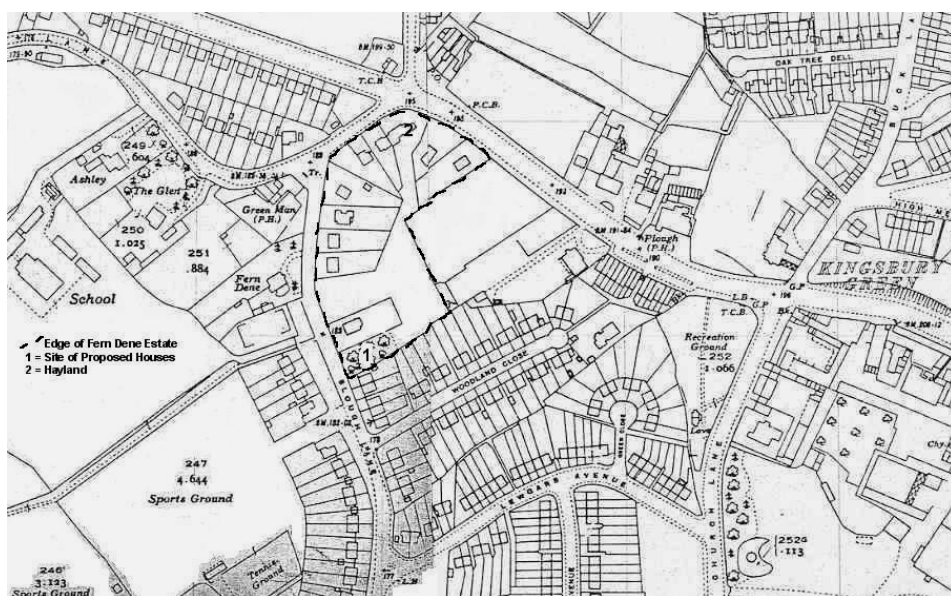
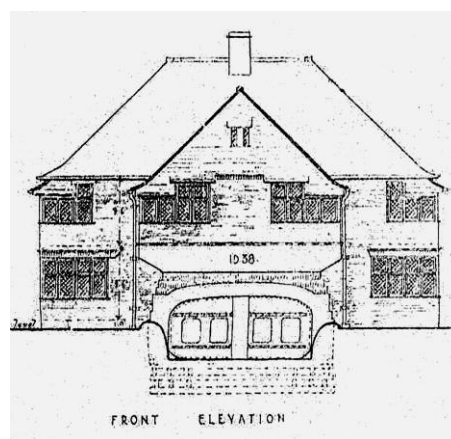
Ernest George Trobridge (1884-1942) is now well known for his elmwood-framed thatched houses and castle-like blocks of flats, built in Kingsbury in the 1920's and 1930's. While looking through planning records at Brent Archives in 2007 as part of my research on the Kingsbury Road area, I came across several applications made by Trobridge in 1938 which included "fortified garages". The designs were not actually built, but the plans show another aspect of this architect's extraordinary work that deserves to be in the public domain.

German re-armament under Adolf Hitler led the British Government to issue advice about Air Raid Precautions as early as 1935. Initially the main threat was thought to be from gas attacks. In April 1937 the German air raid on the city of Guernica (supporting General Franco in the Spanish Civil War), showed that bombing in any forthcoming war was likely to include explosive and fire bombs being dropped on civilian areas. Local authorities in Britain were given responsibility for "A.R.P." in their Districts, and Wembley Council made last minute changes to the plans for its new Town Hall to make the basement into an air raid shelter.

Ernest Trobridge, who in early 1938 had just finished his Mountaire Court block of flats in Highfield Avenue, was a man of strong moral convictions, and his thoughts at this time must have turned to how local people could be protected from air raids. There were still spare building plots on his Fern Dene Estate in Slough Lane, and on 11 February 1938 he submitted two planning applications to Wembley Borough Council. No.13020 was for a detached house with a fortified garage, and No.13021 was for a pair of semi-detached houses with fortified garages.

### Front Elevation detail of the semi-detached homes with fortified garages.

[Source: Brent Archives – Wembley plans microfilm 13021.]



### Map showing the area around the Fern Dene Estate in 1935.

Reproduced from the 1935 edition of the 25 inch to one mile Ordnance Survey map of Middlesex, Sheets XI.5&6.

[Source: Brent Archives – maps collection.]

The minutes of the Council's Planning Committee meeting on 16 February record that the first application was

"disapproved" because the edge of the building would be too close to the site boundary. Trobridge did not pursue this, and the plans were not retained, although it was noted that the fortified shelter would have been for 40 people. Consideration of the second application was adjourned to the next meeting, '... to enable the Town Clerk, the Borough Engineer and Surveyor, and the Air Raid Precautions Officer to report.'

The main plan, taken from the microfilm record of No.13021, shows 'a pair of semi-detached houses ... incorporating the "WAR-DEN" fortified garage, giving protection from 560lb bombs, gas and fire, fitted with 80 internal seats and 12 seats in air lock compartment.' The site for the houses was to be at the southern corner of Trobridge's land, and the air raid shelter was clearly intended for use by many neighbours from the recently built housing in Slough Lane and Woodland Close, as well as for the occupants of the new semi's.

The two four-bedroomed homes were to be built above and around a heavily protected capsule 18ft long by 17ft wide, with a maximum height of 7ft 9ins (approx. 540cm x 510cm x 235cm) and its floor 3ft 10ins (116cm) below ground level. Normally this would provide a garage space, with a separate drive and entrance doors for each house, but in time of war it would be converted into a large air raid shelter. Canvas seats, like upright deckchairs around 17 inches (43cm) wide, would be lowered on frames from the ceiling in eight rows of ten, with seats for twelve more people (presumably brought down from the houses) placed in the lobby inside the garage doors. These would be protected outside by a thick wall of sandbags, so that access to the shelter would be down internal staircases from each house.

According to one of the notes on the plans, the thickness of concrete recommended by the British Cement and Concrete Association to protect from bombs up to 560lb (250Kg) falling from 12,000ft was 60 inches (c. 150cm). His "WAR-DEN" fortified garage had this thickness, and '... to this is added 1'-4" sand course under detonating slab, shock absorbing foundations and safety valve brickwork.' These were the features of Trobridge's air raid shelters that show his unique approach to dealing with design problems.

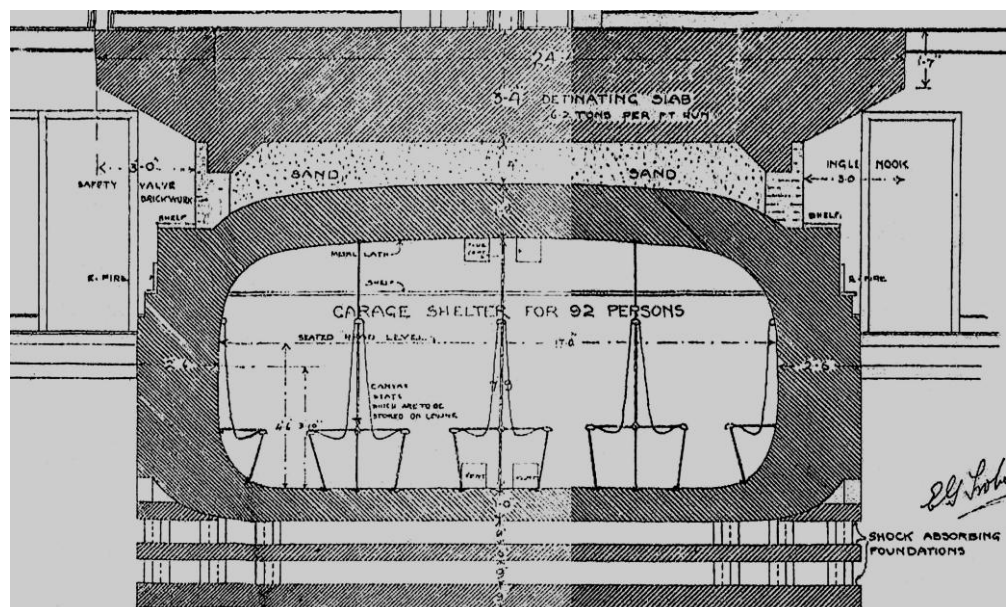
The 'detonating slab', designed to take the full initial impact of an exploding bomb, would be 3ft 4ins (100cm) thick, with its flat top providing much of the first floor surface of the two houses, and its bevelled edge forming the top of an inglenook feature in the ground floor dining rooms. The weight of this alone would be 6.25 tons per foot run. It would rest on a bed of packed sand 1ft 4ins (40cm) deep, which would absorb some of the shock waves from an explosion before these hit the slightly domed, 1ft 8ins (50cm) thick concrete roof of the air raid shelter capsule.

The sand layer would be held in place on all four sides by a 13ins (33cm) thick wall of 'safety valve brickwork'. This would help to support the detonating slab, and provide a decorative feature to the gabled front bay of the two houses. If the slab took a direct hit, the brickwork, built up from the top of the 2ft 6ins (75cm) thick concrete sides of the air raid shelter, would collapse, allowing sand to escape and thus cushion its descent onto the roof of the capsule below.

**Detail from the plans showing the structure of the fortified garages.**

[Source: Brent Archives - Wembley plans microfilm 13021.]

Beneath the concrete floor of the shelter there would be two further rafts of concrete, each separated by 9ins (22.5cm) thickness

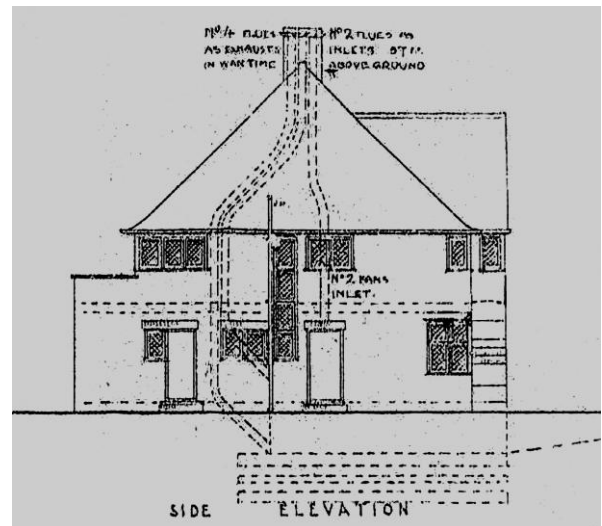


of 'shock absorbing foundations'. No details are shown on the plans of exactly how they were to be constructed, but it appears that the three rows of these round each side may have been of bricks, which again would have given way under a major impact to give a cushioning effect. As no specific material is indicated for the rest of the space between the concrete layers, I assume that it was intended to be the natural clay earth of the area.

The foundations were the main feature of the design which caused concern to the Borough Engineer, Cecil S. Trapp. He wrote to the architect after the committee meeting in February, suggesting that he call to discuss his proposals with the Chief Building Inspector, as the plans did not show full details of these. Trobridge replied on 10 March, submitting more detailed plans (Drawing No.9, which unfortunately was not microfilmed) which reduced the capacity of the shelter to 80 people after discussions with the Council's A.R.P. Officer.

Mr Trapp was still not happy with the structural details, particularly as the detonating slab would be carrying the weight of most of the party wall and the roof which this helped to support. Trobridge sent in his calculations with a letter of 11 April, which concluded: 'I trust you will find that there is adequate support.' The Borough Engineer sent them for checking, and on 10 May he received a report from Felix Milner, M.I.Struct.E., of 68 Victoria Street, S.W.1. with his '...proposed amended lay out of steel reinforcement in the detonating slab.' Trobridge accepted the proposals, and his application was finally approved on 18 May 1938.

Another feature that Trobridge included in his design of the shelter was a ventilation system. Built into the substantial chimney stack were two flue inlets, 37ft (1110cm) above ground level, each with a built-in fan which would deliver fresh air through vents at the shelter's floor level. Higher up the walls of the shelter would be exhaust vents, linked to four flues that would take smoke from the fireplaces in the two houses in normal times. This system would not have helped the people in the shelter if the houses had taken a direct hit from a bomb which destroyed the chimney, but in the case of a gas attack it would have been a life saver!



**Side elevation drawing showing the ventilation system for the air raid shelter.**

[Source: Brent Archives - Wembley plans microfilm 13021.]

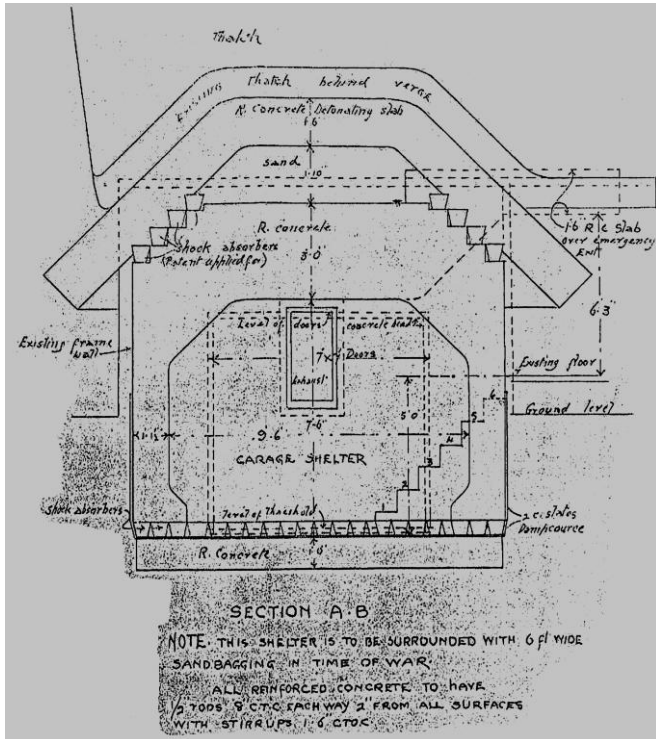
The excavation and materials for the fortified garage (which Trobridge reckoned would weigh 12 tons per foot run) would obviously add greatly to the cost of building the two houses. He calculated that the extra capital cost would be £800, but he had also considered how this could be funded. A number of his building schemes had involved some sort of co-operative system, and the plans include a note about finance which shows that he was thinking along the same lines for this project. The owners of the houses and local people who wanted the security of knowing that they could use the shelter in time of war would be asked to commit to paying a yearly rent per seat, for a period of twenty years.

DATA AS TO FINANCE. COST OF FIRST 20 YRS OF LIFE £800. CAPITAL COST OF PROTECTING SAME BY "WARDEN" SHELTER, APPROX. £9. INTEREST AND SINKING FUND AT 5% = 9 SHILLINGS PER ANNUM. SHARE OF RENT OF GARAGE & SEAT FEE = 13/9 SUGGEST A.R.P. AUTH, 3% INT. LOANS WITH 2% REPAYMENTS SECURED ON INCOME.

**Trobridge's finance calculations, as shown on the plans.**

[Source: Brent Archives - Wembley plans microfilm 13021.]

Trobridge hoped he could borrow the £800 from the local authority at a fixed interest rate of 3%, which would make the rent for each of the 92 seats around thirteen shillings and nine pence a year. With the number of seats reduced to 80, this would have risen to nearly sixteen shillings. It was not until late in 1939 that the Civil Defence Act of that year allowed Councils to lend money to local householders on ten year mortgages to finance the cost of building private air raid shelters, and then at interest rates of over 4%. The difficulties in arranging a loan, and the problem of organising enough people willing to rent a seat in the shelter, may well have been the reasons why these two houses were not built.



In May 1938 Ernest Trobridge submitted application No. 13311, this time to add a fortified garage to his own home, "Hayland", at the corner of Kingsbury Road and Slough Lane, which would provide an air raid shelter for his own family and neighbours. The shelter was for forty people, and included some design improvements from the fortified garage of three months earlier. This time the concrete would be reinforced with 1/2in (1.25cm) steel bars at 8in (20cm) centres. The detonating slab would only be 1ft 6ins (45cm) thick, shaped (and thatched!) to match the existing house, while the roof of the main shelter capsule would be 3ft (90cm) thick.

**Detail showing a section through the proposed fortified garage at "Hayland".**

[Source: Brent Archives - Wembley plans microfilm 13311.]

In between the two protective concrete layers, holding in a layer of sand up to 1ft 10ins (55cm) thick, and between the floor of the shelter and a further 1ft (30cm) thick reinforced concrete slab below, would be a new design of shock absorbers, shaped like flower pots, 6ins (15cm) high. These are noted on the plan as 'Patent applied for', but no details are given. The weekly editions of the Official Journal of the Patent Office for January to June 1938 inclusive contain no applications from Trobridge, and no patent was ever granted to him for this, but it is possible that the War Office decided to keep any such design secret.

This application was also approved by the Planning Committee on 18 May 1938, but like the pair of semi-detached houses with fortified garages in Slough Lane, the air raid shelter at "Hayland" was never built. The plan for it, however, shows how Trobridge would like to be remembered for this side of his work:

**Detail from the bottom right-hand corner of the "Hayland" fortified garage plan.**

[Source: Brent Archives - Wembley plans microfilm 13311.]

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 REC. ARCHT. & AIR RAID STRUCTURES  
 CONSULTANT.  
 HAYLAND KINGSBURY N.W.9.  
 MAY 1938.

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