

CHAPTER 17 THE ELECTRIC TARGET RANGE

INTRODUCTION

1701. **General.** The Electric Target Range (ETR) has a main firing point and three rows of electrically operated targets at 100, 200 and 300 m from the main firing point. Three further firing points are provided at 100 m intervals behind the main firing point (400, 500 and 600 m). On ranges where there is insufficient land behind the main firing point, the 400m target line may be inserted in front of the main firing point. Target mechanisms are FET (see Chapter 29). A separate Grouping and Zeroing range (G&Z) is normally provided but there is no practical reason why grouping, zeroing and elementary application of fire can not be carried out on a ETR fitted with AMS. A typical ETR is illustrated in Figure 17-1.



1702. **Aim.** This chapter describes the design and construction of a standard ETR. In particular it covers:

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1703. **Purpose.** The ETR is designed for a fast throughput of troops firing most types of SA and being trained in the advanced application of fire required by Stages 2-4 of Reference C (Army Operational Shooting).

However if the range is fitted with AMS, this enables grouping, zeroing and elementary application of fire to be practised.

DANGER AREAS

1704. **Range Danger Area.** The RDA template for an ETR is shown in Figure 17-2. The area is based on the WDA template for 7.62mm and 5.56mm centrefire rifle ammunition and is applied from all firing points.

1705. **Hard Surfaces, Hard Targets.** Where hard surfaces exist or when hard targets are engaged, the hard target template wings are to be applied (see figure 19-2).

1706. **Use of Pistol on ETR Ranges.** Where pistols are fired on standard ETR ranges the pistol template (135 mils) falls beyond the standard ETR template on the left and right flank. Advice from TAS should be sought.

DESIGN

1707. **Design.** Design and construction details are available from TAS(RE). The range layout is shown in outline in Figure 17-1.

1708. **Siting.** The site selected for an ETR should be as flat as possible to reduce the requirement for earthworks to a minimum. The LofF is to be close to horizontal as the range design is based on a QE restriction of 150 mils. A slightly concave site with the lowest point between the main firing point and the 400 m firing point is advantageous. A northerly direction of fire will provide the best light for day-time shooting. However, local population density should not be forgotten and, where possible, the range should be orientated accordingly. The range floor is to be well drained with streams or drainage ditches being routed through culverts to allow the safe movement of troops down the range.

1709. **Co-located Grouping & Zeroing Range.** A G&Z range ideally should be co-located adjacent to a ETR. When space restrictions allow no alternative, the G&Z range may be superimposed on the ETR as shown in Figure 17-3. However, the G&Z range must not be used when firing takes place from the rear of the main ETR firing point.

CONSTRUCTION

GENERAL

1710. **Principle.** As all ETR are FDA ranges, there is no need for a stop butt to capture shot or ricochet off the range floor.

1711. **Dimensions.** The range with its RDA will occupy a substantial part of a training area. The total length of 3325 m with an average width of 1132 m covers an area of 3,763,900 m² (376 hectares or 930 acres).

TARGET END

1712. **Mantlets.** Where Fixed Electric Targets (FET) are ground mounted protective mantlets are required. The mantlets must be fully compacted to prevent settlement and exposure of FET. The mantlet is between 300 and 500 mm high, and may be individual to each FET or continuous across the width of the range. It is desirable (current FET systems may not achieve full visibility) that the whole target is visible to the firer in the prone posture and

that no part of the target mechanism is visible to the firer standing at any point of engagement. The surface is to be grassed to make it stable and prevent erosion or stabilised with low maintenance materials that help stem attrition. A crest board of 150 x 25 mm timber set into each mantlet will assist in retaining the profile.

1713. **Targetry.**

a. **Fixed Electric Target Equipment.** FET in their coffins are positioned one per lane at the 100, 200 and 300 m target lines and each is protected by a mantlet (see Figure 17-4) or cut into the ground. They are positioned in each lane so that the targets at 100 and 300 m are on the lane centre line. The targets at 200 m are off-set 2 m to the left of the lane centre line to aid visibility. The whole target should be visible to the firer from the prone posture and no part of the target mechanism is to be visible to the firer standing at any point of engagement.

b. **Access.** An access path wide enough for an FET trolley is built to the rear of the FET pits. An area on each side of the coffin is levelled and surfaced with gravel to give access to the equipment and space for the mild steel coffin lids to open below the LofF.

c. **Targets.** Figure targets, FET and AMS are described in Chapter 29. The most commonly used targets on an ETR are aluminium or plastic Figures 11 and 12. Plywood veneers and target facings are used for 9 mm and sub-calibre ammunition. Representative targets may be produced locally using plywood veneers and various facings. Such targetry must be light, have low wind resistance and be no larger than the Figure 11 target in triple form.

RANGE FLOOR

1714. **Ease of Movement.** The range floor between the main firing point and the 100 m target line must allow safe fire and movement. The closest engagement distance is 25 m forward of the 100 m target line enabling firers to engage the 200 m targets from 75 m. Firing from this position, 125m in front of the main firing point, is the limit of advance permitted, as the RDA template is applied from this point (Figure 17-2). This 125 m limit must be clearly identified. It is essential that no part of the target mechanism is exposed to strike from any firing position.

1715. **Range Steps.** A cross-fall on the range floor may require steps to be constructed between lanes. The width of each step is additional to the lane width and will increase the overall range width.

1716. **Lane Marking.** To ensure that firers engage the correct target and avoid cross-lane shooting, timber lane marker posts are positioned on the flank of each firing lane forward of the 100 and 200 m target lines and on the crest of the 400 and 500 m firing points. They are normally painted with black and white bands. However, the topography of some ranges may confuse firers in identifying their targets as the black and white poles have caused disorientation. Trials indicate that posts painted in one colour and of different heights on either side of the lanes reduce the problem. A system of tall red posts and short black posts appears to be the best and are to be the standard

marker posts which will replace the present black and white posts when refurbishment is undertaken.

1717. **Distance Indicators.** Timber markers are suitably positioned to show the firing distance of each firing point.

CONTROL BUILDING

1718. **Purpose and Location.** On existing ranges the control building is positioned centrally 8 m behind the main firing point. On new ranges it is to be positioned on one flank (see Figure 17-1) or to the rear of the range. Down range the building provides protection to the personnel in it, and houses the range control and communication systems to activate the targetry and record the number of hits. The control building is an operations room that should be sized to accommodate the personnel essential to control and operate the equipment. Ranges equipped with AMS may require a revised layout to provide secure storage facilities and additional environmental controls.

1719. **Construction.** The control building walls may be constructed of concrete, solid block or brick down range and from any material when sited at the back of the range. The walls exposed to strike must provide ballistic protection and prevent damp entering where earth banks are used. The protected walls will also need to be designed to withstand lateral pressures where earth or sand banks are used. The back wall facing 400 - 600m firing points is constructed to withstand bullet penetration (See Chapter 2). The rear of the building must be faced so that firers during fire and movement practices are not exposed to the risk of backsplash (Note. 7.62 mm tracer may backsplash 125m from large sand banks with 34 degree slopes but is contained in earth banks of 34 deg or more). If earth or sand banks are not used, anti-splash protection is provided with 50 mm timber boarding on 50 mm timber battens set vertically to cover the walls exposed to strike. The timber protection is to be off set to allow inspection of the protected walls for shot damage or fixed in such a way to allow inspection of the wall. The building has a raised floor to give the equipment operators a clear view of targets over the heads of personnel on the firing point. The building should be weather tight and vandal-proof.

1720. **Installations.** An automatic target system may be installed to automate practices. Space should also be allowed for AMS control and recording equipment. For night firing, warning and night visibility internal lighting will be required.

1721. **Warning Flags and Lights.** A flag pole made of timber, hollow aluminium or non-ricochet inducing composite material is fixed to the control building at the furthest point from the access door. This pole is for hoisting a 1.8 m² red range in use flag that is clearly visible to those approaching the range. A shorter flag pole is also provided to protect personnel in the control building in a similar way to that used on a mantlet for a butt party. This flag pole made of the same material as the main pole is fixed outside the access door. A red light operated from the control building is fitted to the top of both flag poles for night firing.

FIRING POINTS

1722. **Main Firing Point.** The main firing point of a standard range has 12 firing positions, each of which is provided with a fire trench, firing post and a surfaced area. The surface is normally constructed with 10 mm single sized rounded gravel chippings boxed in with timber to retain the chippings. Firing points may also be constructed with any low maintenance surface providing it will not present a hard ricochet surface.

1723. **Other Firing Points.** The 400 to 600m firing points are grassed earth banks high enough for the prone firer to see the whole target at all three engagement distances. Additional firing points are provided 50m forward of the main firing point marked on the range floor with lane distance markers. See Figure 17-1.

1724. **Alignment.** The centre line of each firing lane is parallel to the main axis of the range. If any firing point has to be built-off centre, the DA will be increased.

1725. **Fire Trenches.** Fire trenches may be timber revetted or pre-cast concrete sections with the top 225 mm in timber. Provision should be made for drainage. In areas of high water table it may not be possible to provide fire trenches. The forward edge of the trench is set back 450 mm from the crest board to ensure that the muzzle of a rifle clears the crest. Consideration should be given to providing covers to pits, especially if the public has access.

1726. **Firing Posts.** These are 100 mm square timber posts 1.6 m long set into timber sockets 400 mm deep. The posts are removable so that firing may take place from other firing points. A cover is normally provided to put into the socket to keep out debris.

ELECTRICITY SUPPLY

1727. **Electricity Supply.** The provision of a reliable electricity supply is essential (a generator seldom proves satisfactory). The power requirement to successfully use a range will vary with circumstances but, as a guide, 50 kVA TP&N is generally satisfactory. In addition to electricity for target mechanisms and control circuits, power should be provided to heat and light:

- a. Control building and systems.
- b. Range Wardens' workshop.
- c. Target store.
- d. Troop shelter and toilets.
- e. Night firing warning lamps.

1728. **Fixed Electric Targets.** Power supply to FET should be switched and circuit protected. The switch should be a lockable isolator switch to prevent others accidentally turning on the power while work on the FETs is undertaken.

COMMUNICATIONS

1729. **External.** A means of summoning the emergency services, ideally a land laid telephone, is to be available.

1730. **Internal.** A telephone system is required to connect the control building to the:

- a. RCO at the 400, 500 and 600 m firing points.
- b. Troop shelter.
- c. Target line for testing and maintaining target mechanisms.

1731. **Public Address System.** A PA system is required with a microphone in the control building and a wandering microphone for use outside by the RCO. A microphone connection point may be required at each firing point. Loudspeakers are to be fitted to the control building and at each end of the main firing point. If the control building is on a flank, the location of installations may need to be reviewed.

MAINTENANCE

1732. **Responsibilities.** The maintenance commitment on a ETR is not as demanding as ranges with a stop butt. However, mantlets protecting target mechanisms must be carefully maintained, and FET will require checking and changing (a two man lift). General maintenance of the range is the responsibility of the RAU and may be divided as follows:

- a. **Range Warden.** See Reference A1.
- b. **Property Management.**
 - (1) Grounds.
 - (2) Fencing and sign posting. (See Chapter 2.)
 - (3) Structures, roads and drainage including stability of slopes and erosion control.
 - (4) Water and electricity supplies.
 - (5) Periodic refurbishment of the range structure.
- c. **Equipment Management.** Repairing and servicing equipment installed by single Service contract.

1733. **Frequency.** Proper maintenance is dependent upon good liaison between the Range Warden and the RAU, and on properly scheduled maintenance periods. A heavily used range may need one day's maintenance each week plus one or two days' maintenance by the Range Warden each month. Two closed periods of a week or so may be needed each year for building and earthworks repair; this work should be combined with the contract repair of equipment.

COMPLIANCE CHECKS

1734. The following should be checked

- a. Authorised weapons, ammunition and practices.
- b. Firing point type, dimensions, construction, lane identification, alignment and profiles.
- c. Full exposure of targets from all firing points, spacing of targets.
- d. Protection to coffins and minimum clearance over coffin.
- e. 200m target line offset and limit of advance identification.
- f. Positioning, alignment and protection to control building.
- g. Quadrant Elevation (150mils).
- h. Template alignment.

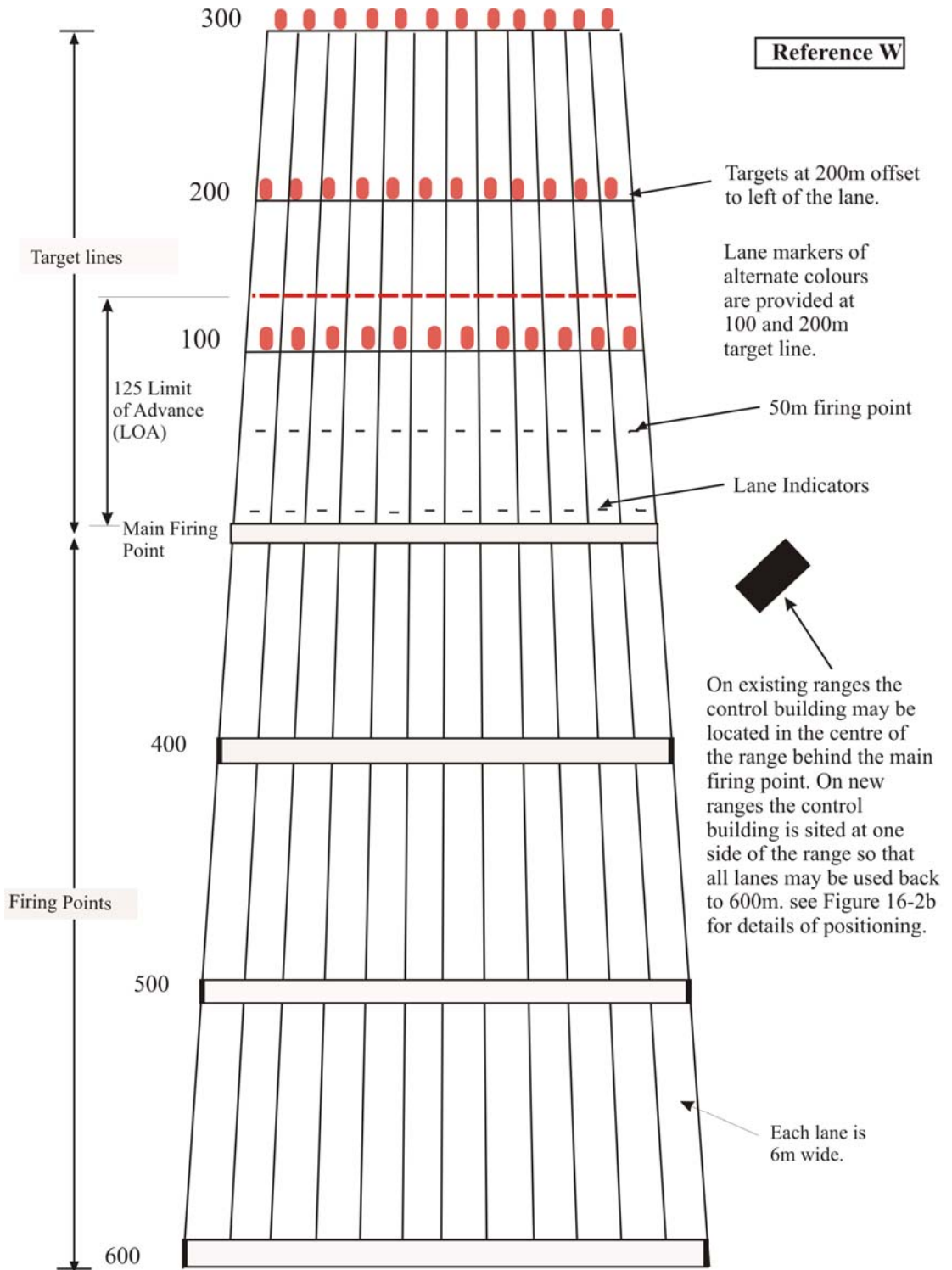
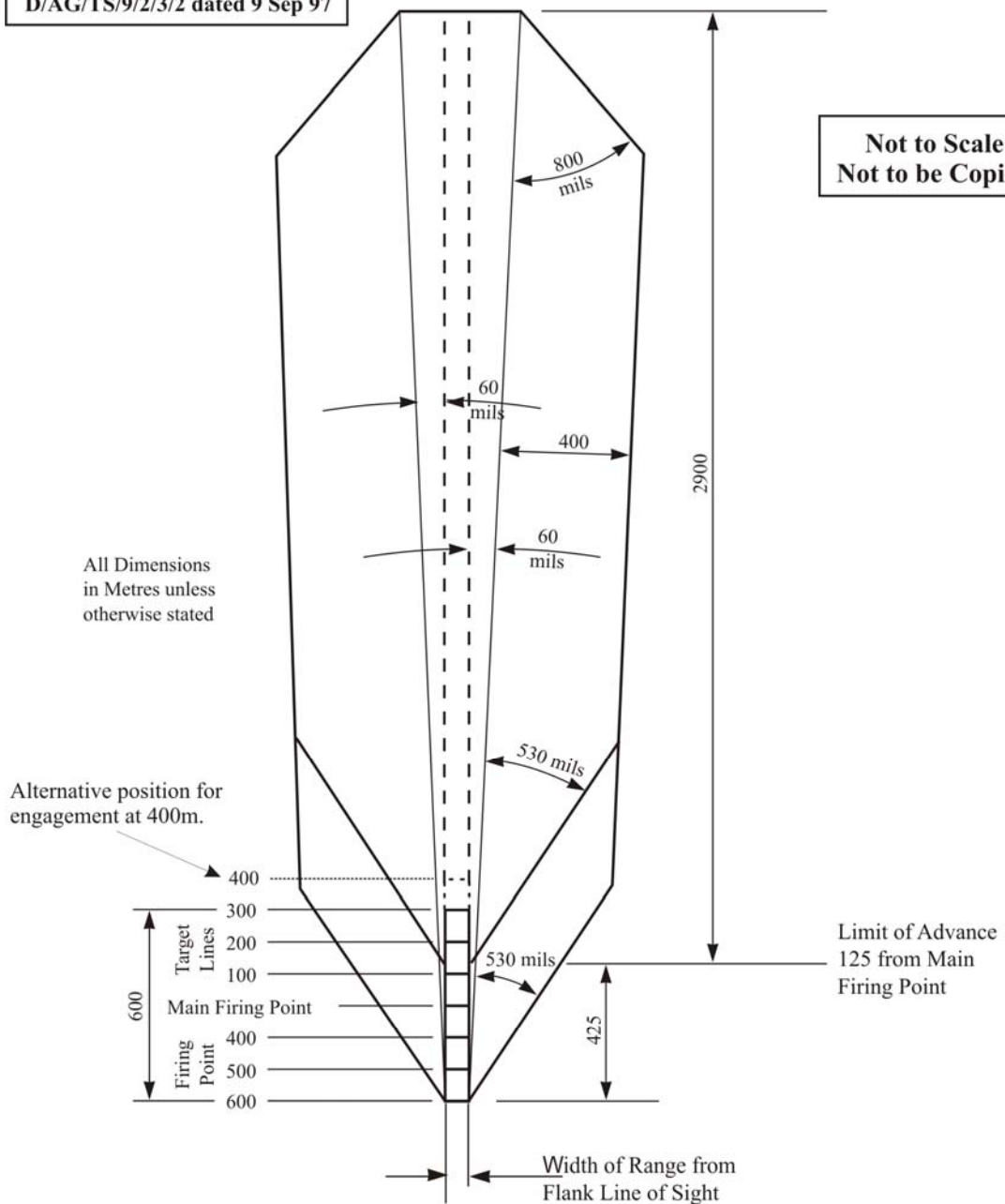


Figure 17-1. Layout ETR

Reference: OB PROC 42985
 D/AG/TS/9/2/3/2 dated 9 Sep 97

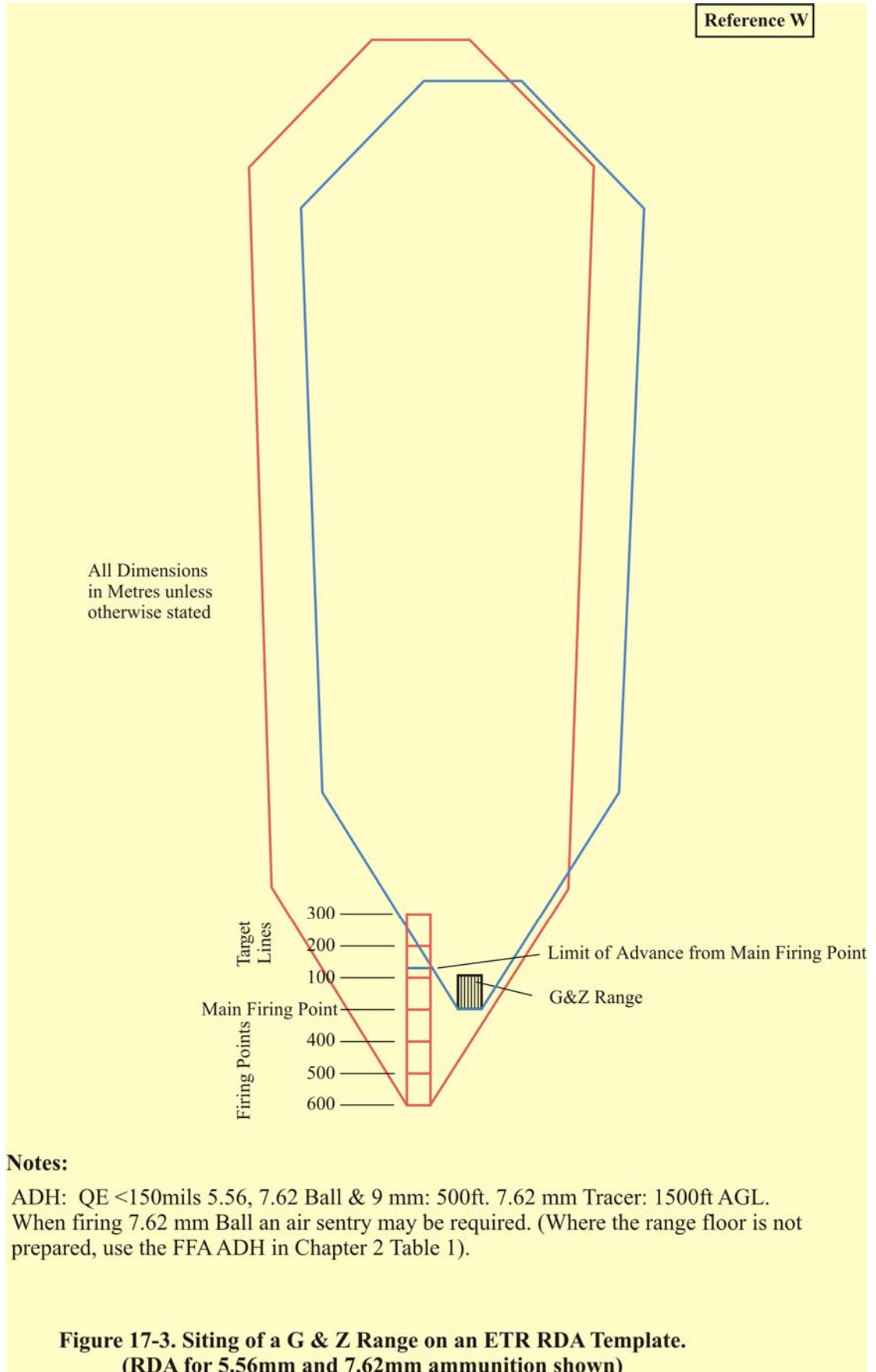
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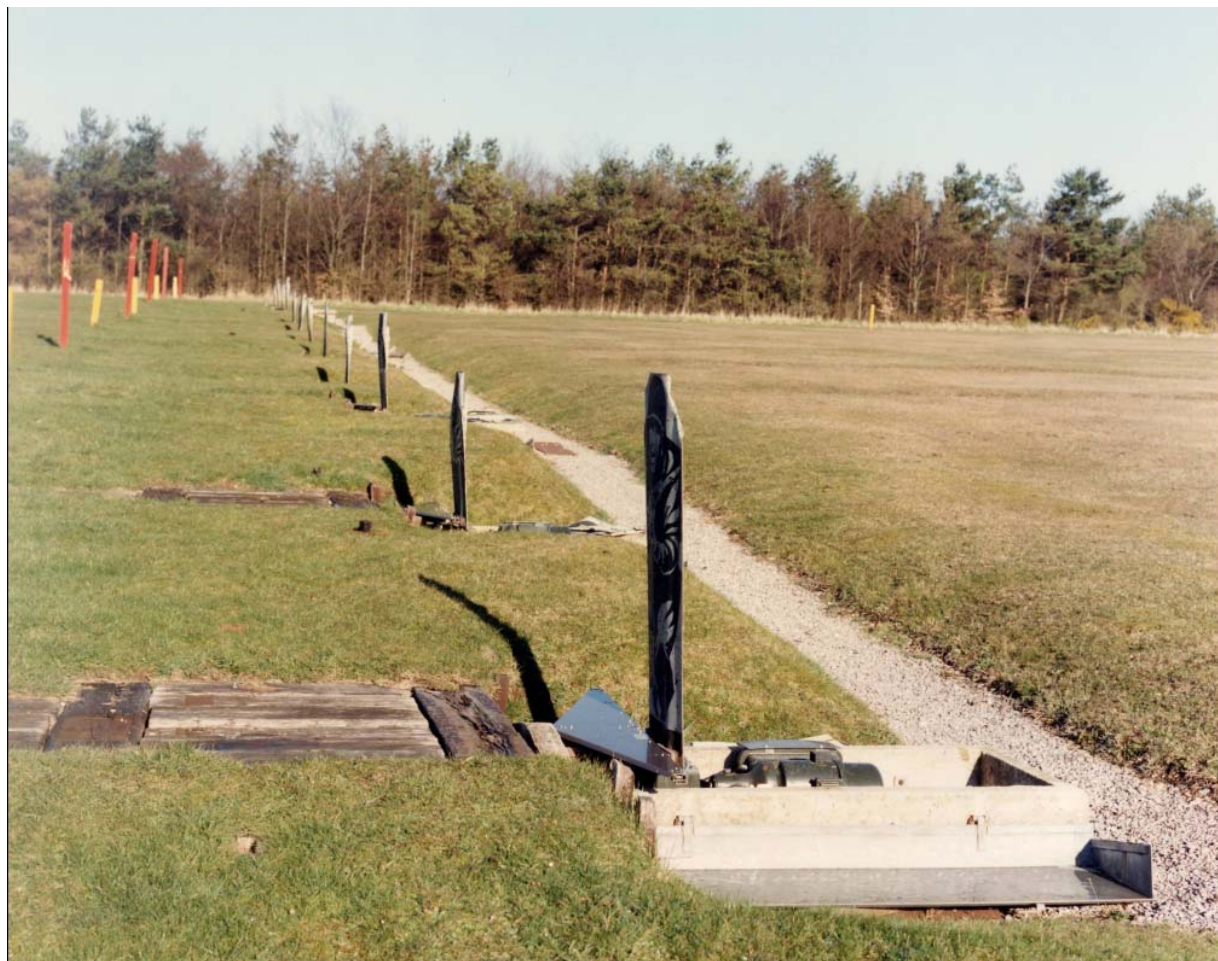


Notes;

1. ADH: 5.56mm and 9mm: 500ft, 7.62mm Ball 750ft, 7.62mm Tracer 1500ft.
 (For ranges where range floor is not shaped use FFA ADH detail in Chapter 2 Table 1.)
2. When firing 7.62mm Ball an air sentry may be required.
3. See paragraph 1708 and Reference B (Pamphlet 21) for pistol use.
4. Where unprotected hard surfaces exist on the range floor within the Coff, hard template wings are to be applied (see Figure 19-2).
5. The Template is asymmetrical due to the 200m target line offset.

**Figure 17 - 2. RDA Template, QE <150mils - ETR
 (RDA for 5.56mm and 7.62mm Service ammunition shown)**





Warminster



Sennelager

Figure 17-5. Typical Target Mechanisms set below ground level to avoid mantlet attrition.