New Zealand Police

Shooting Range Manual

Principles for the safe planning design, construction and operation of shooting ranges

V1.1 24 June 2022

EXPOSURE DRAFT

NEW ZEALAND POLICE
Ngā Pirihimana o Aotearoa

EXPOSURE DRAFT

Design by icondesign.co.nz

Exposure draft

The Arms Legislation Act (new sections came into force on 24 June 2022) provides for the establishment of a regulatory regime for shooting clubs and shooting ranges within the Arms Act.

The Act defines both shooting clubs and shooting ranges.

The provisions are contained in:

- new sections 38A – 38X,
- transitional provisions are to be found in new Clauses 12 and 13 of New Part 2 of Schedule 1, and
- Arms Act sections in force – Regulations making powers to be found in amended sections 74(1)(b) and 74(1)(e) and new sections 74(1)(gb), (gc) and (gd).

Consultation on proposed Regulations as provided for in section 74 as listed above is planned for 2022.

The purpose of releasing this 'exposure draft' is to provide an updated draft New Zealand Police Shooting Range Manual to support the regulatory regime which came into force on 24 June 2022. Content in this exposure draft is subject to further consultation. As such, all wording within this document should be considered draft, and some items referred to, such as application forms, may not be available yet.

This exposure draft has been prepared in advance of the relevant parts of the Act coming into force to assist those:

- operating a current range not previously certified by the Commissioner of Police to plan for making application to have their respective shooting ranges certified,
- wishing to design a new shooting range, and
- wishing to be trained as a Shooting Range Inspector recognised by New Zealand Police.

It has been developed in consultation with representatives from several national shooting disciplines.

An updated New Zealand Police Shooting Range Manual (which will be periodically updated as needed) is available on the New Zealand Police website.

EXPOSURE DRAFT

Table of Contents

GLOSSARY

Active range area	This term is used to describe the area in which the shooting activity is conducted and includes the danger area applied to the range.
Angle of departure (Quadrant elevation)	The angle formed between a horizontal line and the centreline of the bore at the moment the projectile leaves the muzzle of the firearm. Angle of departure is also known as Quadrant Elevation (QE) and is used in the design of an ammunition danger area template.
Azimuth	The horizontal angle of direction of a compass bearing.
Bearing	The angle between a line and the fixed zero line measured clockwise. Unless otherwise stated the zero line is north, a bearing may be a true bearing measured from a magnetic bearing from magnetic north or a grid bearing measured from grid north.
Calibre	The internal diameter or bore of a gun barrel.
Contour	An imaginary line on the surface of the ground at the same height above mean sea level (AMSL) throughout its length. Contour lines are drawn on maps to show the shape of the ground.
Deterministic safety analysis	Is a traditional approach for the development of a ammunition danger area. It requires the calculation of a combination of worst-case factors to create a generic danger area. The ammunition danger area is applied from every firing position to every target position to calculate the overall range danger area.
G.P.S.	Global position systems are receivers that obtain signals from satellites and resection these signals to give you a fix on your position.
Grid north	Except through the origin, grid lines do not lie true north, south, east or west. Grid north is the direction of the North and South grid lines on a map.
Latitude	The north/south measurement of position perpendicular to the earth's polar axis that passes through the north and south poles.
Limited use shooting range	A shooting range constructed and/or designed for a specific purpose which does not require permanent infrastructure.
Longitude	An east/west measurement of position in relation to the Prime Meridian, an imaginary circle.
Low velocity	Less than 2000 feet per second (fps).
Magnetic north	The point in the north pole to which a compass needle points.
NZTM GR	New Zealand Transverse Mercator Grid Reference mapping system.
Officer on Duty (OD)/Range Officer (RO)	A person who holds a firearms licence and is trained in shooting range safety management.
Orienting a map/ Setting a map	Placing it so that its north line points to magnetic or grid north. Also used for air photographs.
Plotting	The process of transferring field observations and measurements to a map or sketch.
Probabilistic safety analysis	Requires the collection and input of data within a probabilistic safety analysis software program recognised by Police. Danger areas calculated are specific to a range and may be smaller than those generated by deterministic safety analysis.
Range axis (Direction of fire)	Is the primary angle from which all range design and geometry is derived from.
Shooting Range Inspector	A person trained as a Shooting Range Inspector and recognised by Police.
Total energy range (of the ammunition)	The maximum range a projectile will travel in a particular direction without restriction.

EXPOSURE DRAFT

ABBREVIATIONS

ADH	Air Danger Height
ADAT	Ammunition Danger Area Template
CAA	Civil Aviation Authority
CofF	Cone of Fire
deg	Degrees
FPI	First Point of Impact
FDA	Full Danger Area
GB	Grid Bearing
GR	Grid Reference
h/w	Hard Wood
Max	Maximum
mils	NATO mils (angle of military measurement)
mrad	Milliradians
NDA	No Danger Area
OD	Officer on Duty
RCEG	Range Certification Engagement Group
SRI	Shooting Range Inspector
SRO	Shooting Range Operator
QE	Quadrant Elevation
RDA	Reduced Danger Area
RO	Range Officer
RSOs	Range Standing Orders
SME	Subject Matter Expert
s/w	Soft Wood
TA	Territorial Authority
TCH	Target Centre Height

TABLES

EXPOSURE DRAFT

Section 1

Section 1

Preface

Exposure draft

1.1 Refer to the Exposure Draft section on page 3 for information on the purpose and interpretation of this document.

Safe design and construction of a shooting range

1.2 Those wishing to design and develop a new shooting range, or to confirm that their shooting range meets the minimum acceptable requirement, are advised to read this manual and seek advice from relevant national shooting organisations of the shooting discipline they wish to participate in. A process flowchart providing guidance on establishing and/or developing a shooting range is included in Appendix 1. Where this manual does not cover the detail you require, it is recommended that you contact Arms Safety and Control, Police National Headquarters.

Minimum acceptable requirement

1.3 The minimum acceptable requirement of any range is to contain the Cone of Fire plus any degree of predictable error considered necessary. If this cannot be contained within the active range area then a danger area beyond the backstop is required, the dimensions of which will be determined by the ammunition used, the angle of departure (QE), the maximum ricochet distance and topography. In order to achieve this, range construction and design must meet the criteria laid down throughout this manual.

Source documents

1.4 This Range Manual is based on international best practice to maintain consistency with professional subject matter experts and the best available research.

Guidelines from this best practice have been used to determine the design and development of shooting ranges within New Zealand.

Examples of international best practice for range design and development are:

- Ministry of Defence: Defence Safety Authority, Defence Ordinance Munitions & Explosives Safety Regulator. (2020) *DSA 03.OME, Part 3, Volume 2 – Defence Code of Practice and Guidance Notes for Ranges.* United Kingdom,
- Royal Canadian Mounted Police. (2007) *Range Design and Construction Guidelines.* The Canadian Firearms Centre, Canada, 2007.

Acknowledgements

1.5 New Zealand Police (Police) wishes to recognise Pistol New Zealand, New Zealand Defence Force (NZDF) and the Range Certification Engagement Group (listed in the Appendices) for their contribution in the production of this manual, noting that the provisions of the Arms Act that apply to civilian ranges do not apply to NZDF. The provisions of the Arms Act do apply to civilian clubs who use NZDF ranges.

1.6 Topographic maps used throughout this manual have been sourced from the Land Information New Zealand Data Service licensed for reuse under CC BY 4.0. There is more information available on their website: https://www.linz.govt.nz/data/licensing-and-using-data.

1.7 Relevant parts of this document have been externally reviewed by Weapons and Range Safety Branch New Zealand Army, and by Mr Frank Compton (Maj Retd) MBE, Range Safety Advisor and international subject matter expert.

PGR Baird
Inspector
Arms Safety and Control

Approval:
This version of the New Zealand Police Shooting Range Manual dated the 3rd of March 2022 is approved by:

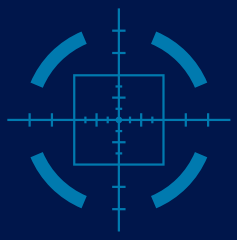
MJD McIlraith
Superintendent
Director Firearms
Police National Headquarters
Wellington

EXPOSURE DRAFT

Section 2

Section 2

Introduction



Background

2.1 This exposure draft of the New Zealand Police Shooting Range Manual, once finalised, is intended to replace all pre-existing range manuals for civilian shooting ranges produced by Police.

2.2 The purpose of this manual is to provide the New Zealand sport and target shooting community and members of the New Zealand public with a set of principles for the safe planning, design, construction and operation of shooting ranges. It also provides existing shooting organisations, clubs and individuals already responsible for operating a shooting range with an updated set of requirements which must be followed if their shooting range is to remain 'Certified' or be 'Certified' under the requirements of the legislation.

2.3 All ranges are to be designed, constructed , operated and maintained to ensure the safety of both participants and non-participants at the shooting activity and those beyond the range. Complying with the principles in this manual is the primary means by which to achieve this requirement. Complying with Police recognised national shooting range manuals for specific shooting disciplines (see section 4) and respective Range Standing Orders (RSOs) (see section 7), provides a method of demonstrating how to meet this requirement. This includes complying with the Territorial Authority consents and the principles of the Treaty of Waitangi.

2.4 Shooting organisations, commercial shooting businesses, clubs, and in some cases, individuals have a responsibility to ensure that land used for their shooting range is safe for that purpose. Failure to do so may render the organisation, business, club or individual operator criminally liable under section 145 of the Crimes Act 1961.

2.5 All individuals using firearms, or supervising the users of firearms, are responsible for ensuring that a firearm is not discharged near a dwelling place or public place as to endanger property or to endanger, annoy or frighten any person (section 48 of the Arms Act 1983). They are also responsible for ensuring that firearms are not used in a careless manner (section 53 of the Arms Act 1983).

2.6 Shooting organisations, businesses, clubs and individuals fulfil these obligations by ensuring that the shooting ranges under their control meet the minimum acceptable requirement of range design and that RSOs are produced and applied, enabling the safe operation and management of those ranges.

The purpose of this Range Manual is to provide the New Zealand sport and target shooting community and members of the New Zealand public with a set of principles for the safe planning, design, construction and operation of civilian shooting ranges.

All ranges are to be designed, constructed, operated and maintained to ensure the safety of both participants and non-participants at the shooting activity.

Shooting clubs

2.7 A shooting club must apply to Police for a 'Certificate of Approval' in order to operate as an approved shooting club under Part 6, section 38B of the Arms Act 1983. Approval will not be granted if the shooting club does not designate a certified shooting range(s) for the conduct of their shooting activities.

Definition of a shooting range

2.8 In accordance with Part 6, section 38A of the Arms Act 1983, a shooting range:

a. means a facility (whether indoor or outdoor) or a designated area of land, used by a shooting club or members of the public for the primary purpose of carrying out shooting activities, and

b. includes any defence area (as that term is defined in section 2(1) of the Defence Act 1990) used by a shooting club.

2.9 In accordance with Part 6, section 38A of the Arms Act 1983, shooting activities:

a. means activities carried out using a firearm or an airgun for the purpose of shooting at inanimate targets (whether fixed or moving), but

b. excludes –
   (1) paintball shooting, and
   (2) airsoft shooting.

Types of shooting ranges

2.10 There are two types of shooting ranges:

a. Established shooting ranges, and

b. Limited use shooting ranges.

Established shooting ranges

2.11 Established shooting ranges are purpose-built for a specific type of shooting discipline and are used on a regular basis. This type of shooting range can be designed and constructed to cater for multiple shooting disciplines to be fired on the same range, e.g. rifles, pistols and shotguns. They can be located on public or private land and may have infrastructure to support their respective shooting activity, e.g. clubrooms, toilets, shelters, markers gallery, firing positions, shooting stalls, storage facilities etc.

2.12 Examples of established shooting ranges:

a. Pistol/rifle shooting ranges,

b Gallery ranges,

c. Baffled ranges,

d. Skeet and trapshooting ranges,

e. Sporting clay ranges,

f. NZDA hunts course ranges,

g. Field shooting ranges with recurring events, and

h. Indoor shooting ranges.

Limited use shooting ranges

2.13 Where a shooting range is to be used for a limited period on public or private land it requires certification as for an established shooting range, e.g. for a one off indoor or outdoor shooting event. This type of range is unlikely to have any fixed infrastructure, e.g. flagpole's, shelter, buildings etc. An example of a limited use shooting range design is contained in Appendix 2.

2.14 While legislation provides for a certification period of five years, the range certificate for a limited use range will be cancelled by Police at the end of the period of use.

Shooting Range Operator (SRO)

2.15 A person cannot operate a shooting range unless it is a certified shooting range. An application to have a range certified can be made by the following people or entities proposing to operate a range:

a. an individual; or

b. in the case of an incorporated society, non-incorporated society or body corporate, by a person that body corporate has authorised to make the application; or

c. in the case of a person who is not an individual or a body corporate, by the person's authorised representative; or

d. if the designated representative of any of the afore mentioned organisations leaves the organisation, the change of representative must be notified to Police without affecting the current certification. The status of the certification remains under the name of the entity; or

e. if an individual SRO changes, a new application for certification must be made by the proposed new SRO (a range certification cannot be transferred to another SRO).

2.16 A SRO is responsible for the operation of their shooting range(s) including compliance with:

a. the Arms Act 1983 and associated regulations, e.g. Arms Regulations 1992,

b. the New Zealand Police Shooting Range Manual,

c. range certification conditions including maintenance of the range,

d. remedial or preventative action required by an improvement notice (see paragraph 8.19), and

e. renewal of range certification.

2.17 In addition to the above, the SRO may have other responsibilities including, but not limited to:

a. lawful use of the land on which the range is operating,

b. identifying and addressing safety concerns at their shooting range(s), and

c. the provision for training Officers on Duty (OD) in accordance with Section 8 of this manual and maintaining a record of trained OD.

Shooting range danger areas

2.18 There are three types of range danger areas which can be applied to both established and limited use ranges (refer to section 5 for detailed explanations of each):

a. A full danger area (FDA) range,

b. A reduced danger area (RDA) range, or

c. A no danger area (NDA) range.

EXPOSURE DRAFT

Section 3

Section 3

Safe design and construction of a shooting range

Safe design and construction of a shooting range

3.1 This section describes the principles for the safe design and construction of a shooting range. The principles described in this section are common for almost all shooting range types.

Additional shooting range design principles

3.2 There are additional principles of safe design and construction for shooting ranges detailed in sections 4 to 7. These sections describe safe design and construction for specific shooting ranges, range danger areas, range signage, and Range Standing Orders (RSOs). Safety considerations for shooting activities that do not require shooting range certification are detailed in section 10.

Shooting range design and construction techniques

3.3 The following are examples of shooting range design and construction techniques that can be used for a variety of shooting activities and may be customised for specific shooting disciplines (refer to Appendix 3 for examples of various range designs). While this shooting range manual covers all types of shooting activities, detailed design and construction criteria for respective shooting disciplines can be found in the source documents listed in section 1, and the recognised national shooting range manuals listed in section 4.

Generic shooting range design

3.4 A shooting range can have different configurations depending on the intended shooting activity. Most shooting ranges have generic design features which may include a firing point(s), a firing line(s), a target area, a bullet catcher and/or backstop, and a danger area. Additional range structures may also include (but is not limited to) covered firing points, target mechanisms, side berms and/or side walls.

Gallery range

3.5 A gallery range design includes a mantlet and markers gallery for target systems and/or persons doing target marking. Some gallery ranges have been modified with the introduction of electronic target systems.

Baffled range

3.6 A baffled range has incorporated into its design a series of overhead, side and/or ground baffles, or similar construction features, that serve to contain all direct fired projectiles and most potential ricochets to the active range area. Baffled ranges will be RDA ranges which allow for a 'splash, splatter or pop-over danger area. Baffles may be positioned within the respective range design cone of fire, however, their potential impact surfaces must be clad with sacrificial timber to reduce the likelihood of ricochets and backsplash. Baffles and protective cladding must be regularly maintained to ensure they remain effective and fit for purpose.

Where this manual does not cover the detail you require, it is recommended you contact Arms Safety and Control, Police National Headquarters.

A flowchart of the process to establish and/or develop a shooting range is included at Appendix 1.

Skeet and trapshooting range

3.7 A skeet and trapshooting range is a shotgun range designed for the discharge of shot at moving frangible targets, thrown on fixed flight paths, or within prescribed arcs.

Sporting clay range

3.8 A sporting clay range is a range designed for the discharge of shot at moving frangible targets thrown on fixed flight paths or within prescribed arcs. This range setting is designed to simulate hunting or field situations.

Indoor shooting range

3.9 Indoor ranges may consist of firing lines, an active range area with a down range Protected Zone, a ventilation system and a bullet trap (backstop) all of which are contained in a building designed not to allow the escape of any projectile. The range should also have various other equipment and facilities such as target arrays, waiting areas, etc. Indoor ranges are typically laid out with a number of firing points and firing lines located at specific distances from the target line. Indoor ranges must be cleaned effectively to ensure there is no build-up of dust in any part of the range. No dust absorbing materials should be in the range and all surfaces smooth to ease cleaning. Wet cleaning to minimise exposure to dust and the use of specialist spark free vacuum only to avoid risk of explosion.

Field shooting range

3.10 A field shooting range is designed to simulate shooting activities in an outdoor shooting range environment and therefore are more likely to have little or no infrastructure. This type of range may not have a suitable backstop and therefore a Full Danger Area (FDA) range template must be applied. Where a topographic (hill) feature meets the minimum acceptable requirement, the application of Reduced Danger Area (RDA) or No Danger Area (NDA) range criteria may be achieved.

Section 3A
Components of shooting range design and construction

3.11 The following range design features are components of safe design and construction for almost all shooting ranges.

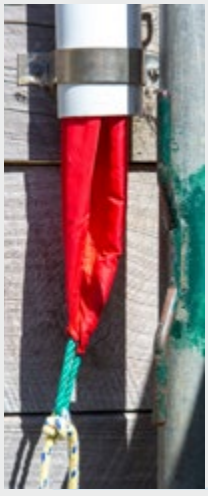
Range axis (Direction of fire)

3.12 Where possible when planning and siting the orientation of a new range, the range axis should run as close as possible north/south (direction of fire to the south in the southern hemisphere) to avoid shooters being affected by the rising and setting of the sun. The range axis can be measured by obtaining a bearing from a compass or GPS (converting the compass bearing to a grid bearing if applicable) in the direction of fire and plotting it onto a map. The range axis is used as the centre line to determine the range danger area.

Range flags

3.13 Each range or range complex must fly a large **RED** warning flag when in use. The flag must be of a size and condition to stand out and be visible from the access point to the range. The flag is to be flown from a flagpole at a height that can be easily seen. The recommended minimum dimension for the flag is 600mm x 1200mm. Indoor ranges are not required to display a range flag but must control entry into an active range area by signage, a locked access door (secured from the inside), warning lights (operation controlled from the inside), or a combination of these.

3.14 The flagpole needs to be located in a prominent position, clearly visible to those approaching the range. If there is more than one entry point to the range and they are not 'line of sight' to each other, then a flagpole is required at each entry point. The location and number of flagpoles depends on the design and layout of the range or range complex. Flagpoles must not be placed in a location that poses a hazard to anyone



operating the flags, e.g. not atop a backstop where, due to the presence of an adjacent range, the flag operator would be exposed to fire from that range.

3.15 The range or range complex warning flag(s) for individual ranges are to be raised prior to the shooting activity commencing and lowered at the completion of the shooting activity. If the range is used for night firing activities, the red flag(s) are to be replaced by suitably visible red flashing lights. Range signage must be collocated with range or range complex warning flags that explain what a raised flag means and clearly state the restrictions on access.

3.16 Some shooting disciplines such as skeet and trapshooting may use a system of red and green signal flags and/or light systems. The correct operation of these flags/light systems will be explained in their respective RSOs and/or match rules.

3.17 Limited use ranges (e.g. sporting clay field shooting ranges) generally do not have the infrastructure to establish flagpoles or flag stations and therefore are not required to display warning flags. In lieu of a warning flag, a portable warning sign (e.g. a sandwich board style or a sign fit for purpose) must be placed at the main access point to the location of the shooting activity. In addition, the control of other potential access points into the shooting range danger area of a limited use range is to be clearly addressed in the RSOs.

3.18 Depending on the design and layout of the range, a range flag may be required for each individual range where the range is part of a larger range complex. This may extend to each bay where multiple shooting bays form part of the range. Range flags must clearly identify which ranges and/or bay is in use at any given time. Range flags for individual ranges are to be raised prior to the shooting activity commencing and lowered at the completion of the shooting activity.

Wind flags

3.19 The location of any wind flags used on a range must not interfere with shooters; or obscure the view of the active range area from the shooters or OD.

3.20 Wind flags must be of different shape and colour to all warning flags in use on the range. This is to avoid confusion over their meaning.

Firing points and firing lines

3.21 Firing points are the specific locations from which individual shooters fire at their targets. They are intended to control the location from which shooters fire and help to direct their firing. This is particularly important on baffle ranges where the baffles are located based on firing positions. A firing line is a group of individual firing points with a common attribute (e.g. distance to the targets).

3.22. Firing points and lines should be sited parallel to the target line and where possible the target line should be parallel to the bullet catcher and backstop.

Firer position spacing

3.23 Firer position spacing is measured centre-to-centre between adjacent firer positions. It is recommended that spacing of firer positions along the firing line be large enough that:

a. Shooters do not cause unnecessary distraction to each other during firing (e.g. being hit by ejected cases), and

b. The OD can conduct their duties (e.g. supervise shooters, clear firearms, and assist shooters as needed).

3.24 Firer position spacing must not be so large that the OD cannot maintain adequate control of the firing line. Having the correct firer position spacing for the intended range use will minimise shooter errors while promoting the optimum and safe use of range facilities. Depending on the shooting discipline, the recommended spacing between firers is 1.5 metres.

Firing line height (Elevation)

3.25 Where practical, and depending on the range design and its intended use, firing lines can be elevated above the range floor. This elevation keeps the individual firing points dry and improves visibility of the target area. Elevated firing lines must be constructed to provide for the safe movement of shooters on and off them.

3.26 Elevating the firing point may also have the effect of removing the range floor from the CofF (a similar effect to sloping the floor toward the target area). If a number of elevated firing points are provided on one range, care must be taken to ensure that firing points positioned in front of other firing points do not interfere with any shooter's line of sight or create an unacceptable ricochet hazard.

Firing line depth

3.27 Firing line depth is the distance measured from the front edge of the firing line to the rear edge of the firing line. Each firing line must be deep enough to accommodate the shooters, their equipment, and provide space for the OD (or any other designated range safety person) to function behind them without any impediments. The recommended firing depth is a minimum of 2.5 metres with an additional minimum of 1 metre behind for range staff.

3.28 There are competition regulations from various shooting organisations that have minimum firing line depth requirements.

Covered firing line

3.29 The firing line may be covered with a weather shelter. The height and construction must not interfere with the shooters or the OD during any part of their activities on the firing line (e.g. preparation, firing, supervision etc). The firing point cover must not obscure the view of the active range area from the shooters or the OD. The firing point cover should where, reasonably practicable, be covered with noise absorbent material to reduce the noise reverberation effect on shooters and the OD.

Range floor

3.30 The range floor is defined as the space between the furthest firing point or line and the most distant target point or line. Where practicable, it should be reasonably level, firm, free draining to prevent ponding, and have a covering of topsoil free of any ricochet inducing material e.g. rocks. Grass is the most common top cover, however, fine granulate stone chip is an acceptable alternative. Particular attention is needed to cover any exposed hard surfaces e.g steel target frames. The range floor should not contain any standing bodies of water, river or stream, that projectiles could be fired in to. If so, then a berm or shelter to prevent impact should be in place. Field shooting range floors are natural features which must allow clear line of fire to the target.

Targets

3.31 Targets can be constructed of various materials. Targets constructed of penetrable materials such as but not limited to paper, cardboard, core-flute and thin plywood are considered ground impact surfaces (refer to paragraph 5.17) for the purpose of applying an ammunition danger area template (ADAT). Targets constructed of non-penetrable materials such as steel are considered hard impact surfaces (refer to paragraph 5.17) for the purposes of applying ADAT.

3.32 The target line is the area where a single target or several targets are positioned. This area can be a marked line on the range floor or have target support mechanisms such as timber sockets to support a target. Target positioning is critical to ensure projectiles are contained within the range danger area by reducing the potential for range floor strike, to give a full target exposure for shooting practices, and to prevent infrastructure attrition. The target line should be located as close to the toe of the backstop as possible.

Moving targets

3.33 Ranges where moving targets are used the design of the range and application of the ADAT must be considered and the extremities of target runs and firing points are clearly marked on the range.

Steel targets

3.34 There are two types of steel targets generally used for target pistol shooting, other shooting disciplines will have a variation of these types to suit their respective requirements, they are:

a. Reactive - These targets react by falling when struck, e.g. silhouette, poppers, etc, and

b. Non-reactive - These targets are fixed and do not move when struck, e.g. some cowboy action targets, gongs, etc. Non-reactive steel targets are to be set at a forward sloping angle to direct splatter and ricochet into the ground.

3.35 The recommended minimum grade of steel must have a Brinell hardness of 450 to 520 HB (or equivalent for both rifle and pistol targets). Grades of steel may also be calculated based on the projectile velocity and impact energy for the specific shooting activity to be conducted.

3.36 Where steel targets are to be engaged at close distances, it is critical that the surface of the steel targets are free from any type of indentation or deformation which could cause an unpredicted ricochet or backsplash creating a risk of harm to any participant.

3.37 Shrouds may be required on ranges where steel targets are used in order to capture splatter and/or ricochet. The RSOs may include additional control measures required for the safe engagement of steel targets.

EXPOSURE DRAFT

Backstops

3.38 A backstop is located around or behind a bullet catcher to capture wide shot and ricochet. If a bullet catcher is not present the backstop will also fulfil the purpose of a bullet catcher. A backstop consists of a natural or man-made feature and can be located up to 25 metres behind the target line. Although a backstop will normally be a natural feature, they may be constructed of suitable man-made material. Where reasonably practicable the range axis should be established at a right angle to the face of the backstop. See Figure 3.1 for an example of how a backstop is designed to capture CofF and ricochet from range floor strike.

3.39 The forward (impact) face of the backstop is to have a slope angle no less than 34 deg consistently across the face of the backstop to a minimum height and width as described in Table 3.1 (This is considered the 'standard' requirement to minimise ricochet and will be checked at the time of inspection). The minimum acceptable requirement for the slope angle is 30 deg, due to degradation as a result of the effects of projectile impact, weathering, natural ground settlement. Before the slope angle reaches 30 deg, the face of the backstop is to be refurbished back to 34 deg. 30 deg is considered the 'critical' minimum acceptable standard and regular maintenance should prevent this occurrence. (see Figure 3.2). The slope angle may exceed 34 deg where the surface material and structure of the backstop can be maintained in position. Where possible slopes of 56 deg or more should be used as these are expected to stop ricochet. There are many proprietary systems available to achieve this where the material within the CofF cannot be made stable at that angle.

Backstop dimensions

3.40 The height, width and depth of the backstop are critical design components required to achieve RDA or NDA status for a range. These dimensions will depend on several factors including the type of shooting activity, type of firearm, calibre, CofF, and firing distance (see Table 3.1 for firing distances up to 100 metres). The total width of a backstop includes the requirement for a flank extension at both ends of the backstop and capture the expected CofF. The flank extension must extend far enough to capture the design CofF for the range from the extreme left and extreme right of the firing points. Where side berms or side walls connect to the backstop, there is no requirement to calculate or measure a flank extension. Vegetation (grass, shrubs) and trees do not augment the height of a backstop.

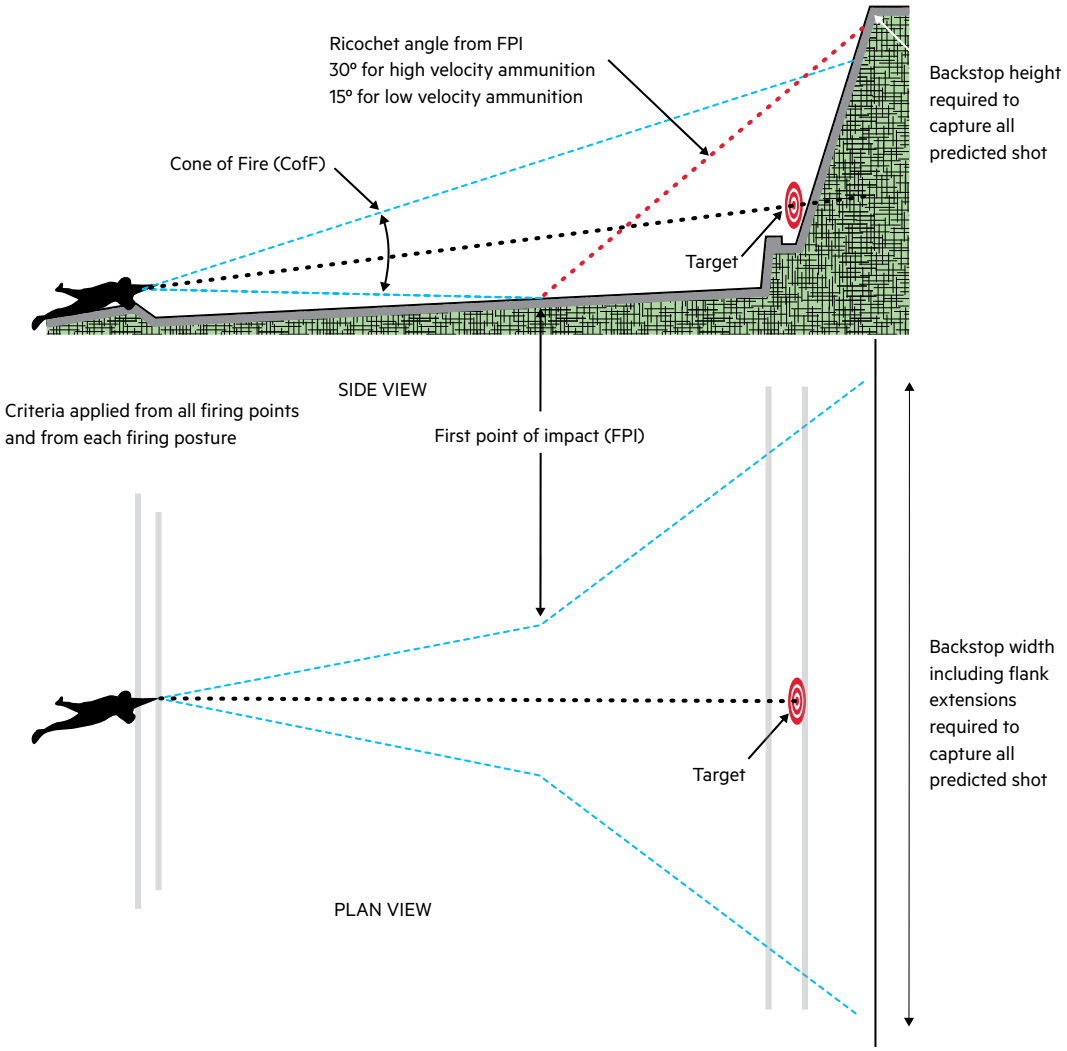


Figure 3.1: Backstop designed to capture CofF and range floor strike from the first point of impact (FPI) and the resultant ricochet

EXPOSURE DRAFT

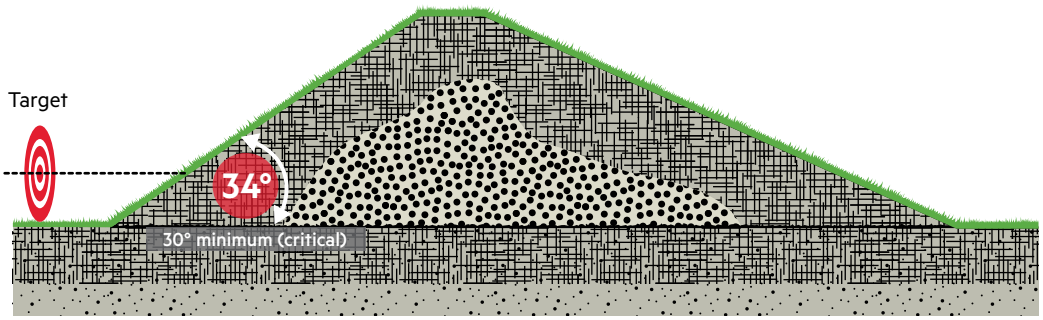


Figure 3.2 : Backstop slope angle

NDA RANGE (up to 100 metres) - RIMFIRE - (For firing distances over 100 metres refer to section 5)

Pistol (Low velocity)					
Firing distance to target line (m)	≤ 15	25	50	75	100
Height (m)	2.5	4.0	6.0	7.0	8.0
Extension beyond flank target (m)	1.0	1.5	2.0	2.5	2.5
Slope angle from horizontal = See note 8 Minimum backstop depth (at crest) = ≥ 1 metre Impact Surface - No visible hard objects within the CofF excluding the target Condition = No degradation or scooping TCH 1200mm					

Rifle (Low velocity)					
Firing distance to target line (m)	≤ 15	25	50	75	100
Height (m)	2.0	2.5	3.5	4.5	5.5
Extension beyond flank target (m)	1.0	1.0	1.5	2.0	2.5
Slope angle from horizontal = See note 8 Minimum backstop depth (at crest) = ≥ 1 metre Impact Surface - No visible hard objects within the CofF excluding the target Condition = No degradation or scooping TCH 1000mm					

NDA RANGE (up to 100 metres) - CENTREFIRE - (For firing distances over 100 metres refer to section 5)

Pistol (Low velocity)					
Firing distance to target line (m)	≤ 15	25	50	75	100
Height (m)	3.0	5.5	8	12	15
Extension beyond flank target (m)	1.5	2.5	4.5	4.5	4.5
Slope angle from horizontal = See note 8 Minimum backstop depth (at crest) = ≥ 1 metre Surface standard - No visible hard surfaces Impact Surface - No visible hard objects within the CofF excluding the target Condition = No degradation or scooping TCH 1200mm					

Rifle (High velocity)				
Firing distance to target line (m)	≤ 25	50	75	100
Height (m)	4.0	5.0	6.0	7.0
Extension beyond flank target (m)	1.0	2.0	3.0	4.0
Slope angle from horizontal = See note 8 Minimum backstop depth (at crest) = ≥ 1 metre Surface standard - No visible hard surfaces Impact Surface - No visible hard objects within the CofF excluding the target Condition = No degradation or scooping TCH 1200mm				

Table 3.1 – Examples of backstop dimensions

Backstop Criteria:

Note 1: Level and clear range floor (or line of fire).

Note 2: Target Centre height (TCH) is 1200mm. If TCH exceeds 1200mm, the backstop height increases by the TCH difference (i.e. 25m Rimfire pistol NDA backstop height is 5m.TCH is 1500mm therefore overall backstop height must increase by 300mm to 5.3m (5m plus 300mm = 5.3m).

Note 3: Flank extension is measured from the outermost flank target (to the left or right of the target line).

Note 4: Overall heights have been calculating allowing for primary firing positions of lying, kneeling and standing.

Note 5: Height is calculated from the furtherest firing line to the target line and the toe of the backstop being no further than 3.5m from the target line.

Note 6: NDA Backstop height is based on the elimination of any CofF range floor strike forward of the target line. If CofF range floor strike occurs the Shooting Range Operator is to consider additional control measures for ricochet capture, such as a canopy, construction of baffles, or an increased TCH in order to maintain a NDA status.

Note 7: When a Shooting Range Operator (SRO) permits multiple firearm type to be used on the same range, the greater of the height dimensions are to be applied.

Note 8: Backstop slope angle is ≥ 30 to 34 deg (533 to 605mils).

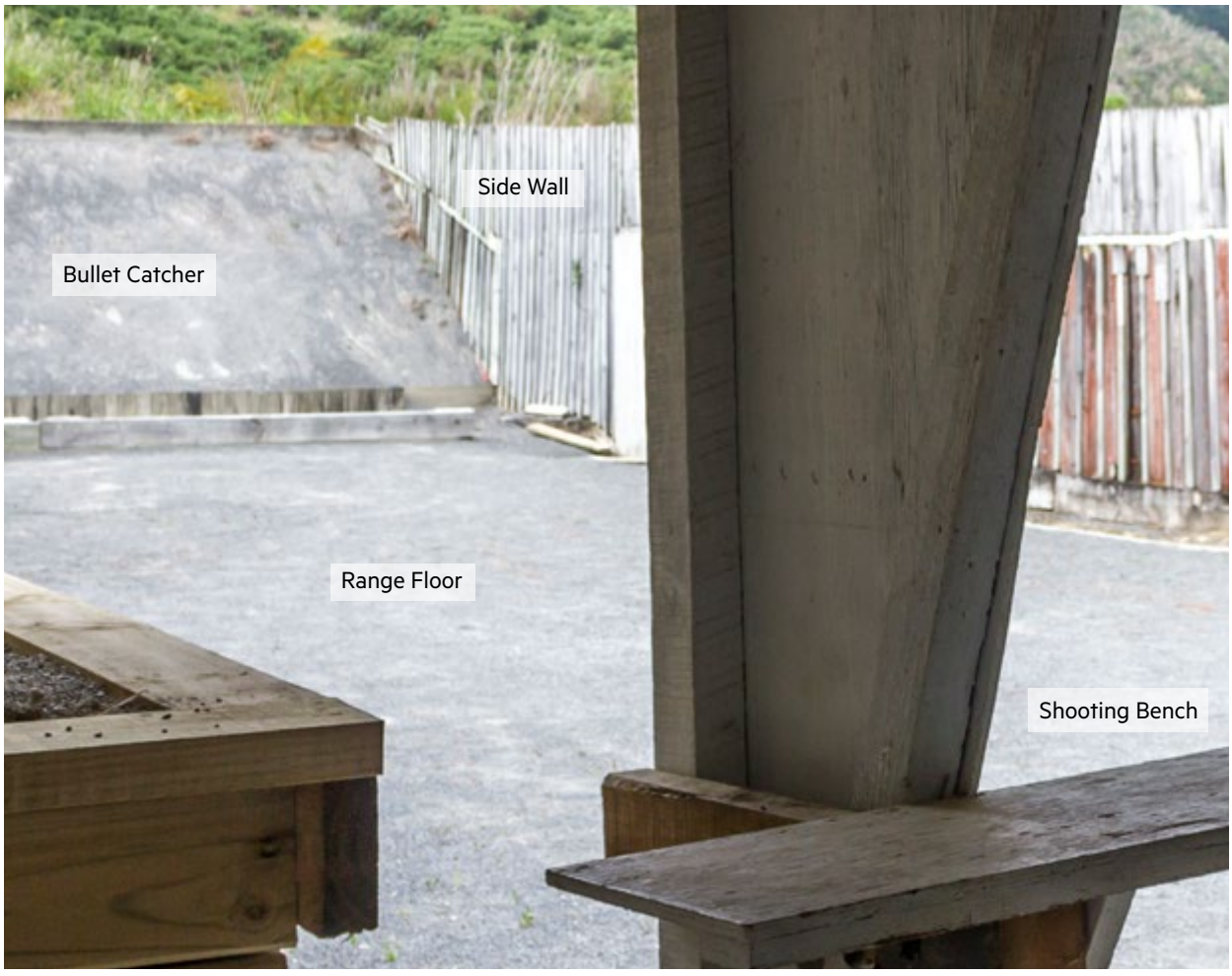
(Reference: DSA 03. OME Part 3 - Volume 2 - Non-Standard NDA Backstop calculations modified with New Zealand shooting discipline criteria)

NOTE: All dimensions can be rounded up to the nearest 0.5m or whole metre for ease of practical measurement.

EXPOSURE DRAFT

Topographic features used to establish reduced range danger areas

3.41 Where a topographic feature, e.g. a hill, is located more than 25 metres to the rear of the target line, it is recommended that a bullet catcher is established no more than 1 metre behind and parallel to the target line. The criteria required to use a distant topographic feature to establish a RDA range is contained in section 5 of this manual.



EXPOSURE DRAFT

Bullet catchers and dimensions

3.42 Bullet catchers serve as the primary bullet impact area and may be built as part of a backstop immediately behind the targets. The bullet catcher slope angle must match the minimum acceptable requirement of the forward (impact) face of the backstop. The dimensions of the bullet catcher depend on its ability to capture the common bullet impact area (Mean Point of Impact -MPI) wherever a target is positioned along the target line (see Figure 3.3). A bullet catcher may be constructed with natural or artificial material which will not induce ricochet or backsplash. The purpose of a bullet catcher is to:

a. Minimise degradation (e.g. loss of slope) of the backstop due to projectile impacts,

b. Ease the backstop maintenance that is required periodically (e.g. reshaping of the backstop face when projectile tunnelling starts to occur), and

c. To ensure the bullet catcher does not receive excessive damage RSO should detail the maximum permissible muzzle velocity or energy to be used on the range as prescribed in Table 3.3.

d. To ensure the bullet catcher remains effective it should be checked regularly to ensure there is no build-up of lead at each MPI that might cause backsplash. The depth of sand for high velocity ammunition is a minimum of 450 mm measured perpendicular to the surface. With a slope of 34 deg this gives a depth of 900 mm on the bullet path.

3.43 A bullet catcher may be constructed of any stable inert fill material. The surface must be covered with sand or a material that retains the profile of 34 deg (to a minimum of 30 deg) and has a minimum depth as prescribed in Table 3.2, or exceeds the maximum target height by at least 0.5 meters, whichever is greater. The depth measurement is taken parallel to the range floor on a horizontal plane. If rubber chip is to be used, the quality and size of the chip must be stipulated. It should be shredded rubber chip that has no steel or fabric reinforcement, with elongated elements removed to produce angular rubber fragments. The fragments (chip) are to be a regular shape approximately 10 - 25 mm in any direction which will produce tight interlocking properties. Tyres, hay, or straw bales are not recommended for the construction of a bullet catcher. Tyres (even though filled will soil) can present an additional backsplash hazard when using low velocity ammunition and should not be used in a bullet catcher or backstop, particularly at the MPI. Rubber chip, hay and straw present a potential fire hazard, however rubber chip used on indoor ranges can be sprayed with a fire-retardant compound to reduce the risk of fire.

BULLET CATCHER DIMENSIONS - RIMFIRE OR CENTREFIRE					
Distance from firing line (m)	≤ 15	25	50	75	100
Crest height (m)	2.5	2.5	2.5	2.5	2.5
Flank extension (m)	1.5	1.6	1.8	2.0	2.0
Crest depth = 0.75 metre Minimum depth behind targets = 0.75 metre (sand or soil) slope angle = ≥ 30 to 34 deg (533 to 605 mils) Composition = sand, fine soil, rubber, steel bullet trap, sand trays Condition = As for backstop if sand or earth. *Standard Dimensions*					

Table 3.2 – Examples of bullet catcher dimensions

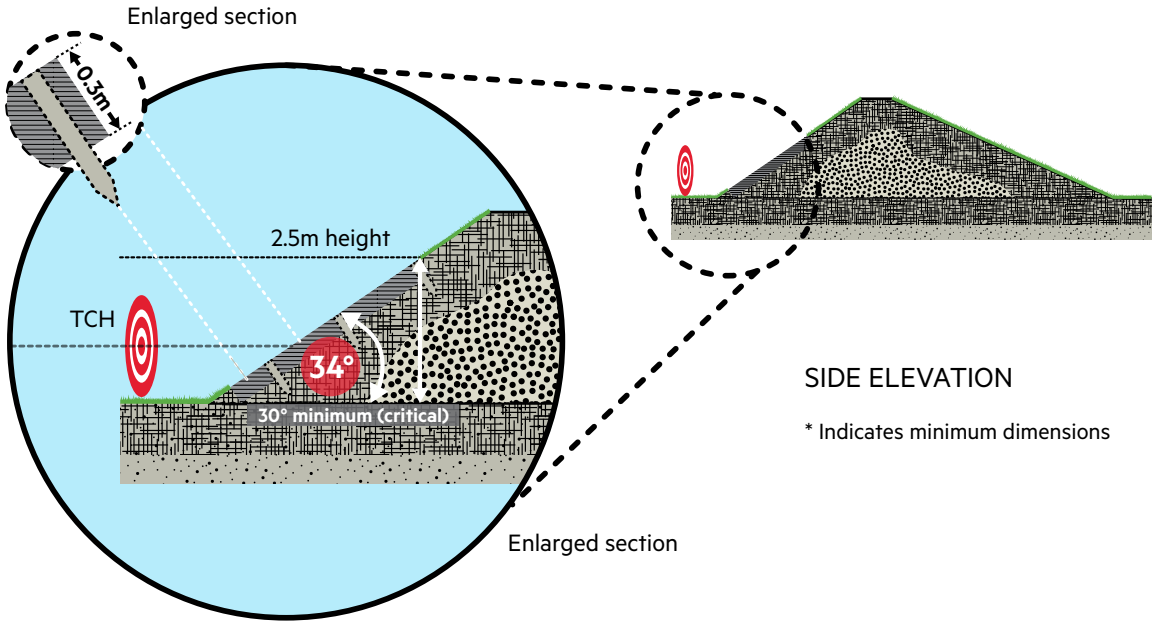


Figure 3.3: Bullet catcher construction dimensions

EXPOSURE DRAFT

Examples Bullet Catcher Maximum Muzzle Velocity (MV) or Muzzle Energy (ME) - Established Range

Indoor ranges	(m/s) MV	Joules ME
Rimfire pistol or rifle	530	285
Centrefire pistol	520	645
Centrefire rifle (NDA)	1000	4500

Outdoor ranges	(m/s) MV	Joules ME
Rimfire pistol or rifle	610	480
Centrefire pistol	655	2030
Centrefire rifle (NDA)	1000	7000
No requirement for limitation during field shooting (No bullet catcher)		

Note: 1. To maintain a bullet catcher in a serviceable state, RSO should detail the maximum permissible firearm muzzle velocity or energy to be used on the range.

Table 3.3 – Examples of bullet catcher maximum muzzle velocity or muzzle energy

Side berms and side walls

3.44 The use of side berms and side walls is not mandatory. However, if used they are intended to:

a. prevent movement of people/animals onto the active range area,

b. reduce the likelihood of an errant shot, ricochet, backsplash or splatter escaping the active range area,

c. separate adjacent ranges and protect people in areas adjacent to the range, and

d. protect buildings or equipment (e.g. a target shed).

3.45 Side berms and side walls do not serve as backstops. If the planned arcs of fire are such that the CofF will cover a side berm, then a properly constructed backstop is required in that location which must capture direct fire and any ricochet. Where a portion of the side berm has been constructed as a backstop, it is to be referred to as a side backstop. Side berms are to meet the following criteria:

a. have a minimum height of 2.5 metres measured from the range floor,

b. be of a minimum slope angle of 30 deg,

c. have a minimum crest depth of 0.8 metres,

d. connect with the backstop (where practicable) and should be continuous (without gaps),

e. be of sufficient length to shelter an adjacent area (where people or equipment are likely to be), and

3.46 Side walls or man-made material side berms are frequently used on ranges. If used to separate adjacent ranges they are to rise vertically, have a minimum height of 2.5 meters measured from the range floor, be of such construction that they will defeat the maximum calibre of cartridge for which the range was designed, and not have any gaps along the entire length. Where a gap is created by the placement of a building, gateway or structure, the material used in the construction must be sufficient to defeat an errant shot, ricochet, backsplash or splatter escaping the active range area. The height of the building, gateway or structure must be equal to the height of the side wall or side berm, or augmented by suitable material to the approved height.

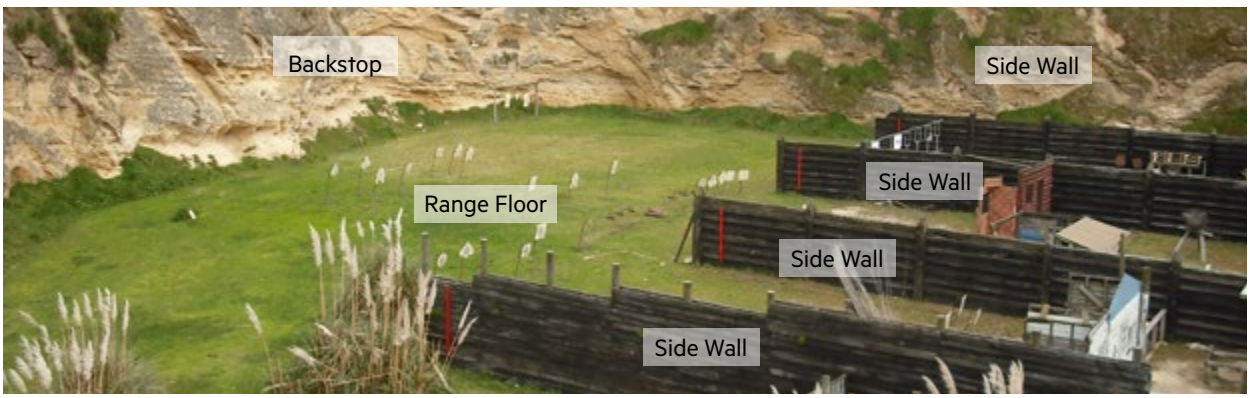
3.47 The use of large quantities of tyres in berm construction is discouraged due to the potential ricochet and backsplash hazard. If tyres are used to construct side berms, it is recommended that they are:

a. staggered and overlapped to provide uniform, gap-free coverage,

b. cut away on one side, filled with soil or sand and firmly compacted,

c. securely supported and configured to prevent toppling, sagging or leaning, and

d. covered with a minimum of 1 metre of soil.



EXPOSURE DRAFT

Baffles and protective cladding

3.48 Baffles are constructed and positioned to provide a method of containing projectiles from escaping the active range area. The projectiles may be direct impact or ricochets. If baffles are constructed of hard material, e.g.steel, protective cladding should be attached to baffle surfaces that are expected to receive direct impact or ricochet and will reduce backsplash. Protective cladding should be checked for serviceability and included as part of the range maintenance schedule. It is also necessary to check the baffle surfaces for signs of hidden attrition (unseen degradation of the base material covered by the cladding). Baffles can be constructed on the ground, on side walls and overhead.

3.49 Recommended dimensions for the minimum thickness of construction materials considered impenetrable to bullet strike are contained in Table 3.4.

3.50 Dimensions for steel protective plating for ranges are contained in Table 3.5. Under some circumstances these dimensions may not provide adequate protection for specific shooting activities. Additional guidance may be requested from respective national shooting organisations or Police.

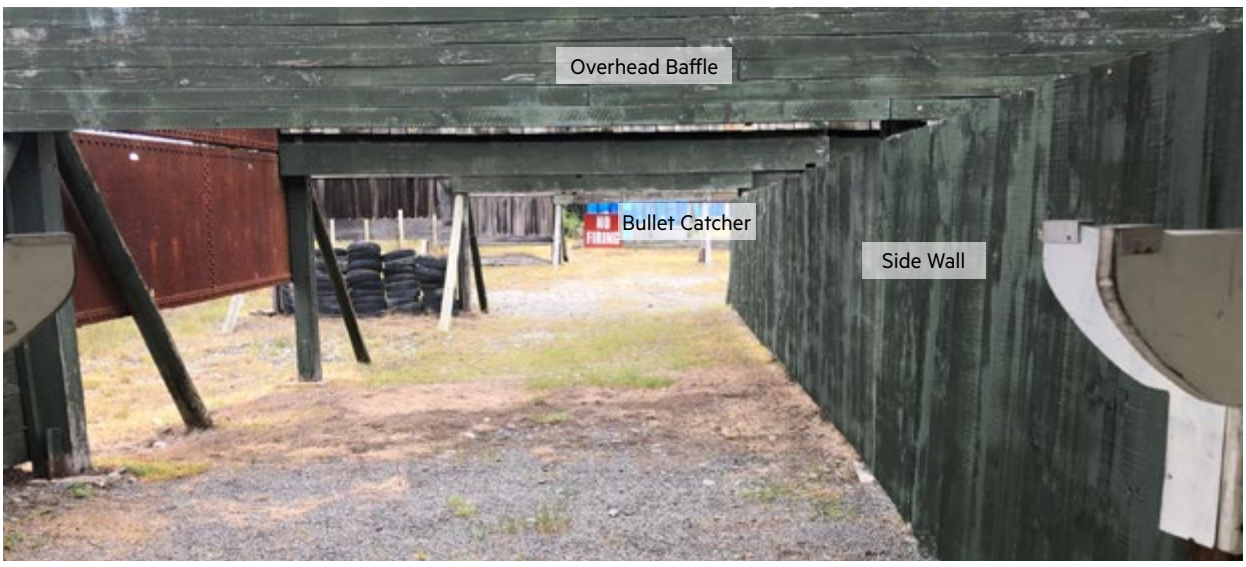
Minimum Thickness (mm) of Construction Materials Considered Impenetrable to Bullet Strike (Hard Wood (h/w), Soft Wood (s/w))				
Ammunition	**Concrete**	**Solid Brick**	**Concrete Block**	**Timber**
Rimfire	75	100	100	125h/w or 150 s/w
Centrefire pistol	150	215	215	175h/w or 200 s/w
Centrefire rifle	200	215	230	250h/w or 375 s/w

Table 3.4: Minimum thickness of construction materials

Steel Protective Plating for Ranges (mm)		
Ammunition	**Defence zone/Baffles**	**Bullet catcher - Impact**
Rimfire	5 direct - 3 flank	6 mild - 4 armoured
Centrefire pistol	6 direct - 5 flank	8 mild - 6 armoured
Centrefire rifle	12 - 8 armoured (Note 1)	See note 2

Note: 1. Minimum recommended armoured steel grade for centrefire rifle is AR500 (or equivalent).
Note: 2. It is recommended that design advice specific to the range is obtained.

Table 3.5: Steel protective plating for ranges



EXPOSURE DRAFT

Cone of fire

3.51 The Cone of Fire (CofF) is the distribution of fired projectiles within a margin of error in the vertical and horizontal planes (see Figure 3.4). CofF is applied around each Line of Sight (+elevation, - depression and +/-azimuth) and is critical in determining the design specification of a range. The CofF accounts for acceptable deviation caused by errors associated with the firer and machining or manufacturing tolerances. CofF are listed in Table A4-2, Appendix 4.

Inability of a shooter to achieve the CofF

3.52 The inability of a shooter to achieve the approved CofF is a risk as projectiles may escape the range danger area. RSOs are to articulate corrective actions if a shooter is unable to achieve the CofF. If unable to correct the error, the shooter must cease shooting. Errors could be:

a. **Misdirected firing**
Misdirected firing error is firing that is deviating from the point of intended impact associated with competently fired yet misdirected shots.

b. **Random firing error**
Random firing error results from single shots that are unintentionally fired with significant random deviation from the point of intended impact.

c. **Wild firing error**
Wild firing error results from single shots that may be deliberately aimed or unintentionally fired in gross contravention of range discipline, and which may impact anywhere inside the total energy range of the ammunition.

Un-licenced or inexperienced shooters and test firing

3.53 When an un-licenced or inexperienced shooter is permitted to shoot on a range (e.g. a club open day), the appropriate minimum shooting distance must be used to ensure the approved CofF for the range is not compromised. The decision to progress back to longer firing distances is at the discretion of the OD/RO. The same criteria is to be applied when conducting approved test firing of a firearm or ammunition type in accordance with RSOs.

Target centre height (TCH)

3.54 Target positioning is critical to ensure projectiles are contained within the range danger area by reducing the potential for range floor strike. The TCH should typically enable a near level line of fire although there are circumstances which may require either elevated or depressed lines of fire (uphill or downhill shooting). A depressed line of fire will be an advantage if ground permits. TCH is dependent on the physical structures of the range and may span from (but are not limited to), between 450 mm and 1500 mm measured from the ground.

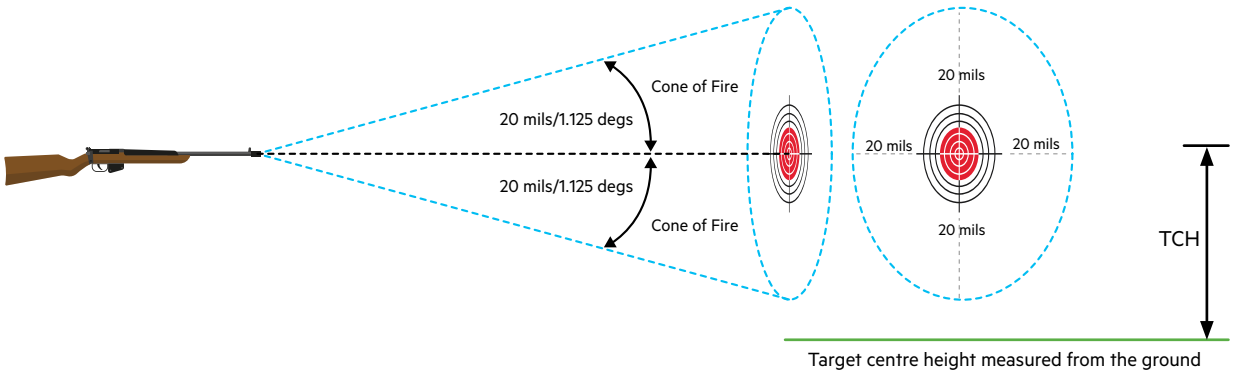


Figure 3.4 : Example of a cone of fire around point of aim and target centre height dimension

EXPOSURE DRAFT

Section 4

Section 4

Specific shooting discipline: Safe design and construction of a shooting range

Range designs for specific types of shooting disciplines

4.1 This manual contains the safe design and construction of shooting ranges for specific shooting disciplines. Police recognises the shooting range manuals produced by the following national shooting organisations for their individual shooting disciplines. Recognised national shooting range manuals are only to be used by the respective disciplines. For all independent range operators, refer to paragraph 4.4.

Recognised national shooting range manuals

4.2 National shooting range manuals recognised by Police are:

a. Pistol New Zealand Range Manual dated 1 June 2018,

b. New Zealand Clay Target Association Manual of Range Design, Construction and Inspection Guidelines dated 28 November 2010,

c. Rules for Certification of Rifle Ranges for the National Rifle Association of New Zealand Full-bore Rifle Shooting dated 6 September 2010,

d. Rules for Certification of No Danger Area Rifle Ranges for the National Rifle Association of New Zealand Full-bore Rifle Shooting dated 6 September 2010,

e. Target Shooting New Zealand Range Manual dated 3 October 2019,

f. New Zealand Deerstalkers Association Manual of Range Design, Construction, and Inspection Guidelines dated 20 October 2005, and

g. New Zealand Deerstalkers Association Manual for Outdoor Hunting Simulation dated 20 October 2005.

Amendment to a recognised national shooting range manual

4.3 Where a national shooting organisation intends to update, amend, or replace the recognised version of their range manual as listed above and once it has been ratified by the relevant national shooting organisation, a copy of the new document must be submitted to Police for consultation and review. If the new version is recognised by Police, the updated document will be uploaded to the Police website for public access.

Independent shooting range operators

4.4 Where an independent Shooting Range Operator is operating a shooting range and has published their own range manual, the manual will be reviewed during the certification process. Until this manual is recognised, the Police Shooting Range Manual will take precedence. Once recognised the manual will be included at paragraph 4.2.

4.5 Where an independent Shooting Range Operator does not wish to publish their own range manual, this Police shooting range manual is to take precedence for the safe design and construction of their range(s).

Where a national shooting organisation intends to update, amend, or replace the recognised version of their shooting range manual, they must submit a copy of the new document to Police for review.

For an independent shooting range operator, this Police shooting range manual will take precedence until the operator's manual is recognised by Police.

Section 5

Section 5

Shooting range danger areas

Danger area definition

5.1 The range danger area is the space where there may be a risk to people, equipment or property from the discharge of a properly aimed shot on a specified bearing (range axis/direction of fire) or within a specified arc of fire.

5.2 A range danger area does not take into account any shots deliberately fired in breach of range discipline or Range Standing Orders (RSOs).

Active range area

5.3 This term is used to describe the area in which the shooting activity is conducted and includes the danger area applied to the range.

Shooting range danger area

5.4 The dimensions and shape of the range danger area(s) are produced by application of an ADAT. Dimensions and examples of ADAT are contained in Appendix 4. Range danger area design depends on a number of factors including the external ballistic characteristics of the ammunition, range construction (site and design), the shooting activities (respective shooting disciplines), and the CofF. It also depends on the safe management of these activities by the Officer on Duty (OD) and compliance with RSOs. A range danger area decision flowchart is contained in Figure A2-4 of Appendix 2.

5.5 The development of a CofF (as opposed to acceptance of an existing CofF that may be considerably larger than necessary) provides much greater flexibility to the design, construction and use of ranges.

Full danger area (FDA) range

5.6 A FDA range is an outdoor range where the range danger area is only limited by the angle of departure (or QE) of the firearm, the skill of the shooter, and the application of the correct ADAT (see Appendix 4).

Reduced danger area (RDA) range

5.7 A RDA range is an outdoor range for which the minimum design requirements are to capture projectiles so that any resultant ricochet remains within the reduced dimensions of the range danger area. The range danger area can be reduced by a significant topographic feature, e.g. a hill. The topographic feature must be sufficient in height, width, and depth to capture all projectiles and ricochets. An ADAT is applied and a point on the feature is designated as the limit of the range danger area e.g. a contour line or the crest-line of the feature (see Figure 5.1). The criteria required to determine if the topographic feature meets the minimum acceptable requirements to reduce the dimensions of

Danger area design does not take into account any shots deliberately fired in breach of range discipline, or in breach of Range Standing Orders.

Range danger area design depends on a number of factors including the external ballistic characteristics of the ammunition, range construction, the shooting activity, and the approved CofF .

EXPOSURE DRAFT

the range danger area includes (but is not limited to) the following factors:

a. range tables for the approved ammunition to be used on the range. Range tables contain ballistic data specific to an ammunition type and performance can be determined in order to calculate an overall danger area,

b. the largest CofF approved for use on the range,

c. targets - to include location, elevation (altitude), type (construction), and the approved target centre height,

d. firing line(s)/point(s) - to include location, elevation (altitude), and the approved firing postures,

e. the quadrant elevation (line of departure), and

f. the air danger height (ADH) for the approved ammunition.

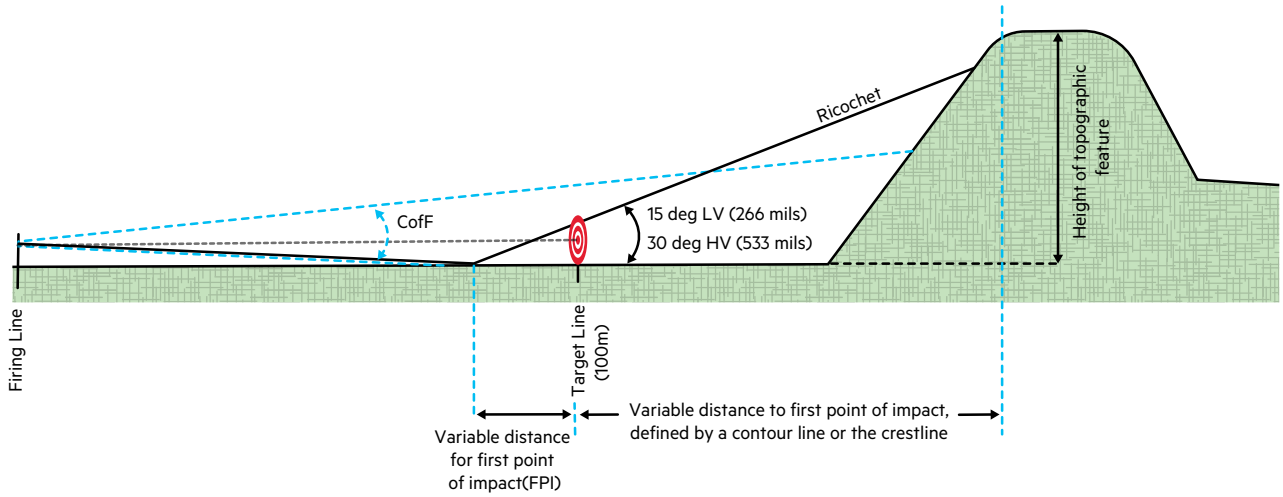


Figure 5.1 – Effect of range floor strike creating a ricochet captured by a topographic feature to establish a RDA range

Reduced danger area (RDA) Pop-over

5.8 Where high velocity centre fire rifle ammunition is used, an anti-ricochet or `pop-over' canopy is required to prevent vertical ricochet from the bullet catcher leaving the range. The canopy shall be positioned to cover the full width and depth of the bullet catcher. Where the canopy is of timber construction, the rear half of the underside is to be lined with steel minimum 5 mm thick across the full width of the canopy. The sides of the canopy are to be impenetrable to ricochet and any debris ejected from the bullet catcher, and is typically constructed of brick or block. Other materials, such as concrete may be used provided that they contain "pop-over", are weather resistant and are low maintenance, noting that the rear half of the canopy underside will take the largest proportion of ricochet. The leading faces of the canopy and supporting walls should be clad to prevent backsplash. If the range does not have a canopy, then a pop-over danger area may be applied as prescribed in paragraph 5.9.

5.9 Where high velocity centre fire rifle ammunition is to be used without a canopy above the bullet catcher, a 100 metres radius danger area is required to the sides and rear of the range (see Figure 5.2). Alternatively the whole area of the bullet catcher may be constructed with a slope in excess of 56 deg thus preventing ricochet. A range that has pop-over is described as a RDA range with pop-over.

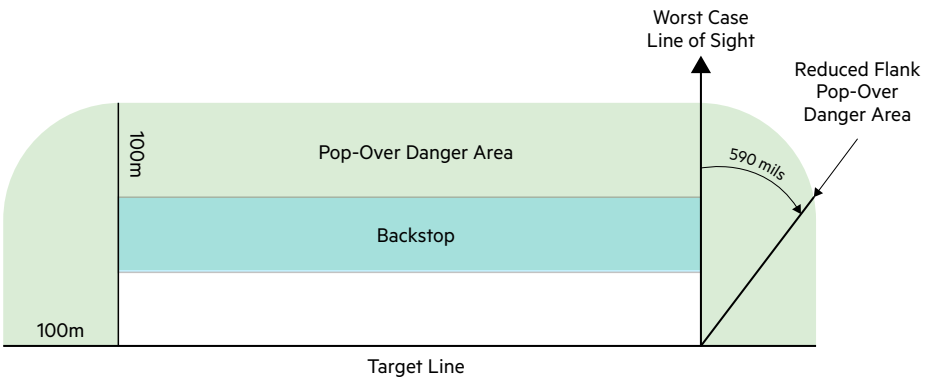


Figure – 5.2: Example plan view of pop-over dimensions

EXPOSURE DRAFT

CofF captured by a man-made structure or topographic feature

5.10 On outdoor shooting ranges where the CofF is captured by the slope of a man-made structure or topographic feature the following is to be considered:

a. where the slope is less than 56 deg ricochet is to be considered and managed,

b. where the slope exceeds 56 deg the danger area is cut off at the point where the CofF intersects the slope establishing a RDA range (see Figure 5.3 and 5.4)

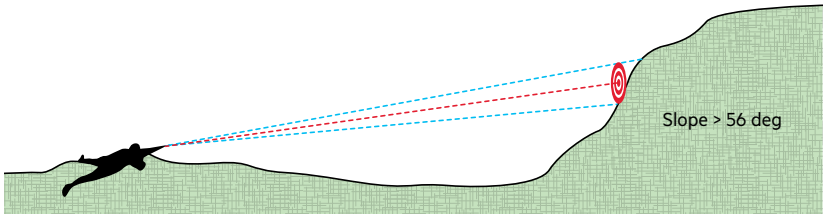


Figure 5.3 – CofF captured by a topographic feature with a slope greater than 56 deg

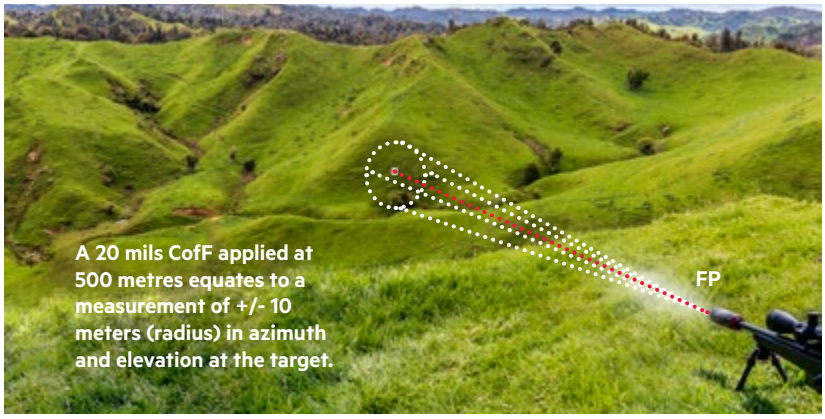


Figure 5.4 – CofF captured by a topographic feature

CofF is not captured by a man-made structure or topographic feature

5.11 On outdoor shooting ranges where CofF is not captured by a man-made structure or topographic feature, then a FDA range must be established. However, where there is not sufficient land available to establish a FDA range it may be possible to apply the RDA range criteria described in paragraph 5.7 of this section.

No danger area (NDA) range

5.12 A NDA range is where the range is designed to capture all projectiles and any ricochets, backsplash, or splatter within the active range area. A combination of factors must be considered in order to establish a NDA range which includes, but are not limited to the following:

a. minimum acceptable dimensions of the backstop including the correct slope angle,
b. maximum firing distance,
c. type of firearm and calibre,
d. cone of fire to be applied,
e. type of shooting activity,
f. type of target to be engaged,
g. type of shooting position to be adopted, and
h. where high velocity ammunition is used, a canopy should be considered.

A NDA range is where the range is designed to capture all projectiles and any ricochets, backsplash or splatter within the active range area.

A range cannot be certified if the Shooting Range Operator has not obtained landowner permission to use the land as a shooting range.

EXPOSURE DRAFT

Rights to use and ability to control access to the range and danger area

5.13 A range cannot be certified if the required land and the associated danger area(s) are not under the control of the Shooting Range Operator (SRO) when shooting takes place. If the SRO does not own or have exclusive control of the land and range danger area(s), then they will need to show that they have authority to use the land and can control who can access the site at all times while shooting activities are being conducted e.g. through a lease or other appropriate land use agreement (e.g. a licence to use that land for the required periods of time). The agreement must specify the 'use' of the land as a shooting range and any associated range danger area so that it is clear that authority to use is granted for that purpose.

5.14 Where the owner (or controlling authority) of the land, on which the range and/or danger area is situated, withdraws authority for the use of the land as a shooting range (e.g. if the lease or licence is terminated), the SRO must promptly inform Police once it is known that the authority is being withdrawn and cease using the range when the authority has ended. If the SRO is unable to quickly obtain new authority to use the land, then the range will need to be closed.

5.15 If projectiles land in any place outside of the range danger area the SRO must immediately close the range. The SRO is to ascertain the cause and where it is identified that the integrity of the range construction being in doubt, the SRO is to engage a trained Shooting Range Inspector for advice. Based on this advice, the SRO is to remedy the fault. Where this is not possible the range is to remain closed and Police Arms Safety and Control are to be notified of the circumstances. The SRO may be issued an improvement notice providing requirements to re-establish a safe and fit for purpose range.

Overshoot projectiles

5.16 An overshoot is defined as a projectile that carries over, or beyond, a backstop. By definition, an overshoot projectile will not have struck any downrange object before traveling beyond the backstop. Overshoots are distinctly different from ricochets.

Impact surfaces

5.17 Impact surfaces are all surfaces within the CofF that are likely to be struck. Impact surfaces are categorised as follows:

a. **Hard impact surfaces.** Hard impact surfaces includes, but are not limited to concrete, rock, steel, water and frozen surfaces.

b. **Ground impact surfaces.** Ground impact surfaces includes all surfaces other than hard impact surfaces. The composition and depth of the ground (including top soil and vegetation) in some geographic regions may allow for the reduction of the ricochet angle if it is deemed safe to do so by the SRO.

EXPOSURE DRAFT

Ricochet

5.18 A ricochet is the change of direction and velocity, induced in a projectile or fragment caused by its impact with a material. For high velocity (>2000 fps) ammunition design purposes ricochet is taken as 30 deg off ground impact surfaces and 45 deg off hard impact surfaces. For low velocity (<2000 fps) ammunition the ricochet angles are taken as 15 deg off ground impact surfaces and 45 deg off hard impact surfaces.

Backsplash

5.19 Backsplash is defined as projectile fragments, target materials, or ground debris, thrown back towards the shooter as a result of projectile impact.

5.20 To protect shooters from hazardous backsplash, eye protection should be worn within the backsplash safety distances listed in Table A4-1, Appendix 4.

Effect of significant topographic features on shooting range danger areas

5.21 The location of significant topographic features will determine the type of range danger area to be applied to the range. The location and dimensions of significant topographic features will determine if the range is a RDA or NDA range

Effect of trees in shooting range danger areas

5.22 Heavy tree cover in a range danger area, or atop a backstop, may be a desirable feature for an outdoor range in so far as trees add to the aesthetics of the range/range complex and may serve to diminish noise. However, trees do not influence the dimensions of the danger area nor augment the height of a backstop, and may induce ricochet if struck.

Activity inside a shooting range danger area - Managing the risk

5.23 The OD must stop all firing immediately when encroachment into the shooting range danger area has been identified.

5.24 The range perimeter danger signs serve to attract the attention of people in the area, e.g. hunters, farm workers and contractors, who could unknowingly transit into the range danger area.

Determining a shooting range danger area

5.25 The range danger area is determined by applying the correct ADAT (1:50,000 scale or 1:25,000 scale) from the firing point/line along the range axis (direction of fire) on a topographic map (1:50,000 scale or 1:25,000 scale) of the range location. The outline of the ADAT is traced onto the map. If hard impact surfaces at less than 30 deg and are within the CofF, then the hard impact surface dimension is to be applied. Where steel targets are to be engaged, the hard impact surface dimension may not be required when applying the ADAT, in accordance with RSOs. This procedure will produce a range danger area for the respective ammunition type, at a given CofF, with a restricted angle of departure (QE), over a single arc of fire. See Table 5.2 for an overview of the steps required to determine a range danger area and Figure 5.5 for a process flowchart.

Reduction in dimensions of shooting range danger areas

5.26 Reduction in the dimensions of shooting range danger areas are to be determined by the requirements described in this manual. SROs are not to reduce a shooting range danger area for the sake of convenience.

Design, construction, and application of an ammunition danger area template

5.27 The ADAT must be relevant to the types of firearms and ammunition to be used on the range and must reflect a thorough understanding of all types of shooting activities to be conducted on the range. Appendix 4 of this manual includes guidance on the design, construction and application of an ADAT including examples of various templates. Scale diagrams of Templates T1 to T8 (drawn to 1:50,000 scale) listed in Table A4-1 of Appendix 4, can be obtained from the Police website. Alternatively, the ADAT for a specific shooting discipline can be obtained on request to the respective national shooting organisation.

! The OD must stop all firing immediately when encroachment into the shooting range danger area has been identified.

EXPOSURE DRAFT

STEPS FOR DETERMINING A SHOOTING RANGE DANGER AREA		
STEP	**ACTION**	**DETAILS**
	PREPARATION	
1	Identify the range location	- Obtain a 1:50,000 or 1:25,000 scale Topographic Map of the overall range location
2	Identify type of shooting activity to be conducted on the range	- Obtain the correct ADAT required for the templating (the scale of the ADAT must match the scale of the map)
3	Identify the boundary of the land approved for use as a shooting range	- Plot the boundary on the map
	ONSITE	
4	Plot the individual range location on the map	- Walk the ground and familiarise yourself with the range layout and features - Move to the furthest firing point/line on the range, position yourself in the centre facing the direction of fire and plot your location on the map as a NZTM grid reference.
5	Plot the range axis (direction of fire)	- Ensure that you are positioned at the same GR in Step 4 - **Single Arc of Fire**: If using a Firing Point (FP), measure the range axis through the centre of the target line from the FP, this bearing should be at right angles to the target line (this will be a Magnetic Bearing (MB) if using a compass) - Convert the MB to a Grid Bearing (GB) and plot the centre of arc (range axis) on the map, take the appropriate ADAT for the firearms to be used (use largest calibre) and the type of surface (ground or hard), place the ADAT on the FP and align with the centre of arc (range axis) - Visualise the range danger area to see if it fits within the land approved for a shooting range (see Figure A2-2, Appendix 2) - **Arc of Fire**: If using a Firing Line (FL), measure range axis from the centre of the FL to the centre of the target line (this will be a MB if using a compass) - Move to the furthest left firing position on the FL and measure the left of arc (to furthest left target), repeat for the right hand side (using the furthest right target) - Convert the MBs to GBs and plot them on the map, select the appropriate ADAT for the firearms to be used (use largest calibre) and the type of surface (ground or hard), place the ADAT on the left end of the FL, align the spine of the ADAT with the left of arc and then move the ADAT to the right end of the FL, sweep the spine of the ADAT to the right of arc - Visualise the range danger area to see if it fits within the land approved for a shooting range (see Figure A4-6, Appendix 4)
6	Select the correct ADAT – (from T1 to T8)	- Based on largest calibre to be fired - Approved CofF - Maximum angle of departure (QE) - Consider 'hard surface' engagement - Consider the ADH
7	Manually apply the selected ADAT to the map	- Place the ADAT FP on the map GR and align the centre spine of the ADAT with the direction of fire GB plotted on the map - If firing is to take place closer to the target line, the firing point on the ADAT is to be moved to the minimum distance and the range danger area re-assessed
8	Determine if the range is an FDA, RDA, NDA Range	- Identify any man-made or natural feature that could be used to safely reduce the danger area along the range axis (direction of fire) - To achieve RDA or NDA status, the approved CofF of the ADAT must be contained by the selected man-made or natural feature - A NDA Range does not require a trace of the ammunition danger area, but does require a GB for the range axis (direction of fire)
9	Confirm range danger area	- Confirm that the range danger area is contained within the approved land boundary for the shooting range including any associated danger area
10	Record all information (onsite)	- Grid References to the maximum/minimum firing point/line - GB for the range axis (direction of fire) - Grid References to selected backstop/natural feature/limit of reduced danger area
	POST SITE VISIT	
11	Trace the ammunition danger area for the range (single arc of fire)	- Trace the full ammunition danger area onto the map proper - Check and confirm the accuracy of all GRs and the GB - Check and confirm the accuracy of the tracing - Annotate the trace with a legend (if required) (this process can be done on an overlayed sheet of tracing paper to avoid defacing the actual map)
12	Include in RSOs	- Prepare to copy the overall range danger area for inclusion in RSOs
NB	Field Shooting Range – Danger Area	- A field shooting range may require an arc of fire for the respective shooting activity. This requires a more complex application of the ADAT (see Figure A4-6 for an example). It may also require the application of a movement box using parallel arcs (see Figures A4-8-9)

Table 5.2 – Steps required to determine a shooting range danger area

EXPOSURE DRAFT

Determining a Shooting Range Danger Area

Field shooting: A field shooting range may require an arc of fire or movement box with parallel bearings to maximum arcs for the respective shooting activity. This requires a more complex application of the ADAT. (see Appendix 4 of this manual).

Figure 5.5 - Process flowchart - Determining a Shooting Range Danger Area

Section 6

Section 6

Shooting range and danger area signage

Shooting range signage

6.1 Range and danger area signage are required for all ranges. Signs need to be of durable construction to resist weathering. The signs warn people approaching the shooting range site and the range danger area, of the risks associated with entering it. Shooting Range Operators that have not developed suitable signage for their shooting range are to adhere to the guidelines laid down in this section.

Shooting range entrance signage

6.2 The shooting range main entrance sign needs to be large and visible. It should be located at a commonly used access point (e.g. main gate area or entranceway) and clearly identify the site as a shooting range. It should contain, at a minimum, the range or range complex name, the Shooting Range Operator contact information (e.g. phone number, website or email address etc.) and a warning that the person is entering a shooting range. Range signage colocated with a flagpole must contain wording that explains what a raised flag means and clearly state any restrictions on access.

Shooting range danger area signs

6.3 Shooting range danger area signs are to be positioned around the perimeter of the overall range danger area. (where practicable). These signs identify the external boundary of the range. The recommended minimum size of range danger area sign is 40 cm x 30 cm (16 inch x 12 inch) or of a size that can been seen from 100 metres away. It should be of an appropriate colour scheme to be readily visible.

6.4 The intention of these signs is to alert people of the range and range danger area boundaries. Signs need to face outwards, away from the range danger area and spaced at intervals that enable clear identification. They must clearly warn all persons not to enter the range danger area, e.g. **'DANGER, Firing Range, Keep Out'.** Range danger area signs must be visible at all times and must not be obscured by brush or vegetation. Perimeter signs should be checked periodically as part of the range maintenance plan to ensure they are in good order and all graphics and wording remain legible. Where a range danger area sign is found to be in a poor state of repair or non-legible, it is to be replaced or refurbished as soon as practicable. As well as range danger area signs, a warning flag is flown when a range is in operation.

6.5 If fixed danger area signs are not practical for use on limited use or field shooting ranges, portable range danger area signage is to be placed at all known vehicle or foot traffic access points into the range danger area.

6.6 Where portable range danger area signage is not practical all reasonably practicable measures are to be taken to reduce the risk of unauthorised entry. Evidence of these control measures will be required for certification of limited use or field shooting ranges such as an assurance from the landowner that access to the property is restricted to participants of the approved shooting activity. If signs are not to be used this must be included in RSOs for the purpose of certification.

EXPOSURE DRAFT

Section 7

Section 7

Range standing orders

Introduction

7.1 Range standing orders (RSOs) are required to ensure that all necessary precautions are taken to prevent accidents to range users and prevent danger to the public.

Responsibility for RSOs

7.2 RSOs are the responsibility of the SRO who controls the shooting range or range complex. RSOs can be written for a single range or where multiple ranges are located within a range complex, they can be written for the complete range complex with each individual range included separately within the orders or as an annex to the orders. They must be signed by the SRO or evidence of any other appropriate authority that operates the range.

Risk assessment

7.3 Where the Shooting Range Operator (SRO) is required to comply with the Health and Safety at Work Act 2015, it is recommended that a site-specific risk assessment is conducted. The site-specific risk assessment is not covered in this manual, however, there are many online resources and commercial agencies available to assist the SRO if required.

Notification to Police

7.4 SROs are required to submit a current copy of RSOs to Police as a requirement for certification. They will be reviewed for content and compliance during the range certification and in the renewal of certification process. If the RSOs is amended at any time throughout the duration of the 5-year range certification period, the amended copy is to be submitted to Police for review against the original range certification.

7.5 Prior to a change to the safe design, construction or shooting activities on their range(s), which requires an amendment to the RSO, the SRO must inform Police. Police will review and advise if the current range certification remains valid or where necessary, a new certification may be required, e.g. the development of an additional range(s).

Notification to all range users

7.6 RSOs must be accessible to all range users. All regular range users, including members and associated organisations are to be provided with an electronic or hard copy of RSOs. It is recommended that the SRO display the most up to date copy of the RSOs on a noticeboard and website (if applicable).

7.7 The SRO must ensure that all range users are made aware of any changes to the RSOs. The Officer on Duty (OD)/Range Officer (RO) and all range users are to routinely review RSOs to refresh themselves on safe range operation and any approved amendments.

Range Standing Orders are the responsibility of the Shooting Range Operator who controls the shooting range or range complex.

EXPOSURE DRAFT

RSOs - Contents

7.8 A list of considered headings presented in a logical order are contained in Appendix 5. The table contains mandatory headings which must be included within the RSOs to achieve certification. Some headings have been identified as being relevant to specific shooting disciplines and therefore are designated as being exempt and/or optional headings. RSOs may include but are not limited to inclusion of the following information:

1 **Range/range complex name**

2 **Range name** (if an individual range)

3 **RSOs date** – The date RSOs were authorised (including any subsequent approved amended versions)

4 **Introduction**

a. information about the range,
b. describe the legal title of the land on which the range is located, and any associated land affected by the range danger area (if different),
c. name of the landowner permitting the use of their land as a shooting range, and
d. hours of operation.

5 **Responsibilities**

a. name of the SRO, (who is responsible for the overall safe operation of the range), and
b. the person in charge of the day-to-day administration, management and maintenance of the range, if not the SRO.

6 **Compliance with RSOs –**

a. statement directing that all range users must comply with RSOs, and
b. describe the consequence of non-compliance with RSOs.

7 **Range location –**

a. physical street address of the range, and
b. By NZTM map sheet number and grid reference.

8 **Range safety rules –**

a. generic safety rules relevant to the use of the range, and
b. any special requirements before, during and post shooting.

9 **Range layout / Range danger area –**

a. description of all ranges by name or number, distance, and range danger area, e.g. NDA/RDA/FDA,
b. where a range is designated a FDA or RDA range, a scale map of the respective range danger area is to be included as an annex (a scale map is not required for a NDA range),
c. for RDA ranges, the limitation of the danger area is to be clearly defined, and
d. the range axis (direction of fire) is also to be clearly indicated in the scale diagram.

10 **Restrictions –** Describe restrictions on firearms calibres/ammunition approved for use on the range, and the procedure to approve firearms/calibres/ammunition that are not listed.

11 **Conditions of use –** Describe any specific conditions of use for the coordination of range activities, e.g. Range 1 must be closed when Range 2 is in operation.

12 **Targets / New target systems –**

a. describe approved soft and hard target types to be used,
b. describe the correct placement of targets,
c. list approved target centre heights, and
d. describe the procedure for approval and use of new targets and target systems.

13 **Steel targets –** Describe the criteria for the use of approved steel targets

14 **Moving targets –** Describe the criteria for the operation of moving targets

15 **Minimum safe engagement distances –** List the minimum safe engagement distances by calibre, target type and composition of the backstop/bullet catcher material

16 **Approved range users and priority of use –**

a. list approved range users/organisations in their order of priority.

17 **Warning flags – Danger signs –**

a. describe locations of warning flags, danger signs and their use,
b. flag locations may be included within the Google Earth image (or similar diagram).

18 **Range safety appointments –** Describe the range safety appointments required for the safe conduct of a shooting activity

a. RSOs must state that an officer is on duty for each individual range, when in use,

EXPOSURE DRAFT

b. the OD/RO must hold a firearms licence and be appropriately trained in shooting range safety management,

c. the SRO should keep and maintain a register of all persons that have been trained and can perform the role of OD/RO including evidence of how the training was delivered, and

d. it is recommended that a record is kept of individuals who fulfil the role of OD/RO each time the range is in use by name, date, time and range used.

19 **Cone(s) of fire (CofF) -** List the approved CofF for each range

20 **Inability of a shooter to achieve CofF –** Describe the procedure to coach and correct the firer to achieve the CofF

21 **Un-licenced or inexperienced shooters and test firing –** Describe the procedure(s) used to manage an un-licenced or inexperienced shooter on the shooting range, and the safe conduct of approved test firing of firearms and ammunition.

22 **Specific safety rules for the use of the range/range complex–**

a. a statement detailing that these RSOs take precedence over all other individual shooting discipline rules,

b. list specific safety rules for the use of the range/range complex,

c. describe approved shooting activities, and

d. unapproved shooting activities must be reviewed for approval by the Range Operator and included in RSOs as an authorised amendment prior to being used (reminder that amendments to RSOs must be notified to and approved by Police).

23 **Prohibited ammunition –** List any prohibited ammunition types

24 **Air danger height (ADH) –**

a. list approved ADHs for the range,

b. describe the procedure for aircraft intrusion over the range danger area, and

c. describe any necessary procedure required by agreement with the local aerodrome(s) or CAA for use of the range (if applicable).

25 **Eye and hearing protection –** Describe the rules for the use of eye and hearing protection

26 **Accident/Incident procedure –**

a. describe the procedure in case of an accident/incident not involving a firearm, and

b. describe the procedure in case of an accident/incident involving a firearm.

27 **Medical and emergency –**

a. location of the first aid/medical kit, and

b. identify a suitable method (cell phone/ landline/radio) to contact emergency services.

28 **Fire precautions and procedures –**

a. evacuation procedure in the event of a fire,

b. location of onsite fire alarms and equipment, and

c. any relevant seasonal fire restrictions that must be complied with.

29 **Range maintenance plan –**

a. a schedule detailing regular maintenance checks of the range(s) e.g. detailing the criteria for refurbishment of the bullet catcher fill material (if applicable), and

b. for the purpose of certification, the standard of the range maintenance will be assessed against the range maintenance plan.

30 **Range clearance –** Describe the procedure for clearance of the range at the completion of the shooting activity

31 **Unauthorised access and/or use of the range** – Describe the procedure for managing any unauthorised access and/or use of the range

32 **Children (Minors) –** Rules for supervision of children (minors) on the range

33 **Health and hygiene –** Rules for health and hygiene procedures (e.g. washing hands before handling food after shooting)

34 **Domestic animals –** Rules for allowing domestic animals on the range

35 **Additional headings –** Any other information deemed necessary for inclusion in the RSOs for the safe management and operation of the range

36 **Amendment to RSOs –** Describe the procedure for amendments to these RSOs

37 **Authorisation of RSOs –** The RSOs are to be authorised by the Shooting Range Operator, e.g by signature and date

38 **Distribution list –** All range users and associated organisations

Annexes – Additional annexes (if required to supplement the main body)

A **Range layout –** A Google Earth or Topo50 map image indicating a plan view of the range(s) including flag locations,

B **Range danger area –** A scale drawing illustrating the FDA/RDA including a land boundary permitted for use as a shooting range (Not required for a NDA range),

C **Additional shooting organisations -** Where there are additional shooting organisations using the range, specific rules for their discipline can be added as an annex. They must not contradict these RSOs. The annex must be reviewed and approved for inclusion in these RSOs, and

D **Any other relevant information -** Information, tables, images etc, that are more suited to be included as an Annex and reduce clutter in the main body of the orders (e.g. Table of equivalency).

Eye and hearing protection

7.9 All range users in close proximity to the shooting activity are to wear appropriate eye and hearing protection in accordance with the rules of the shooting activity being conducted. Specific rules for the use of eye and hearing protection will be detailed in the RSOs.

Limited use shooting ranges

7.10 RSOs for a limited use or field shooting range need only cover the relevant headings specific to the safe operation and management of the range. Appendix 5 indicates all mandatory headings required to achieve certification that must be included and provides an exemption for headings that are not required for limited use or field shooting ranges.

Individual shooting range summary sheet

7.11 It is recommended that each individual shooting range has a sign displayed listing a summary of the relevant restrictions and conditions specific to that range, e.g. an extract from RSOs listing approved firearms and calibres (see Figure 7.1). These signs are intended to provide a brief summary of the safe operating restrictions and conditions to all users of that range. They do not remove the requirement to display a full set of RSOs accessible to all range users.

Figure 7.1 – Example of RSOs individual range summary sheet

Section 8

Section 8

Shooting range certification

Shooting range certification

8.1 All shooting ranges as defined by the Act (see paragraph 2.8) must be certified by the Police Commissioner (Commissioner). The certification includes the inspection of range structures both man-made and natural features which constitute the shooting range. It also includes a review of the Range Standing Orders (RSOs) required to ensure the safe operation of the shooting range. Police are responsible for managing the certification process on receipt of the shooting range application. A shooting range is a facility (whether indoor or outdoor), or a designated area of land used by a shooting club or members of the public for the primary purpose of carrying out shooting activities.

8.2 In order to comply with the requirements of certification the Shooting Range Operator (SRO) is responsible for ensuing that all shooting activities are conducted in accordance with RSOs. The approved CofF for the range is not to be compromised when shooting activities include unlicenced or inexperienced shooters, or the test firing of a firearm or ammunition type.

8.3 Sighting-in is a shooting activity. Areas set up for and routinely used by the public for sighting-in will need to be certified as a range. However, sighting in conducted as an ad-hoc or occasional shooting activity does not require the use of a certified range if it can be carried out safely. Refer to Section 10 of this manual for guidance on the safety considerations for the conduct of ad-hoc or occasional sighting-in.

Making an application for shooting range certification

8.4 Any person intending to operate a shooting range must apply for the certification of their respective shooting range(s). The process for making an application for range certification is detailed in Table 8.1 and Figure 8.1. The certification is valid for 5 years at which time the Shooting Range Operator (SRO) may apply for a renewal of certification.

8.5 The following documents are to be included with the completed application for range certification:

a. Range Standing Orders (see section 7), and

b. Shooting range inspection report (see paragraph 8.9).

8.6 The SRO is responsible for obtaining a Shooting Range Inspection Report at the completion of a range inspection conducted by a trained Shooting Range Inspector (SRI) recognised by Police. The SRI acts as an agent for the SRO.

All shooting ranges as defined by the Act must be certified by the Police Commissioner. Certification includes the inspection of range structures both man-made and natural features which constitute the shooting range. It also includes a review of the Range Standing Orders (RSOs) required to ensure the safe operation of the shooting range.

STEPS FOR MAKING AN APPLICATION FOR SHOOTING RANGE CERTIFICATION

STEP	ACTION	DETAILS
1	Shooting range certification - Review of requirements.	- Shooting Range Operator (SRO) reviews section 8 of the Police Shooting Range Manual (available online from the Police website). - SRO obtains a copy of the Application form for Shooting Range Certification - SRO is required to have their range inspected by a trained Shooting Range Inspector (SRI) recognised by Police.
2	SRO prepares range certification documentation.	- Acknowledgment that all necessary consent(s) from a Territorial Authority and/or Regional Council to operate a shooting range within their respective boundaries has been obtained. - Acknowledgement that Landowner(s) permission to use their land as a shooting range (including the range danger area) has been obtained. - Produces the Range Standing Orders (RSOs). - Completes the Shooting Range Inspection Checklist.
3	SRO engages a trained SRI recognised by Police.	- Arrange a date and time for the range inspection. - Provide the SRI with relevant documentation required to conduct the inspection, eg. RSOs and Shooting Range Inspection Checklist.
4	The SRI conducts a review of all documentation received from the SRO.	- Commences compiling the Shooting Range Inspection Report and reviewing Shooting Range Inspection Checklist (as completed by the SRO). - Reviews the RSOs and additional documents.
5	The SRI conducts an on-site inspection of the range.	- Conduct the physical inspection of the range as per the Shooting Range Inspection Checklist. - Validates the RSOs and all information provided by the SRO. - Records all relevant information/measurements/details. - Takes photographs to support the Shooting Range Inspection Report.
6	Complete the Shooting Range Inspection Report - Offsite.	- The SRI compiles their range inspection report from details recorded in the Shooting Range Inspection Checklist. - Requests any further information from the SRO required to complete the report (if required) - Reviews and checks the Shooting Range Inspection Report using the checklist as a guide - Completes the Shooting Range Inspection Report.
7	The SRI submits their Shooting Range Inspection Report to the SRO.	- The SRI explains the report to the SRO.
8	**Shooting Range Inspection Report** - The range **does not meet** the minimum acceptable requirements, **OR**	- SRO conducts remedial work required to achieve compliance based on guidance from the SRI or an appropriate Subject Matter Expert (SME) from a national shooting organisation/discipline (if required). - SRO arranges a re-inspection of the remedial work when complete to include another Shooting Range Inspection Report. - Range re-assessed as meeting the minimum acceptable requirements.
9	**Shooting Range Inspection Report** - The range **meets** the minimum acceptable requirements.	- SRO submits their Application for Shooting Range Certification to Police. **Documents include:** - Application Form (for Shooting Range Certification). - Shooting Range Inspection Report. - Current and authorized copy of RSO. - Fee (when set).

EXPOSURE DRAFT

STEP	ACTION	DETAILS
10	Police receive the Application.	- Enter and record all relevant information/data from the Application Form and supporting documentation. - Police confirms receipt of the application to the SRO.
11	Police Review the Application.	- The National Clubs and Ranges Advisor (NCRA) reviews the application and supporting document for compliance with section 38 of the Arms Act 1983. - The NCRA may need to contact the SRO or the SRI to clarify any issues identified in the application, or recommend a Notice to Refuse letter is issued to the SRO informing them of significant areas of concern which require further remedial action by the SRO. - When satisfied, the NCRA will make recommendation to approve/decline the application.
12	NCRA Recommendation to the Commissioners Delegate – Recommend – **'Declined'.**	- NCRA recommends '**Decline**' explaining the reason(s) (in formal written format). - The Commissioner's delegate will review and consider the recommendation (this may include further research and consultation with respective SME). - Decision is made to '**Decline**' the application.
13	Police notify the SRO that their application is **'Declined'.** **OR**	- Application '**Declined**'. - Police notify the SRO by email or cover letter which include the reason. - The notification may include a recommended course of action and reference to the 'Appeal' process.
14	NCRA Recommendation to the Commissioners Delegate – Recommend – **'Approved'.**	- NCRA recommends '**Approve**' explaining the reason(s) (in formal written format). - The Commissioner's delegate will review and consider the recommendation (this may include further research and consultation with respective SME). - Decision is made to '**Approve**' the application.
15	Police notify the SRO that their application is **'Approved'.**	- Application '**Approved**'. - Police notify the SRO by email or cover letter. - Police issue a Shooting Range Certificate to the SRO valid for 5 years subject to the conditions stated.
16	Police Records - Updated.	- Police will update their records to reflect all relevant information received and submitted throughout the application process for the SRO and respective shooting range

Notes:

1. Range Standing Orders can include multiple ranges in a shooting range complex.
2. Where a SRO is also a trained SRI and recognised by Police, they may inspect their own range(s) and submit their Shooting Range Inspection Report to Police as part of their Application for Shooting Range Certification. (It is recommended that the SRI/SRO have their report peer reviewed by another trained and Police recognised SRI in these circumstances).
3. Applications for limited use range certification will be treated as a priority application due to the time sensitive nature of the application.

Table 8.1 – Overview of the application process for shooting range certification

EXPOSURE DRAFT

EXPOSURE DRAFT

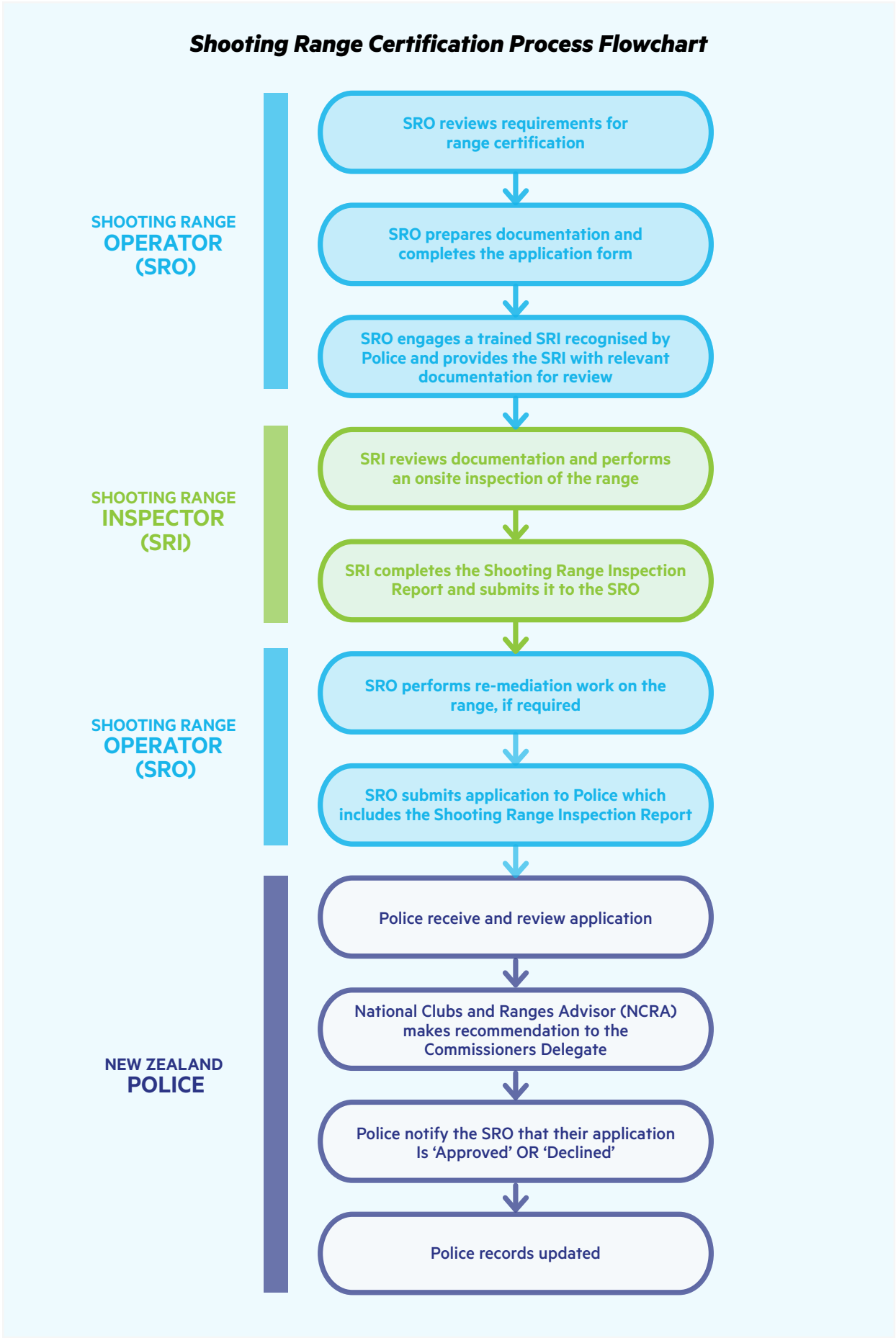


Figure 8.1 - Process flowchart - Shooting range certification

Forms

8.7 All relevant forms, templates, checklists and reports can be found on the Police website.

Transitional

8.8 Incorporated target pistol shooting clubs with ranges that were approved by the Commissioner under Regulation as at 22 June 2022 are treated as if those ranges had been issued with a certificate under the new section 38P of the Arms Act. Their certification starts on 24 June 2022 and ends 5 years later or earlier if cancelled. Otherwise, existing shooting ranges operating as at 24 June 2022 that wish to continue to operate must apply within 12 months from that date.

Range inspection for certification

8.9 A physical range inspection is a critical element of the certification process. A shooting range inspection can only be conducted by a trained Shooting Range Inspector (SRI) recognised by Police. The SRI will also review the RSOs for content and accuracy against the physical description of the range. A register of trained SRI will be made available on the Police website (subject to consent of the individual and adequate site privacy and security measures being implemented).

Shooting range inspection checklist

8.10 The Shooting Range Operator (SRO) is responsible for completing the shooting range inspection checklist including the range plan diagrams (recording the actual measured and/or calculated dimensions of their range structures/features). The SRI will use this checklist during their inspection to assist with the checking and recording of their information.

Shooting range inspection report

8.11 The SRI will compile a shooting range inspection report based on information contained in the shooting range inspection checklist. The report will contain supporting photographs and map images. The SRI will submit their shooting range inspection report to the SRO assessing the range as compliant or non-compliant. If the range is non-compliant the SRO will carry out remedial work and request a re-inspection of this work. If (or when) the range is assessed as compliant, the SRO will submit the shooting range inspection report to Police as a requirement of their application for shooting range certification. Police will review the application (including the shooting range inspection report) and 'Approve' or 'Decline' the application.

Additional inspections

8.12 A member of Police trained as a SRI may undertake additional inspections of existing ranges. This is separate to the initial certification of a range and is part of the Police regulatory function. For these inspections, this member of Police may assess that a range is not being operated with proper regard to individual or public safety, or doesn't meet the minimum acceptable requirements, or is not complying with conditions of certification. Where a shooting range has been assessed as not complying, the member of Police will make recommendations for remedial action. Depending on the nature of this the issue, the shooting range may be subject to an 'Improvement Notice' or its certification may be cancelled requiring the shooting range to be closed.

Officers on Duty

8.13 The Commissioner will grant a certificate when satisfied that all legislative conditions are met. One of these conditions is that when a shooting range is in use, an officer is to be on duty (Officer on Duty or OD) who holds a firearms licence and is appropriately trained in shooting range safety management. This training as a minimum must cover:

a. the duties and responsibilities of the OD,

b. understanding and compliance with RSOs,

c. the correct preparation and set up of the range prior to commencement of firing to include clearance of the danger area,

d. that only approved firearms, calibres and ammunition are used on the range,

e. that they supervise all shooters and inspect firearms and ammunition in accordance with the respective shooting discipline requirements, e.g. specific range safety procedures, match/ competition rules etc,

f. that only approved targets are used, and target placement is correct,

g. the control and supervision of firearms security and safe firearms handling within the range environment,

h. that they assign shooters to targets,

i. the safe conduct of the shooting activity using appropriate range commands (for the respective shooting discipline) and clearance of firearms,

EXPOSURE DRAFT

j. that they report all RSOs breaches,

k. the appropriate control of all non-firing participants while firing is in progress, and

l. the procedure to follow in an emergency.

8.14 The officer who is on duty (OD) has a role of command and control and is responsible for the running of that range while on duty. When there are one or more shooters on the range, one of these must be designated as the OD. The OD can fulfil their role and participate as a shooter, ensuring that they can maintain control of the range at all times.

8.15 Some national shooting organisations currently provide training for their members to be a Range Officer or Range Safety Officer for their specific shooting discipline. The training must include the OD minimum training requirements listed in paragraph 8.13. It is a condition of operating the range that an OD must be on duty for each individual range in use.

8.16 A SRO should keep and maintain a register of persons that have been trained and can perform the role of OD. Evidence of the method used to deliver the training should also be included. It is recommended that a record is kept of individuals who fulfil the role of the OD each time a range is used by name, date, time and range used.

8.17 The RSOs may describe any additional persons that are required for the safe operation of the range. Where an approved shooting activity or organised shooting competition is being conducted, the 'Match' or 'Competition' rules will also detail range safety appointments required for the safe conduct of the activity/competition.

Conditions that may affect shooting range certification

8.18 **Departure from the conditions of initial certification -** The SRO must request the Commissioner review their range's certification if it is intended that the operation of the range will depart from the conditions imposed by the Commissioner when the range was certified. This includes when any additional ranges are added or there are proposed changes to the range use or conditions.

8.19 **Improvement notice** - Police may issue an improvement notice to a SRO where there is any breach of conditions which may include:

a. failing, is likely to fail, or has failed to comply with any conditions to which a shooting range certification is subject (e.g. failure to follow or enforce the RSOs, or where the minimum acceptable requirements for range construction are not being met), or

b. a contravention or anticipated contravention of the Act or Regulations under the Arms Act 1983.

8.20 The improvement notice will specify a reasonable period in which the SRO is to:

a. remedy the non-compliance or contravention, or

b. prevent a likely non-compliance or contravention from occurring.

8.21 Depending on the reason for the issue of an improvement notice, a range inspection (specific to the nature of the problem) may be required to confirm compliance.

8.22 **Temporary suspension of a shooting range's operation -** If the SRO fails to comply with an improvement notice within the stated time frame, a member of Police may temporarily suspend the shooting range's operation. If the breach cannot be remedied, Police may cancel the shooting range certification.

8.23 **Cancellation of shooting range certification** - The Commissioner may cancel certification in respect of a shooting range if the Commissioner is satisfied that:

a. the shooting range is no longer being operated as a shooting range, or

b. the shooting range is not being operated with proper regard to individual or public safety, or

c. the operator is not complying with any of the conditions set by the Commissioner e.g. not maintaining the shooting range at a safe standard, or

d. the shooting range no longer meets all required safety standards published by the Commissioner, or

e. any territorial authority or regional council consents have been cancelled, or

f. the operator of the shooting range has failed to comply with an improvement notice.

8.24 In addition, a SRO may elect at any time to surrender their range certification before expiry where the SRO doesn't want to operate the range anymore. If there is to be a new SRO of the same range, they will be required to make application for range certification.

EXPOSURE DRAFT

Section 9


Backstop
Bullet Catcher
Target Line
Side Wall
Side Wall
Range Floor
11

Section 9

Additional shooting range planning and compliance considerations (Including those specific to indoor shooting ranges)

Environmental planning considerations

9.1 When establishing a new shooting range, it is necessary to consult with territorial and regional authorities regarding potential environmental issues such as excessive noise levels, contaminated waste management or removal, contamination of surface/subterranean watercourses etc. Depending on when a range was established, some established shooting ranges may be operating under 'existing use right' criteria and may only need to obtain further territorial/regional authority approval if they intend to make changes to the range. The relevant local territorial/regional authority will be able to advise.

9.2 There are some environmental issues associated with indoor ranges and to a lesser extent some outdoor ranges. These may include:

a. **Lead contamination** - into the ground, ground water, waterways, buildings and surrounding areas,

b. **Extraction of airborne contaminants (indoor ranges)** – the ventilation system should be filtered before the airflow expels into the external environment,

c. **Noise containment and suppression** - potentially excessive internal and external noise levels, and

d. **Potential risk of fire** - due to excessive build-up of unburnt powder e.g. initiated by muzzle flash.

9.3 There are some health issues associated with indoor and outdoor shooting ranges, these may include:

a. Lead exposure,

b. Potential harm from airborne contaminants produced during firing,

c. Potential damage to hearing, and

d. Potential damage to eye sight.

Landowner permission (including the range danger area)

9.4 Shooting Range Operators are to obtain landowner(s) permission to use the land (or body of water) the shooting range occupies, including any associated range danger area. The Shooting Range Operator (SRO) must be able to confirm that the overall range danger area of their respective range(s) is contained within the boundaries of this area. Where the land/water is owned or legally controlled by another party, copies of written agreement(s) between all affected parties. This would include, for example, the lease or licence permitting use of the land while the range is in operation including any associated range danger area. There may be more than one agreement if the range danger area (or part there of) is owned or controlled by a different person.

The Shooting Range Operator must be able to confirm that the range danger area of their respective range(s) are contained within the boundaries of the land approved for use as a shooting range.

Air danger height (ADH) and airspace considerations

9.5 The air danger height (ADH) is the maximum height above ground level (AGL) which a hazard may exist. The ADH is either the highest point of an aimed shot measured from a firing position or its maximum ricochet height. Intrusion within the ADH can be controlled safely by the Officer on Duty stopping firing if an aircraft enters the ADH for the duration of the intrusion. Shooting ranges may include the requirement for an air sentry in their RSOs.

9.6 Table A4-1 in Appendix 4 lists the ADH that ricochets from various ammunition calibres may travel in a vertical dimension and therefore ADH from potential ricochets must be considered.

9.7 Liaison with the Civil Aviation Authority is only required where the trajectory of the projectile is likely to exceed (CAA Rules - Part 77.9 - Notice of use of weapons - https://www.aviation.govt.nz/rules/rule-part/show/77/1)

a. 45 metres (150 ft) above ground level within 4 km of an aerodrome boundary, or

b. 120 metres (400 ft) above ground level if more than 4 km from an aerodrome boundary.

9.8 Where a shooting range is located within a 4 km radius of an aerodrome, it is recommended that the SRO is to liaise with the aerodrome management to identify any necessary procedures required for the safe operation of both facilities. This may require a formal agreement to be established between the SRO and the aerodrome management.

Shooting range maintenance

9.9 It is a requirement that a range maintenance plan is compiled, and scheduled regular checks are conducted by the SRO to maintain the shooting range in a safe and fit for purpose condition. Range maintenance is an important component of range certification or renewal of certification. The range maintenance plan is to be included in the RSOs.

Useful links:

1. **Lead exposure** - refer to Ministry of Health NZ - https://www.health.govt.nz/your-health/conditions-and-treatments/diseases-and-illnesses/lead-poisoning
2. **Environmental noise -** refer to Ministry of Health NZ - https://www.health.govt.nz/your-health/healthy-living/environmental-health/noise
3. **Environmental considerations** - refer to Resource Management Act 1991 - https://environment.govt.nz/acts-and-regulations/acts/resource-management-act-1991
4. **Auckland Regional Public Health Service -** https://www.arphs.health.nz/assets/Uploads/Resources/Healthy-environments/Minimising-Lead-Exposure-in-Shooting-Club-Ranges-v1-20181114.pdf
5. **United States Environmental Protection Agency -** https://www.epa.gov/sites/default/files/documents/epa_bmp.pdf

EXPOSURE DRAFT

EXPOSURE DRAFT

Section 10

Rear Shelter

Section 10

Safety considerations for ad-hoc sighting-in when not on a range

Ad-hoc sighting-in when not on a range

10.1 Sighting-in is a shooting activity and can be conducted on a certified range (provided it complies with that range's standing orders). Areas set up for and routinely used by the public for sighting-in will need to be certified as a range. However, sighting-in that is conducted as an ad-hoc or occasional shooting activity does not require the use of a certified range, if it can be carried out safely, whether on private or public land, for example:

a. it is done by an individual or a small group of individuals (but not a shooting club); and

b. they are doing sighting-in as an ad-hoc or occasional activity (such as, prior to a hunting trip, or pre-duck shooting season); and

c. the public (or a club) do not access and use that area for sighting-in (for example, there are no established targets, or other indications that the area is used for shooting activities).

10.2 A shooting activity undertaken by a shooting club must be conducted on a certified shooting range.

Safety considerations

10.3 The following criteria must be considered for the safe conduct of a shooting activity that does not require land certified as a shooting range:

a. Identify an area of land that you own, control or have permission to shoot on. The area should be away from populated areas and selected so as not to endanger, frighten, or annoy members of the public, where there are no buildings or human activity. Buildings in the danger area that are not at risk of direct impact and are vacant of human activity, e,g. a hay barn, can be assessed as low risk.

b. Select a safe backstop within the area (this is critical). A large bank or hill immediately behind the target is recommended. Trees or vegetation without solid ground behind them are not a reliable backstop. The steeper the slope of the natural feature the better it reduces the potential for ricochet.

c. A rifle bullet can travel several kilometres even after a ricochet, therefore, the direction of fire should be oriented so that the fall of shot area extending beyond the target does not contain roads, dwellings, buildings or areas of human activity. Ideally the bank or hill (backstop) immediately behind the target should be high enough to contain ricochets (see Appendix 4 for examples of ammunition danger area templates).

d. Avoid hard or stony surfaces likely to cause a ricochet or backsplash. If a ricochet is heard when shooting, stop shooting and select a more suitable location.

e. Select an area where you have control and full visibility of anyone entering the danger area. Avoid selecting backdrop areas where members of the public, farm staff etc. might enter the danger area without your knowledge, e.g. roads, tracks, access-ways or river flats where you don't have full visibility of the danger area.

f. Select targets that will not create a ricochet or backsplash e.g. paper, soft timber, suitable steel targets (positioned correctly). Targets should be placed centrally at the base of the backstop (bank or hill) to ensure all bullets will be captured by the backstop.

g. Avoid areas with livestock within the danger area.

h. Ensure that firearm safe handling, and the seven rules of firearms safety are to be applied in accordance with the Arms Code.

Targets ideally should be paper, soft suitable timber or suitable steel targets (positioned correctly) that will not create a ricochet or backsplash and should be placed in the centre of the base or foot of the hill/feature.

EXPOSURE DRAFT

Section 11

Section 11

Closing a shooting range

Closure

11.1 Where a shooting range does not comply with the minimum acceptable requirements for safe range design, construction and operation, the range is unsafe and the Shooting Range Operator (SRO) or member of Police must direct the range is closed.(see paragraph 8.23).

11.2 Any individual using a range who considers the range unsafe should cease using it and report this to the SRO. On receipt of this notification, the SRO must close the range until they can confirm the range is safe.

Notification to Police

11.3 If the range is confirmed unsafe, it must remain closed, and signage posted to this effect. The SRO must notify Police without delay. Police may issue an improvement notice (if applicable) and go on to consider temporary suspension in the event of non-compliance. A range inspection addressing the specific matters giving rise to the problem may be required as a part of this process. If the issue has been addressed, then cancellation of the ranges certification may be unnecessary and the range can be re-opened. However, if the issue has not been satisfactorily addressed, then Police may consider cancelling the range's certification.

11.4 Any individual who considers a shooting range to be unsafe should notify both the SRO and Police without delay.

Temporary closure for administrative, maintenance or weather conditions

11.5 A SRO may close a range(s) temporarily for repair work, maintenance, or the effects of adverse weather, e.g. flooding. The SRO is not required to notify Police in these (or similar) circumstances and may reopen the range when appropriate.

Decommissioning

11.6 When a range is to be decommissioned and closed permanently, all range signage and structures should be removed. Other remediation (perhaps in consultation with Iwi) may be required by the land owner, lease holder or licensor, depending on the particular circumstances.

Any person discharging a firearm on a shooting range that has been closed for shooting may commit an offence against sections 48 and 53 of the Arms Act 1983.

A Shooting Range Operator who fails to ensure that a shooting range is safe may commit an offence against section 145 of the Crimes Act 1961.

EXPOSURE DRAFT

Supplementary information

Appendix:

1. Process flowchart – Establishing and/or developing a shooting range.
2. Example of a limited use range design – Field shooting range.
3. Examples of various range designs.
4. Design and application of an ammunition danger area template.
5. Range Standing Orders - Required headings and information.
6. Conversion factors and units of measure.

EXPOSURE DRAFT

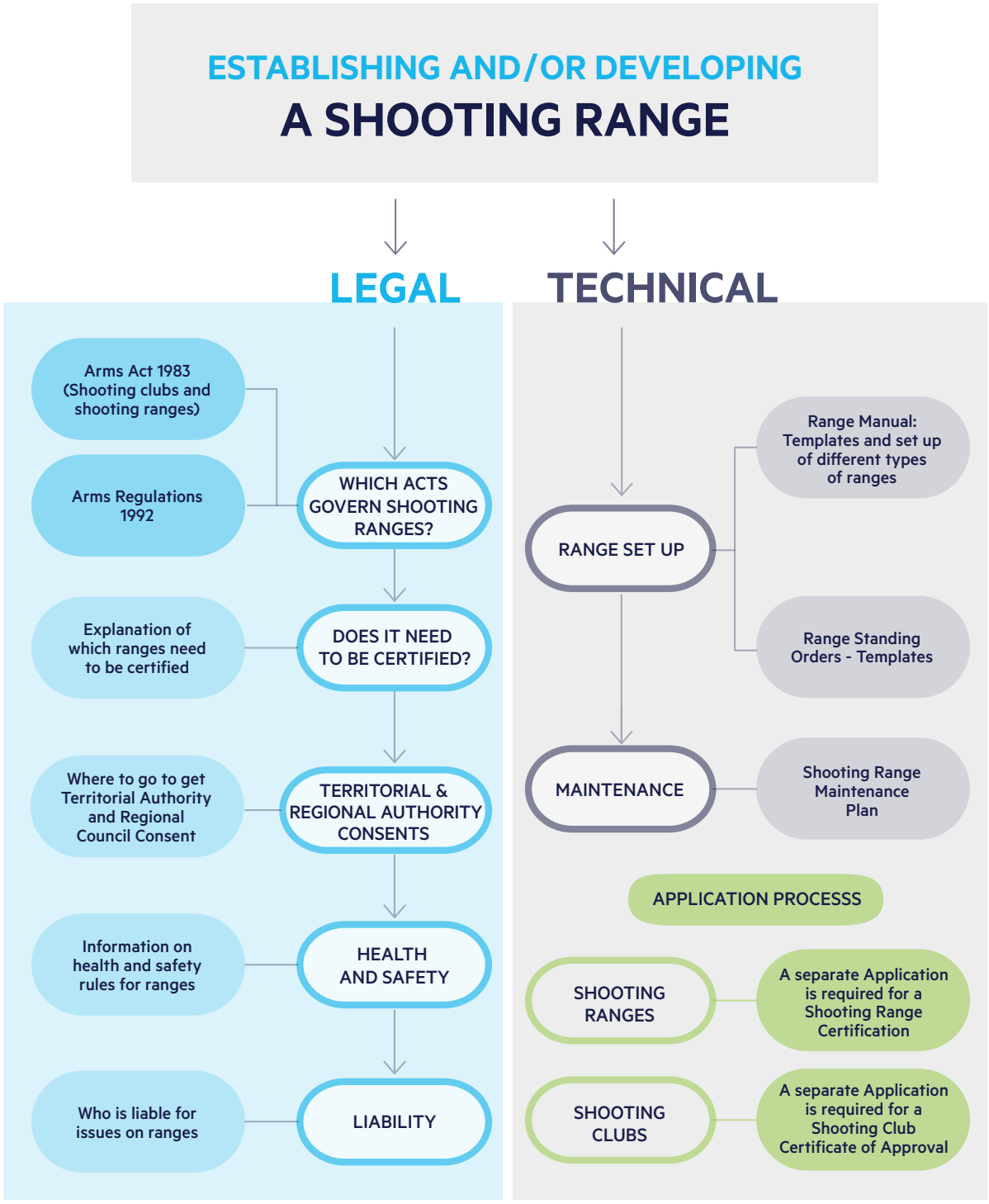
RANGE CERTIFICATION ENGAGEMENT GROUP (RCEG)		
Abbreviation	**Organisation**	**Representative**
NRANZ	Nation Rifle Association of NZ Inc. / Advisor	John Snowden
NZCTA	NZ Clay Target Association	Hamish Wilson
NZDA	NZ Deer Stalkers Association	Bill O'Leary
PNZ	Pistol NZ	Peter Miles
TSNZ	Target Shooting NZ	Ross Mason
COLFO	Council of Licensed Firearms Owners	Marcus Griffin
N/A	Firearm Safety Council of Aotearoa NZ / Advisor	Joe Green
N/A	Gunsafe Firearms Safety and Education	Kerry Adams
GPRE	Gillice Practical Rifle Event	Simon Gillice
NZ GAC / PHGA	NZ Game Animal Council, Professional Hunting Guides Association, Federated Farmers	Roger Duxfield
Field Shooting	Field Shooting Advisory Group - Chairperson	Nick Fisher
NZ Police	NZ Police - National Clubs and Ranges Advisor	Doug Puke
NZDF - External Advisor	Weapons and Range Safety Branch, NZ Army - Publication reviewing officer/Advisor	Dale Stokes
NZDF - External Advisor	Weapons and Range Safety Branch, NZ Army - Advisor	Kevin Hicks

Table A.1 – Range certification engagement group members

Note: External RCEG Members provided a consultation and advisory role for the production of this publication. Decision on final content remained the sole responsibility of Police.

Appendix 1:

Process Flowchart – Establishing and/or Developing a Shooting Range



Note: The aim of this process chart is to provide the reader with an insight into the type of procedures that may need to be completed when establishing a new shooting range or developing an existing shooting range. For more detailed information and advice, it is recommended that the reader make contact with a National Shooting Organisation relevant to the shooting discipline they wish to establish or develop their range for (see section 4). It is also recommended that the reader review the source documents listed in section 1 for specific detail on safe design and construction of various types of shooting ranges.

Figure A1-1 - Process Flowchart – Establishing and/or developing a shooting range

Appendix 2:

Example of a limited use range design (including - field shooting ranges)

1. A limited use range may be set up for a one off indoor or outdoor shooting event. Field shooting activities, NZDA hunts courses, sporting clay field shoots, and smallbore shooting activities have similar characteristics of a limited use range and therefore have been included in this Appendix.

2. Limited use ranges are unlikely to have any established range features or infrastructure, e.g. bullet catchers, flagpoles, fixed range signage, buildings, toilets etc.

Design

3. When looking at the shooting range design, the following should be considered:

   - the area of land that you are planning to use,
   - type of firearms and calibres to be used,
   - the use of significant topograhic features to reduce the range danger area,
   - bullet catcher (if applicable),
   - ammunition danger area template,
   - range danger area, and
   - target placement.

Backstop/ Topographic feature

4. A limited use range is required to have a backstop (except where it is a FDA range). Where practicable the backstop is to comply with the dimensions for a NDA range as laid down in Table 3.1, Section 3 of this manual. Where this can not be achieved, the range may be considered a RDA or FDA range.

5. Where possible a significant topographic feature may be used in place of a backstop to establish a RDA range for both limited use and field shooting ranges.

6. The dimensions of the topographic feature must be such that all projectiles (fired within the approved CofF) and ricochet are captured by the feature.

7. The slope angle of the topographic feature will depend on the terrain and therefore create a potential for ricochet. Criteria for mitigating ricochet on RDA ranges can be found in Section 5 of this manual.

Range template

8. The correct ammunition danger area template (ADAT) to be used for a limited use or field shooting range will depend on the type of firearms, ammunition, targets and type of shooting activity to be conducted. Normally a FDA ADAT would be used for this type of range, however it may be possible to achieve a RDA or NDA range respectively if the criteria can be met.

9. A Shooting Range Inspector (SRI) can advise on what template(s) may be applied based on the information provided by the Shooting Range Operator (SRO) (this should include the information listed in paragraph 8 above).

10. The SRO may apply a template using a firing point, firing line or movement box with parallel bearings allowing for maximum left and right of arc target placement. The application of a movement box requires additional templating skills and knowledge, therefore it is recommended that the SRO and/or SRI seek guidance from Police if required.

Range danger area

11. The design of the range must consider the “Range Danger Area” the purpose of which is to provide a buffer zone between the range’s shooting activities and local community activity. It provides an area beyond the active range area in which overshoots and ricochets can impact without causing harm to any person or damage to property. A range danger area decision flowchart is displayed in Figure A2-4 of this Appendix.

Firing point

12. Firing Points should be clearly defined and allow the shooter to have clear line of sight and uninterrupted line of fire to the target(s) intended to be engaged from each respective firing point. The Officer on Duty and /or other necessary range safety appointments should have uninterrupted access to all firing points.

Range environment

13. Ideally the range environment between the firing point(s)/line(s) and the target locations should;

- allow a clear line of sight,
- be free of any large obstructions,
- be free of any large exposed rock outcrops,
- not contain exposed bodies of water or rivers where direct impact on the surface of the water is likely to occur,
- not contain any man-made structure within the overall range danger area, e.g. buildings,
- have clearly marked or identifiable firing point(s)/lines(s) and target location,
- be clear of any livestock within the active range area, and
- not put any livestock at risk of direct strike within the range danger area.

Target placement

14. Targets must be placed so that the backstop/topographic feature encompasses the entire applicable CofF. If the backstop or topographic feature is insufficient for this to be achieved FDA template is to be applied.

15. If targets are placed in an elevated position above the toe of the backstop or topographic feature, there must be sufficient remaining height behind the elevated target to the crest of the backstop/topographic feature to capture the CofF.

16. If this cannot be achieved or targets are placed on the crest of a feature, a FDA template is to be applied.

17. Where steel targets are to be used it is recommended they are of a style or construction that reduces the likelihood of ricochet or backsplash. RSOs may include additional control measures for the safe engagement of steel targets. There are also minimum distances recommended for the engagement of steel targets due to the inherent risk of backsplash (see Table A4-1, Appendix 4).

Range standing orders (RSOs)

18. The RSOs applicable to the limited use or field shooting range should be available on-site. They should be read and understood by the Officer on Duty.

Other requirements

19. Other requirements that must be considered:

a. identify an area of land large enough to contain the range danger area of the shooting activity,

b. obtain the permission of the landowner to conduct the shooting activity on their land including any other land affected by the overall range danger area, and

c. confirmation of compliance with any necessary Territorial Authority/Regional Council requirements.

EXPOSURE DRAFT

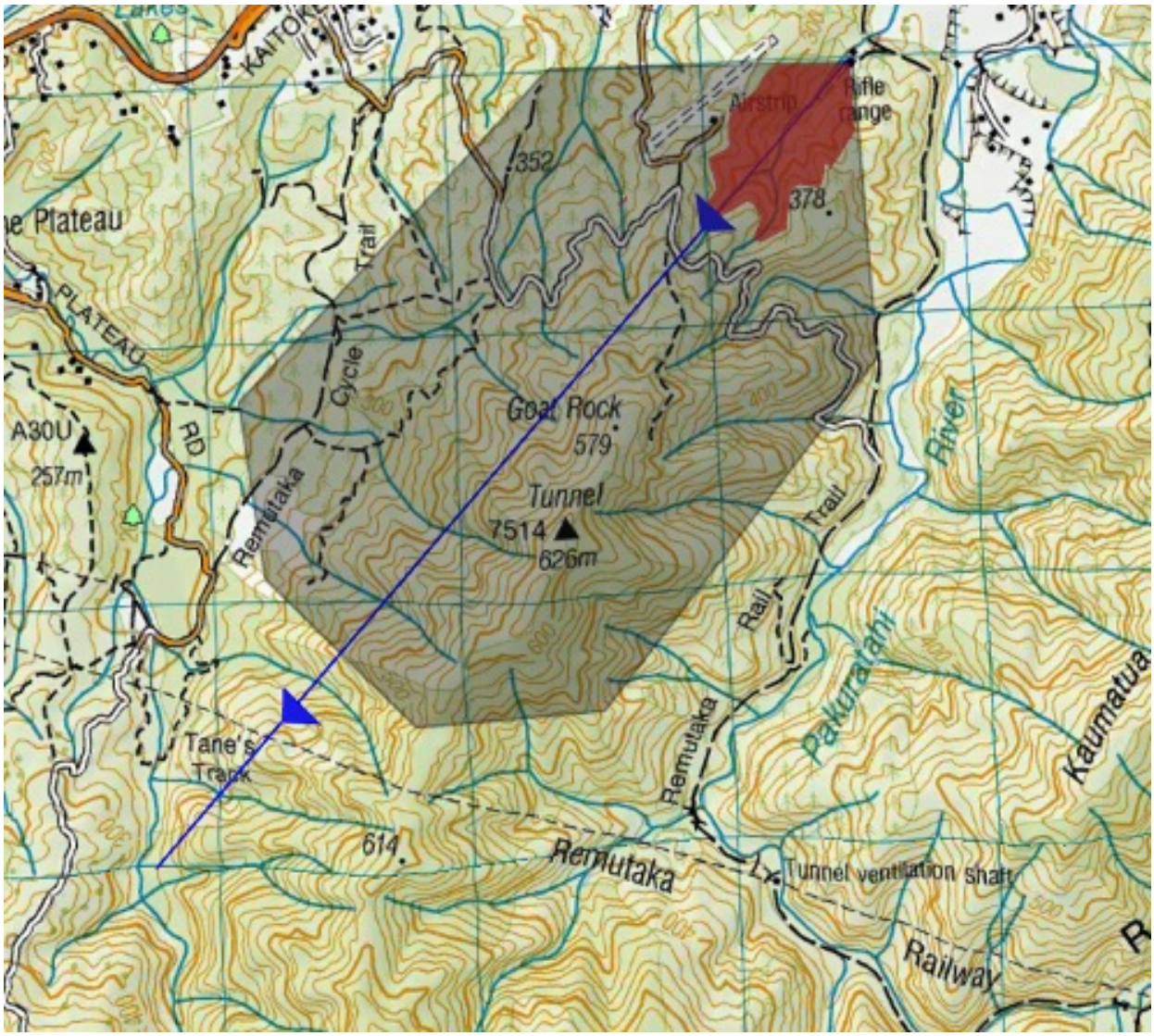


Figure A2-1 – Example of an enlarged view of a T6 template (7.62 mm where a reduced danger area (RDA) has been applied at the 330 metre contour line. The axis of the range is indicated by the blue line and arrowheads. The grey shaded area represents the T6 ADAT and the red area represents the actual RDA.

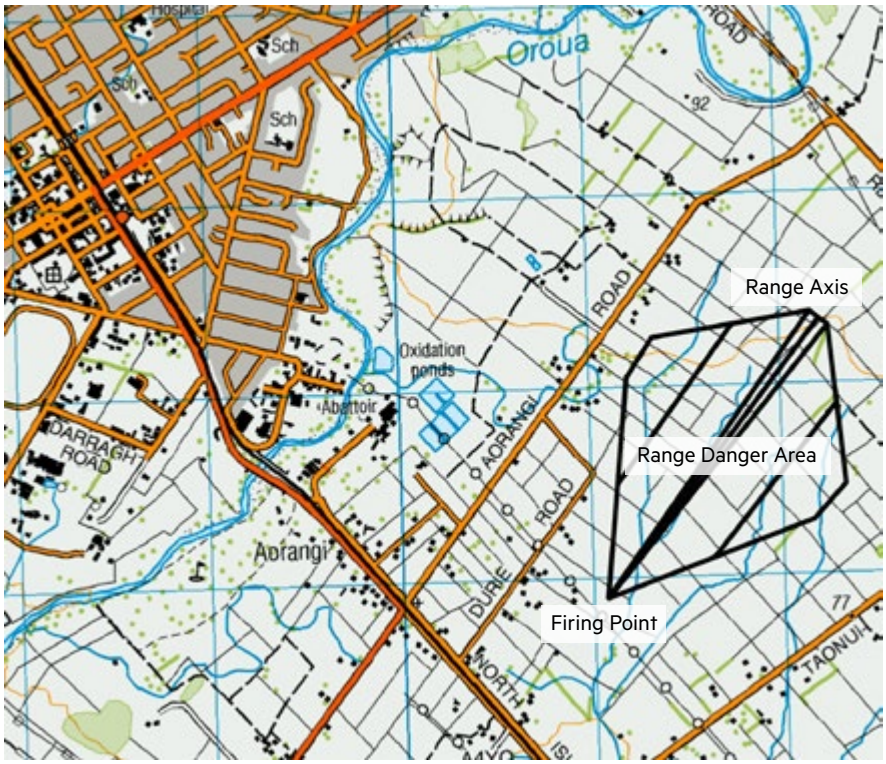
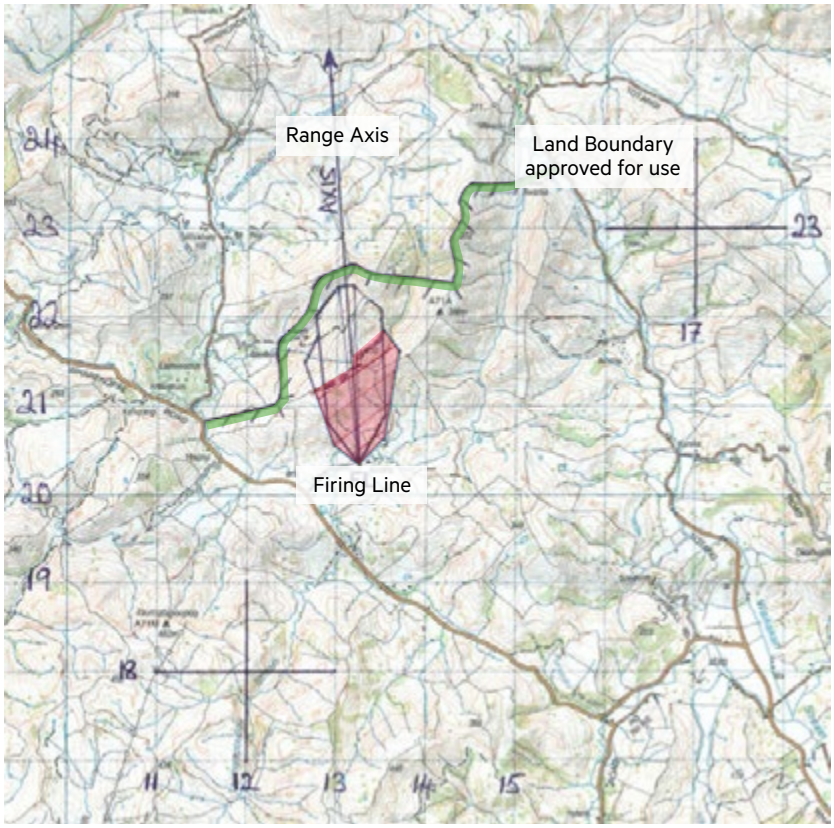


Figure A2-2 – Example of a T5 template (hard surface) applied to a map (Not to scale)



NZ Police - Example of a field shooting range (Frangible only)	
Map:	NZ Topo50 - Example
Scale:	1:50,000
Ammunition Danger Area Template:	5.56 mm QE< 160 mils (Frangible Only) 9 mm QE< 150 mils (Frangible Only)
Firing Line/ Point GR	GR1326 2033
Fixed Arc of Fire (Range Axis)	6324 mils GB (5900 mils MB)
1. Danger Sign	GR1319 2030 - Facing West
2. Danger Sign	GR1341 2036 - Facing East
Author	DG Puke 3 Nov 20

Figure A2-3 – Example of a manually drawn template for 5.56 mm and 9 mm applied to a map (Not to scale)

- The red area represents the reduced danger area which is limited by the crest of the feature.
- The green hashed line indicates the land boundary approved for a shooting range.

EXPOSURE DRAFT

Range Danger Area Decision Flowchart

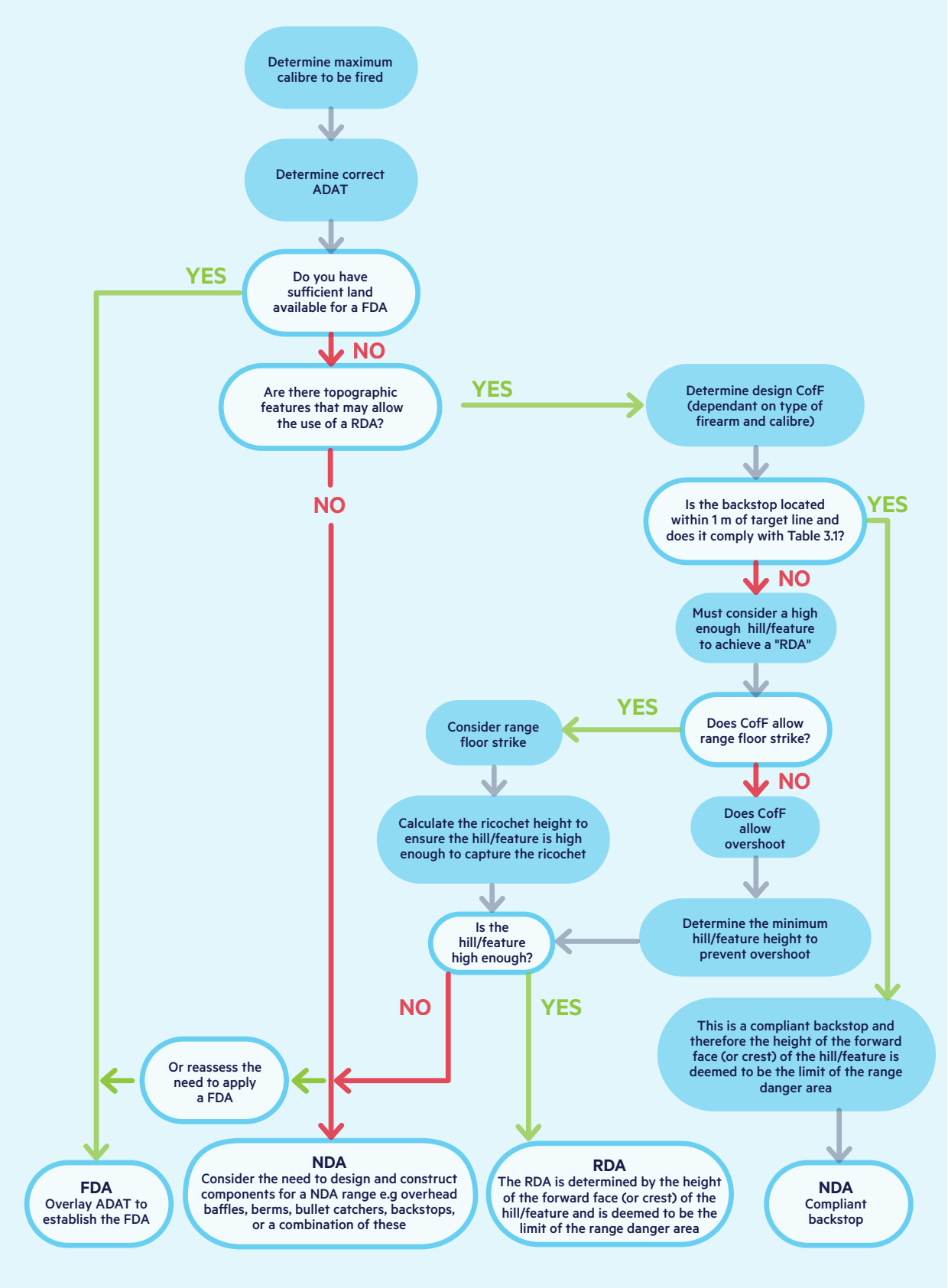


Figure A2-4 – Range danger area decision flowchart

EXPOSURE DRAFT

Appendix 3:

Examples of various shooting range designs and construction techniques

Figure A3-1 – Examples of standard rifle ranges

Figure A3-2 – Examples of standard pistol ranges

EXPOSURE DRAFT

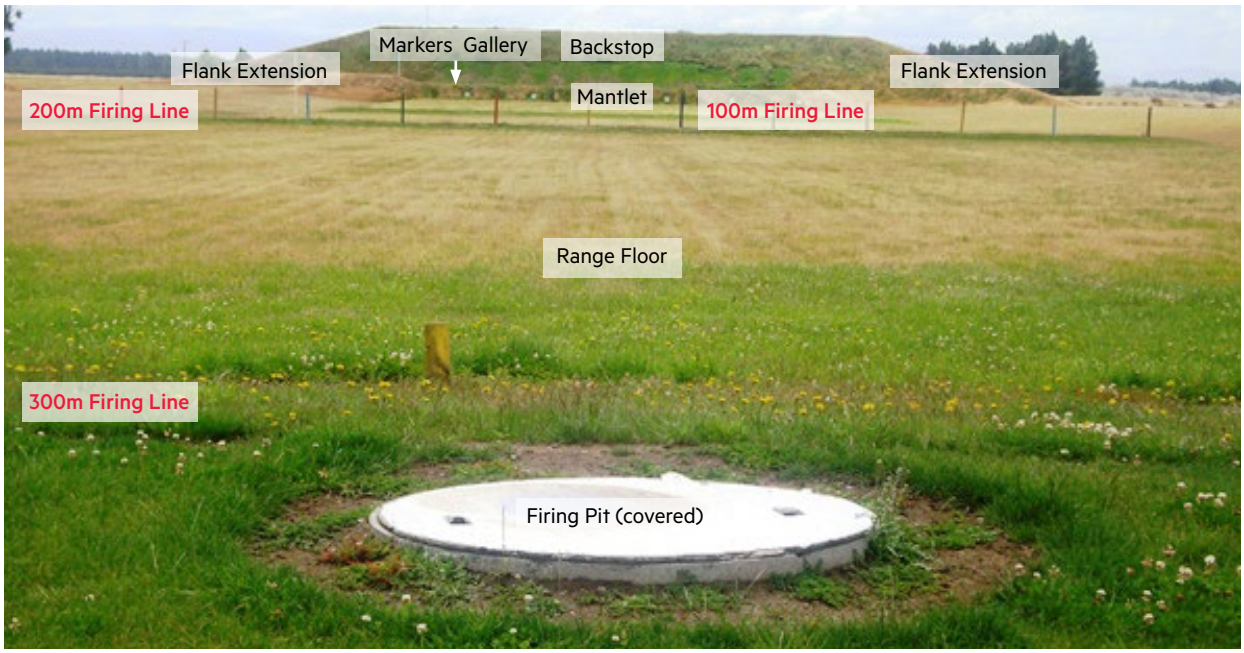
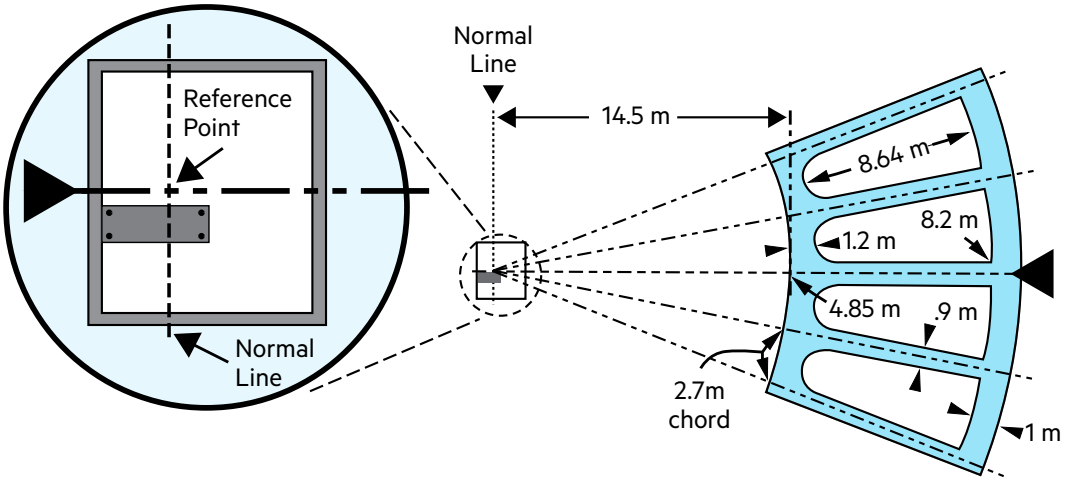


Figure A3-3 – Examples of gallery ranges

Figure A3-4 – Examples of skeet ranges

Figure A3-5 – Example of a down the line (DTL) trap (field) range



Note: 1. Reference point is located at the intersection of the normal line and the centrerline of the trap house

Figure A3-6: Typical trap field layout

Without a shooting stall

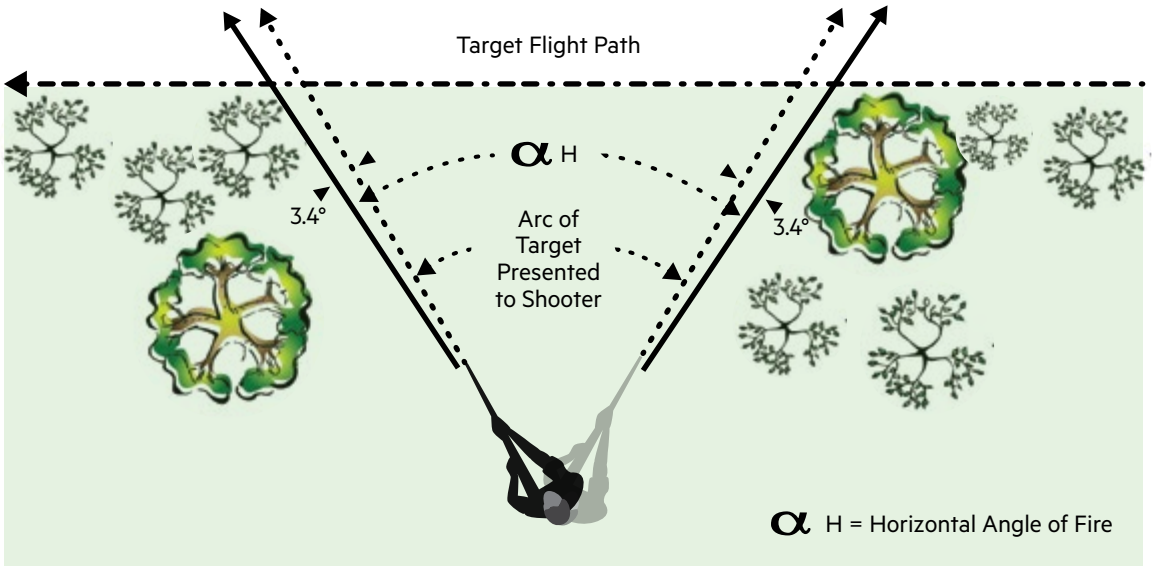
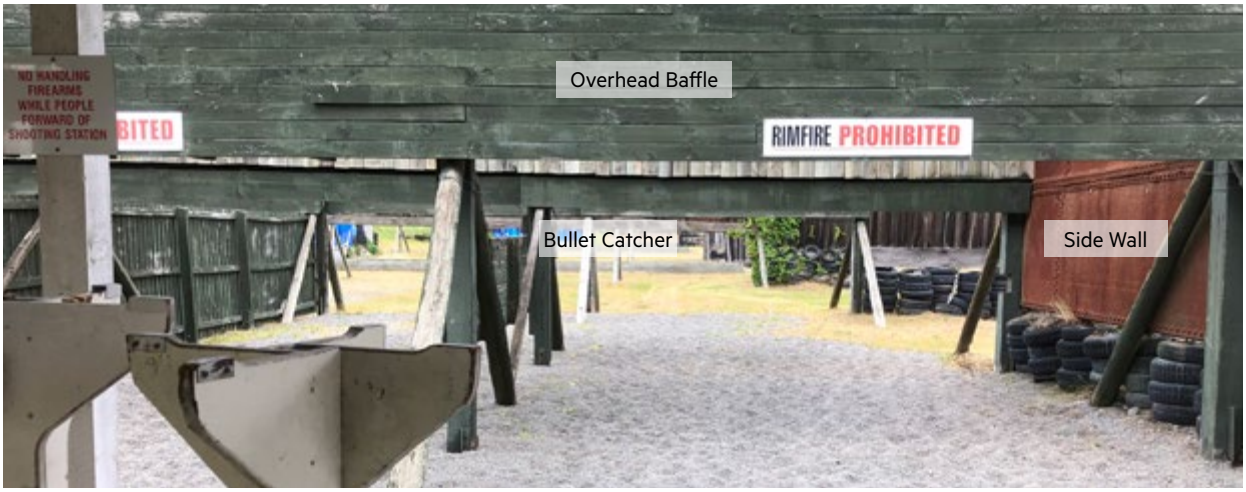
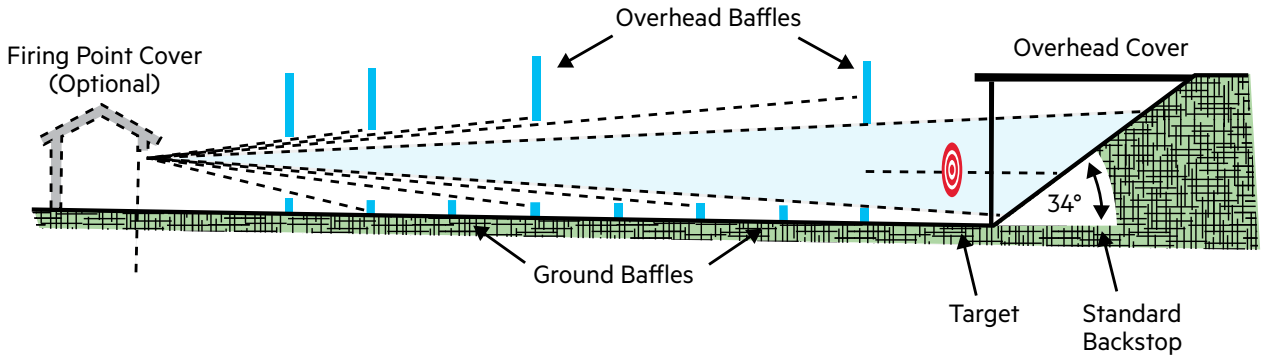


Figure A3-7 – Example of a sporting clay shooting range (without a shooting stall)

EXPOSURE DRAFT





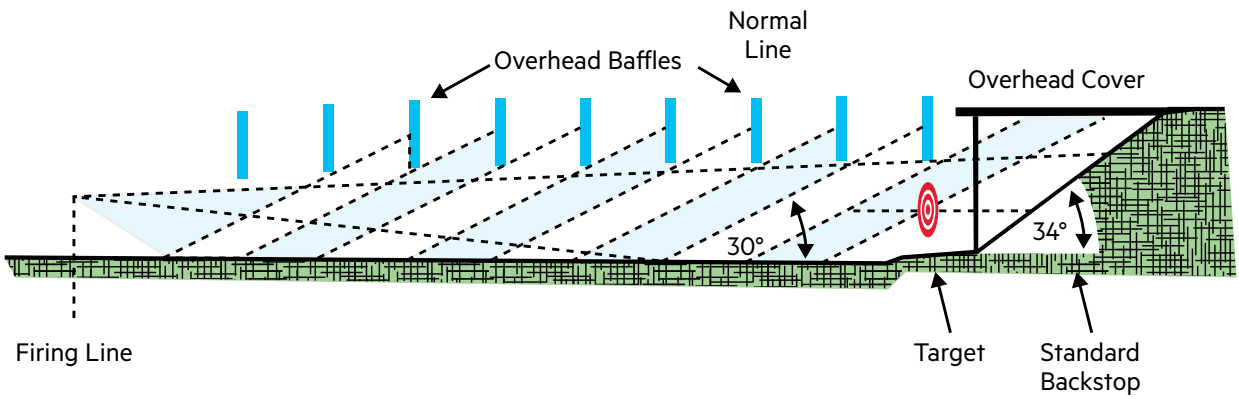


Figure A3-8 – Examples of baffle ranges

Figure A3-9 – Examples of indoor ranges

Figure A3-10 – Example of a field shooting range

EXPOSURE DRAFT

Design and application of an ammunition danger area template

Ammunition danger area templates can either be produced by deterministic or probabilistic safety analysis methods recognised by Police. Table A4-1 shows generic deterministic ammunition danger area template dimensions by firearm category and groups. Refer to Note 4 of this table on guidance where it is necessary to apply a variance to dimensions in this table.

AMMUNITION DANGER AREA TEMPLATE (ADAT) DIMENSIONS								
Template	Suitable Firearms	Maximum Distance	Opening Ricochet Angle (mils/ deg)	Ricochet Distance (Ground) (m)	Ricochet Distance (Hard) (m)	Ricochet Closing Angle (mils/deg)	Air Danger Height (ft/m) AGL	Backsplash Safety Distance Ground / Hard (m)
T1	Rimfire rifle and pistols	1400	530 mils (30°)	175	350	800 mils/45°	500 ft/ 150 m	10 Ground 20 Hard (for T1/T2/T3)
T2	Centrefire Pistol up to .50 cal	2000	530 mils (30°)	250	500	800 mils/45°	500 ft/ 150 m	
T3	Muzzle loading and percussion rifles	2000	530 mils (30°)	250	500	800 mils/45°	500 ft/ 150 m	
T4	Centrefire Rifles up to 223 inch /5.56 mm (See Note 5)	2000	530 mils (30°)	250	500	800 mils/45°	500 ft/ 150 m	15 Ground 50 Hard (for T4/T5)
T5	Centrefire Rifles up to .223 inch /5.56 mm (See Note 6)	2500	530 mils (30°)	350	650	800 mils/45°	500 ft/ 150 m	
T6	Centrefire Rifles up to 8mm (.308 inch / 7.62 mm) (See Note 7)	2900	530 mils (30°)	400	800	800 mils/45°	500 ft/ 150 m	22 Ground 50 Hard
T7	Centrefire rifle .338 inch	3700	530 mils (30°)	450	900	800 mils/45°	500 ft/ 150 m	22 Ground 300 Hard
T8	Centrefire Rifle .50 inch	5200	530 mils (30°)	650	1300	800 mils/45°	3000 ft/ 1000m	120 Ground 350 Hard

Notes:

1. Template dimensions in this table are traditional deterministic danger areas.
2. Backsplash distance is not the minimum engagement distance. Minimum engagement distance is determined by the club or association shooting discipline. Consideration should be given that any person within a backsplash safety distance is wearing personal protective equipment, e.g. eye protection. Applying a reduced engagement distance for .338 inch and .50 inch engaging hard target is not recommended.
3. When describing a danger area within RSOs, the Shooting Range Operator (SRO) is to display the full danger area as detailed in this table to scale on the respective map, then illustrate within the templated area the limit of the reduced danger area for the range (see Figure A2-1, Appendix 2 for an example).
4. If a SRO applies a proven ADAT variance to this table for a specific firearm and/or ammunition nature this is to be quantified with any specific safety control measures in RSOs.
5. T4 is to be used for firearms groups that fit within .223 inch/5.56 mm firing ammunition up to 55 grains.
6. T5 is to be used for firearms groups that fit within .223 inch/5.56 mm firing ammunition > 55 grains up to 69 grains.
7. T6 is to be used for firearms groups that fit within the .308 inch/7.62 mm (up to 8 mm) firing ammunition >69 grains.
8. Where a limited use or field shooting range includes a hard impact surface (e.g. rocks, steel, etc.) at less than 30 deg and within the CofF then the air danger height should be increased to 1000 ft for T1 to T5, 1500 ft for T6, and 3000 ft for T7 and T8.

Table A4-1 – Ammunition danger area template (ADAT) dimensions

Cones of Fire (CofF) Established Ranges	
CofF for all approved rifle and ammunition calibres/natures.	20 mils (1.125 deg)
CofF for all approved pistol and pistol ammunition calibres/ natures.	23 mils (1.3 deg)

Cones of Fire (CofF) Limited use or Field Shooting Ranges	
All approved rifles	Unsupported 20 mils (1.125 deg) Supported Positional (not prone) 15 mils (0.844 deg) Supported (Prone) 10 mils (0.563 degs)

Note: 1. If a Shooting Range Operator applies a variance to the cones of fire in table A4-2 for a specific firearm and/or ammunition nature, this variance is to be quantified with any specific safety control measures in RSOs, e.g. firearm and/or calibre restrictions, type of shooting activity, record of shooting trial results, etc.

Table A4-2 – Cones of fire (CofF)

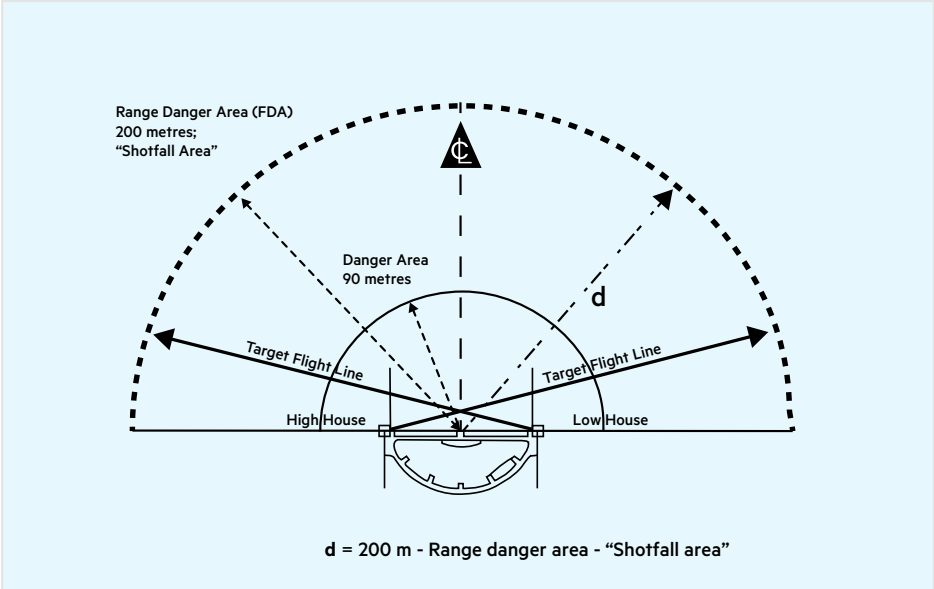


Figure A4-1 - Example NZCTA Shotgun skeet range template

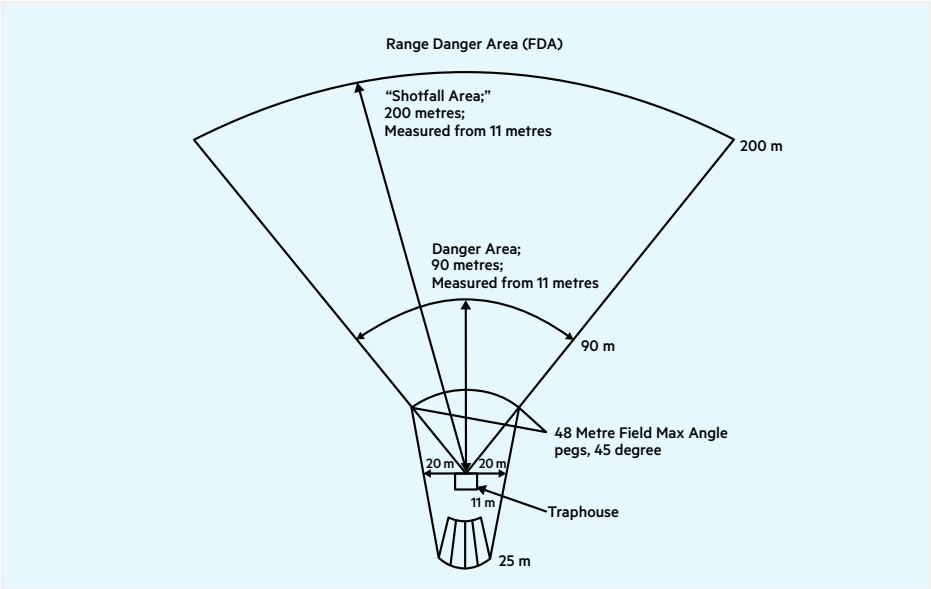


Figure A4-2 - Example NZCTA Shotgun trap range template

EXPOSURE DRAFT

Applying danger area templates

As a start point, a design plan drawn-to-scale is prepared for the range being developed or assessed. This includes the proposed firing points, firing areas, backstop(s), buildings and property boundaries.

Ammunition danger area templates can then be applied to the design plan. They are applied to all the firing point(s), parallel to the direction of fire. Outside boundary lines are traced from the template onto the plan or map. The resulting danger area defines the maximum boundary of the range danger area, with nothing in place to reduce or eliminate this.

If an arc of fire (e.g. engaging multiple targets from a single firing point) is planned, the ADAT is applied to all possible firing point-to-target combinations. The entire area that encloses the resulting danger area is the required overall danger area.

If a firing area is being assessed, perhaps for the purposes of a field shooting range – where a shooter moves forward or laterally a significant distance – the ADAT is applied to the outside edges of the firing area in the direction(s) of fire. The resulting danger area marks the boundaries of the danger area with nothing in place to reduce or eliminate this.

Shooting Range Operators must beware of the temptation of making the danger area 'fit' the land available to them without any use of a suitable natural feature or construction taking place to enable this.

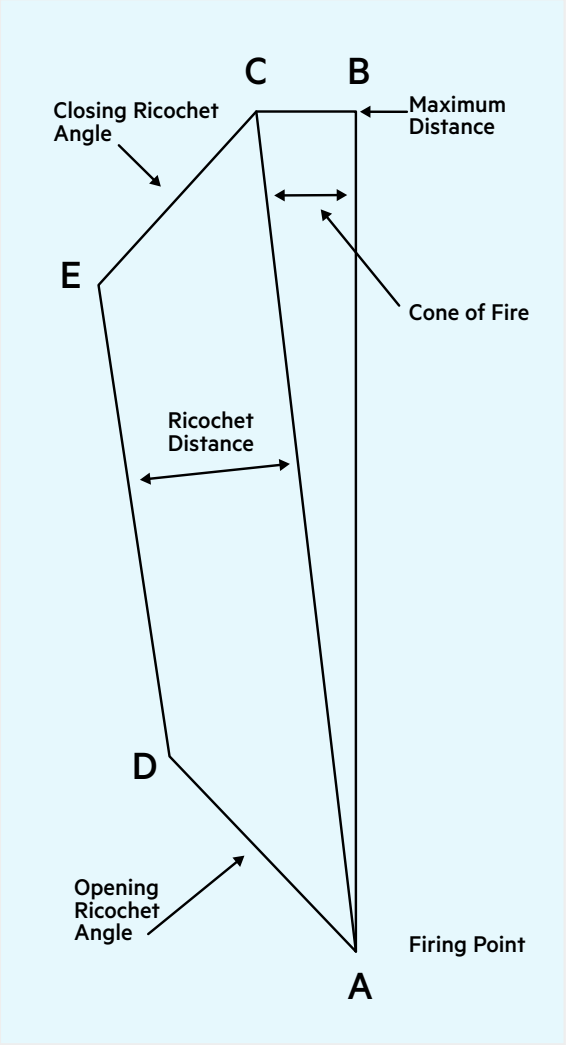


Figure A4-3 – Example template design

Ammunition danger area design explanation

Line A – B. Line A – B is a straight line between the firearm and the target, which has been extended to reach the maximum length of the ammunition danger area template. The maximum length of the ammunition danger area template is either:

a. the maximum possible range of the projectile, or
b. the maximum possible range of the projectile based on the angle of departure (QE), so long as this range is not shorter than the maximum ricochet range.

Line A – C. Line A – C is the cone of fire angle applied to Line A – B. Line A – C is the same length as Line A- B. The angle between Line A – B and Line A - C will vary depending on the cone of fire applied.

Line A – D. Line A – D is the opening ricochet angle and, unless empirical data exists to the contrary, it is always to be at an angle of 30 deg (530 mils) to Line A – C.

Line C – E. Line C – E is the closing ricochet angle and, unless empirical data exists to the contrary, it is always to be at an angle of 45 deg (800mils) to Line A – C.

Line E – D. Line E – D is the ricochet boundary. Ricochet distance between line A – C and E - D is recommended to be one eighth of the maximum distance for ground surfaces (see Note 3) or one quarter for hard surface (see Note 4).

Notes:

1. **Completion of the Ammunition Danger Area Template.** Lines A – C, B – C, A – D, C – E and D – E are mirrored to the right of Line A – B to complete the ammunition danger area template.
2. **Maximum Distance.** Determined by maximum angle of departure of firearm type and ammunition by range in use.
3. **Hard Impact Surface.** Hard impact surfaces include, but are not limited to, concrete, hard crystalline rock (for example, basalt, rhyolite, and granite rocks), steel and permafrost.
4. **Hard impact surfaces.** Hard impact surfaces includes, but are not limited to concrete, rock, steel, water and frozen surfaces.
5. **Ground impact surfaces.** Ground impact surfaces includes all surfaces other than hard impact surfaces. The composition and depth of the ground (including top soil and vegetation) in some geographic regions may allow for the reduction of the ricochet angle if it is deemed safe to do so by the SRO.

Example Template Design (Not to Scale) 1:50,000 Map
T4 Centrefire Rifle (Ground and Hard Impact Impact Surface)
.223 inch / 5.56 mm

Note: All ADATs are drawn with a QE (angle of departure) of <150 mils and 20 mils CofF

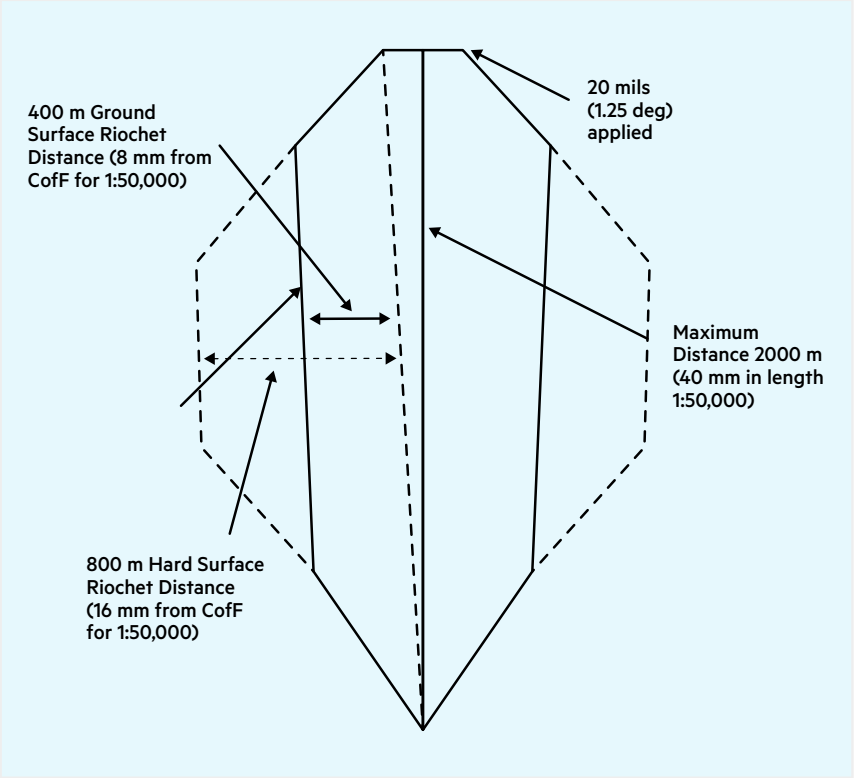


Figure A4-4– Example of template design

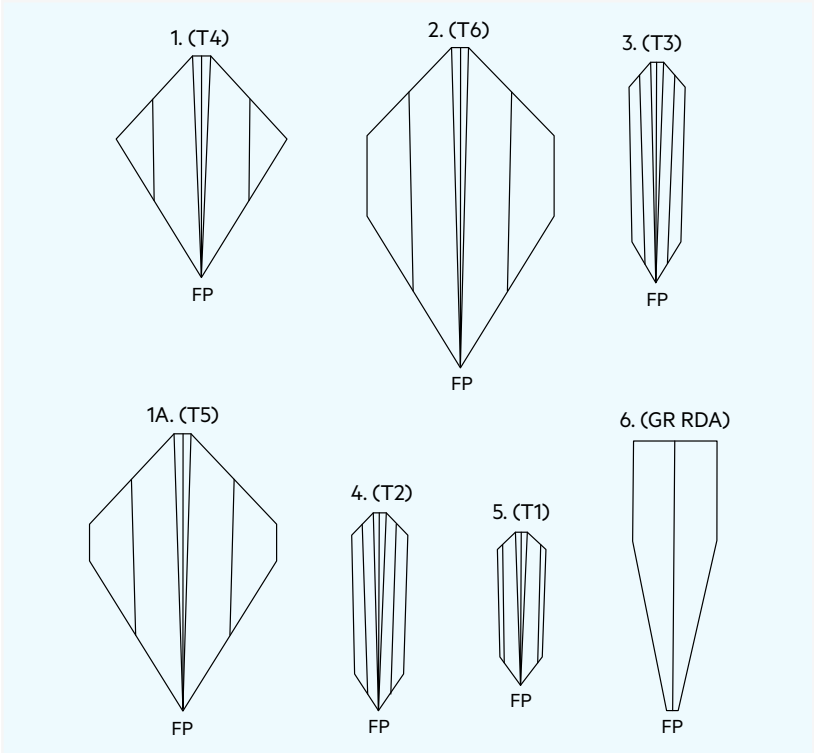
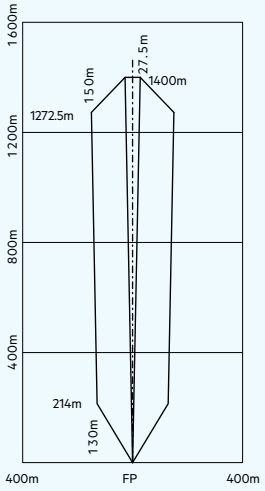
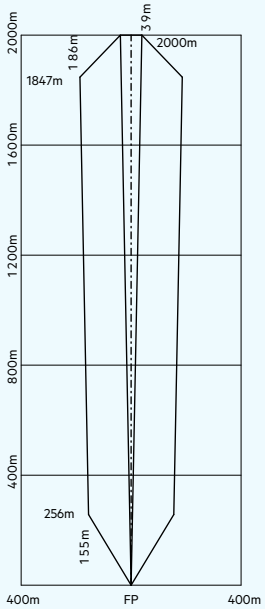


Figure A4-5 - Example of generic templates (Not to scale)

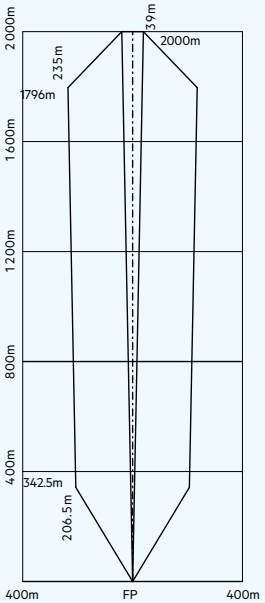
EXPOSURE DRAFT



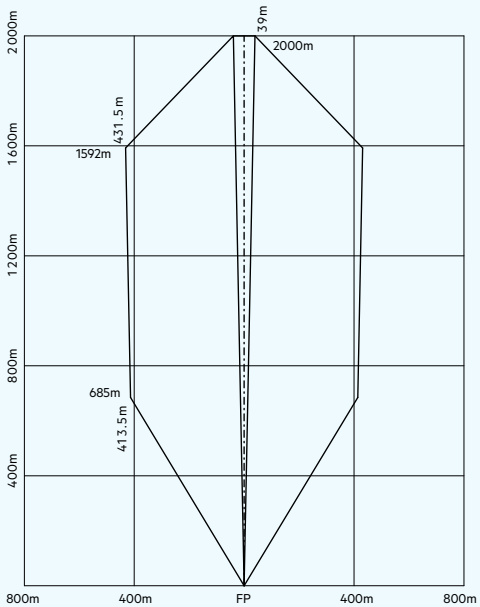
T1 - RIMFIRE RIFLE & PISTOLS



T2 - CENTREFIRE PISTOLS UP TO .50 CAL

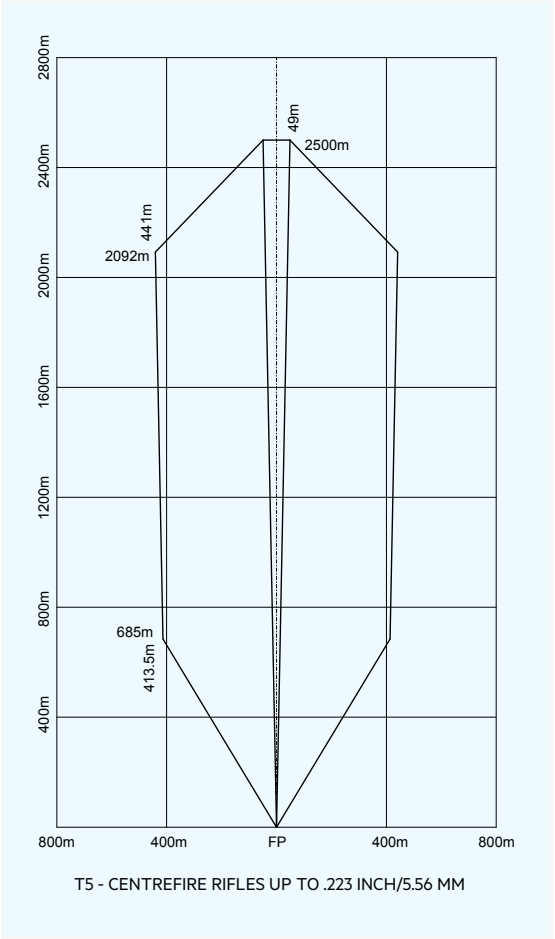


T3 - MUZZLELOADING AND PERCUSSION RIFLES

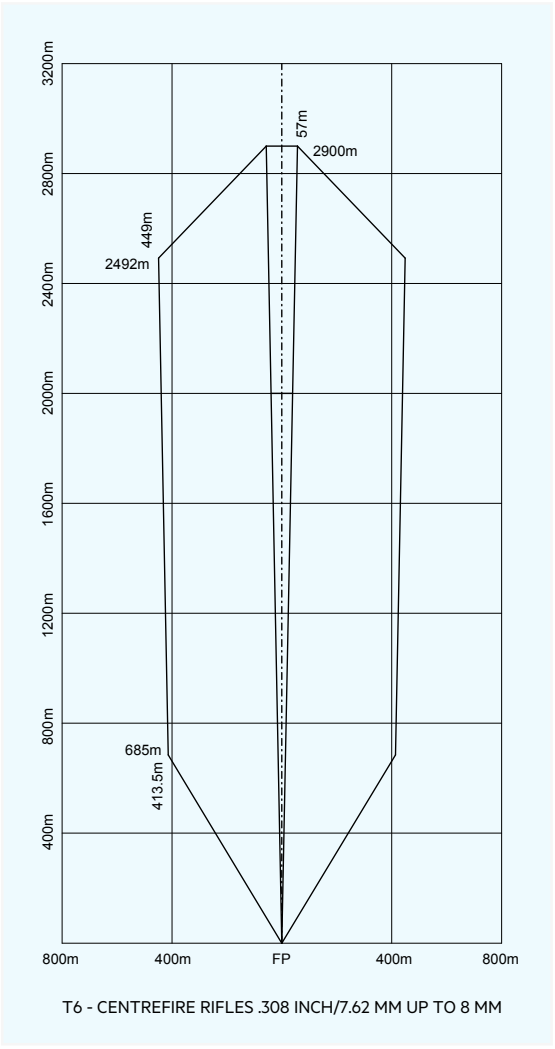


T4 - CENTREFIRE RIFLES UP TO .223 INCH/5.56 MM

Figure A4-5.1- 1:25,000 T1 - T2 - T3 -T4 Templates (Not to scale)

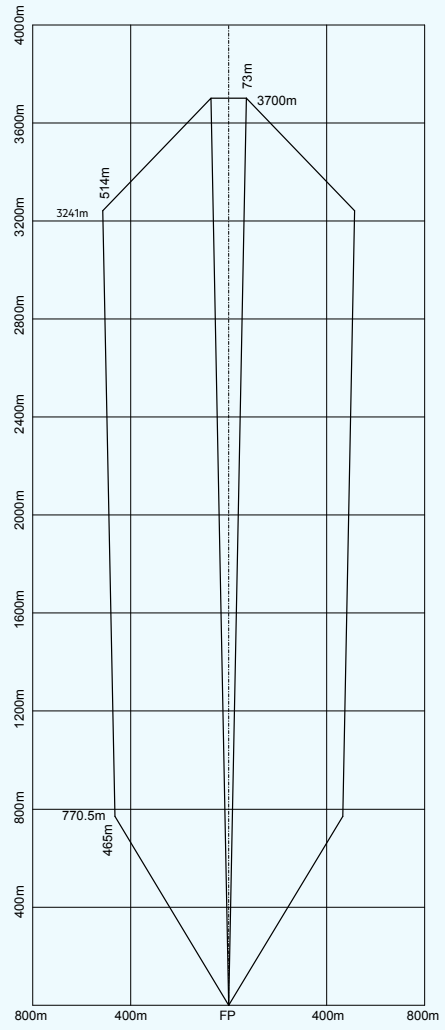


T5 - CENTREFIRE RIFLES UP TO .223 INCH/5.56 MM

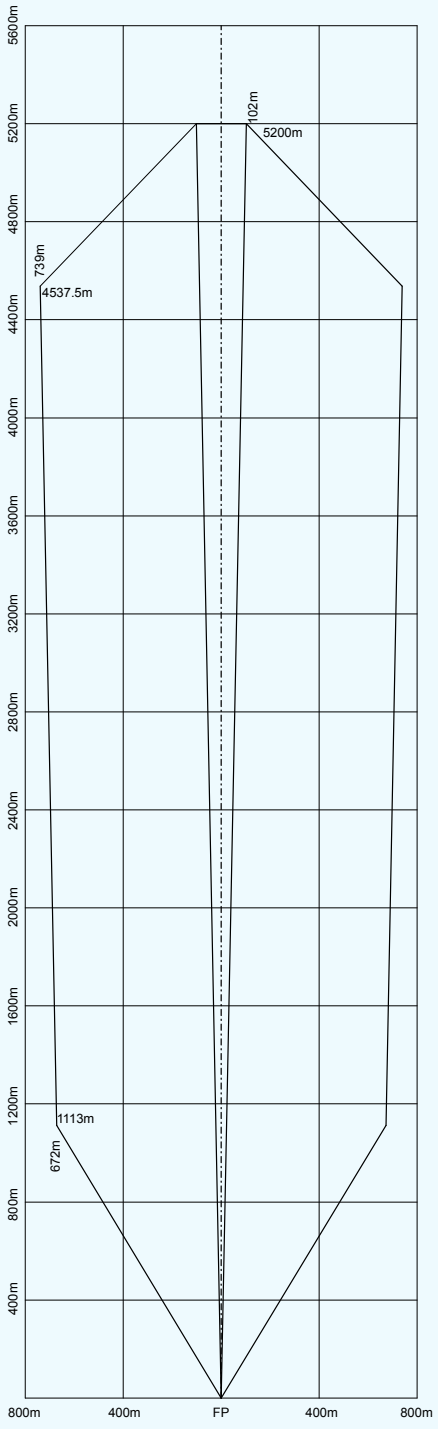


T6 - CENTREFIRE RIFLES .308 INCH/7.62 MM UP TO 8 MM

Figure A4-5.2- 1:25,000 T5 - T6 Templates (Not to scale)



T7 - CENTREFIRE RIFLE .338 INCH



T8 - CENTREFIRE RIFLE .50 INCH

Figure A4-5.3 - 1:25,000 T7 - T8 Templates (Not to scale)

Example of template design for a field shooting range (not to scale) 1:50,000 map
T4 centrefire rifle (ground surface) .223 inch / 5.56 mm

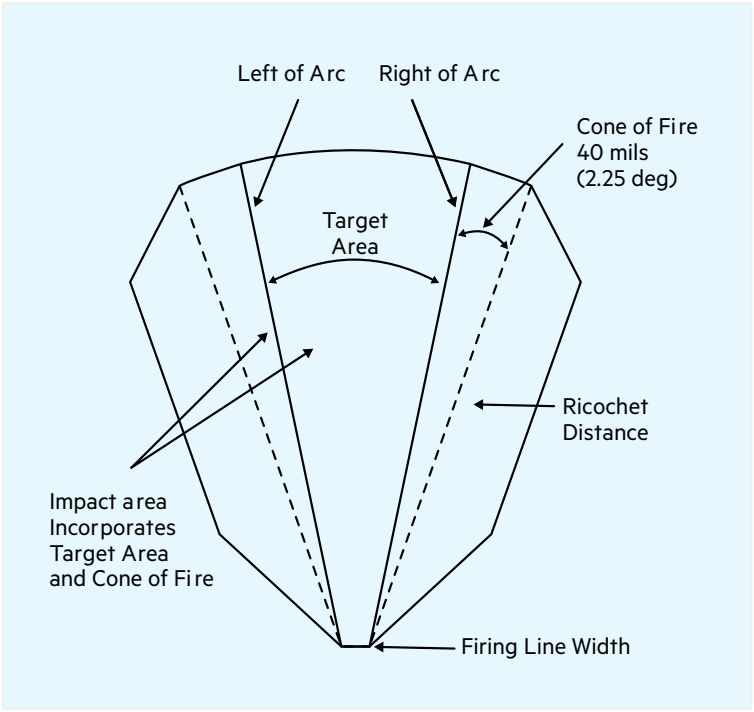


Figure A4-6
Example of template design for field shooting

Example of template design for an established shooting range (not to scale) 1:50,000 map
T4 centrefire rifle (ground surface)
.223 inch / 5.56 mm

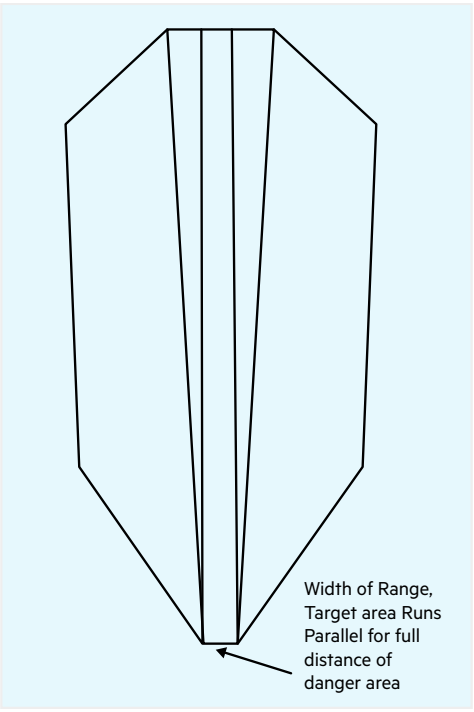


Figure A4-7
Example of template design for an established range

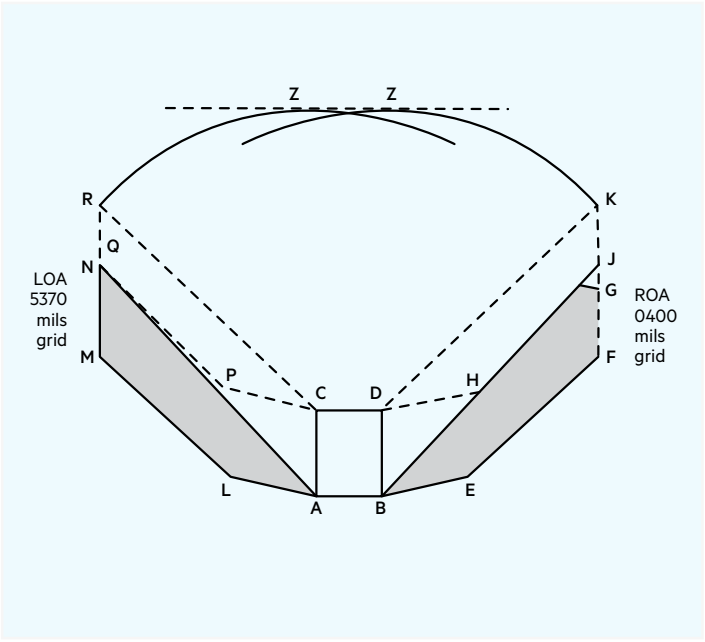


Figure A4-8
Example of parallel bearings to maximum arcs of fire

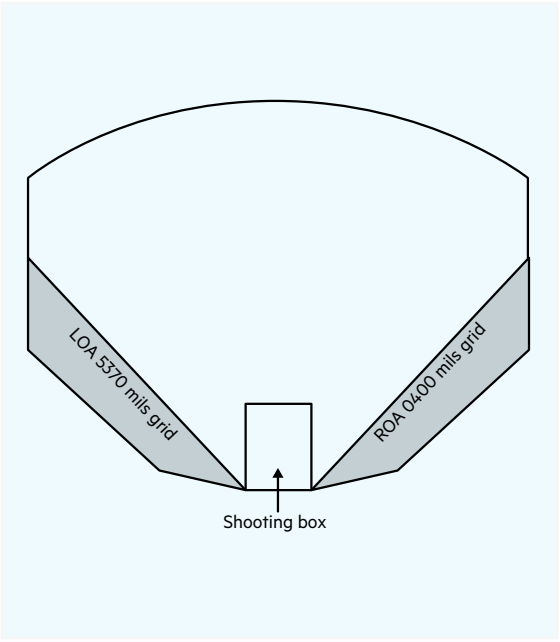


Figure A4-9
Example of completed movement box including parallel bearings to maximum arcs of fire

(Scale diagrams of all ADATs can be found on the NZ Police website, Clubs and Ranges page, Shooting Range Forms and Resources - Resources - Ammunition Danger Area Templates. These diagrams can be printed to scale and photocopied onto an A4 transparent plastic film (also known as foils or transparencyies).

EXPOSURE DRAFT

Appendix 5:

Range standing orders – Considered headings

(Detailed information for each heading is contained in paragraph 7.8 of Section 7)

The table below lists the headings required in Range Standing Orders (RSOs). Depending on specific shooting disciplines there may be more information required which can be added at their discretion.

LEGEND	M = Mandatory requirement to be included in the RSOs	M** = Mandatory requirement if applicable	E = Exempt for limited use and field shooting ranges only	Optional

SERIAL	HEADING	N/A	Y	N
1 **M**	Club / Range / Range complex name			
2 **M**	Range name			
3 **M**	RSOs date			
4 **M**	Introduction			
5 **M**	Responsibilities			
6 **M**	Compliance with RSOs			
7 **M**	Range location			
8 **M**	Range safety rules			
9 **M**	Range layout / Range danger area			
10 **M**	Restrictions			
11 **M**	Conditions or use			
12 **M**	Targets / New target systems			
13 **M**	Steel plate targets			
14 **M****	Moving targets			
15 **M**	Minimum safe engagement distances			
16 **M**	Approved range users and priority of use			
17 **M**	Warning flags – Danger signs			
18 **M**	Range safety appointments			
19 **M**	Cone(s) of Fire (CofF)			
20 **M**	Inability to achieve CofF			
21 **M**	Un-licenced or inexperienced shooters and test firing			
22 **M**	Specific safety rules for the use of the range/range complex			

SERIAL	HEADING	N/A	Y	N
23 **M**	Prohibited ammunition			
24 **M**	Air Danger Height (ADH)			
25 **M**	Eye and hearing protection			
26 **M**	Accident/Incident procedure			
27 **M**	Medical			
28	Fire precautions and procedures			
29 **M** **E**	Range maintenance plan			
30 **M**	Range clearance			
31 **M** **E**	Unauthorised access and/or use of the range			
32	Children (Minors)			
33 **M**	Health and hygiene			
34	Domestic animals			
35	Additional headings (if required)			
36 **M**	Amendment to RSOs			
37 **M**	Authorisation of RSOs			
38 **M**	Distribution list			

Additional annexes
(if required to supplement the main body)

SERIAL	HEADING	N/A	Y	N
A **M**	Range layout and location			
B **M****	Range danger area			
C **M****	Additional shooting organisations			
D	Any other relevant information			

Table A5-1 - Range standing orders – Considered headings

EXPOSURE DRAFT

Appendix 6:

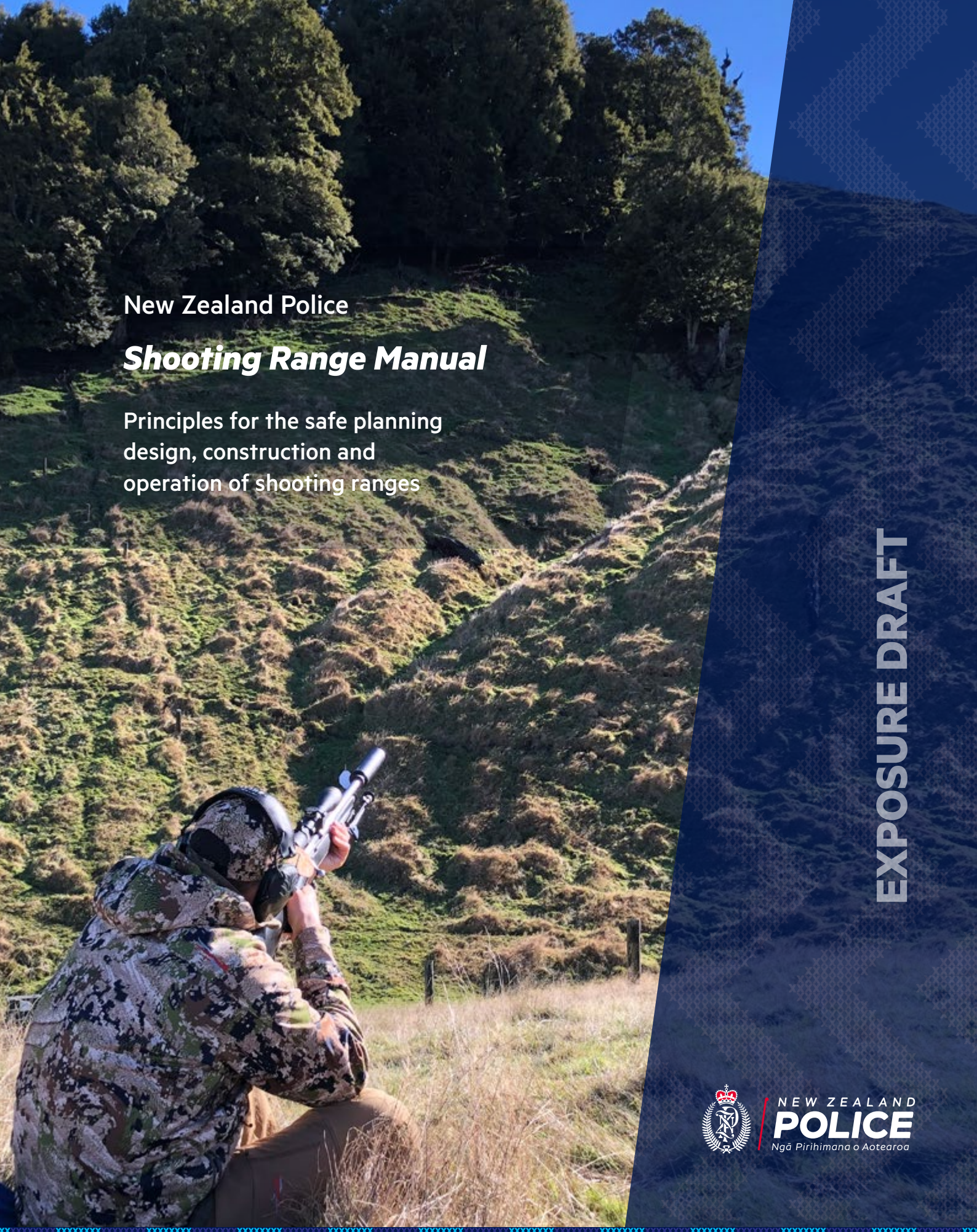
Conversion factors and units of measure

Weight		
1 gram	=	15.432 grains
1 gram	=	0.03527 ounces
1 lb	=	7000 grains
1 kg	=	2.205 lbs
Distance		
2 mm	=	100 m in a 1:50,000 scale map
1 inch	=	25.4 mm
1 ft	=	0.3048 m
1 m	=	1.0936 yards
1 km	=	3281 ft
Velocity		
1 m/s	=	3.2808 ft/sec
1 ft/sec	=	0.6818 miles/hr
Energy		
1 joule	=	0.73757 ft/lbs
1 ft lbs	=	1.3558 joules
Pressure		
1 MPa	=	145.036 lbs/per sq.in (psi)
Angular		
360 deg	=	6400 mil / 6283.2 mrad
1 deg	=	17.77778 mil / 17.45329 mrad

Table A6-1 - Conversion factors and units of measure

EXPOSURE DRAFT

EXPOSURE DRAFT



New Zealand Police

Shooting Range Manual

Principles for the safe planning design, construction and operation of shooting ranges

EXPOSURE DRAFT

NEW ZEALAND POLICE
Ngā Pirihimana o Aotearoa