



A Guide to Planning & Construction of a shooting Range



Section 1. BUILDING A SHOOTING RANGE

1.1 Introduction

This section, and those that follow contain information to be used during; the design, construction, upgrading and operation of both outdoor and indoor shooting ranges; or when assessing the suitability of existing ranges. This information is to be used in conjunction with information contained in other applicable sections of these guidelines.

1.2 The First Steps

The most important step in any journey is the first. It is important to your clubs success that you make certain that your first step is in the right direction.

When your club considers the construction of a new range or making changes to an existing one, planning is the key to your success. The time spent, and questions answered between your first step and your first shot can make the difference between success and failure.

An approved Pistol NZ Range Development Advisor can assist you by providing information to help you be successful. As time and funds are available, design, on-site evaluation and assistance with specific range development projects may be provided.

The Range Development Advisor can approve your range designs and layouts. The primary consideration must always be safety. Safety is a function of many factors. How the range is used and operated are as important as the physical design. Construction and maintenance are only the physical factors in the safety of a range. Only the proper use and operation can ensure safety.

1.3. Planning Overview

Step one Decision – What type of range?

Whether an organisation is starting up or seeking to upgrade an existing range facility, the first decision is to identify the types of shooting necessary to meet the needs of the user. To determine the user needs, conduct a survey of members. This will also give an indication of how well the membership will support and back the project.

The following guidelines are suggested.

1. What type of range is required?
2. Will it be an indoor or outdoor facility?
3. How many shooters must be accommodated? (allow for future expansion)
4. Will the emphasis be only training, casual plinking or competitive shooting?
5. What type of firearms will be permitted on the facility
6. What types of ammunition will be permitted on the facility?
7. Will the facility be used exclusively for members?
8. What type of shooting activities will be permitted on the facility
9. What type of targets will be used on the facility?
10. What special uses will be made of the facility, such as Police firearms training, hosting National competitions etc.

The Initial decision is whether the facility will be indoors or outdoors or a combination.

Other factors to be considered during the decision making process include:

- a. Prevailing climatic conditions
- b. Availability of land. (Including land use as a danger area)
- c. Available funding
- d. Health & Safety considerations.

Step two Select Alternatives

The choice of alternatives depends on whether the organisation has existing facilities in need of upgrading or plans to construct a new facility.

Existing facilities.

- a. Restore an existing facility to currently accepted use criteria.
- b. Expand an existing range, where feasible, to accommodate either a new shooting activity or a combination of shooting activities.
- c. Construct a new facility on an existing site.
- d. Sell the existing site and relocate.
- e. Remain as is and do nothing.

New facilities.

- a. Move to an existing range and share facilities with another group.
- b. Rent shooting time from another club
- c. Plan, design, site and construct a new facility
- d. Do Nothing

Examine each alternative based upon the shooting community and the specific user.

Step Three Site Selection.

Prior to site selection, decisions must be based on the above stated alternatives. Remember; do not attempt to force a facility onto a site. Rather, find, evaluate and select a site that will accommodate the required facility. In too many cases, a parcel of land is leased/purchased with the visions of the ultimate range facility, only to find out during the planning phases that the land is inadequate for the intended purpose. The key to deciding whether the project is feasible is to gather the following data.

- a. Obtain from your local authority information regarding resource designation.
- b. Obtain from a Range Development Advisor the planning requirements needed to be able to use a particular area as a shooting range.
- c. Identify several sites because one or more may prove unsuitable or construction costs prohibitive.
- d. Gather technical data relative to each site, including zoning maps, aerial photographs and topographical maps. (Scale 1/50000)

To determine if a site is suitable:

- a. Fill out a copy of the Range approval forms provided in the appendix for each site. This will provide valuable insights for the decision making process.
- b. Guidelines highlighted on the questionnaire indicate the areas that either meet or exceed acceptable standards. The failure of one or two items does not necessarily mean the site cannot be used, simply that modifications are needed to make the site acceptable.

- c. Contact a Pistol NZ Range Development Advisor or the Pistol NZ Administration Officer and have a Range Inspection Officer assigned to go over the selected sites and assist in choosing the area best suited to the development of a shooting range.
- d. Additional criteria
 1. Environmental restrictions
 2. Access
 3. Resource consent considerations
 4. Construction costs
 5. Property values. Most clubs lease but having the ability to purchase, even at a later date is desirable.
 6. Select a site that meets or exceeds all acceptable standards for safety.

Step four. Preliminary design.

After selecting the site, apply the information gathered under step one and three to the rendering of preliminary drawings.

- a. Preparation of preliminary layout sketches
- b. In the draft document specification include applicable zoning, environmental, building code and other pertinent restrictions.
- c. Prepare alternative preliminary site plans showing different layouts.
- d. Prepare a safety plan for each project.
- e. Submit all permit applications for approval. Be prepared via the draft document to present and perhaps defend the proposal before any public hearings or the Environment Court.

Step five. Final Design.

Preliminary site plans prepared in step four, along with previous documentation, should provide enough information to make the final site selection. At this point you will need the professional help to make your plans work; Lawyers, engineers, architects, draftsman, surveyors and lots of volunteers who have the time and commitment to see the project through.

Detailed plans showing specific dimensions are needed to obtain building permits. These plans should follow the usual format required by your local Council.

To conclude the project:

- a. Follow through with all commitments and requirements identified in step four.
- b. Prepare final construction plans and specifications.
- c. Obtain all necessary building permits
- d. Ensure you arrange for the development to be monitored by a Police Approved Range Inspecting Officer. This is done by contacting the Pistol NZ Administration Officer who will allocate an inspector to monitor your range development and prepare a report for final approval of the range by Police Headquarters.

1.4 Outdoor Range - General Considerations.

Developing an outdoor range involves these critical factors:

Site Selection:

- a. Size – an area large enough to accommodate the appropriate danger area as modified by existing topographical features. For example, in flat country the entire area required for a specific danger area would be needed, but in hilly or mountainous areas the space requirements may be different.

- b. Location – locate the range as far away from populated areas as possible.
- c. Design – design criteria should incorporate specific range requirements along with adequate space for current use, yet provide for future expansion.
- d. Environment – During the planning phase, make every effort to minimize any adverse impact on the surrounding environment.

Danger Areas:

- a. Danger Areas, direct fire and ricochet areas will vary in size and design based upon terrain features, range structures, such as baffling and the chosen shooting activities.
- b. Danger Areas are designed to provide an area large enough to contain all projectiles within an acceptable degree of risk fired on a range complex.
- c. The distance a bullet will travel varies according to several factors:
 - 1. Ballistic coefficient
 - 2. Bullet weight
 - 3. Muzzle velocity
 - 4. Calibre
 - 5. Bullet shape
 - 6. Angle of muzzle elevation
 - 7. Wind speed
 - 8. Wind direction and humidity.

Baffles.

Baffles are safety barriers designed and configured to contain projectiles to a given area of the range facility. However, fully baffled ranges, using overhead baffles in conjunction with ground baffles, can still permit the occasional escape of projectiles. Thus, additional space for a danger area is required adjacent to the range proper. This area can be reduced or eliminated by using different baffle configurations in accordance with danger area limitations.

1.5 Primary Information

Basic Details for Consideration Prior to the Establishment of Outdoor Ranges:

The Ground

You must have an area of reasonably level ground on which to practice any form of shooting. The area must correspond with the requirements for shooting particular events. The events most commonly practiced require 25 metres, 50 metres, 100 metres and 200 metres in length. This does not include the extra area behind the firing line, which is devoted to a suitable building, which gives shelter (covered firing point), and provides divisions between shooters, room for supervising officials, and room for spectators. Nor does it include the area beyond the targets where backing targets may be installed and where some form of bullet stopping material must be, nor does it include danger areas.

Regional Authorities (Local Bodies)

In order to avoid legal problems, it is essential that clubs ensure recognition by the local authority, within whose boundaries a proposed range may be located, of the intended establishment of any such range. Organisations will also need to consider implications of the Resource Management Act and may need to apply for consent under a Local or District Council plan before any construction can commence. This is a lengthy process so be prepared for delays.

Range Direction

In the choice of the ground, be aware that a northerly aspect is undesirable due to the strain of looking into direct sunlight. However, large overhangs can nullify this effect. The prime consideration should be to obtain the best possible lighting for the targets for the longest period in each day, which normally means the shooters should be facing in a southerly direction.

Safety

When you have visualised the area that will be required, consider the safety factors. We are dealing mainly with short-barrelled firearms, which are held, in the hand. It is obvious that the accidental discharge of a pistol may result in a projectile being hurled in almost any direction except back towards the shooter (hence the obligation to always point pistols down range). Accepting that the danger area in front of a pistol encompasses a relatively large arc, we have established that the Coff and ricochet area must be included. Similarly, we have set certain heights as a minimum for some sort of device to stop the escape of shots, dependant on the length of the range and the Coff dimensions. Suitable devices for this purpose are great hillsides or man made structures built to minimum heights to do the same job. Such structures are expensive.

Danger Area

An alternative is to have a "danger area" which extends sufficiently far as to encompass the entire flight of a projectile and any potential ricochet without the danger of any person, building, or road, being in that area, such as forestry or farmland.

Side Walls

The provision of sidewalls or raised banks is a normal procedure but it is not mandatory. These are intended to contain stray shots within restricted boundaries of the range, and to prevent accidental entry to the range by man or beast.

Objectives

Your first goal is to form the Club and become incorporated. Until you actually apply to Pistol NZ for recognition and affiliation, and this is granted, your range cannot be approved. What is normally suggested to new Clubs is that they try to synchronise the two steps. This way your experience begins to count from the moment both objectives are achieved. Experience can only be gained once the range can actually be used. (For Pistol Ranges an understanding of the Pistol NZ system is essential.)

Range Approval

No Pistol NZ affiliated club range may be used for pistol, rifle or shotgun shooting until a NZ Police approved Range inspecting officer has inspected it and it has been approved by the Commissioner of Police.

A NZ Police Approved Range Inspector does the actual range approval. An initial inspection by a Range Inspector comes first. To get this process underway information from the club is required, this needs to be in the form of a sketch or plan of the proposed site, and photographs of your proposed site. The details need to be clear and photographs are essential.

The Range Inspector will offer advice and assist you every step of the way through the approval process. You will be supplied with the necessary forms to complete; these will assist in the approval process. A complete record of your range is maintained and filed for future reference purposes and will specify the standard and classification of the range once established. A final inspection is normally made after the range is ready for use, and a certificate is then issued by Police Head Quarters.

NOTE: *A final inspection will be made by a NZ Police approved Range Inspecting Officer. The range cannot be used until the NZ Police has approved it.*

Progress

For Pistol Clubs, when the Club is accepted as a member by Pistol NZ the Police are advised. When the range is approved the Police are again advised but it is this last advice, which allows you to purchase and have pistols available. Prior to this you will nominate your Club Armourers to the Police, these armourers will need to have suitable security (safes, etc.) in which to retain club firearms.

Range Officers

Each Club must have at least one qualified range officer before their range will be certified. There is no excuse for any lack of qualified Range Officers as each National Shooting Organisation provides a training service, which prepares members to sit an examination with the intention of becoming qualified. Every member should take such a course, as opportunity provide, as it covers much of the information, which is needed by a shooter, whether he/she qualifies as a Range Officer, or not.

Free Advice

Some uncalled for advice can be given at this stage as experience has shown that such advice is wasted if given after the event.

1. When in doubt, and before committing your club irretrievably, seek advice from an Approved Range Inspecting Officer. These individuals are trained and have years of experience in shooting range development. You may be surprised to find that others have met your same problem in the past.
2. Any number of Clubs have been ousted from quite satisfactory ranges because either the property changed hands or the owner became tired of acting as host. Always endeavour to obtain a long term, favourable lease of the property concerned, or wait until you can purchase your own piece of ground. Range construction is expensive and seldom portable.
3. At all times set your sights on producing your range and buildings to the highest standards. Your Club and the sport will grow. The standards you set now will never deteriorate

1.6 Inspection and Certification

1. Inspection and Certification of Pistol ranges to ensure that they meet and comply with the required standards is the responsibility of Pistol New Zealand Range.
2. Clubs using ranges controlled by the NZ Defence Force are to provide copies of the Range Inspection reports and safety certificates to Pistol NZ.
3. Reinspection of ranges will be undertaken by an approved Range Inspector on a five yearly basis to ensure that the range(s) still meets the required minimum standards.

1.7 Approval Procedure

1. On advice of an intention of any club or person to establish a range, the Range Inspecting Officer requests information which will indicate the type of range contemplated and the construction which will be involved.

2. If an outdoor range, the Range Inspector can immediately supply comprehensive material and information on the subject and will request proposed plans from the applicant before any work is undertaken.
3. If an indoor range, it will be necessary to establish:
 - (a) End use of range.
 - (b) Topography of the proposed site.
 - (c) Suitability of the site for the purpose.To this end, photographs of the area and a sketch map are requested.
4. Given that a representative of the Range Inspector is convinced of the practicality of the proposals, arrangements should be made for an inspection of the site.
5. Given that the site is suitable and the intentions of the applicant are acceptable, forms for record and an application for approval will be despatched to the applicant for completion.
6. On the return of the necessary forms, photographs, and maps, the entire proposal will be considered by the Range Inspecting Officer, and if need be, a final inspection of the site may be undertaken.
7. Given that the Range Inspecting Officer certifies a range, a report is filed with Police National Headquarters, a certificate will be issued and a copy filed.
8. The certificate will be forwarded to the applicant with a note of congratulations.
9. The Police Department, through the Manager, Licensing and Vetting will be advised of
 - (a) the name of the range
 - (b) The address of the range
 - (c) The users of the range
 - (d) The type of range
 - (e) The firearms approved for use on such a range
 - (f) The date on which the range was approved and requesting to add the range to the list of approved ranges.

Comment

1. Improvements and additions to ranges are able to be recorded only if the information is voluntarily reported to the Range Inspecting Officer and supported by documentary or photographic evidence.
2. There is no compulsion for owners of ranges to produce a range of a higher standard than that which is laid down as a minimum requirement.
3. Details of various proposed "Action Ranges" will need to comply with certain given criteria.
4. Ranges will be re-inspected at irregular intervals to ensure that they still comply with the minimum requirements as laid down in this manual. (Current policy is 5 yearly inspections)

1.8 Certification / Approval Forms

APPLICATION FOR APPROVAL OF SHOOTING RANGE. RC-1

Name of Pistol NZ Club

Name of Range

Address of Range

Classification applied for

- (A) Indoor Range 22 calibre only []
- (B) Indoor Range Centre Fire []
- (C) Outdoor Range 25 metre []
- (D) Outdoor Range 50 metre []
- (E) Outdoor Range 100 metre []
- (F) Outdoor Range 200 metre []
- (G) Outdoor Range 200 Metre + []

Name (Club President)

Name (Club Secretary)

Signature

Signature

This application must be supported by the documents and information listed in the Guide to Planning & Construction of shooting Range supplied with this package (Please complete applicable forms supplied.)

Details to comply with the Guide to Planning & Construction of shooting Range.

DO NOT FILL IN THIS SECTION - For Official use only.

Application forwarded to:(Range Inspecting Officer)

Date of Inspection, /...../.....

This Application is **approved / declined** (Delete One)

Subject to.

.....
.....
.....

Range Inspecting Officer:

Signature.

Date...../...../.....

Range Development Application

RC-2

Pre Inspection Requirements.

TYPE OF RANGE TO BE INSPECTED

Have you enclosed or Supplied the Following:

a)	Indoor Range	.22 cal only	[]
b)	Indoor Range	Centre Fire Pistol	[]
c)	Outdoor Range	25 Metre.	[]
d)	Outdoor Range	50 Metre.	[]
e)	Outdoor Range	100 Metre.	[]
f)	Outdoor Range	200 Metre.	[]
g)	Outdoor Range	200 Metre +	[]

- a) Plans (Drawn to scale) YES / NO
- b) Elevations YES / NO
- c) Sections YES / NO
- d) Specifications YES / NO

Photographs of the range showing

- a) Permanent Firing Point established YES / NO
- b) Targets from the firing point YES / NO
- c) Firing point from behind the targets YES / NO
- d) Overall view of area of range YES / NO
- e) View to left of the range (from beside firing point) YES / NO
- f) View to right of the range (from beside firing point) YES / NO
- g) Turning targets showing mechanics of operation YES / NO
- Have you specified scene on back of photographs YES / NO

Have you drawn to scale to show height, location and nature of devices to prevent escape of projectiles

- a) Longitudinal section of range YES / NO
- b) Cross section of range YES / NO
- c) Large scale details and specifications of materials and construction if OTHER than earth bank or natural Features used to prevent escape of projectiles YES / NO

One NZPS Topographical Map to scale of 1:50 000

- a) Showing site of range clearly indicated YES / NO
- b) Clear indication of roads, paths, buildings, etc. YES / NO

A large, clear SKETCH of the site overall showing

- a) Range fences YES / NO
- b) Position of danger flags YES / NO
- c) Position of any notices warning the public YES / NO
- d) Position of Firing point YES / NO
- e) Position of targets YES / NO

If your range varies from the requirements of the Guide to Planning & Construction of a shooting range, detail the variations and the reasons for them on a separate sheet of paper. Ensure that the map supplied can be used to find the range if one is not a native of the area. Otherwise supply a road map that shows a route to the range.

OUTDOOR RANGE - WITH NATURAL STOP BUTT

RC-3

The Following information is required by the Range Development Committee in order to approve, or to continue to approve, your range.

Please specify the events that will be practiced on this range

Have you complied with all requirements of the Guide to Planning & Construction of shooting Range. YES / NO

- 1) What is the height of the stop butt above target slot or target base?.....
- 2) What is the angle of stop butt face from vertical?.....
- 3) What material is in the stop butt face?.....
- 4) Is there a bullet catcher? YES / NO
- 5) Of what material is the bullet catcher constructed?.....
- 6) How far behind targets is the stop butt face?.....
- 7) What is the width of the stop butt face?.....
- 8) What is the length of the target slot or base?.....
- 9) Have you installed suitable targets for the event(s)? YES / NO
- 10) How many targets are installed?.....
- 11) What is the length of the firing point(s)?.....
- 12) What is the distance between targets and the firing point(s)?.....
- 13) How many shooting bays have you installed?.....
- 14) Are the flank lines of fire when extended 30 degrees covered by the stop butt? YES / NO
- 15) Do you have space behind shooters for spectators and officials? YES / NO
- 16) Does the range slope uphill, downhill, or is level?.....
- 17) Do you have the approval of your Local Authority for the use of the range? YES / NO
- 18) Do you have Resource consent YES / NO
- 19) Have you a covered Firing point? YES / NO
- 20) Do you have a toilet facility? YES / NO
- 21) Do you have kitchen facilities? YES / NO

OUTDOOR RANGE: - WITH FULL DANGER AREA

RC-4

The Range Inspecting Officer will require the following information, in order to approve, or to continue to approve, your range.

Please specify the events intended to be practiced, other than for shooting straight down range:

HAVE YOU COMPLIED WITH ALL REQUIREMENTS OF THE GUIDE TO PLANNING & CONSTRUCTION OF A SHOOTING RANGE . YES / NO

- 1) Is there a stop butt? YES / NO
- 2) What is the vertical height of the stop butt from base to top?.....
- 3) How far behind the targets is the stop butt face?.....
- 4) What is the width of the stop butt face?.....
- 5) What is the width of the target line?.....
- 6) What are the dimensions of the land that is owned by the club behind the targets?.....
- 7) What is the length of the target slot or base?.....
- 8) What is the length of the firing point(s)?.....
- 9) How many shooting bays have you installed?.....
- 10) Do you have space behind shooters for spectators and officials? YES / NO
- 11) Does the range slope uphill, downhill, or is it level?.....
- 12) Have you installed suitable targets for the events? YES / NO
- 13) How many targets installed?.....
- 14) What is the distance between the firing point(s) and the targets?.....
- 15) Do you have the approval of your Local Authority for the use of the range? YES / NO
- 16) Do you have the approval of the owners of the property contained in the danger area for their land to be used as a Range Danger Area? (Written approval required) YES / NO
- 17) Have you made provision for danger flags and notices? YES / NO
- 18) Have you a covered firing point? YES / NO
- 19) Do you have a toilet facility? YES / NO
- 20) Do you have kitchen facilities? YES / NO