Outdoor 3D Range Layout Manual:

Outline:

Range Layout

Shooting Lane Layout

## Target Choice and Placement

Miscellaneous

1: Range Layout:

Objective: To layout a safe course that makes best use of terrain, minimizes maintenance, accommodates all archers, efficient for archers to be able to progress at an even pace and ensures that safety is the highest priority. In addition this will also help improve our sport by making it TV and spectator friendly as well. Today with such tools as GPS mapping programs can really be an asset to ensure that the courses are laid out in a manner that ensures safety. In addition there is a technique outlined here to help determine a ranking system for 3D courses with a suggested target rank.

■ Overall: Course layout has many elements:
  o Safety of is the primary concern: All people utilizing the course have to be kept safe and clear signage and trail marking is important to ensure that unsafe intrusion into a shooting lane is prevented. Ensure that all access and egress is marked and boundary is marked to prevent unsafe intrusion by the public.
  o Variety: efficient use of the terrain to increase variety from station to station to allow for a creative enjoyable safe experience.
  o Access/Egress: Ensure all points of access and egress are marked and through areas that are safe zones.
  o Efficiency: Courses should be laid out so that people can move efficiently from station to station and more important for tournaments is to prevent time lags.
  o Accommodation of all archers: It is also important to remember that archers come in all shapes and sizes as well as varying levels of fitness and good signage and safe walking area are important. 3D is an outdoor bush activity but application of common sense and reasonability is important as well. if course has some challenges and limitation these should be communicated through signage and proper trail markings.
  o Accommodation for Spectators and TV crew. Spectators and TV crews should be able to access as well to help promote our sport and they can move around and through the course safely without disturbing archers.

■ Path Safety: Since safety is the biggest priority one should be able to progress around the course along the trail without getting into conflict with an arrow path. This could be important for people who have equipment failures, spectators, or even personnel in event of an emergency.
  o Avoid placing shoots across the walking trail. If you want to create a specific shot then adjust the walking trail accordingly so that it does not cross the shooting lane partway down. This is a significant safety hazard because even if someone is not in direct path of arrow due to a bow problem, archer error, glance-off, bounce off, arrow break, ricochet the danger to others is increased. Also remember it is not just the archer going around the course but the whole group and they need a safe place to be

while archer is shooting which is of course behind the archer. Another consideration is convenience; if other archers are behind the stake it makes it much more efficient for archers to cycle through their turns, and can use their binoculars before and after their shot in a place where they can view clearly away from the stake.

Shooting Lane

Walking Trail

Barricade

Modify Walking Trail
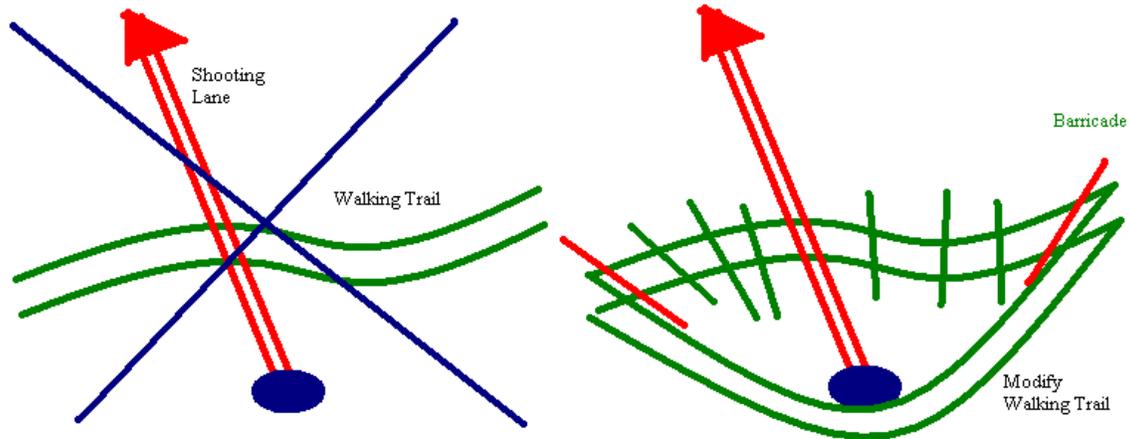
- o Another Item of Path Safety is the direction of the shooting should be such that a person progressing forward on the trail does not come into a shooting lane unawares. While signage and or other audible voice command can be effective one must also be aware of those who may be unfamiliar with 3D shooting and course layout. Best scenario for safety is to have all shots perpendicular to walk trail towards safe area. There are shoots however laid out in "golf course" format or "walkthrough" format: Where shooting lanes are along path of travel but special precautions must be taken to ensure people do not travel in reverse on course. The safest option of course is illustrated in Figure 3, where walk path and shooting lane do not coincide.
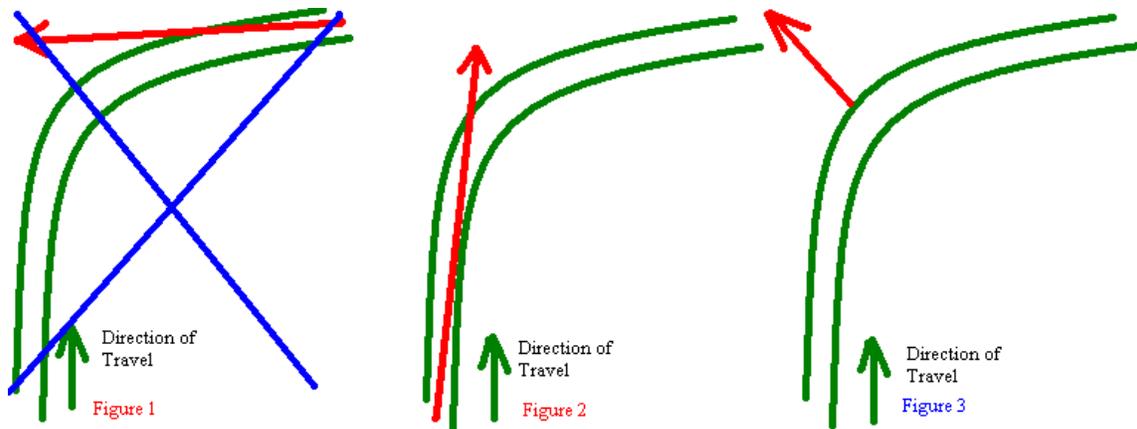
Figure 1: **Extremely Dangerous**! People coming down trail are coming into a shooting lane and with some dense bush the archer shooting is blind to people suddenly entering shooting lane. Even with precautions in place children often will wander ahead of group to next target after shooting.

Figure 2: is a nice setup for a course for people to be able to progress through quickly because they are walking towards next target when traveling to pull arrows but still extra precautions must be made to ensure people do not travel in reverse on course or else you get same scenario as Figure 1. Also a special precaution must be made to ensure group ahead is far enough down walk-path before next group commences shooting.

Figure 3 is the safest setup Walk-path and shooting lane does not share same real estate. While this makes archer have to walk back to path after retrieving arrows it is still the safest option. This allows two-way travel along the course which provides convenience for spectators, archers and range officials.

TV and Spectators: Another consideration is to have TV and Spectators in a gallery behind the archers at certain stations that maybe a "signature" example of the course. This then also precludes the shooting across the trail scenario as well because spectators and TV crew should be able to access and exit each gallery without conflict or disturbance.

2: Shooting Lane Layout:

> Objective: To ensure shooting lanes are laid out in a safe manner that provides an opportunity for all archers to place an arrow in the vitals of a target.

Overall: there are many considerations to a good shooting lane layout. Good 3D course incorporates variety and the possibilities of different shooting scenarios are only up to a course planner's imagination. Creativity is certainly encouraged however safety is still the top priority. Each archer has their own opinion what makes a great setup but there are a few things that need to be considered: These are safety and entertainment.

- **Safety Considerations:** These are many and the basics are as follows and require good judgment on the course planner's part. Of course the ultimate responsibility lies with the archer to ensure their own safety however not taking safety items into consideration when planning a course may be considered as negligence. These are some things to build into the setup:
    - Safe access and egress to station: Ensure that that the path from walking trail to shooting station is not hazardous. This is especially important where climbing a hill, ladder, staircase etc. Ensure there is good footing available.
    - Safety at Shooting Station: The course designer should always ensure there is a shooting path clear to target for archers of all shape sizes and handedness. That tree 1 foot out from bow beside a right handed archer may provide clearance, but for a left handed archer clearance is minimized. Are there tree branches or other obstacles above, below or beside that may tangle in archer equipment. There are many examples of this. A branch that the top limb could strike when arrow is released etc. Is the ground firm where archer stands, while it does not have to be perfect; shooting in a patch of mud at top of hill is probably not the best, nor placing a stake in an anthill. There are situations as well with special custom stations such as platforms or other innovations that a person must have special consideration for safety. I have seen where the guardrail of a tree stand is in the way for a short archer and their bottom limb may strike it. The solution then was to provide a footstool on top of the platform for the shorter archers but then the effectiveness of the safety guardrail is negated.
    - Safety along shooting lane: Are there obstacles preventing archers from seeing or hitting their target. These can be above below or beside the shooting path and consideration must be made for differences in each archer's physical and equipment limitations.
    - Safe area behind target: Is there a backstop, or how far could an arrow go if it misses the target? Is there sufficient room to ensure path of arrow cannot cross another shooting lane or walking path? If people are looking for their arrow behind target are they going to be in conflict from another shooting lane?
    - Spectator Safety. At each station consideration must also be made for where the others in the group are to stand while archer is shooting and make it convenient for each archer to enter and access the shooting station. This where the "shooting across the path scenario" is especially distasteful. Also if there is a spectator gallery thought has to be given as well to ensure that they can see and enjoy the sport of archery as well as creating good TV camera angel for increasing the potential for showcasing our sport.

- **Entertainment:** This why people do 3D archery! Do not lose sight of this important fact. Safety is the main priority but people do 3D archery for enjoyment. What entertains each 3D archer of course is different but we can identify many common

areas of enjoyment for people. The balance of each of these is what makes each course unique however there are a few items we can all agree on. The basic tenet I can provide here is that nobody has ever complained to me about a course being too easy. It is always the opposite. A person has to maintain a healthy level of challenge for the **AVERAGE** archer. The challenge should not be in trying to hit foam but in getting a 10x in the target. A good motto here is easy to get a 5, challenging to get an X.

- ○ ARROWS: No one likes to break or lose arrows. There are varying levels of skill and ability but prevention of lost/broken arrows is an important consideration. In this sport it is inevitable that arrows will be lost or broken but arrows broken or lost to course layout do not increase an archer's enjoyment. New archers losing 6 arrows on a single 3D course is not conducive to the enjoying themselves enough to return.

    - ■ The following Figure shows how to minimize the chance of breaking arrows. The "fan" setup in 3D where all archers are shooting for the same kill is unacceptable because the chance of breaking an arrow is greatly increased. The chance of hitting an arrow is increased shooting sideways at the shaft vs. the nock, and the chance of the arrow being damaged if struck is 100%. In the second scenario it is much preferred as the chance of hitting an arrow is minimized and a glancing shot will rarely damage the arrow. Many people shoot pins or collars on their arrows for this reason.
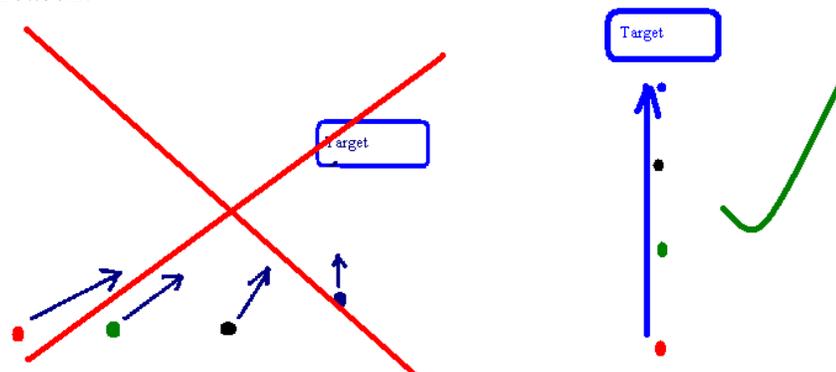
    Target

    Target

    - ■ Backstop: Having a good backstop for arrows that miss a target is also a great thing to think about. There are times that it may not be possible (e.g. animal up a tree) and get the aesthetics of the shot but effort can be made that every shot is not like this.
    - ■ Accounting for Skill: Archer's of varying levels of skill shoot the same course. There is no beginner, intermediate and advanced courses in 3D archery and so it is always best to set the course in such a way that the beginner archer will finish with same number of arrows he started with 95% of the time. If the shot layout is such that every shot is a struggle to hit foam for a new archer they will not return.

- Enjoyment
  - Build the 3D course for your archers!: When presenting you always must consider your audience. The archers are your customers! As a course planner you are presenting 3D archery to archers! Remember most of these folks will be bowhunters and people much like you when you started in the sport!. If they enjoy it; then it will be a positive experience for everyone! 3D is an approximation of bowhunting and many people use it as practice. When they go out hunting are they shooting to hit the animal or to place an arrow in the vitals represented by the 8 ring on a 3D target. Set your course accordingly. An archer should be reasonable confident they can get the 8 ring on every animal in the course with their level of skill. A turkey at 35 yards is a very challenging shot and is one best left for shoot-offs! People will complain about shots like that but will never complain about a 15 yard moose!
  - Accommodation: Ensure archers of all ages sizes and shapes are accounted for it is frustrating for a short archer that cannot see targets over terrain. When setting the youth stake, see the target from your knees and get the archer's perspective. When setting the Traditional stake, look at it from a traditional archer's point of view.
  - Variety: variety adds entertainment value. Having a variety of shots is important. I do not just mean targets (we will cover that later) but in the actual shooting lane layout. Spice it up and create challenge. If a golf course was all Par 5's or all Par 3's it would be boring. It is the mix that makes each course interesting.
  - Challenge: Ensure archers are challenged as well. Throw the odd hard shot in the mix but follow it up with a less difficult shot. There are more ways to challenge an archer than by increasing distance. More on this topic later.
  - Balance: in the end have a balanced course; ensure the challenges are offset by creativity. Most of all Have Fun!
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- **Target Choice and Placement:**
  - Objective: To ensure appropriate targets are laid out in such a manner that an archer can shoot them without concern for safety and to maximize enjoyment.

Overall: there are always limitations to targets. Targets are expensive and a 20 animal course usually represents about $8,000 – $10,000 worth of 3D Targets. How these targets are placed impacts safety, maximize target life and the archer's enjoyment.

- Target Quality: Ensure targets are in shape to perform as required. If you have a 3D Tournament where 200 archers are expected a target that has

significant wear will be providing pass-through opportunities and the related headaches. If you are scoring 10x's as 11 points ensure all targets have 11's. Ensure scoring zones are clearly defined. Use pictures at station to clarify rings if required.

- Placement (Distance): When placing targets distance is a factor. Consider scoring zone size and placement when placing targets using considering the items already presented. Every target is different some turkeys have a large 8 ring centrally located and a small 10 ring and thumbnails sized X ring. These can be a great skill equalizer. Placed out at a significant distance it takes a good or lucky shot to get the X and a reasonable shot will score an 8 and an archer's error still has a high probability that the arrow will hit the animal. A Mackenzie wolverine for example has a bigger 10 ring but smaller 8 ring and its location close to the edge of the animal makes it highly likely for glance offs and misses if put out same distance as turkey. General rules of thumb for small targets (Coyote/Turkey or smaller) medium (deer, wolf bear etc.) and Large (Moose, Mule Deer, Elk, Caribou Grizzly bear etc.) that I like to use is look at course from 0-50 yards and divide into thirds. With 5 yards overlap! Par for small then is 0 to 25 yards, Par for medium is 20- 40 yards and large from 35 to 50. Of course this is just a guideline but in general: Use the size of the 8 scoring rings and the animal and remember it should be possible for a new archer to hit the 8 ring fairly easily.
- Placement (Target Angle): When it comes to quartering and angling shots the best suggestion is **DON'T**! The scoring zone on the animal is specific to placement. Most targets are designed for a broad side placement + or – 15 degrees! However there are specific targets designed for quartering away that has a representative scoring zone that is accordingly. First reason is that extreme quartering shots can be hard on arrows (glance-off or miss) they are hard on targets and with the new replaceable core targets, I have seen where arrows strike the replaceable core edge after entering the scoring zone and bend snapping the arrow. If you have heard the comment after an archer received a score of 5 on an animal that it would be an 11 in real life the animal was quartered too far! These are best left for the novelty range. Quartering a target shrinks the scoring zone laterally and moves it away from a realistic approximation thus penalizing the newer less familiar and practiced archer more than the veteran. In bow hunter education we teach that an animal quartering towards you is not a good shoot choice, so we do not want to reinforce with our 3D tournament either.
- Placement (Aesthetics) This is the style points. How you choose to do this can add some pizzazz and humor to the shoot and laughing archers are happy archers. A standing bear in an outhouse with a roll of toilet paper in one paw will get a laugh. At one shoot the planners had a grizzly bear positioned with some other targets so it looked like a bear protecting its kill that was a work of art. Taking the time to do some creative things like this heighten enjoyment for the new archer. Also remember variety is the

spice of life and you have the opportunity as a 3D course planner to place your signature on a very unique presentation.

- **TV Accommodation:**
  - o If we really want to grow and showcase our sport we need to make it TV friendly and exciting for spectators. Using World Series of Poker as an example it became popular when the "hole card camera" was utilized. This added a dimension to the game for spectators and made it exciting to watch. It was not without controversy however but it has become the standard. Certain precautions had to be taken to prevent cheating but it has taken a sport from the fringe and made it mainstream.
  - o Commentary: This is another element that is missing. Major sports all have a commentator to explain to the viewing audience what is happening and draws them into the subtleties of this sport.
  - o TV Galleries, we need to make course so that TV can follow much like they do with golf. They have leader boards, and live coverage without making it a long drawn out boring process. This builds the suspense of what is happening because each golfer gets to know what the other golfers are doing for score.
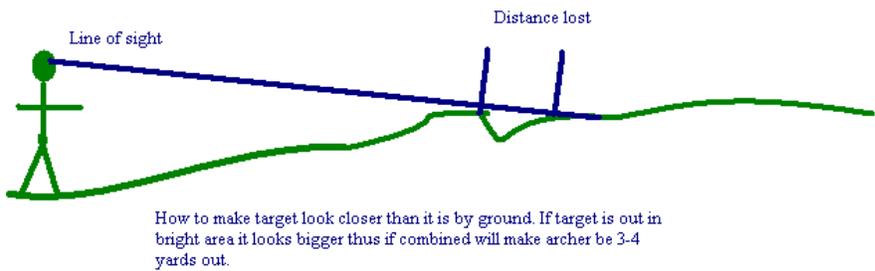 - o
- **Miscellaneous:**
  - o Here are some hints and tips developed that can help in 3D course layout.
  - o **Determining Par:** 3D incorporates involves placing the arrow in a specific part that is indistinguishable from an unknown distance in variable terrain. In order to rank each shot one should look at the difficulty of the shot. Like golf; distance is a good estimator of par but there can be some extenuating factors as well. These can be things such as an extreme downhill shot, or some other condition that could add difficulty such as a shot where it is hard to see scoring rings because it is in a tunnel and other such elements. The overall ranking system I would use is based on distances as outlined above. Here is a table based on average archer! Some shots an average archer would find difficult (ie extreme short shots) become easy with experience!...

Target Size	Distance	Difficulty Ranking
Small	5-15	0 (easy)
	15-25	1 (average)
	0-5 or 25+	3 (difficult)
Medium	0-25	0
	25-35	1
	35+	3
Large	0-35	0
	35-45	1
	45+	3

  - o **If there are other factors then add 1 to the difficulty ranking**.

- **3D A.C.E (Al's Cumulative Evaluation) Average**: In the end a good calculation for cumulative for a 3D course would be 26. This gives 1 very difficult (rank 4) shots, 5 difficult (rank 3) 7 average and 7 easy shots. This means that 6 out of 20 are harder than average and 7 that are easier than average meaning that overall the course is slightly easier than average to allow for the increased difficulty of the very difficult shot. The rank 4 would be target at the extreme end of range with a twist thrown in. This cumulative number is known as the 3D A.C.E. Average.

- This allows for how "tricky" a course is instead of just using pure distance. There have been courses set that were extremely short on distance but very technical in terms of shooting.

- **Distance Tricks**: the interesting component of 3D is that estimating distance is an important component for 3D success. Here are some strategies to create challenge in estimating distance so that you don't have to increase distance to increase difficulty:
    - Apparent brightness: Targets placed in bright areas which are well lit tend to look closer than they appear due to combination of increased detail and brightness making them appears bigger as well. Conversely: Apparent darkness, a target in Shadow becomes harder to see which our brain interprets as distance.
    - Hide the feet!: This makes target look shorter which our brain calculates as further away. Conversely Placing animal so feet are readily visible or even elevated makes target appear closer.
    - Downhill Shot, Target always looks further and even when archers correct for slope elevation tend to hit high.
    - Uphill Shot…in conjunction with elevating feet target appears taller so looks closer than it really is even with slope distance calculated archers tend to hit low.
    - Target size, for example: the aim rite deer is ¾ size so always looks further than appears.
    - Framing target and hiding ground tends to make animal look closer if in bright area and further if in dark area.
    - Targets in opening after brush tend to look further.
    - Targets in Brush after opening tend to look closer.
    - GAPS: This is where you use terrain to mask gaps in the ground.

Line of sight

Distance lost

How to make target look closer than it is by ground. If target is out in bright area it looks bigger thus if combined will make archer be 3-4 yards out.

- Use variety of terrain and animal sizes and keeps people on their toes for distance. Put a medium target close (15 yards) then a small target far (25 yards) in similar settings and mess with range estimator.
- Timing and Flow:
    - Avoid placing multiple targets at station as it creates bottleneck especially on shots with tree stand or other shooting sight that takes time to access/egress.
    - When doing shotgun start try to place pin shooters ahead of open shooters.
    - When shotgun start is used try and keep one station between each group. And try not to use targets 8-13 unless separate quick access. Most people prefer not to walk course twice. Especially with physical limitations.
    - Keep groups limited to 4 or less if at all possible.
    - Consider each class for speed. Open shooters take longest, kids and traditional archers are fast but often have to look for arrows unless course set accordingly. Pin archers are faster then open archers but slower than Traditional archers. If possible keep each class on their own course.
- Water on Course: Available for archer's comfort and safety.
- Address archer concerns reasonably. Some are going to whine regardless and others will provide constructive criticism.
- Build course for the average archer and should provide opportunity for a new archer to score 160 or better. Some planners want to ensure no archer can shoot the course with a 200. If worried about a tie for first then a shoot-off can generate excitement and determine winner. A 3D A.C.E factor of 26 is a good average. That being said I have never heard anybody complain that a 3D course was too easy and they shot too high of a score.
- On super close shots (under 5 yards) allow each person to pull arrow after shot to preserve arrows and prevent glance offs.
- A course can never have too much signage and information.
- If shoots are designed with new people in mind more new people will try the sport out once word gets out.
- Keep it safe and fun!