



Guide to Country Steps

Scope

This guide forms part of the Country Path series and provides information about the requirements and best practice for step design in outdoor and informal locations.

This guide does not replace professional design and building requirements where the safety of the construction is concerned. Always obtain advice from a competent person about design, ground and hydraulic conditions. For built steps a builder should be employed or adequate skill training provided for the volunteers.

Index

Scope	1
Index	1
1 Steps General	2
1.1 Long Tread Steps.....	4
1.1.1 Irregular flights.....	4
1.2 Stepped Ramps.....	5
2 Country Steps.....	6
2.1 Timber Front (Temp).....	6
2.2 Stone & Flag Paver Steps	7
2.2.1 Stone and Kerb Steps	8
2.3 Other Natural Materials Steps	8
2.3.1 Natural Stone Steps	8
2.3.2 Stone Riser Steps	9
2.3.3 Riprap Steps	10
2.3.4 Log Nosing Steps.....	10
2.4 Wooden Steps	11
2.5 Hand and Guard rails	12
2.6 Helical & Spiral Steps	14
2.7 Check Dams	15
3 Construction Basics	15

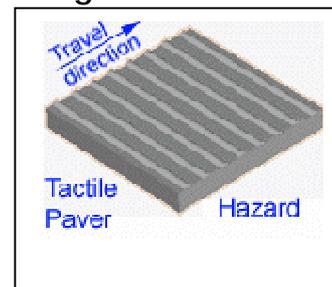
Guide to Country Steps

1 Steps General

Steps are needed in most pathways at some time or other, they should always be constructed with the safety of users in mind. It is generally advisable to obtain professional advice regarding the soil and material stability of a slope where construction is to take place. It can be hazardous building a flight of step on ground which is unstable, liable to slip or is sensitive to erosion. Drainage of ground around and under the steps must also be considered and the depth of porous sub-grade and foundation thickness must be adequate for the structure.

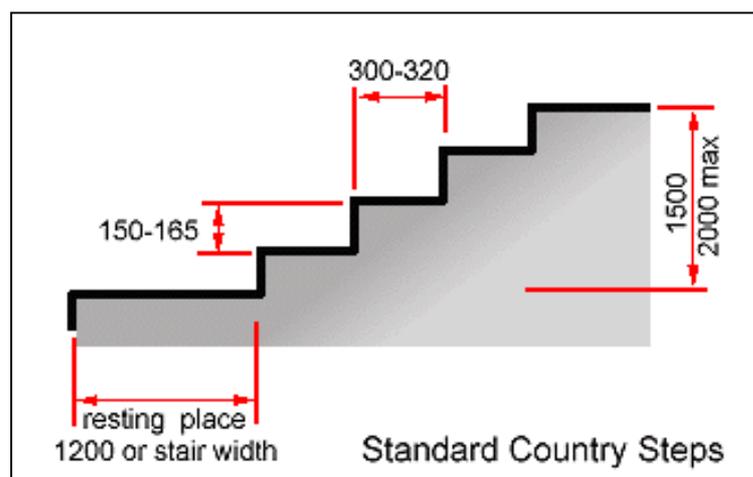
- Single steps should not be used with the exception of roadside kerbs.
- Where possible steps should not open in line with the path route.
- Where possible a level space 1500 (or full width of stair) x 1200 should be available at the top and bottom of a flight.

- Tactile and colour change warning must be placed at the top and bottom of a flight of all outdoor staircases. This should be 400 back from the step and 800 mm deep the full width of the steps. Always use the correct type of paver style.

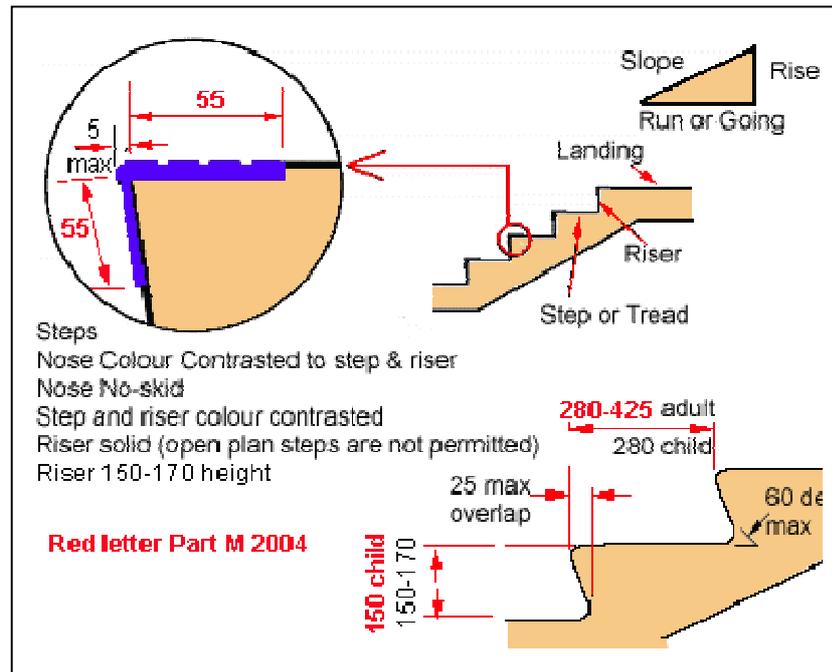


- All steps must be square or have sections which are square. Curved and tapered steps are a hazard especially for people with vision or mobility impairments. Helical staircases may be used but can be a hazard for people with low vision or mobility.

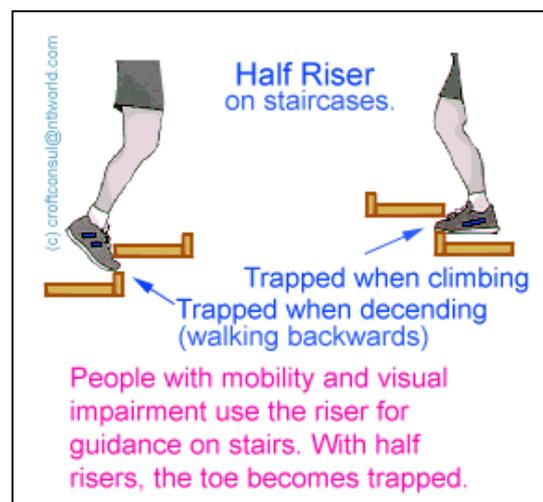
- All steps should be 1200 wide minimum.
- The riser of steps in walkways should be between 150 and 165 mm height. No single steps except kerbs can be used. 150 high risers are specified for steps under the authority of the Highways Agency.



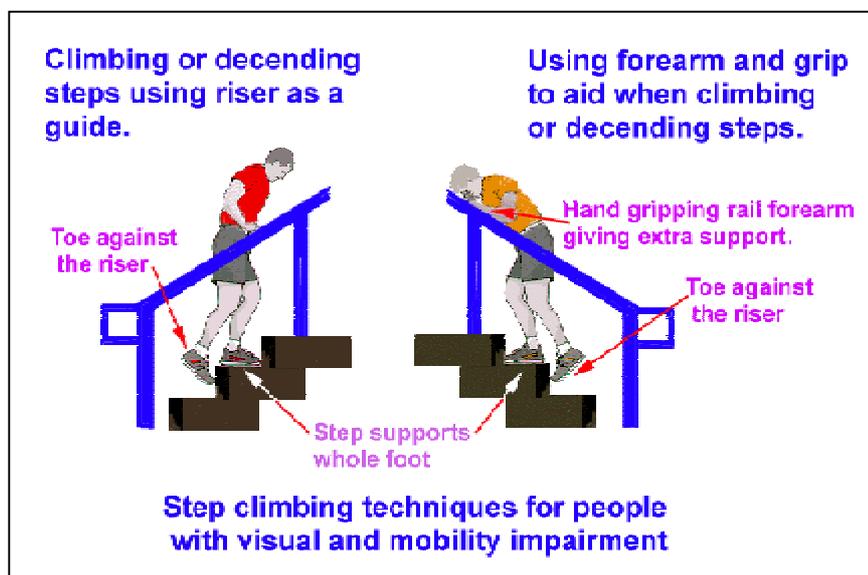
- Steps of less than 135 mm risers should not be used in standard staircases as these form a hazard.
- On standard steps the going or tread length should be 3000 to 320 mm. The going of a flight of steps must be consistent.
- All steps must have contrasting non-trip nosing.
- Flights should be 1500 to 2000 mm high between rest places.
- Rest places should be 1200 mm long or the width of the steps which ever is larger.



Having solid defined risers on steps and nosing with no overhang is important as many people use the riser and nosing as a guide when climbing or descending steps. People with low mobility and vision may descend steps facing upwards



and feel for the riser to guide their toes and judge distances. Open plan steps therefore can trap toes and be hazardous. Open plan steps (with or without and upstand) are



also problematic for people with visual and balance/ vertigo impairments as the alternating site lines and light levels cause disorientation.

Provision of handrails on all formal steps is required as many people cannot negotiate steps without their aid. Good gripping surfaces and support for the forearm is needed to aid and steady movement. Do not forget that children also need to use handrails which should be provided at appropriate heights. On less formal hiker's routes providing handrails should be considered. See hand and guardrails below.

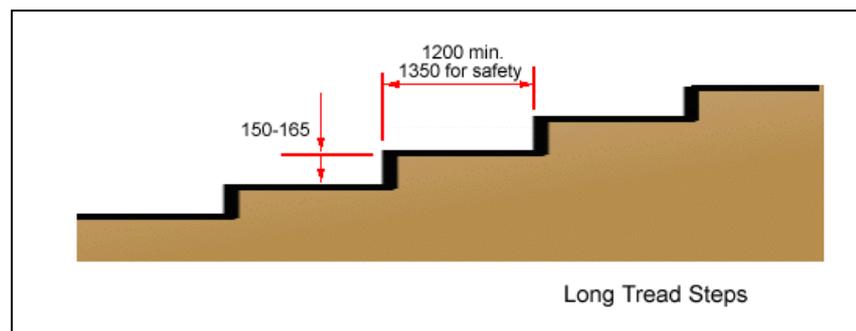
Where ever possible staircases should be lighted at night and in poor light conditions. Sites should be selected so that trees etc. do not cause deep shadows or leaf fall.

For formal and indoor stairs see our guide 'Step Risers and Stair Use'.

1.1 Long Tread Steps

In certain places long tread steps may be used. These should

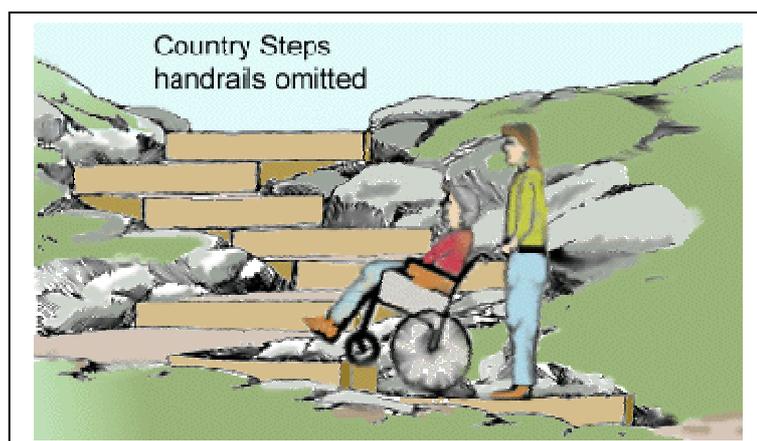
- have consistent going and
- be used for flights of no more than 1500 mm rise.
- Steps should have 150-165 mm risers
- Have a going of at least 1200 mm.



1.1.1 Irregular flights

The flights can be irregular to suit the landscape and remain usable by people with low vision and for people in wheelchairs with an assistant. The main criteria are long, wide steps with space for the wheelchairs and assistant and space to turn and face each step at right angles to the riser.

Steps should be 130-150 mm max. high and at least 1400 mm deep to aid wheelchairs. Risers 50-75 mm height allow many manual wheelchair riders to use these



steps unaided (dependent on arm/body strength).

Handrails are essential on these type of steps (omitted on drawing for clarity).

Steps must be well maintained, have low cross-falls (1:50) and firm surfaces.

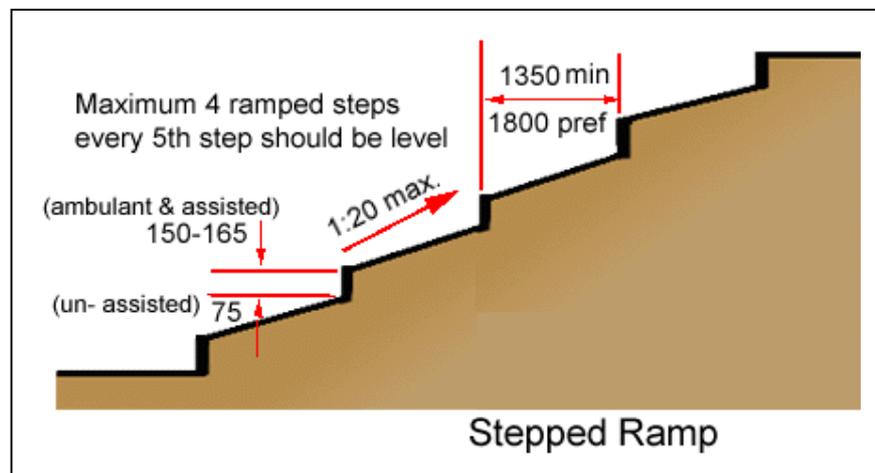
An alternative ramped route should be available for mobility vehicles and cycles.

1.2 Stepped Ramps

Stepped ramps may be used with care as these can be hazardous for people with mobility or balance impairment. They may also be a hazard in wet or icing conditions. They must be well maintained and kept clear of moss, algae growth, fallen leaves or other sources of slips. They are generally impassable and unsafe for wheelchairs and other mobility vehicles.

They should

- Have a level rest step every 5th step.
- Have a going of 1350-1800 mm minimum.
- Have a slope of 1:20 or less.



- Step risers should be 150-165 mm for ambulant users and assisted manual wheelchairs. Risers for unassisted manual wheelchairs and mobility scooters 75 mm.
- Have drained, self drying, non-slip surfaces which provide good traction. As a rule stepped ramps must have concrete or tarmac type surfaces to prevent erosion and wear.
- Have continuous handrails with toe plates or tapping rails.
- Step nosing must be colour contrasted and non-skid.

2 Country Steps

2.1 Timber Front (Temp)

Along country paths it may be uneconomical to provide timber, concrete etc. steps at every part of the route. Steps can be built up from the path surface material well compacted and restrained by a timber riser. These should in general be limited to hiker's paths and similar less formal paths. These single board style steps are common to many locations.

However, although cheap to construct they are maintenance intensive and have very short life spans. They are most suitable for use on temporary routes, e.g. steps used to avoid an area where maintenance work is being carried out.

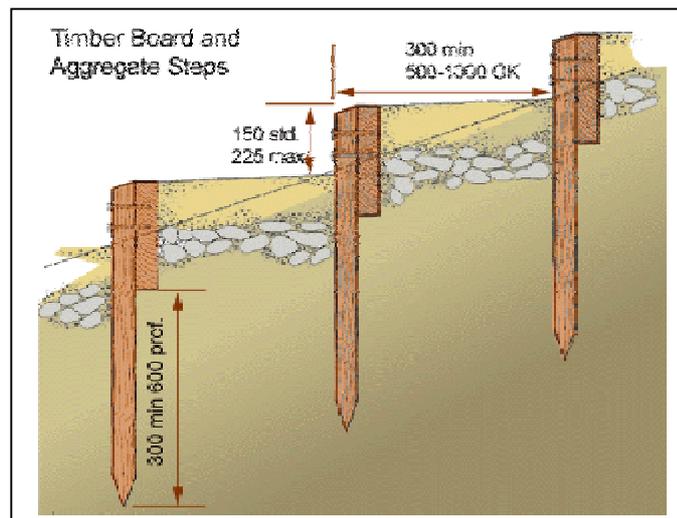
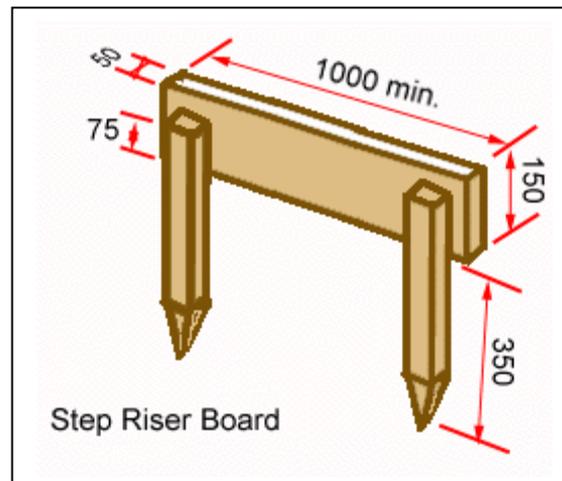
They can be a tripping hazard for people with low vision and limited mobility.

The surface must be porous to allow draining while being well compacted to provide a firm level footing.

150 mm depth of additional ballast material 30 to 60 mm size can be added below the standard surface to provide additional drainage and robustness to the steps. Use of a lean concrete mix as a footing is also helpful in extending the steps life.

The 150 x 50 timber board should be fitted with 350 mm deep restraining stake to prevent movement. Alternatively the riser and side boards can be set into the ground by 250 mm. The stake need to be fitted to the outside of the riser to act as buttresses to prevent collapse. The stakes should be fitted near the outer edges of the riser, max 100 mm from the edge to avoid catching user's feet. (see also Wooden Steps below)

Handrails should be dug in to 450 mm depth. A rubble in-fill or lean concrete setting should be used to ensure the rail post stay firmly in position.



While the handrails shown in the sketch are usable, providing standard design handrails with underside supports is the preferred option.

The timber should be well protected by creosote or other preservative before use.

Where possible a narrow drainage swale should run along side the steps to help with drainage. An edging board at the side of the sale will help reduce erosion.

The steps should have handrails on both sides.



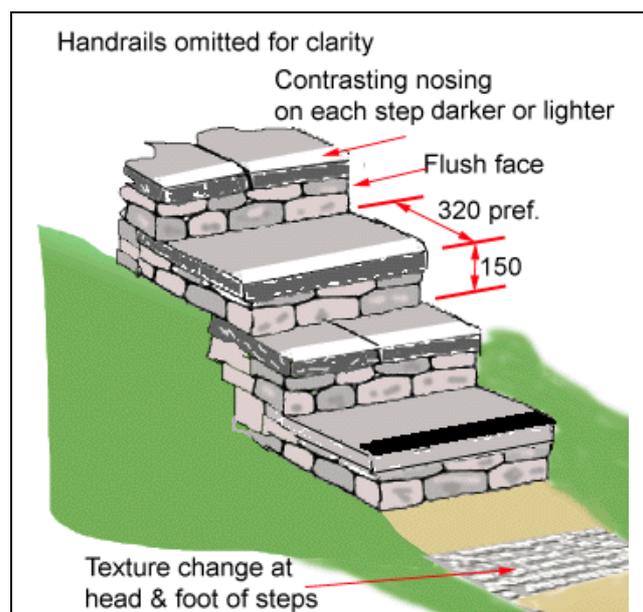
Remember timber darkens with age and damp. A heavy coat of creosote will make the edge dark, therefore, a step surface should be a light colour to provide contrast. Alternatively, if the step surface is dark colour material paint the top edge of the timber with a durable white paint.

Steps should not be placed in direct line with the path unless essential due to space limitations. A change of surface texture and colour at the top and bottom of the flight warn people with low vision and hearing that there is a potential hazard. A harder e.g. a paving slab, area or rubble band across the path should be considered. This gives a change of texture and sound.

2.2 Stone & Flag Paver Steps

Stone built steps with flag stone treads are a viable choice for low maintenance.

Like all steps they should have handrails and contrasting nosing. The contrast can be darker or lighter than the flag stones.



The face of the riser should be as flush as possible without any overhangs to catch toes when climbing the steps.

A texture and colour change should be set into the path 400 mm from the top and bottom of the steps. This textures band should be 400 mm deep and the full width of the path.

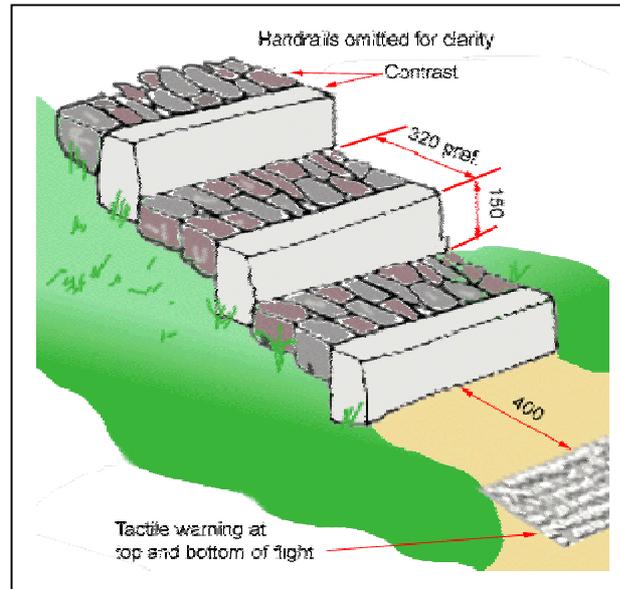
2.2.1 Stone and Kerb Steps

Combining kerb stones with darker stones for the tread can make an attractive, low maintenance flight of steps.

It is important that the stones in the tread are grouted into position and that surfaces have no more than 5 mm unevenness.

As with flag and timber steps regular cleaning is needed to clear algae and moss build up.

Handrails must be provided and tactile warning sited at top and bottom of the flight.



2.3 Other Natural Materials Steps

As with any staircase a level approach should be provided at the top and bottom of the steps with a tactile warning surface. The top step should never open directly in line with the path. Three flights of steps in one direction is the maximum which should be employed without a change of direction. Rest platforms should be provided every 12-18 steps, the platform should be wide enough for other users to pass a resting person.

Steps should be well drained and water should never flow over the treads where it could deposit silt or be a hazard in it self. Drainage ditches should be provided where necessary.

These types of steps would be used in less structured locations and on hiker's paths as they a likely to be unsuitable for older and disabled people's safe use.

2.3.1 Natural Stone Steps

Natural stone steps can be used with care in places used by disabled and older people.

Always contrast the nosing where the path is used by people with disabilities, and give it consideration in any other location.

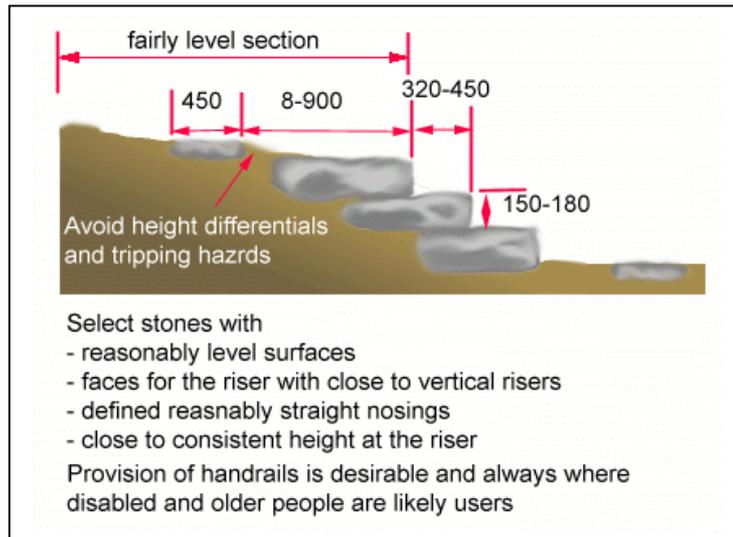
They should be close to square at the nosing and for the riser without large overhangs.

Treads should be as level as possible (trim with a hammer and chisel if necessary) and 320-450 mm deep.

Steps should be at least the width of the path they serve.

Provide a reasonably level landing at the top and bottom of the flight with a flat stone set into the path as a warning.

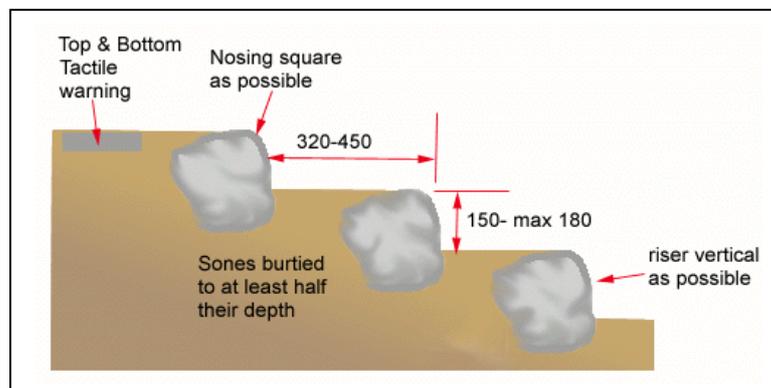
Always provide handrails for general use and consider providing them on rougher hiker's paths. The path access information should indicate that these types of steps are in use and preferably a notice should be provided at the path head.



2.3.2 Stone Riser Steps

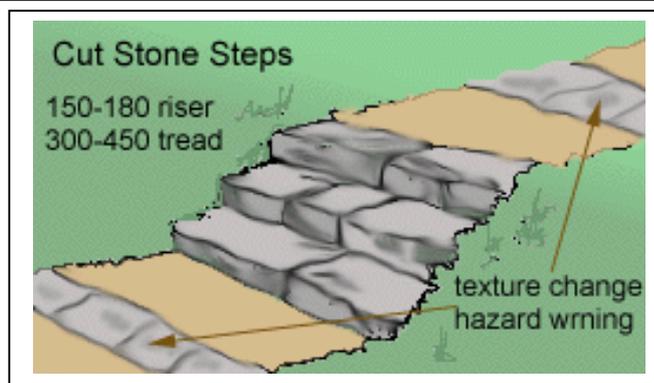
Using steps with stone nosing is not recommended where older and disabled people are likely users of a path.

Stones may also be cut and shaped to



produce a good walking surface. These are a preferred method for making 'natural' looking steps for accessible paths.

They should follow the same guidelines as Natural Stone Steps above, with the tread filling being constructed to the same



standard as the path.

Where water is likely to be a problem consider packing the underside with a gravel base to aid drainage and stability. These should be inspected regularly for movement or displacement due to walking or water.

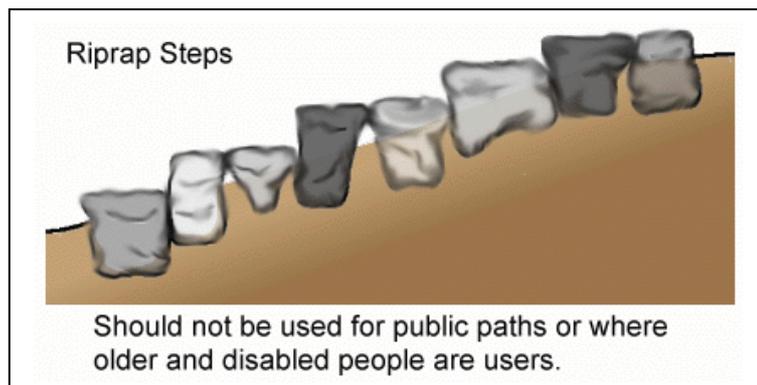
2.3.3 Riprap Steps

Riprap is difficult to make into step safe for use by people with disabilities and older people who are less stable on their feet.

If used on hiking paths they should be as wide as the path and selected to provide level treads and upright risers. Nosing overhangs and irregular riser height should be avoided as much as possible as these can be tripping hazards.

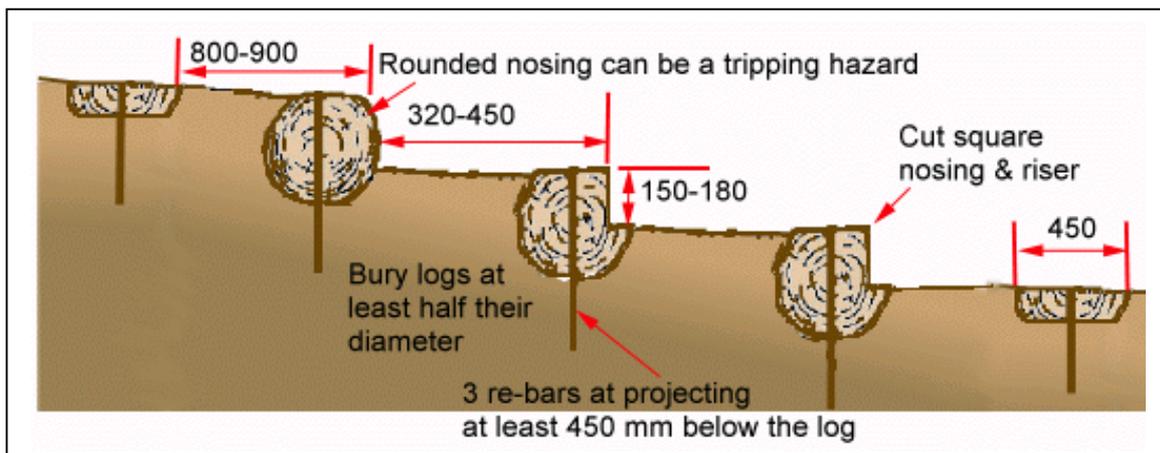
Stone placement should not become a tripping hazard.

The stability of the stones should be checked regularly and soil repacked where it has washed away. Consider constructing a drainage swale alongside the steps.



2.3.4 Log Nosing Steps

As with Stone risers Log risers can be used but pose a number of problems.



The log must have a level top and riser face as the log curve will be a tripping and slipping hazard. This exposes the heart of the wood to water and fungi making them slippery and prone to rot.

In practice these should only be used on hiking path and for short term temporary use in other situations.

Un-cut rounded riser logs are more hazardous and can be a tripping hazard and become slippery with wear and in wet conditions. The top of the tread surface should be level with the top of the timber.

2.4 Wooden Steps

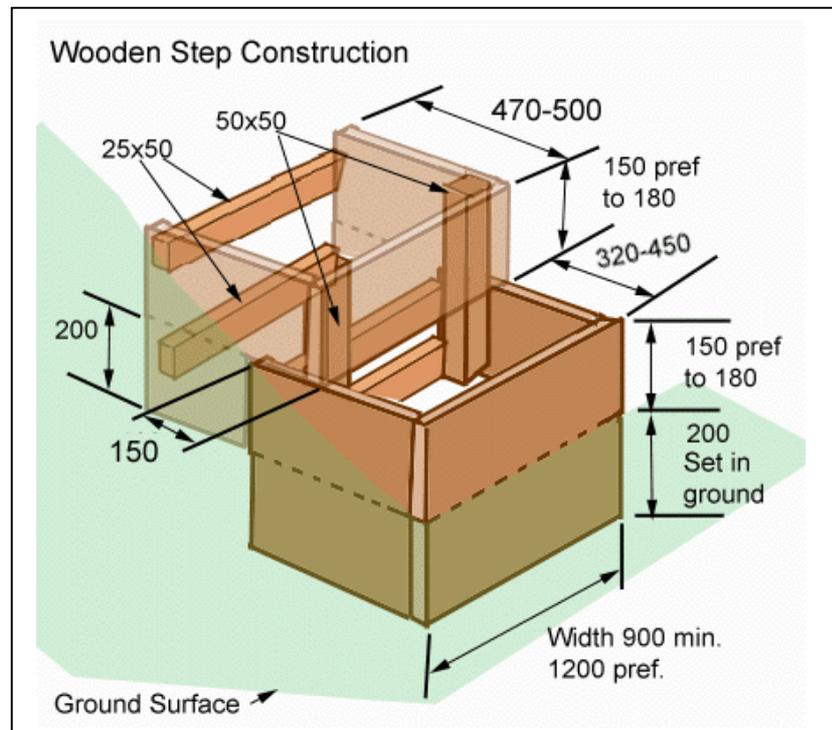
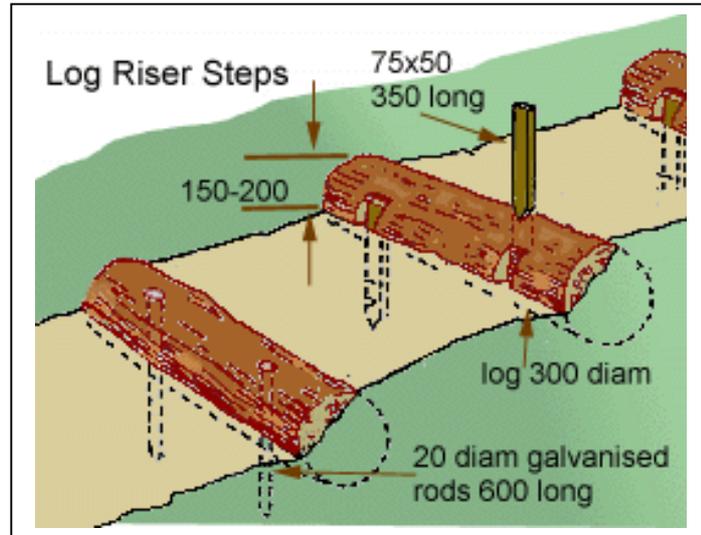
Steps can be constructed from cut timber, 25 mm thick on the sides and 50 mm thick as the riser, to form boxes as steps. The steps should be set into the soil by 200 mm (or more) to hold them rigid. A 50 x 50 mm square section should be used to join the step layers and reinforce the corner joints. The steps should overlap at each rise so that at least 150 mm of the upper step rests on the lower.

All sections should be held together with 4 mm galvanised nails or screws. The timber should be treated before setting in the ground.

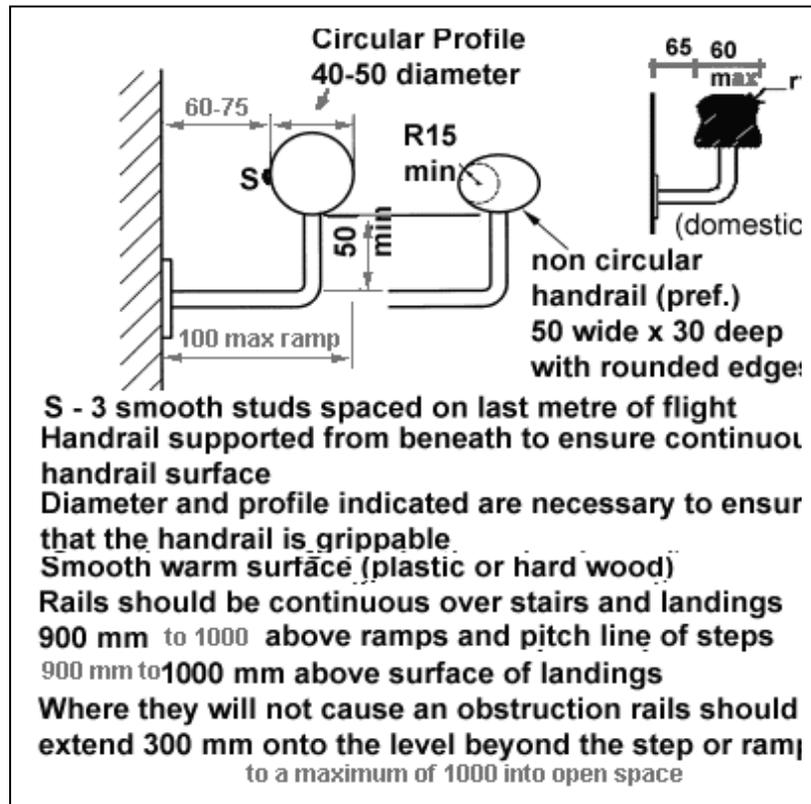
The lower part of the box can be filled with rubble to assist drainage and the top layer finished to the same standard as the associated path.

The nosing top edge of the riser should be painted to contrast with the tread fill material.

All other features should be as for other steps, e.g. handrails, tactile warning, drainage, flight length etc.

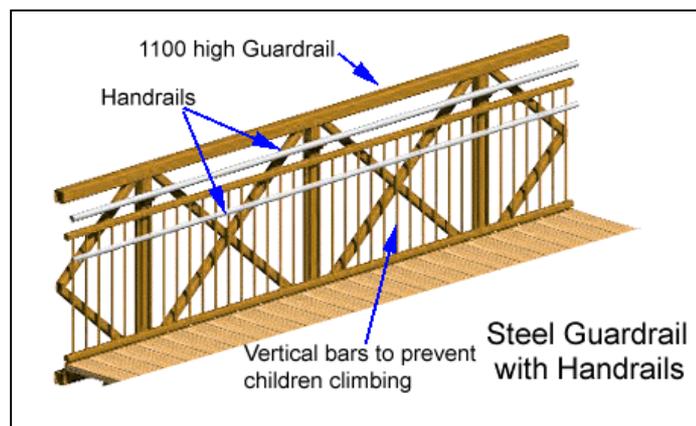


- Steps wider than 1800 mm should have a central handrail. On escape stairs wider than 1400 mm central handrails are required.
- Handrails should be 40-50 mm diameter and always supported from the underside so that a continuous support surface is available. The end of the handrail can be turned back into the wall to provide a positive end to the rail. The rails should project over the stairs 75-100 mm so that people may rest their arms on them.



- Handrail profiles should be either round or oval (preferred) in non-domestic settings. A square flat topped handrail profile can be considered for domestic use.

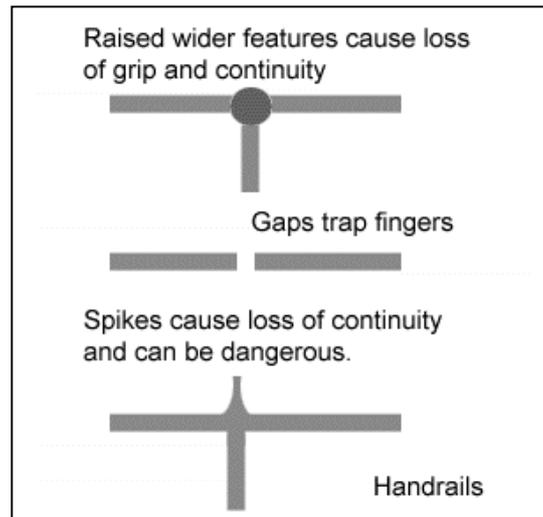
- Handrails and guardrails which have distant horizons should have opaque panels or walls. This aids people with low vision or susceptibility to vertigo.



- Guard rails on platforms and walkways should be 1100 or more high (1200 mm where cyclists or skate boarders are likely users).

- On stairs and steps the handrails should continue around the platform. Handrails are not required on level walkways but can be helpful for people with mobility impairments.

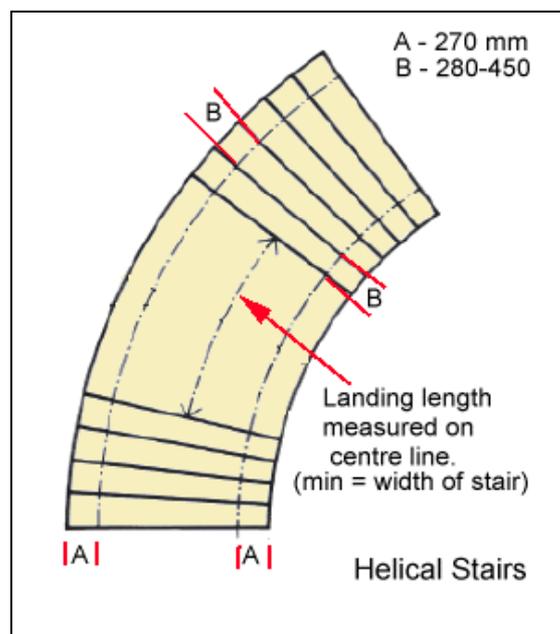
- Vertical barrier bars help prevent children climbing guardrails or stair sides. Alternatively, heavy wire mesh with max. 50 mm wide holes can be used.
- Continuing handrails for 300 mm (or more) on to the level at the top and bottom of flights helps steady people after climb. The projection should not interfere with walkways as this causes a hazard.
- Continuity of handrail surface should not be interrupted by projecting components which cause people to have to release their grip or would prevent the continuous support for the fore arm.
- British Building Regulations Part K 1.29a, state – that a 100 mm diameter sphere cannot pass through any openings in the guarding. This applies to all components of a handrail or guardrail. Gaps at component joints should also have sufficient space to prevent finger trapping e.g. 50-75 mm.



2.6 Helical & Spiral Steps

Helical staircases may be used with a going (tread depth) of 280-450 mm (dimension B in the sketch 320 mm min. is preferred for adult use) in outdoor locations.

Risers must be solid and handrails provided. As with all outdoor steps tactile warning tiles must be provided at top and bottom of the flight. If the flight is wider than 1800 mm between handrails an extra central handrail is required. On the inner curve if dimension A is more than 200 mm the handrails should be extended out over the minimum step with so that support is available at the safe tread going. (Part M 2004 supersedes Part K 1998)



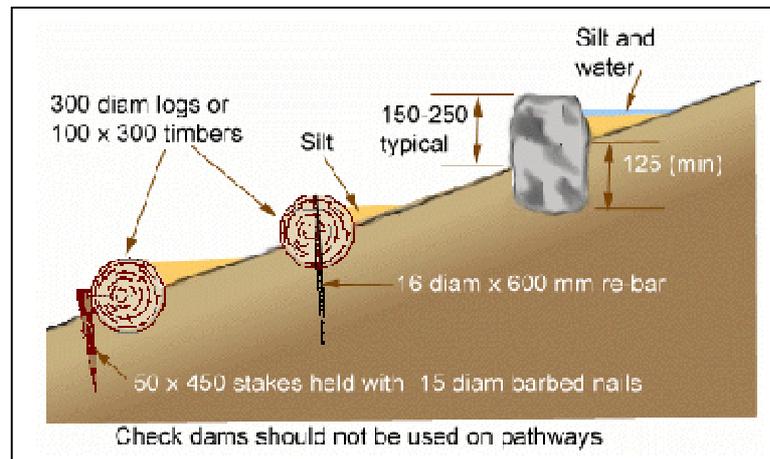
The use of spiral stairs and open plan stairs on routes used by people with disabilities and older people is not allowed. The taper is a danger

to everyone using the steps especially where mobility or vision is impaired or when carrying a load.

Spiral staircases are not permitted in schools and places of learning.

2.7 Check Dams

These are included under steps as they are sometimes found on existing paths where water erosion is a problem. These are logs or stone barriers which are used in conjunction with other drainage features. The dams are intended to collect silt from the runoff.



These are single steps in line with the route and

therefore a tripping hazard. The rear of the step is often low and again a tripping hazard.

The silt build-up behind the dam is often soft and water logged which again makes them a hazard for walkers.

They are dangerous on any path used by cyclists and mountain bikers.

By preference they should not be used on paths, alternate drainage and protective measures should be considered. They can be used on side slopes where people are not expected to travel a erosion control and rebuilding features.

Stakes and re-bar should be placed every 1000 to 1500 mm to retain the logs. The dams should be spaced about 20 metres apart up the slope (inclines up to 1:4) on steeper slopes a closer interval should be used.

3 Construction Basics

If the stairway climbs straight up the hill, each step should be slightly crowned to drain water to the edges or slightly sloped to one side. When the trail traverses a slope, each step and landing should have a slight cross fall to promote drainage. Water should not be allowed to descend long lengths of a set of steps or to collect on or behind a step on the landing. Where live stock is likely to use the steps a the landings should be long enough for all for feet to stand, and wide enough for another animal to pass safely.

On more formal steps the risers and going must be consistent. For less formal steps the tread depth/length of going must be the same



for each step. Less formal paths step riser height consistency is less problematic where people with disabilities are not expected users.

A drain dip or open slot culvert where the path approaches the top of the steps is a good idea. Side drain ditches should be considered on longer flights and staircases.

Select locations for steps where hikers are constrained to the steps. Hikers are notorious for walking alongside steps.

Calculate your staircase before starting work and where necessary build-up or cut away material to suit a consistent rise and tread. Pick a place where water is less likely to pose a problem and the ground at the base of the steps provides solid support which is not liable to slippage.

Always start constructing a flight of steps from the bottom. Starting a flight part way up makes the steps prone to washing out.

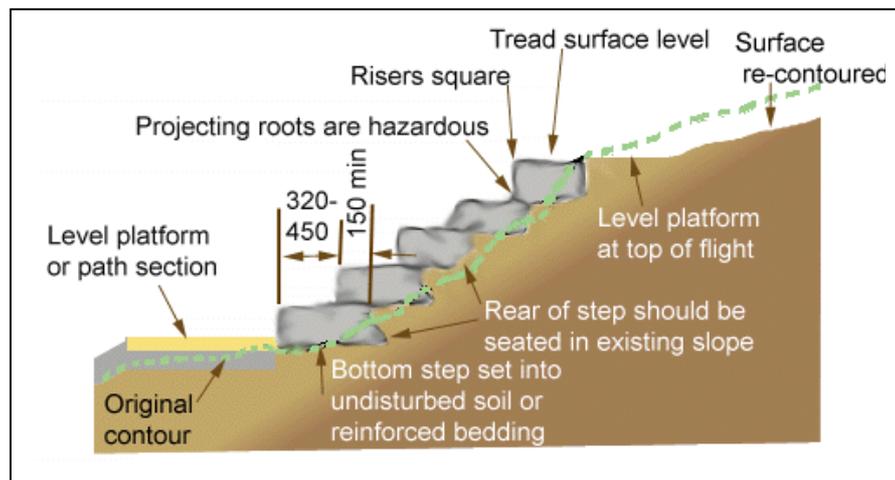
Construct the bottom step on a solid footing with a concrete apron to help carry the load where possible.

Each successive stair is placed atop the previous stair. Wood stairs are usually pinned to each other and into the footing. Dry masonry rock stairs usually rely on the contact with the stair below and with the footing to provide stability.

Single steps should never be used as they are a safety hazard as people will not be expecting the step.

In all outdoor flights of steps, the key is to use the largest material possible and to seat it as deeply as possible. Rocks should be massive and rectangular. With a flight of steps which traverse a slope, it helps to seat the upper end of the step material in footings excavated into the slope.

The most important area of the step is usually in the run or tread. This is where most user's step as they climb. If the step is



composed of materials such as a board on edge with fill behind it, then the user will step onto the landing. Almost all pedestrians descending the step will walk off the edge of the step. Others may descend backwards and use the riser to guide their feet, handrails are essential for this manoeuvre.



The top of the step (and landing) should be level, stable and provide secure footing. The edge of the step should be solid and durable without excessive rounding at the nose.

Remember, flights of steps special structures are relatively expensive and deserve careful attention to protect the investment. Flights of steps should be built by professionals or training provided for your volunteer crews. Always have the design and finished product checked by a civil engineer.

Some construction considerations

- Retaining walls should be carefully checked for shifting, bulges, or loose structural material.
- Make sure that all the footings are protected from erosion.
- Ensure hand and guardrails are firmly footed and rigid when completed.
- Internal anchors for increasing the stability of retaining walls.
- Precision blasting to obtain sufficient sized footings in rock.
- Power tamping equipment to strengthen fill.
- Cable winching systems can be used for moving large rocks or timbers to step and wall locations. Powered winches should be considered if there are large amounts of material to move over distance. For smaller moves a wire sling and turfer may be sufficient. Provide training for volunteers or employ a professional to move larger logs and rocks.