

The Bruce Trail Association

Guide for Trail Workers

Third edition



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Guide for Trail Workers

Third edition



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Supporter of the Canadian Trail and its Creators

Important information

1. The Bruce Trail Association has published this guide for trail workers for reference by its volunteers and any others building and maintaining the Bruce Trail.
2. The information contained in this Guide is, to the best of our knowledge, based on information and techniques found to be useful and appropriate by trail workers not only from the Bruce Trail Association but also for similar organizations, both volunteer and professional, from across the world.
3. The guidelines provided here are to be used in conjunction with common sense, occupational health and safety regulations, landowner and land management considerations and provincial and municipal building codes, for the planning and completion of any trail work. Most importantly, the safety of all trail workers and trail users must be the prime consideration during any work being done on or to the trail. Any activity which might endanger workers or users must be avoided. All trail workers do so at their own risk. **Never work alone.**
4. The contents of the guide for trail workers is for reference only. The authors are not responsible for the interpretation or use of this information.

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Introduction

WHEN YOU VOLUNTEER some of your time and energy to work on the Trail, you help achieve one of the most important objectives of the Bruce Trail Association – to build and maintain the Bruce Trail and its side trails. Having done so since 1965, the Association accepts responsibility for keeping the Trail and its structures safe and accessible. No special skills are needed for routine trail maintenance; but there are, of course, certain approved standards and recommended methods which you will need to know. The purpose of this guide is to provide this information to help you do a good job. Thank you for becoming a trail worker.

This guide is divided into Parts A and B. Part A provides background information regarding Bruce Trail policies. Part B contains the hands-on information for trail maintenance. Please, read the guide carefully.

What does being a trail worker involve?

Most Clubs have a system under which sections of trail, perhaps 3 to 6 km in length, are assigned to Trail Captains, who have responsibility for keeping the trail in good order. This will mean spending a day or so on your section at least two or three times a year, depending on club policy (at the end of winter, early in summer, and in the fall), and reporting to your Club Trail Co-ordinator or Trail Director on the condition of the Trail (see Appendix A). **This practice is part of the Comprehensive Plan for the Bruce Trail and must be followed!**

You will find this work easier and more enjoyable if you have someone to assist you. Perhaps your own family is able and willing to help you, and this can be a very satisfactory arrangement. If this is not possible, ask your Club if an assistant can be found, or get a friend interested. Most important, if you find at any time you are unable to get out on the trail to do the work for which you are responsible, let your Trail Co-ordinator or Trail Director know promptly so that other arrangements can be made to maintain your section. Nothing can be worse than failing to do anything, so that your Club or the BTA get complaints about the condition of your section, and you have the embarrassment of admitting that you have not been out on your section of trail since last year!

Very often, when Trail Captains are having trouble, it is because they are attempting activities beyond their own resources.

Many Trail Captains find that a quick inspection of their section will bring to light any major problems such as downed trees or damaged bridges. The Captain notifies the Club Trail Director or Co-ordinator. He or she and other trail workers form a work party to solve the problem. Experienced trail workers know that there are many members ready and willing to work on a project if they have a leader and direction as to what needs to be done. This is a very enjoyable way to do Trail maintenance and learn new techniques at the same time.

If your Club does not have a section of trail for you personally to look after, or if you feel you cannot take on such a regular commitment, you can still volunteer to be on call as a trail worker for specific tasks. Work parties are often organized for specific projects such as trail rerouting, slope control or bridge or boardwalk building. Work parties can be great fun and help Club members to get to know each other. Some of the Clubs organize a special Trail Action Day (formerly called Go-to-Blazes Day) in the spring to give the Trail an initial clean-up before the main hiking season begins. This has been valuable in introducing many people to trail work for the first time, in addition to the publicity it has given to the Bruce Trail Association.

Whatever the nature of the work you do on the Trail, we hope you will do it thoroughly and with enthusiasm. Always be on the look-out for ways in which the Trail can be improved, rather than just maintained at its previous standard. The better the job you do, the more rewarding your experience will be and the lower the risk for the hiker.

Part A – Objectives and responsibilities

Trail maintenance

According to the Charter of Incorporation of the Bruce Trail Association, the primary objective of the Association is "to establish and maintain for the use of the public a trail to be known as 'The Bruce Trail' along or adjacent to the Niagara Escarpment and the wildlands associated therewith from the Niagara Gorge to Tobermory on the Bruce Peninsula; and to establish and maintain similar trails in such areas as may be determined".

For the purpose of achieving this objective, Bruce Trail Clubs were established along the Escarpment, each responsible for a particular section of the Trail. Responsibility for trail construction, maintenance and improvement is still vested in the Clubs. (Complete details of all Bylaws will be found in the Bruce Trail Comprehensive Plan and on file at the Association's head office, Rasberry House.)

The responsibilities of the Bruce Trail Association in this regard are:

- Establish construction and maintenance performance standards.
- Assist Clubs which are short of helpers by arranging for work parties to perform any of these maintenance tasks or carry out major reroutings of the trail. (See also Appendix C)
- Organize seminars or workshops for the purpose of training active trail workers and discussing improved methods of trail management.
- Maintain a comprehensive register of landowners whose property the trail crosses, with information provided by Clubs.
- Have authorized signs manufactured, and supply them to Clubs as needed.
- Provide financial assistance to any Club for trail management purposes, if the financial assets of the Club are insufficient.
- Receive from each Club an Annual State-of-the-Trail Report, and to analyze these reports with a view to future action. (See also Appendix B)

Overnight Rest Areas (ORA)

The second objective of the Association, as defined in the Charter, is: "to establish, maintain and operate on the Bruce Trail and such other trails, camps, campsites and other facilities to enable members of the public to resort thereto for purposes of year-round hiking, recreation, physical fitness and study".

The aim of the Association in this respect is to have a chain of overnight rest areas on or close to the Trail so that hikers may move from one rest area to another in not more than five hours. Ideally such rest areas would be 12 to 15 kilometres apart. These rest areas may consist of:

- Primitive campsites (with or without shelters) accessible only by foot, organized by the Bruce Trail Association or the Clubs but not continuously supervised;
- Other campsites in provincial parks, conservation areas or other parks, at which hikers may expect to pay a user fee;
- Huts or more substantial buildings run by organizations such as the Canadian Youth Hostel Association or by commercial enterprises.
- Bed and Breakfast establishments that will allow camping (for a fee) on their premises.

The initiative of Bruce Trail Clubs in establishing campsites will be encouraged, and Clubs will be responsible for maintaining such campsites in their area. The Association will have the overall responsibility for ensuring that the chain of rest areas is as complete as possible, and for determining the standards required for the location and design of campsites, privies, water supply and signs promoting appropriate camping behaviour.

Please take note. It is *not* up to individual trail workers to establish new campsites along the Trail nor to relocate existing campsites. Trail workers may identify to their Club Trail Director opportunities for improvements to the network of ORAs, but new campsites can only be established with the approval of the BTA, the landowner, and in some cases the Niagara Escarpment Commission.

Generally speaking, campsites need to be located where there is some form of supervision, such as in a provincial park or conservation area, or where they are quite remote from easy road access; otherwise, abuse such as fires, vandalism, and littering, are likely to occur.

The route of the trail

The distance from Queenston to Tobermory, as the crow flies, is 315 km; but because the Trail follows the general line of the Niagara Escarpment, with all its windings, spurs and valleys, the total length of the Bruce Trail is about 800 km. Where feasible, the preferred route known in the BTA as the Optimum Route, most commonly follows the Escarpment brow, with extensive views offered from such a height of land. Sometimes, however, the Trail is located further back from the brow, sometimes below the Escarpment, or part way up the scarp slope. In many areas, such as the Caledon Hills and Dufferin Hi-Land sections, the Escarpment is buried under glacial deposits and there is no clearly defined brow.

Once again, it should be noted that it is not the job of individual trail workers to establish or revise the "macro" route of the Trail. Significant changes to the Trail route, i.e. any change that goes beyond 10 metres from the existing route, or onto the property of a different landowner, must only be carried out with the approval of the Club Trail Director, the Landowner Relations Director and the BTA. Trail Captains may make revisions to the "micro" route of the Trail (i.e. within 10 metres of existing route), but only after the landowner's permission is obtained. Trail workers are encouraged to look for opportunities for improving the trail route, but to make changes only after appropriate approvals have been obtained.

The choice of route depends partly on practical circumstances, for instance the need to by-pass built-up areas or active quarries. Trail developers should note that roads, particularly those with heavy traffic, should be avoided as much as possible; road sections are tolerated only to preserve the continuity of the Trail. Unopened road allowances are often attractive but do require permission from the township landowner. They are also open to horses, snowmobiles and trail bikes. Public land may be considered preferable to privately owned land, all other factors being equal.

The most important factor in the choice of route should certainly be scenic and aesthetic considerations. Open and mature timber land, with little undergrowth, is generally preferred; but the Trail should traverse a variety of different landscapes. If it can be routed past a beauty spot such as a scenic lookout or waterfall, or near a site of historic or cultural significance, it is worth a few metres of extra hiking.

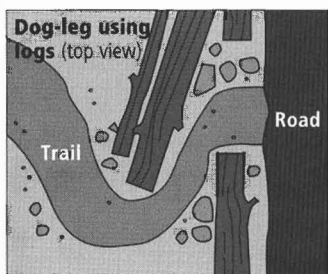
Conservation

The third objective in the Charter of the Association is "to engage in and promote conservation of wildlife and natural resources". Although the Trail, with good reason, passes through extensive areas abounding in wildlife, care must be taken not to create any unnecessary disturbance to fauna or flora. Sometimes this may mean routing the trail to avoid sensitive ecological areas such as wetlands, or to give a wide berth to colonies of rare or endangered plants such as orchids. It should also skirt around reforested areas with newly planted trees – or be very carefully routed through them. Farmland (one of our most important natural resources) must also be protected, and the trail will normally go around the edges of fields with no disturbance to crops, pastures and farm animals.

Many groups and government agencies have people with the expertise to assist in determining which areas should be avoided.

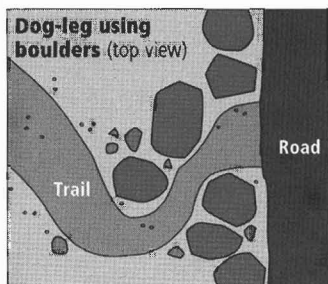
Environmental precautions must also be taken when constructing the Trail. Prevent soil erosion or gullyng, especially on slopes. Avoid crossing marshy areas – skirt around them if possible. A well-located and carefully constructed trail will have minimal maintenance problems. Another important factor is to choose a route which is acceptable to hikers but unsuitable for trail bikes or other vehicles which are not only a nuisance to hikers but can cause serious damage to trails and the environment.

Simple "tricks" of route management will discourage vehicle use of the trail: where the trail meets a road, create a "dog-leg" with a narrow trail entrance which will make the route unappealing for vehicles but easily negotiated by the hiker on foot. Large trees or boulders left at the edge of the path near road accesses may act as a barrier. Where vehicular access is a serious problem, it may be necessary to



consider, in conjunction with the landowner, the erection of fencing and a gate or stile.

Alternative routes may be established for use in certain seasons, for example, to avoid ski runs in winter or areas prone to flooding in spring. Alternative routes may also be designed to provide opportunities for circular loop walks starting and finishing on the main Trail.



Criteria for the optimum or ideal route for the Bruce Trail have been determined based on the Bruce Trail Comprehensive Plan published in 1991 and available from the Bruce Trail Association. Please see Appendix C for detailed route planning.

Environmental considerations

The Bruce Trail winds through some of the most beautiful landscape in all of Canada – indeed in all the world, as recognized in 1990 when the Niagara Escarpment was designated a UNESCO World Biosphere Reserve.

This places some special responsibilities on all of us as planners, builders and managers of the Bruce Trail. In our work we must always remember that the protection of the flora, fauna, rocks, soil and waters along the Trail is the highest priority. Without the rich and varied natural surroundings of the Niagara Escarpment there can be no reason to have a Bruce Trail, no reason to hike there.

While most trail workers have a good “environmental consciousness” when they go about the task of building a new bridge across a pristine trout stream or a boardwalk through wetland, we must strive to do better. The Bruce Trail must truly ‘lie lightly on the land’. In fact, it must be gently woven into the fabric of the landscape in a way that does not brutally alter the local environs of the Trail.

If a slope requires major work to build a section of trail, for example, perhaps the trail would be better located elsewhere. Good planning can avoid unnecessary environmental alteration – and unnecessary hard labour!

Let's all become more attuned to our environmental responsibilities in every aspect of our Bruce Trail work. If you, as a trail worker, want to know more about the natural habitat of your section of the Trail, why not contact your local Conservation Authority, naturalists' club, the Federation of Ontario Naturalists at 355 Lesmill Road, Don Mills, Ontario, M3B 2W8. Telephone 416-444-8419, or the Niagara Escarpment Resource Centre at 232 Guelph Street, Georgetown, Ontario, L7G 4B1. Telephone 905-877-5191. A wealth of information is available to help Bruce Trail workers become even better stewards of our precious Trail.

Liability

Liability and the management of risk are becoming increasingly important in trail maintenance and management, as more and more people seem inclined to take legal action after they have suffered an injury or loss. This subject should be looked at from the following three perspectives:

a) Landowners' liability – Landowners are protected by the provisions of the Occupiers' Liability Act, which says that individuals using a recreational trail in a rural area, and paying no fee for its use, assume the liability for their actions onto themselves. The landowner has an obligation not to deliberately and knowingly create a hazardous situation with reckless disregard for the public's safety, for example, he or she is not allowed to "set traps". On property which is owned by the BTA, this protection also applies to the Association.

Trail workers should be sure not to deliberately create any situation which might be construed to be hazardous, for instance placing a large rock or log across the Trail to discourage mountain bikers. Such actions could be detrimental to the landowner's and the Association's legal position.

b) Bruce Trail Association Liability – The BTA carries liability insurance to protect it from claims for damages incurred in connection with the use of the Trail. As an organization managing a recreational trail, the BTA has a responsibility to do so in a responsible manner, and to act as a reasonable person would under the circumstances. The test of reasonableness would be determined by the court. For instance, the court would probably agree that it is impossible and unreasonable for the BTA to remove every potential hazard created by "Mother Nature" on an 800 km long wilderness trail following the edge of the Niagara Escarpment. However, it would also not be reasonable to route the Trail along the very edge of a sheer cliff if a safer route exists, or to allow a bridge to remain on the Trail when it is not capable of carrying the weight of a hiker.

In applying the test of reasonableness, the court would almost certainly look to see whether we had acted in accordance with our own stated standards, and may also look at standards adopted by other trail management organizations such as provincial and national parks or the Appalachian Trail Conference.

It is the Association's duty to adopt reasonable standards, and to ensure that they are being applied on the Trail. Similarly, in order to limit the risk exposure of the BTA, it is the duty of every trail worker to apply the BTA standards as they are presented in this booklet. One of the most important things a Trail Captain can do is to inspect the Trail regularly, and to document in writing what conditions were observed and what was done about them.

Regularly scheduled work parties for construction and maintenance along the Trail need to demonstrate "due diligence". The work should be documented and filed along with the Trail Status Reports for review in case of any legal action. Poorly done Trail maintenance and construction could seriously affect the BTA's reputation and ability to gain new members and funding.

c) Individual Trail Worker Liability – The BTA liability insurance also provides coverage for employees and volunteers of the Association when they are working on behalf of the BTA. This means, for instance, if someone working on a trail work party with you is injured and takes legal action against you, you would be

eligible for coverage of your legal fees, damage awards, etc. This coverage does not include coverage for medical costs. All Ontario residents will have basic OHIP coverage to handle any trail work-related injuries, and some may have supplementary private coverage for expenses not covered by OHIP. It is important to note that individual trail workers would only be covered by the BTA insurance if they are doing work they are authorized to do, and only if they follow BTA policies and standards. For example, if a Trail Captain operated a chainsaw on the trail in contravention of BTA policy, and someone was injured as a result, the Trail Captain may well have to defend himself or herself in a lawsuit without the support of the BTA insurance policy.

If, in the course of your trail work, you encounter a landowner, or trail worker who raises concerns about liability, please refer them directly to the Association staff at Rasberry House. Telephone 905-529-6821.

Experimentation

The Bruce Trail is a world-renowned trail used increasingly by visitors from near and far. **As such, the trail must show a high degree of consistency in blazing, signage, construction of bridges, stiles, etc. and in the clearing of the treadway itself from Niagara to Tobermory.**

Often, individual trail workers will come up with what they firmly believe to be a better mousetrap: a better way of blazing, building boardwalks, etc. Such innovation is good; it is important that new ideas be hatched, nurtured and – if found appropriate – incorporated into the evolving management program for the Bruce Trail.

Such new ideas must be subjected to some degree of formal evaluation. If you have an idea for a new trail-building tool, a new design or a new construction method, don't just head off into the wild blue yonder and do whatever you want. Discuss it first with your fellow trail workers, your Trail Captain, your Club Trail Director. If you should encounter staunch resistance to your idea, do not despair: answer the criticisms, take it to the B.T.A. Trail Director or present it through

the Trail Development and Maintenance newsletter, *Treadway*. Develop your idea and propose it as a pilot project. If it is approved then put it into place and be prepared to monitor it rigorously to measure such things as user opinion, wear and tear, ease of repair, safety, etc. (not just the ease of installation). The Bruce Trail is a special trail; it must have new ideas if it is to meet tomorrow's demands. Let's experiment, but do so within approved guidelines!

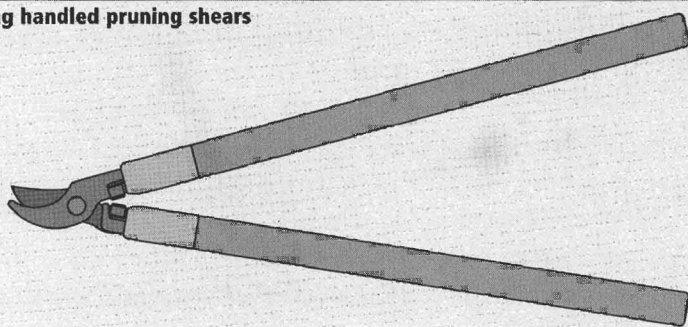
Part B – Guidelines for trail workers

1. Trail clearing and treadway protection

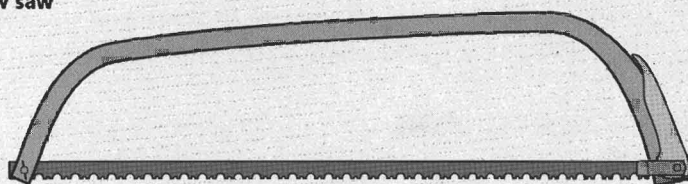
Two basic tools are needed for trail clearing:

1. Pruning shears, preferably long-handled, for cutting live wood up to about 2 cm in diameter
2. Bow saw (Swedish type) of medium size for cutting larger or dead wood. The teeth should be covered by a sheath of plastic or wood for protection when the saw is being carried any distance.

Long handled pruning shears

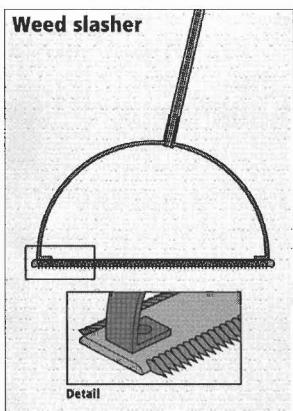


Bow saw



With these two tools, you will be able to perform a very large proportion of the work that needs to be done on a trail. Other tools which are sometimes helpful include:

- Horticultural pruning saw, with a short curved blade that folds into its handle
- Pick-axes and mattocks, for loosening and moving hard, stony soil
- McLeod grub-hoe, for smoothing and establishing a treadway and moving small amounts of material



- Shovels, for establishing a treadway along a hillside
- Rakes, particularly fan-shaped leaf rakes, for removing debris from the treadway
- Weed-slashers or scythes, for cutting annual herbaceous growth such as grass and weeds.

Axes are generally not suitable for trail clearing. They don't do a particularly good job, and are dangerous to use, especially when working in a group. Similarly, chain saws have limited

application in trail work. They are mainly useful in new trail construction and in clearing large trees that have fallen across the trail. Any live tree that is large enough that it would require a chain saw to cut it down, probably should be left standing. A minor reroute of the trail would be preferable to cutting of such a large tree. **Also note that the BTA has a policy prohibiting the use of chainsaws on the trail except by persons properly trained in their use, and outfitted in appropriate safety equipment. A chain saw is a very powerful and dangerous tool, which should only be used by those who are properly trained and equipped. (See the full policy statement in Appendix E).**

Another power tool which is useful in keeping annual growth at bay is the gas-powered brush-cutter or string trimmer which comes in portable or wheeled models. When equipped with a nylon string line, it can be very helpful in cutting grasses and weeds in open meadow areas. The heavier duty models, which are equipped with a blade, are useful in clearing woody shrubs and small tree seedlings, but they generally leave short stubs or stumps which are a tripping hazard, and which may re-sprout. Therefore they are most appropriate for clearing back heavy shrub growth at the sides of the trail, but not on the treadway itself. **Safety precautions and protective equipment are also required with string trimmers/brush cutters. See the safety notes in Appendix D and the BTA Policy in Appendix E.**

Protective gear

Most of the Clubs have a stock of commonly used tools, including in some cases chain saws and brush cutters. However, most volunteers who go out to work on the trail on a regular basis find it more convenient to have their own basic tools.

How wide should the trail be?

The Bruce Trail is normally a single-file footpath, and so 0.6 m (2 feet) is sufficient width for the actual treadway, which should be solid, stable, and clear of obstacles. However, above ankle height, vegetation should be cleared to at least 1.5 metres (5 feet) width, so that nothing touches the hiker, and so that it will not grow in too

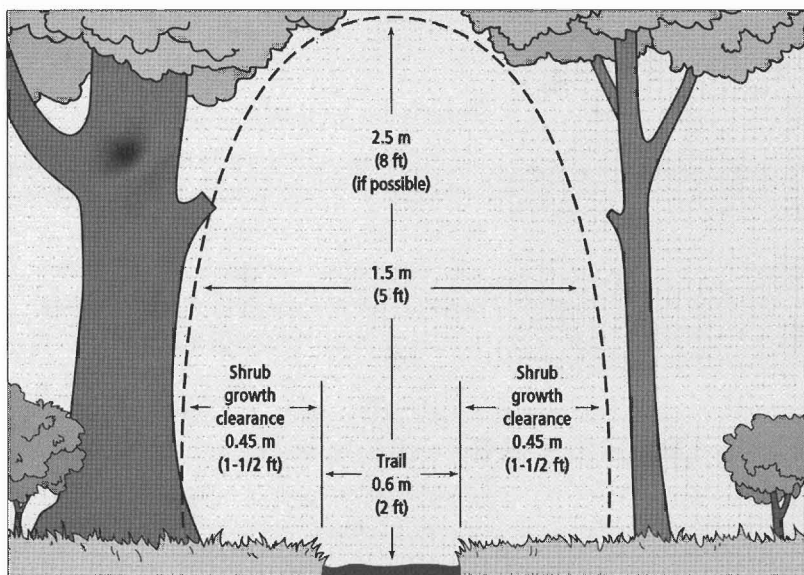
quickly. A narrower trail adds to maintenance problems, and is more easily obscured. Exceptions are permissible, however, under certain circumstances. For instance, where the Trail winds through a mature forest, it may not be practical or desirable to have 1.5 m clearance between the trunks of large trees, as long as understorey shrub growth is kept back. Do not pile up cuttings at the edge of the trail; these look unsightly and become a potential fire hazard (although no one should be smoking while walking along the trail). Debris should be thrown well away from the Trail, and scattered. Protect flowering plants and patches of moss if possible.

Working safely is of the utmost importance. Here are a few basic items you should consider taking with you while working on the Trail:

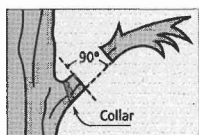
- A small first aid kit – few essential items could go in a fanny-pack
- Work gloves – bring an extra pair in case your first pair get damaged or lost
- A Canadian Standards Association (CSA) approved hard hat or safety hat
- Safety glasses
- Appropriate footwear – consider where and in what conditions you will be working. You might need two or three types: work boots with steel toes, hiking boots or rubber boots.

How high should you clear?

Cut as high as you can reach – up to 2.5 metres (8 feet) if possible. Some backpackers need well over 2 metres clearance. Remember that as branches grow longer they will droop lower, and rain and snow will pull them down still further.



Shrubs and trees that just clear the head will often obscure the vision of someone travelling downhill. On the other hand, try not to let too much sunlight into the trail, as this just encourages more undergrowth. If possible, work toward the development of a continuous canopy arching over the trail, so there is plenty of clearance for the hiker, but not too much penetration of sunlight.

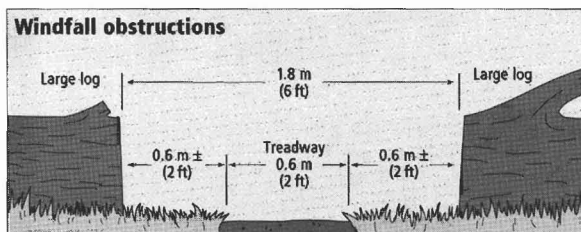


How to deal with trees?

Cut off obstructing branches close to the main bough or trunk, but leave the “collar” around the base of the branch so that the tree can heal the wound. Cut branches at right angles – acute angle cuts leave sharp points. In the case of very small trees and seedlings, it is probably better to remove them completely, since they would only grow and become a problem in the future. Cut them at or just below ground level to minimize tripping hazards and sucker growth, but leave the roots to stabilize the soil.

What about windfalls across the trail?

When a large log or tree trunk falls across the trail, there are a number of options. If the top of the log is less than 20 cm (8 inches) above the treadway, this is an easy stepover for the hiker, and the log need not be removed. Larger logs should



be removed, at least from the treadway proper. A chain saw or large bow saw may be needed for this job. Start by making a saw cut

at one edge of the trail. It may then be possible to swing away the part of the log covering the trail. If not, then a second cut will have to be made, so that the obstructing portion can be removed. Be sure to cut out at least 1.8 m (6 feet) to give full clearance for the treadway. It is acceptable to cut out only the top portion of the log, so that it is easier for the hiker to step over. The height of the log should not exceed 20 cm (8 inches); however, in most cases this is probably just as much work as complete removal.

Please note: It is not BTA policy to deliberately leave or place logs or other obstacles across the Trail to discourage or obstruct mountain bikers. This practice has proven to be ineffective, and could create liability concerns for the Association and the trail worker.

How to deal with brush and weeds

In open and semi-open areas, summer is the time when the trail can become badly overgrown, even to the point of vanishing. Towards the end of June, shrubs should be pruned back, and weeds cut. Clear everything that obscures the treadway, and clear wide; a wide trail is less easily obscured by later growth and drooping plants. You may use a slasher, scythe, string trimmer or brush cutter. Cut close to the ground surface so that hikers will not get their legs and feet wet from rain-soaked or dew-covered foliage, but disturb the soil as little as possible to avoid erosion. Then, try to get out again later in the summer (say mid to late August) when goldenrod, thistles, burdocks and brambles can be a nuisance for hikers.

What about the problem of wet areas?

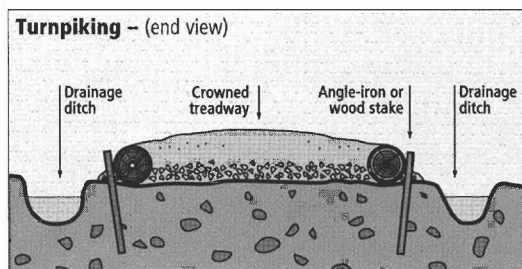
There are several possible ways of dealing with areas which at times become swampy or muddy. Your first option should be to determine whether the trail is in fact in the best location. Sometimes a minor reroute onto higher, drier ground, will solve the problem, provided that the landowner has no objection. If you do make a small localized change in the trail route, be sure to block the former route and if possible rehabilitate it, so that it will not continue to be used. If a better route is not available, then one of the following methods may be adopted:

Stepping stones

Sometimes well-placed flat stepping stones, firmly bedded, are all that is needed to get the hiker across the wet area. They are the best and most permanent solution, if suitable large rocks are available.

Turnpiking

A technique known as turnpiking can be very effective, especially in mineral soils rather than organic materials. Start by lining your treadway along each side with a wooden log at least 10 cm in diameter, and preferably of a rot-resistant variety



such as cedar or hemlock. The logs should be prevented from rolling outwards by placing them against rocks or trees, or by driving in angle iron or wooden stakes along the outside. Always nail the

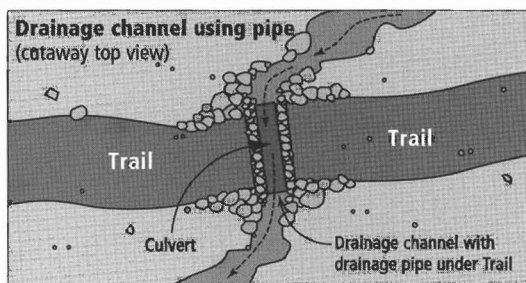
angle iron or stakes to the log. Then dig out soil along the outside of the trail and pile it in between the logs, thereby creating a dry, raised area in the middle, bordered by a drainage ditch on each side. The trail should be “crowned”, i.e. have its highest point at the middle, so that water will drain off to the sides, rather than collecting on the treadway. This technique should not be used where there are rare or endangered plants. Crushed stone can be brought in by wheelbarrow to fill in between the logs.

Wood chips

Another possible solution is a slightly raised treadway of wood chips, if these are available. Again, these should be restrained along the edges by logs or rocks. In order to be effective, the wood chips must be placed at least 10 cm deep, and will have to be renewed on a regular basis because of decomposition and sinking into the mud. Carrying sufficient wood chips to do a good job any distance from the stockpile location is a labour-intensive, time-consuming job, requiring plenty of helpers. A drainage ditch will slow decomposition of the chips.

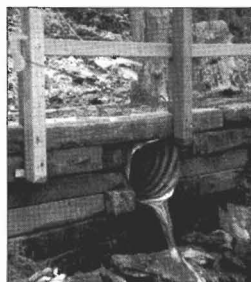
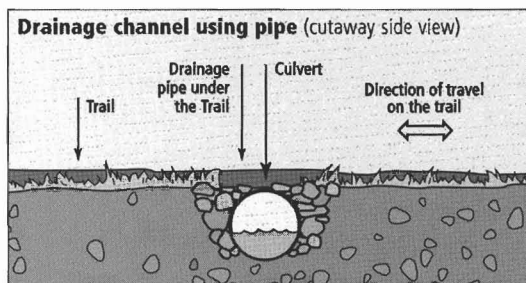
Corduroy

In the past, a trail surface known as corduroy, i.e. many small logs placed side by side across the trail, has been used, especially in remote areas where other options were difficult to implement. Unfortunately, as the wood weathers and begins to decompose, it tends to become slimy and extremely slippery whenever it is wet (which is most of the time). This technique is only suitable if covered by a layer of wood chips.



Drainage channel and culverts

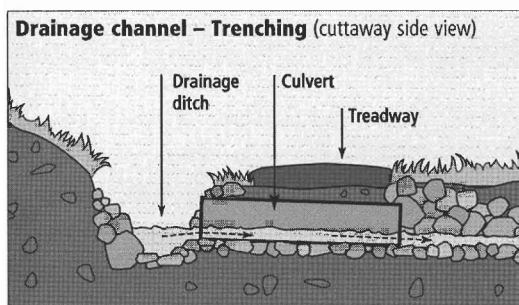
If the problem is water draining across the trail, then it may be helpful to install a culvert drainage channel in order to collect the flow in one area, and



allow other parts of the treadway to dry out. A channel of up to 30 cm in width may be cut across the trail. This channel should contain a drainage pipe covered with rocks and dirt. The ends of the pipe can be secured with large rocks. The size of the pipe depends on the maximum water flow. Upstream the sides of the channel should be lined with stones.

Trenching

This technique involves digging a drainage ditch to a lower area to prevent water from

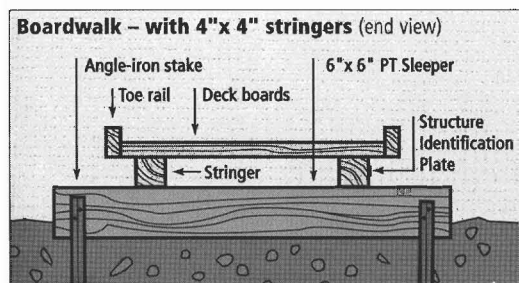


collecting on the treadway. A ditch along side the trail leading to a lower area or a settling pond is usually enough. On a slope, if necessary, a ditch dug along the uphill side can be used to collect water which would otherwise end up on

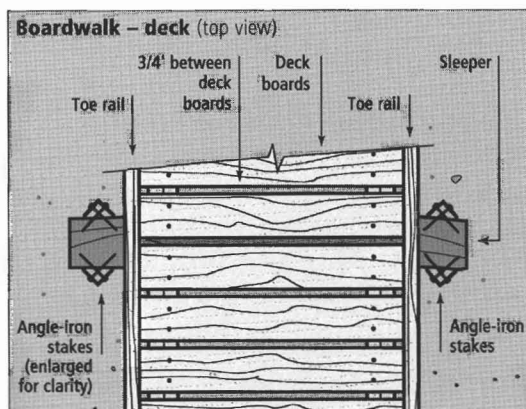
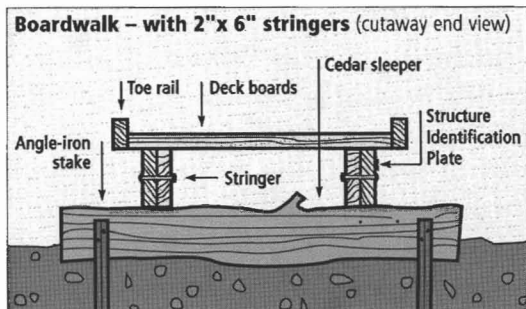
the trail. At the lowest point of the drainage ditch a culvert could be installed across the trail to allow the water to continue on its downhill journey.

Boardwalk

The final option is the construction of a boardwalk. This is a more expensive solution, which requires some carpentry skills, and usually involves the purchase and transporting of materials to the site. The BTA recommends using locally obtained white cedar logs (check for approval of the landowner), or pressure treated 2" x 8" or 4" x 4" as stringers, which should be securely fastened to cedar log or PT 6" x 6" sleepers. Deck boards may be of 2" x 6" or 2" x 8", and should be



of a decay resistant wood such as pressure treated, cedar or hemlock. Rough-sawn planks, when available, have the advantages of slightly greater thickness, a more rustic appearance, and are



less slippery when wet. Cross-ways deck boards should be spaced a maximum of 2 cm (3/4 inch) apart. The desirable deck width is 80 cm (32 inches) up to 122 cm (48 inches). The wider decking is necessary on lengths over 30 feet so two hikers can pass. Boardwalks should be made as level as possible, both from end to end and from side to side. A 2"x 4" toe rail may be attached along each side of the deck, to prevent a hiker's boot slipping off the edge.

Structure identification

Any non-natural structure the BTA is responsible for, for example, boardwalks, stiles, bridges and steps, should be identified with an identification number. The ID numbers will help locate structures and identify those needing attention. See *Appendix A2* for details.

Garbage and litter

Whenever you are out on trail maintenance, always take a garbage bag, and pick up any litter you see. Hikers can hardly be blamed for the tires, building materials, mattresses and kitchen sinks which are sometimes thrown over the escarpment brow or dumped near access points to the trail; but it is a good practice to organize an occasional work party to clear up these unauthorized rural garbage dumps. Some of these materials may even have some value in recycling programs. Garbage often includes broken glass and sharp metal edges, so it is a good idea to wear work gloves when doing this. Local environmental or youth groups such as Scouts and Guides can sometimes be enlisted to help.

A technique for opening a new section of Trail or reroute

Assuming you have obtained the necessary permissions and you have walked the proposed new route, you should layout a "best route" using surveyor's blaze tape (see *Part A, page 10 and 11 for guidance*).

When you tackle the tough job of opening a new section of trail, it is essential to have a work party. A crew of a minimum of five people can generally open 1 km of trail in a day. The front person lifts logs out of the way, and may use a chain saw or large bow saw to remove overhanging limbs, small live trees, and dead trees leaning across or near the trail. Next, a second person rakes a rough path along the best line of travel. Behind, comes a pair of workers with long-handled pruning shears, to clip all the small woody plants on the treadway, and to trim back small branches overhanging or protruding into the trail. One of these people should also have a bow saw to remove stubs of saplings and anything else too big for the clippers to handle.

Finally, the rear person uses a fan rake to remove all leaf litter from the trail, thus creating a very obvious path for the hiker to follow; this person should also have clippers, to trim off any stubs or plants missed by the people ahead.

2. Blazes

Good blazing is the key to trouble-free route finding on the trail. Nothing annoys a hiker more than to “run out of” blazes — unless it is to follow a series of old blazes which should have been obliterated from an abandoned route.

The Bruce Trail blaze is a white, painted rectangle, 52 mm by 156 mm (2" x 6"), oriented vertically. (Please refer to the example printed on the back cover of this guide). The painted blaze is easy to install, durable, and difficult to deface or steal.

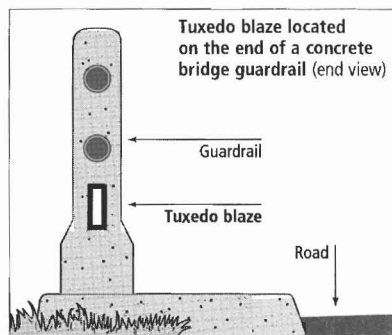
Why this size?

It was adopted from the Appalachian Trail, and has proven to be reasonably visible from a distance without being too ugly a blotch on the landscape.

Why rectangular?

Because the square-cut lines stand out clearly in contrast to the irregular shapes of natural features. Therefore, when painting blazes, take the time to ensure that the blaze has straight edges and square corners. The trail worker who carelessly splashes some runny paint on a tree is not only creating a poor image of our standards of trail maintenance, but is also making a blaze which is less visible to the hiker who is seeking guidance. For this reason, do not blaze when it is raining or the trees are wet; you will either end up with a runny mess, or all your efforts will be wasted because the blazes will be washed off, and have to be done again.

Why white?



Once again, this is based on the Appalachian Trail standard. The BTA has also decided to use white for the main Trail. The problem of blazing on very light-coloured surfaces can be overcome by painting a larger black rectangle, say 76 mm x 178 mm (3" x 7") as a frame, with the standard white blaze in the centre.

This practice, known as the Tuxedo blaze, can also be used to trim an oversize blaze down to the proper size. Tuxedo blazes have the advantage of being much more conspicuous than regular ones, and can therefore be very useful at key locations on the trail, where visibility is essential, such as turns, junctions, access points and across open areas .

Why paint?

Because it has durability. Strips of plastic and venetian blind slats have been tried in the past with poor results. They can be easily removed by vandals, necessitate excessive nailing, and in many cases became brittle and cracked, or rusty and unsightly. Proper-sized strips of white vinyl home siding or white-painted pieces of wood may be useful only for marking temporary or experimental routings, but they are not authorized for use as permanent blazes.

Latex semi-gloss paint is most commonly used, largely because of the ease of cleaning up brushes in soap and water. Latex paints also dry quickly, and are more environmentally acceptable than oil based paints.

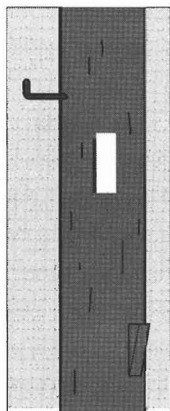
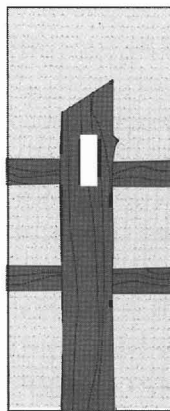
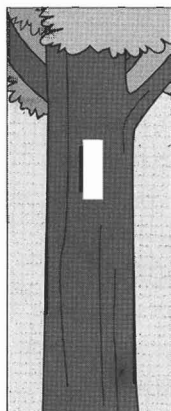
Equipment for blazing

Many trail workers find it convenient to carry the painting equipment in a 6 quart basket, or a carrier made by cutting away part of the top of a plastic windshield washer fluid jug. Alternatively, you may find that an old tool belt is a good way to carry the paint and other equipment you will need. Paint can be carried in a plastic screw-top jar, rather than the original can, and an old juice can is convenient to hold the brush when it is not in use.

The paint brush should be no wider than 35 mm (1-1/2 inches). Other odds and ends may also be carried in the basket e.g. diamond markers, nails, and the paint scraper. **A scraper is essential for preparing the surface**, when painting on a rough or loose-barked tree. It can also be used to trim your blaze if you make a mistake, and for removing unwanted blazes from abandoned routes. Care should be taken on thin-barked trees not to scrape too deeply. You may prefer to carry your scraper on a thong or lace tied to your belt or around your neck.

Where to blaze

Blazes are normally put on trees, fence posts or utility poles. Blazes on fence posts

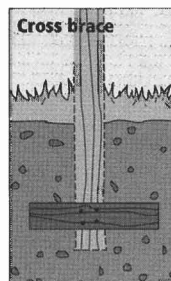
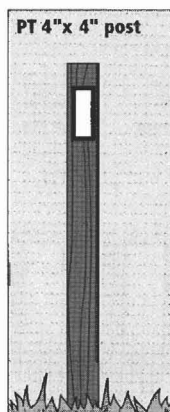
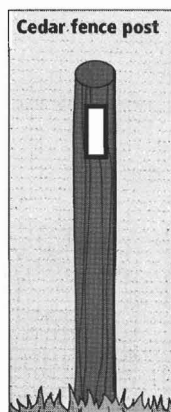


should not run all the way to the top of the post, but should stop 2 or 3 cm short of the top, for better visibility.

If suitable trees and posts are absent where directions are crucial, the trail worker should be prepared to erect a suitable post on which to paint the blazes. This

could be a round cedar fence post, a cedar or PT 4"x 4", or a steel post with a piece of wood, large enough to contain a blaze, attached to the top.

A piece of 1"x 6" or 2"x 4" is large enough for a single blaze, while a piece of 1"x 6" or 2"x 6" is needed for



painting a double (turn) blaze. Posts must be buried or driven deep enough in the ground to prevent them being removed or turned. If feasible, attach a cross brace at the bottom of the post to help prevent turning or theft. A piece of 2"x 4" will do or drilling a hole for a piece of rebar will also work. It is not recommended that a 2"x 4" be used as a post, since it is not strong enough to resist being broken off by a determined vandal.







The use of rock cairns or the painting of blazes on large rocks on or near the ground is not recommended, because these are not visible from very far away, and the blaze will be easily covered by snow. Only in very unusual circumstances, such as on a boulder beach where no other method is practical, should stones be used.

Do not try to paint a 51 mm wide blaze on a sapling which is only 20 or 30 mm (3/4 or 1-1/4 inches) in diameter. In order to paint a decent blaze, the tree must be at least 78 mm (3 inches) in diameter. For best results, avoid painting in cold weather; check the minimum temperature indicated on the paint can. With experience, you will learn which tree species are good and bad for painting. For instance, beeches and young maples are excellent, cedars and ironwoods are good provided they are scraped, but trees of the poplar family should be avoided because the bark contains a waxy substance which makes the paint peel off prematurely.

The configurations below apply to all Trail blazes

Blaze colours: White for the main trail

Light blue for side trails

| Main Trail Diamond | Side Trail Diamond | Single blaze | Double Right turn | Double Left turn | End of side trail (T blaze) |
|---|---|---|---|---|---|
| MTD | STD | S | DR | DL | T |
|  |  |  |  |  |  |

The original version of the double blaze consisted of one standard blaze straight above the other, with a separation of 51 mm (2 inches) between. The method of double blazing now used offsets the top blaze by 51 mm in the direction of the turn. The vertical separation of 5 cm is still maintained. The original version is no longer acceptable. If there is insufficient width to paint the offset blaze, use a blaze board or blaze post.

How to mark a turn

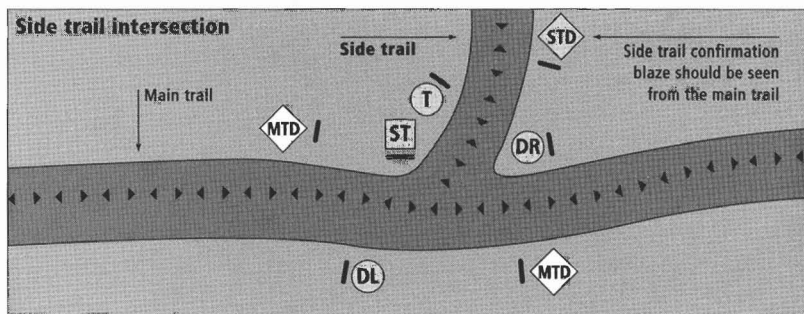
A double blaze to give warning of an abrupt change of direction should be clearly visible immediately before the turning in the trail, and the next blaze, the "confirmation blaze", should be a single blaze on the new alignment. Do not double blaze for each bend in a winding trail if there is no cause for doubt. For clarity, a diamond marker should be placed above the confirmation blaze.

Do not use arrows, or a BT diamond sign turned on its side, to indicate a turn.

Side trails

Secondary trails which are not part of the main continuous route of the Bruce Trail from Niagara to Tobermory, are marked with blue blazes of the same size and shape as the main Trail white blazes. The colour blue you will need to match is located in *Appendix C, page C15 – Side Trail Blue*.

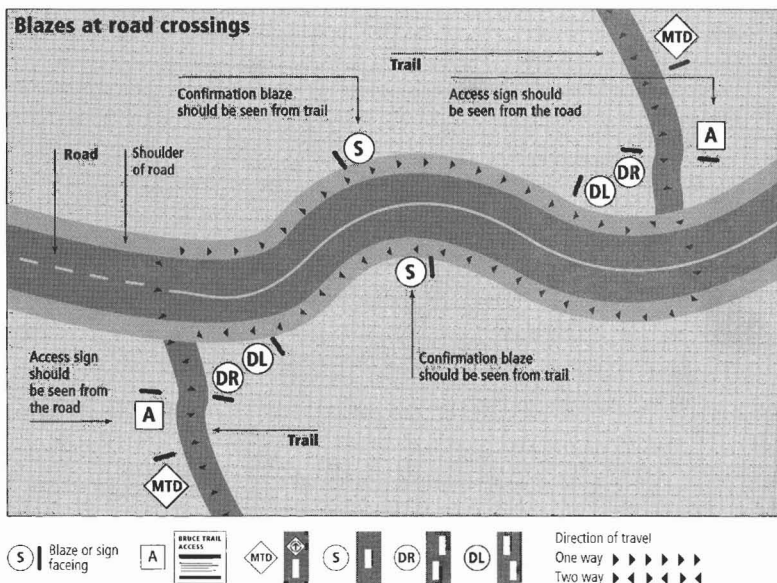
Immediately before reaching the side trail intersection, there should be a double blue blaze on the main Trail to advise hikers; this may be on the same tree or post as a main Trail white blaze. The first blue blaze on the side trail should be clearly visible from the junction point and should have a side trail diamond above it. On the side trail, when reaching the point where it terminates at the Main Trail (or at some other destination), place a T blaze as close as possible to the junction.



The T is formed by placing one normal size blue blaze crossways, 5 cm above the top of a normal blue blaze. This indicates that the side trail is ending. It is felt that clear, concise signage at trail junctions is sufficient to advise hikers of their location and direction of travel. See *Section 4 – Signage*.

Some general tips regarding location of blazes:

- Blazes should normally be about eye level, 1.5 to 1.7 m (5 to 5-1/2 feet) above the ground and preferably on the right side of the trail. *The exception to this is on traveled roads, where the blazes should be placed along the **left** side to encourage hikers to walk on the left, facing oncoming traffic.*
- Generally speaking, avoid using the same tree for blazes facing in both directions. Not only is the same tree unlikely to be the most easily visible from both directions, but also, the loss of this one tree (for whatever reason) would mean the loss of two blazes.
- Do not try to blaze both directions at the same time. Treat each direction as a separate job, carefully selecting the most suitable blaze locations as you walk along the trail.



- Pay particular attention to blazing at road crossings, especially where the trail does not go straight across the road.
- Frequency of blazes depends on the nature of the trail and the environment through which it passes. A trail section with a well-defined treadway passing through dense bush with thick undergrowth on both sides will need less frequent blazing than a section through mature hardwoods where there is no undergrowth. Urban areas and developed parks and conservation areas often need the most closely spaced blazing because of the many alternative paths and roads which a hiker could take. The general rule is that, as you pass one blaze, the next blaze should be visible, but the distance may be extended if there is no cause for confusion.
- Avoid blazing on dead trees – they are the most likely to be toppled in a storm.
- An excessive number of blazes is considered to be unsightly; however, when in doubt, it is best to err on the side of more blazes, to avoid the possibility of hikers becoming lost and frustrated. Remember, if a hiker becomes seriously lost and unable to find his or her way back onto the trail, it is not just an inconvenience; it is a potential safety or landowner relations concern.
- Remember, when blazing in early spring, that in a month or two, growth of vegetation may make your blazes invisible. Try to allow for this by trimming foliage well back in the vicinity of the blaze. It may be necessary to cut away obstructing foliage during your early summer inspection of the trail.
- Sometimes the wide, "obvious" treadway, so easily followed in summer, will literally disappear under a thick layer of fallen leaves or a winter mantle of snow. You should visit a newly blazed section of trail over several seasons to assure that the blazing is adequate.
- Generally, a newly built section of trail will need more blazes than an older, mature section. As time passes, it may not be necessary to maintain every blaze that was needed initially.

Removal of abandoned blazes

When the route of the trail is changed it is necessary to remove all blazes marking the abandoned route. Methods of obliterating old blazes will vary according to the condition of the paint and what kind of tree or post it is located on. It is preferable to scrape off blazes from fence posts, utility poles or trees with thick, scaly bark; but you should avoid excessive scraping on a young or thin-barked tree. Often, a canceling paint will be needed, and this should blend as closely as possible with the background colour. Mixtures of grey, brown, black, blue and/or green may be effective. Too much contrast between the black-out paint and the background may result in the hiker following the "black trail".

Also remember that painted out blazes may need to be maintained, since, over a period of time the canceling paint can wear off. Thus, the original blazes can reappear, creating a trail of "ghost blazes", which can be very confusing. This problem does not occur when abandoned blazes are scraped off.

Finally, when blazing, never assume that the route is obvious. It may be obvious to you on a clear day, especially if you are familiar with the section. It may be very different in conditions of poor visibility for someone who has never been there before, especially if one critical tree has fallen down! A good test of your blazing competence is to get someone who is unfamiliar with the trail to walk ahead of you, so that you can see where there is any hesitation or confusion.

See *Appendix C*, page C13 for the BTA Trail Blazing Kit, which has a detailed list of all the material needed for proper blazing. See page C9 for the easy way to blaze a trail.

3. Slope control

Slope control is an extremely important aspect of trail maintenance in many sections of the Bruce Trail. Preventing erosion is a constant battle. Ontario's climate is such that heavy rains can combine with many hikers' feet to turn the most stable soil into a slippery quagmire. As with bridges, boardwalks and reroutes, make sure the landowner is consulted and approves any slope stabilization efforts.

In early spring – as soon as the frost is out of the ground – Trail Captains should take a careful look at their sections of trail to see what is needed in this respect. Individual members can, of course, help their Clubs by reporting areas where they think control measures are needed. Slope control is nearly always a job for a work party, and perhaps this is why it has often been neglected. April or early May is a good time for such a work party. Picks, shovels, mattocks, grub hoes, crowbars, sledgehammers and crosscut or chain saws are the tools that may be needed.

Whenever possible, the trail should avoid grades of more than 15 per cent. An inclinometer is a handy tool for measuring the angle of a slope. On grades steeper than 10 per cent, special precautions must be taken. The notes and diagrams below are intended to assist trail maintenance parties in the selection and design of appropriate measures. There is no absolute "best" method, as every situation is different, and different materials, tools and skills will be needed to address each problem area.

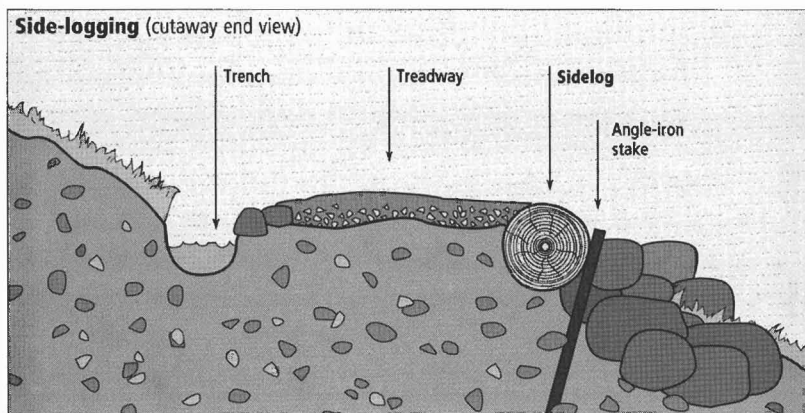
Route selection

Before getting into construction of major works such as steps, which require expensive materials and continual maintenance, the trail worker should always look to see if a different route choice could avoid the steep slope. A route that crosses the contour lines at a sharp skew angle will be much less steep than one that crosses the contours at right angles (i.e. straight down the "fall line" of the slope). There are a couple of concerns that must be kept in mind however. First, the landowner's permission must be obtained, and of course, you must stay within the boundaries of the property for which the trail has permission.

On a trail section that is confined to a 20 metre (66 feet) road allowance, there may not be enough room to select another route. Secondly, the old, more direct route straight down the hill must be well blocked or camouflaged; if the steep route looks more attractive to hikers, they will continue to use it, in spite of your efforts to make the trail safer and to protect the environment.

Side-logging

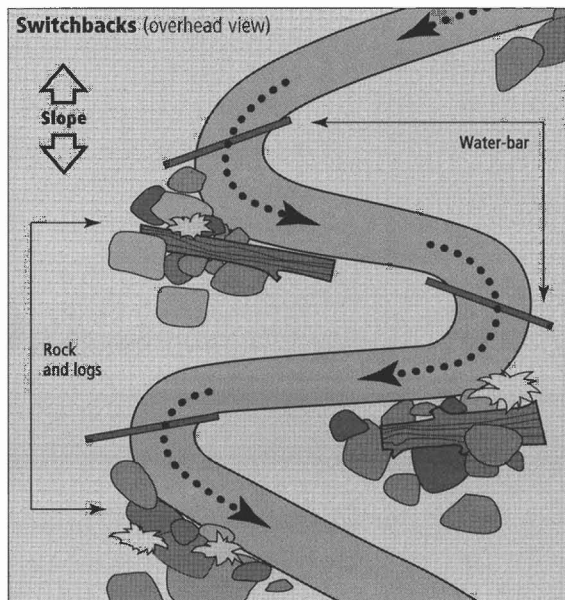
Where the trail crosses a slope diagonally, it is often a good idea to support the path on the downhill side, by means of a series of sidelogs. These delineate the path, help to keep the trail surface relatively flat, and prevent the treadway from



collapsing or being washed down the hill. It is sometimes possible to find suitable dead trees locally to do this work. Cedar or hemlock will last longer than hardwoods. The logs must be supported in place by trees, very large rocks, or some type of stake. A 60 cm (24 inch) long drilled-one-end steel angle-iron, or a fence post T-bar will do a good job. Ideally, the packed earth of the treadway will be slightly higher than the sidelog, with a gentle slope toward the log, so that water will run off the trail, rather than along it. To prevent washouts of the path, you may also consider a shallow ditch along the uphill side of the treadway, with occasional water-bars to outlet the water in a controlled manner.

Switchbacks

On longer slopes, a number of diagonal paths can be linked together in zigzag



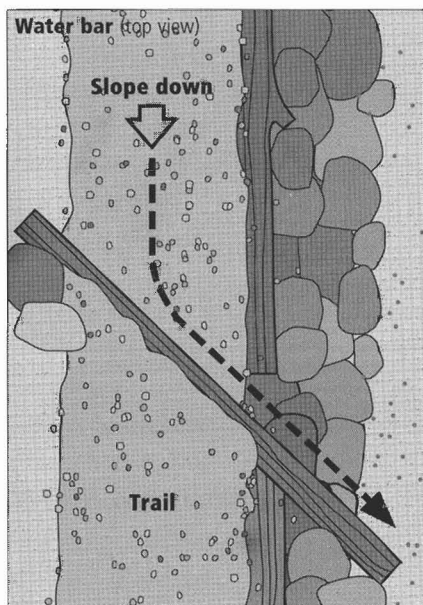
fashion to form switchbacks. Take a good look at the slope, and you will often be able to pick out some natural lines for the trail to follow. The side-log method of path construction is of course, ideal for switchbacks. At switchback turns, some efforts should be made to discourage the development of short-cut pathways that would defeat the

purpose of the switchback. Placing rocks and brush downhill along the path will keep hikers on the treadway. The turning points of a switchback are also an ideal place to construct a water-bar.

Water-bars

One of the problems with any pathway on a grade is that water will tend to collect in, and flow along the path. Unless it is forced to go elsewhere, the water will continue to flow downhill, increasing in volume and speed as it goes. The greater the volume and speed of the water, the more soil will be eroded. Therefore, on long or steep slopes, control measures are often required to divert water off the trail at frequent enough intervals to prevent the water volume and speed from doing serious damage. One of the best and most common of these is the water-bar.

A water-bar usually consists of a log, cedar is best, laid across the trail at an angle of about 45 degrees from the direction of travel. The log should be about 15 cm (6 inches) in diameter, stripped of its bark, and must be long enough to fully span



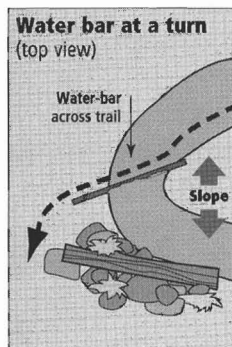
the width of the trail on the angle, intercept all water flowing down the path, and carry it completely off the trail. The log must be seated (dug in) to a depth of about half its diameter, and must be held firmly in place with stakes, preferably located outside the treadway proper. Trees, roots or large rocks may also be used to hold the water-bar in place, or if the trail is sidelogged, the bar may be nailed to the sidelog using large spikes.

A slight depression may be excavated across the path above the bar, and the soil can be packed along the downhill side of the log to prevent

leakage. The area into which the drainage is directed must be lower than the trail, should be stable and covered with healthy vegetation, and should be located so that the water will not find its way back onto the trail further down the hill.

Generally, the steeper the slope, the greater will be the need for water-bars, and

the closer their spacing should be. Occasionally, a tree root or rock outcropping can be used as a natural water-bar, with only a little modification.



Note: Where a water-bar is placed at a turn on a switchback, i.e. where the hiker's direction of travel is changing, the angle of the bar may not be 45 degrees. It will probably be roughly parallel with the direction of the uphill portion of the trail, and will be at an acute angle to the direction of the downhill leg of the trail.

Steps

These are an obvious method of slope control, but remember that they require a great deal of time and effort, not only in construction, but also in continuing maintenance. Steps should only be considered after all other options mentioned

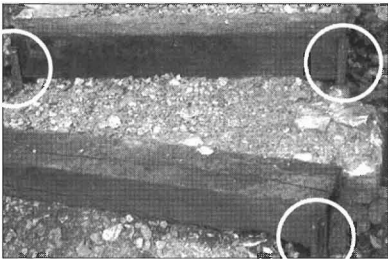
Steps using railroad ties



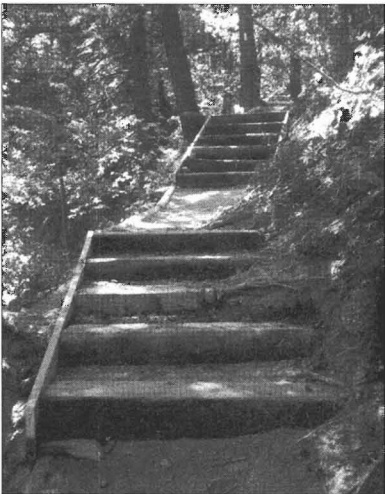
Steps using stones



Steel angle-iron stakes

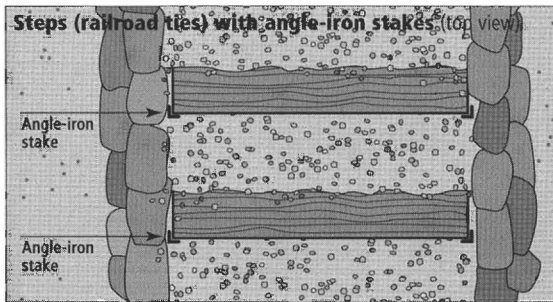


Steps with a skirt board

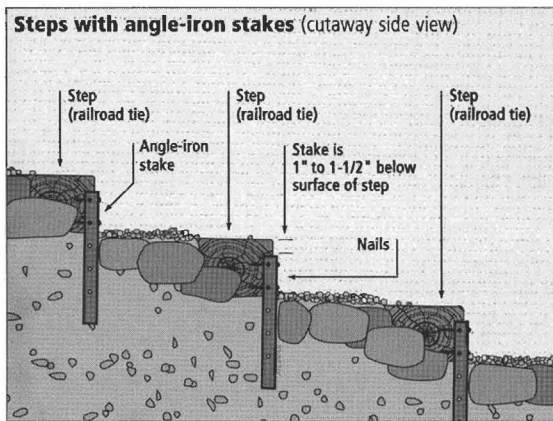


have been evaluated. Steps are most suitable for short, steep slopes where there is no opportunity for diagonal movement, and where traffic is fairly heavy. Steel stakes will usually be necessary for step construction.

A note on steel stakes: Most sections of sidelogg and steps were held in place, in the past, with wooden stakes. Time, weather, moisture and intensive use tend to cause wood stakes to deteriorate and break. Steel angle iron was first introduced in the late 1980's in an attempt to find a permanent solution. While the angle iron has generally performed well, it has been found that frost has

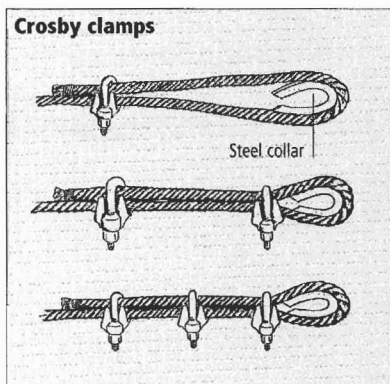


a tendency to push the stakes up so that they protrude in the treadway, thus creating a real hazard to hikers. **Protruding stakes are a liability concern and must be avoided.**



The solution to this problem is to drill two small holes about 2 to 3 cm from the top of the stake, and to drive a galvanized nail or a screw through the holes into the wood which is being supported. In this manner, the steel

stake can never protrude above the level of the wood, even though some frost heaving may still take place. You should also try to always place steel stakes out to the sides of the trail, rather than in the treadway proper. Steel stakes, even when installed properly, require constant monitoring to ensure they remain safe.

Crosby clamps**A warning about handholds**

It may be tempting to assume that measures such as those described above are not needed if a fixed cable or other handhold is provided to assist hikers in the ascent or descent of a steep slope. It is true that a securely fixed cable may be helpful in a few selected locations, but **it does not eliminate the need for erosion control measures**. The chief objection to fixed cables, however,

is their need for frequent safety checks. Either the cable or the means of attachment may deteriorate, or be damaged by vandals. A handhold that is not secure may increase the danger by generating false confidence in its reliability.

If it is decided to provide a handhold, **do not use ropes** such as cotton, hemp, nylon and polyester. They will deteriorate with age, weather and exposure to the sun. The minimum requirement is a 6.5 mm (1/4 inch) steel wire braided cable, fastened securely to rock, concrete, or sound, sturdy, living trees. Ends of the cable should be fastened with Crosby clamps, properly attached. Where trees are used, an allowance must be made for growth of the tree. The portion of the cable which will be gripped by hikers must be covered with a piece of PVC plastic pipe or an old, usable section of garden hose, preferably rubber. A safety inspection of the cable condition and all attachments should be done at least four times a year.

Fieldnotes on steps

This image shows a full page of blank primary-ruled paper. It features multiple sets of horizontal lines designed to guide young learners' handwriting. Each set consists of three lines: a solid top line, a dashed middle line, and a dotted bottom line. These sets are repeated vertically down the entire page, providing ample space for practicing letter formation and alignment. The paper is otherwise completely blank, with no text or other markings.

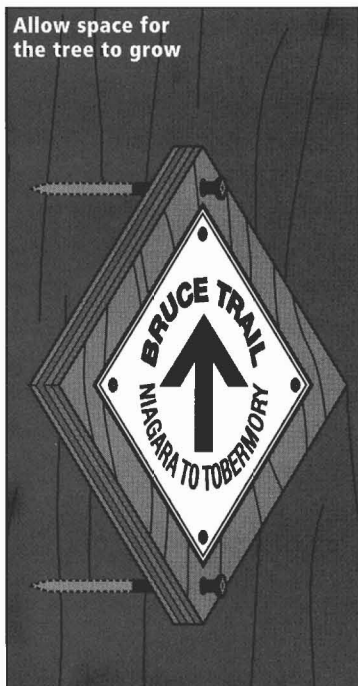
4. Signs

Signs are important for identifying the Bruce Trail to the public, for reminding trail users of the code of behaviour expected of them, for providing information on how they may contact the Association, and for giving directional guidance and useful information.

Sign placement and installation

All new signs being erected on the Bruce Trail or its side trails should be mounted on 12 mm (1/2") pressure treated plywood backing. Metal signs supplied by BTA the sign coordinator are attached to the backing with 1/2" long #8 Robertson head wood screws. Use of the plywood backing helps to prevent damage to the signs by vandals, and eliminates the problem of trees growing out around the sign and its nails or screws.

All signs, except the Diamond markers, should be fastened at least 2.5 m (8 feet) above the ground on trees or on a sturdy wooden post erected for this purpose. Holes for mounting signs should be pre-drilled through the sign and its backing before going out in the field. For the smaller signs, use either 8 cm (3 inch) galvanized Ardox™ nails, or 2-1/2" #10 Robertson head wood screws, in a line along the axis of tree growth, that is, one above the other, not side by side. Coated deck screws also do an excellent job.



Leave the nail or screw heads out from the surface of the tree bark to allow the tree room to grow. Young, actively growing trees will need at least 2 cm (3/4 inch) of room for growth before the bark contacts the head. The advantage of screws is that, when the space for growth has almost been

used up, they can be unscrewed a few turns, again providing space for more growth. When using screws, it may be necessary to drill a pilot hole in the tree trunk, especially in hardwoods such as oak, beech, ironwood and maple.

Trail Captains should know exactly where all the signs are on their section, and inspect them each year on a walk-through. Severely damaged or stolen signs, need to be replaced. Badly neglected signs that are slowly disappearing under new bark growth should be removed and replaced. Careful monitoring of all signs will ensure early replacement and will avoid problems. In areas where vandalism is a concern, use longer nails or 3" #12 Robertson screws with washers as a deterrent to souvenir hunters. Coating the back of the sign with axle grease has also been found effective in deterring theft.

For aesthetic reasons, try to avoid putting signs on particularly fine specimens of tree. Never fix signs on telephone or hydro poles; they could be dangerous to a lineman climbing the pole, and will likely be removed by the utility company.

Official Bruce Trail Association (BTA) signs

There are ten categories of BTA signs:

1. Diamond Trail Marker – two types
2. Access
3. Appreciation – private land
4. Overnight Rest Area (ORA)
5. Side Trail Information
6. Permissive and Non-permissive pictographs
7. Stock – special issue
8. Bruce Trail Association land
9. Custom
10. Trail Head

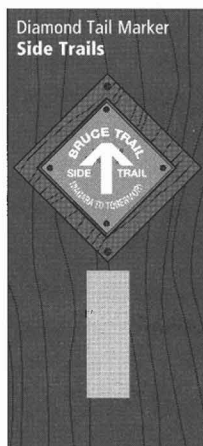
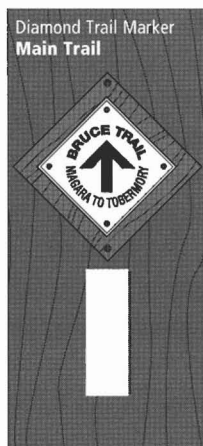
Note: All signs are ordered through the Club Trail Director: See the *Sign Order Form* at the back of this *Signs* section.

1. Diamond Trail Markers

- i) Main Trail – Sign code: DTM – M
- ii) Side Trails – Sign code: DTM – ST

PURPOSE:

- indicate the route of the Trail.
- advise hikers at intersecting trails.
- mark the location of the Trail across a valley, field or beach.
- reassure hikers that they are on the Trail



LOCATIONS FOR USE: Diamond

markers are installed about 4 to 5 cm (2 inches) above a blaze within 10 metres (30 feet) of all branches or junctions along the Trail. They provide a very visible indication of the location of the Trail. They should be installed at junctions with side trails and with other trails. They are valuable as a direction indicator at access points. The side trail diamond should be placed above a side trail blaze within 10 metres (30 feet) of the junction with the main Trail. In remote locations where there are few signs, a diamond should be installed above a blaze about every other kilometer facing in either direction.

MOUNTING: Diamond markers are mounted on a 6"x 6"x 1/2" PT plywood backing using 3/4" #6 Robertson wood screws. Use 3" galvanized nails or 2-1/2" #10 Robertson head decking screws to affix the diamond to a tree or other suitable object. Note that the nails or screws should be applied at the top and bottom: not at the sides.

The arrow on the Bruce Trail logo should always face upward. The words "Niagara to Tobermory" and the arrow are part of the BTA's corporate logo and are not intended to be turned to the side or upside down to show a change in direction!

COLOUR: Main Trail: black lettering on a white background.

Side trail: white lettering on a blue background.

2. Access Sign

Sign code: ACCESS

PURPOSE

- Identify Bruce Trail access points
- Encourage its use as a hiking trail only
- Inform users that the Trail is built and maintained by volunteers from the local BTA club
- Create awareness of the risks to hikers using the Trail
- Give phone number, e-mail and web site information where membership and additional information may be obtained.



LOCATIONS FOR USE: They shall be used at access locations, such as road crossings or places where the trail leaves a traveled road. Also, install them where a trail leaves a parking lot that leads directly to the Trail.

MOUNTING: When used at an access point, this sign should be mounted facing a hiker entering from the road. It should be clearly visible to someone looking for the Trail entrance either when hiking or driving by. When used at other access points, it should be mounted in a prominent place, perpendicular to the hiker's direction of travel. At a road crossing, it is acceptable to mount on a T-bar, fence post or 4"x4" PT post if a suitable tree is not handy.

SIZE: 30 cm x 30 cm (12"x 12").

COLOUR: Black lettering on white background.

3. Appreciation – Private land

Sign code: AP/PL

PURPOSE:

- Identify the Bruce Trail
- Encourage its use as a hiking trail only
- Inform users that they are passing over private land through the courtesy of the landowner
- Convey the Trail Users' Code (abbreviated version)
- Give the toll-free phone number where membership and other information may be obtained.



LOCATIONS FOR USE: Shall be used where the trail enters onto privately owned land. Where the trail crosses several properties owned by different landowners, in succession, a separate sign will not be posted on each owner's property, unless specifically requested by the owner. Locations for this sign should be planned in a co-ordinated manner. You should consult with the Trail Director and the Landowner Relations Director.

Note: Some of the Conservation Authorities consider their lands to be "private", and have asked that this sign be erected at their boundaries. Trail workers should check with their club Trail Director or the local conservation authority, if their section of the trail crosses conservation authority land. Custom decals to identify the Conservation Authority are available.

MOUNTING: This sign should be mounted in a prominent place, perpendicular to the hiker's direction of travel, immediately inside the boundary of private lands.

SIZE: 30 cm x 30 cm (12"x 12").

COLOUR: Black lettering on white background.

4. Overnight Rest Area (ORA)

Sign code: ORA

PURPOSE:

Each campsite and shelter should be posted with this sign to indicate that camping is permitted. The sign should be placed in a prominent location, at or near the entrance to the O.R.A.

CAMPSITE IDENTIFICATION: a decal includes the name of the appropriate BTA club name and a campsite number used in that club's section of the Trail.

MOUNTING: the same height and method as Access signs.

COLOUR: Black lettering on white background. Tent with green circle and fire with red circle and slash.

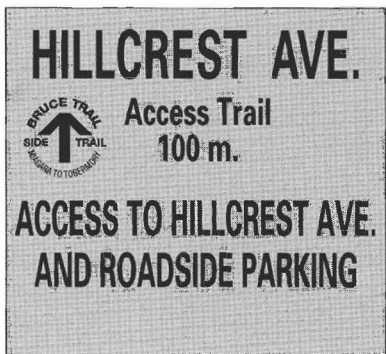


5. Side Trail Information

Sign code: ST

PURPOSE:

- Advise trail users of the name, type, length, and destination of side trails, plus other useful information
- Enable trail users to make informed choices regarding their route direction and destination.



LOCATIONS FOR USE: The Side Trail

Information sign should be placed at the beginning of every side trail at the edge of the side trail, perpendicular to the direction of travel on the side trail, so that it is in plain view of a person standing at a trail junction. This sign could well be mounted on the same tree that carries the first blue blaze of a side trail.

MOUNTING: The same height and method used for Appreciation signs.

SIZE: 30 cm x 30 cm (12" x 12").

COLOUR: Black lettering on a light blue background (same colour as side trail blazes).

Content – Each Side Trail Information sign contains unique information and is prepared specifically for the one side trail to which it applies. The sign message should contain the following, in this order:

- 1. Name of side trail** – Side trail names are generally assigned by the BTA Clubs, with the BTA having a review and approval function to ensure there is no duplication of names.
- 2. Length of side trail** – in kilometres, to one decimal.
- 3. Type of side trail** – There are 6 types of side trails:
 - i) **Loop** – a trail which leaves the Main Trail and rejoins it at another location, by means of a route which is longer than the main Trail.
 - ii) **Short-cut** – a trail which leaves the Main Trail and rejoins it at another location, by means of a route which is shorter than the main Trail.
 - iii) **Link** – a trail which links the Bruce Trail with another trail, for example, the Alton Side Trail is a link trail between the BT and the Grand Valley Trail.
 - iv) **Access** – a trail which connects the Bruce Trail to an access point or parking area.
 - v) **Connector** – a trail which connects either two other side trails, or the main Trail with another side trail; for example, McKay's Harbour Side Trail connects the Main Trail and the Inland Side Trail.
 - vi) **Dead End** – a trail which leaves the Main Trail and goes to a particular destination, for example, a campsite, water source or lookout from which the hiker must return by the same trail.
- 4. Other helpful comments** should be included at the bottom. An example would be the destination of the trail, or the length of hiking circuits created by linking this trail with the Main Trail or other side trails.

6. Permissive – Non-permissive use

This series of signs, using pictographs of activities, are available with a surrounding green circle indicating a permitted use or with a red circle and slash indicating a non-permitted use. **Note:** These signs are to be used on private land with permission of the landowner.

PURPOSE:

- advise the hiker of appropriate uses
- encourage appropriate behavior on the Trail
- implement the wishes of a private landowner to permit or prohibit specific activities on their land

LOCATIONS FOR USE: At the entrance to a landowner's property in consultation with the landowner. They should be posted perpendicular to the direction of travel so that they are easily seen by hikers entering the property along the Trail. These signs are also valuable for use at intersections with other trails.

MOUNTING: The same height and method as the Access signs.

SIZE: 30 cm x 30 cm (12" x 12")

COLOUR: Green circle or red circle and slash with black pictograph on white background.



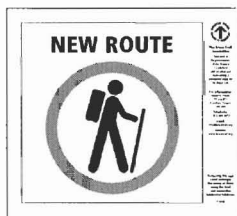
Hiking

Sign code: H



No hiking

Sign code: NH



New route

Sign code: H-NR

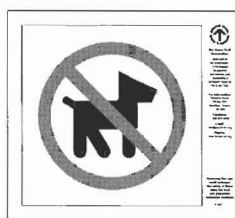


**Closed route –
No hiking**

Sign code: NH-CT

**Leash your dog**

Sign code: LEASH

**No Pets**

Sign code: NPETS

**No Horses**

Sign code: NHORSE

**No Snowmobiles**

Sign code: NSNOW

**No Trail Bikes**

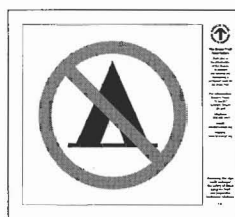
Sign code: NTB

**No Bicycles**

Sign code: NBIKE

**No fires**

Sign code: NF

**No camping**

Sign code: NC

**No hunting**

Sign code: NHUNT

7. Special Use Signs – in stock

Developed over the years for specific applications along the Trail at the request of a BT Club, Conservation Authority, Municipality or private landowner.

PURPOSE:

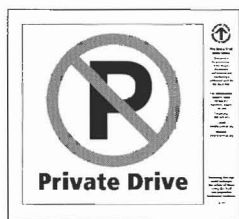
- create awareness
- provide specific information not shown on other signs
- carry out the wishes and maintain good relations with our landowners

LOCATIONS FOR USE: At the entrance to a landowner's property in consultation with the landowner. They should be posted perpendicular to the direction of travel so that they are easily seen by hikers entering the property along the Trail. The sign may also be useful at a specific point along the trail such as at an intersecting trail or driveway.

MOUNTING: The same height and method as the Access signs.

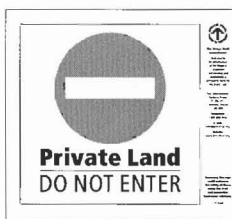
SIZE: 30 cm x 30 cm (12" x 12")

COLOUR: Black printing on a white, blue or yellow background.



**No Parking,
Private Drive**

Sign code: NP-PD



**Private Property,
Do not enter**

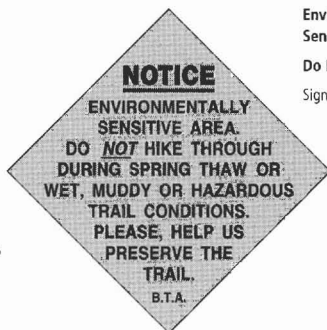
Sign code:
L-PP/DNE



**Natural
Regeneration
Area**

No Trespassing,

Sign code: NRA



**Environmentally
Sensitive Area**

Do Not Hike

Sign code: ESA



**Private Property,
For hiking only**

Sign code: PP-HO

8. Bruce Trail Association Land Signs

i) Permitted Uses:

PURPOSE:

- advise Trail users of the permitted activities on BTA managed properties
- identify the boundaries of BTA managed land

LOCATIONS FOR USE: At the Trail entrance into BTA owned lands. They should be posted perpendicular to the direction of travel so that they are easily seen by hikers entering the property along the Trail.

SIZE: 30 cm x 30 cm (12"x 12")

COLOUR: Black lettering, a yellow circle and black pictographs on a white background.



ii) Do Not Enter Sign:

PURPOSE:

- stop the use of a trail or other entrance into BTA managed land
- identify the boundaries of BTA managed land

LOCATIONS FOR USE: At the Trail entrance into BTA owned lands facing outward to stop access through unauthorized trails. This sign will also be useful along closed sections of trail.

SIZE: 30 cm x 30 cm (12"x 12")

COLOUR: Red circle with black lettering on a white background.



9. Custom Made Signs

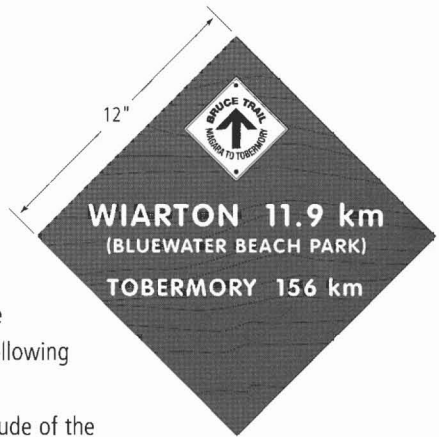
In addition to the in-stock official Bruce Trail signs, trail workers may custom make the following four types of optional signage, provided they have (or can obtain) the necessary carpentry skills. They can also be ordered through your Club Trail Director.

i) Destination/Distance

Sign code: D/D

PURPOSE:

- Advise the hiker of the distance to the next significant destination point along the trail
- Advise hikers of their direction of travel, by indicating nearby and ultimate destinations which can be reached by following the Trail in that direction
- Give hikers an impression of the magnitude of the Bruce Trail, and their location on it, by occasionally giving the distance to the end-points of the Trail
- Identify the Bruce Trail at its junctions with other trails.

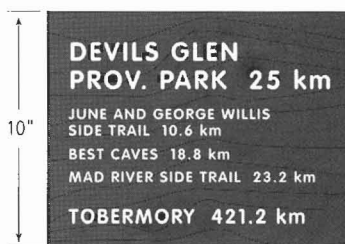


LOCATIONS FOR USE: Should be installed just beyond junctions with Side Trails, within about 5 metres of the actual junction point, so that it is visible from the location where the hiker must make a decision. This would generally be applicable in both directions of travel. It should also be installed similarly at junctions with other, non-BTA trails, for instance the Guelph Radial Line Trail.

May also be erected within a short distance (e.g. less than 20 metres) on either side of Overnight Rest Areas (campsites), so that hikers departing the ORA are informed of the distance to the next destination, and their direction of travel is confirmed. This sign should not be placed on or very near traveled roads, where it may be the target of vandals and thieves.

SIGN TEXT: The text for this sign will generally consist of:

- One line, indicating the distance in kilometres (to one decimal place) to the next destination of some significance along the Trail. (Major access points, towns and villages, and Overnight Rest Areas are typical examples).
- An additional, secondary text line, giving the distance in kilometres (no decimals) to Tobermory or Niagara should be added on some signs, about once every 20 to 25 kilometres, in each direction. Thus, a long-distance through hiker or end-to-ender would get an indication of their progress along the length of the Trail about once each day of travel.



SIZE AND CONSTRUCTION: The sign can be a square, approximately 29 cm (11-1/2 inches)

on each side, turned at 45 degrees to form a diamond shape. A standard Bruce Trail Diamond sign is attached in the top corner, after the sign has been mounted on a post or tree. Alternatively, a rectangular piece of 2"x 8" or 2"x 10" lumber mounted horizontally can be used.

MOUNTING: The sign should be mounted perpendicular to the direction of travel, with the top about 2.0 metres above ground level. Holes should be predrilled in the top and bottom corners, for 5/16" or 3/8" lag screws, countersunk so that the head lies below the surface. Lag screws of 3" or 3-1/2" in length are recommended. Mounting on a solid wood post is preferred, but a sturdy tree of at least 8" diameter is also an acceptable mounting. On hardwood trees, it may be necessary to pre-drill a pilot hole in the tree before driving in the lag bolts.

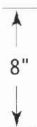
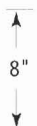
COLOUR: This sign will preferably be made of cedar wood, treated with a medium brown, penetrating type wood stain. The lettering is made with a V-groove router bit, and then painted white in the groove. It is not necessary to be very careful with the white paint, if the surface of the sign is sanded with a belt sander after the paint has dried.

ii) Fingerboard

Sign code: F/D

**PURPOSE:**

- Advise the hiker of the distance to the next significant destination point along the trail
- Advise hikers of their direction of travel, by indicating nearby and ultimate destinations



which can be reached by following the Trail in that direction; to give hikers an impression of the magnitude of the Bruce Trail, and their location on it, by occasionally giving the distance to the end-points of the Trail

- Identify the Bruce Trail at its junctions with other trails.

LOCATIONS FOR USE: Should be installed at junctions with Side Trails, within about 1 metre of the actual junction point, so that it is visible to the hiker entering from a side trail.

SIGN TEXT: The text for this sign will generally consist of one line, indicating the direction and distance (in kilometres) or the direction only to the next destination of some significance along the Trail. Major access points, towns and villages, and Overnight Rest Areas are typical examples. An additional, secondary text line, giving the distance in kilometres (no decimals) to Tobermory or Niagara should be added on some signs, about once every 20 to 25 kilometres, in each direction. Thus, a long-distance through hiker or end-to-ender would get an indication of their progress along the length of the Trail about once each day of travel.

SIZE AND CONSTRUCTION: The Fingerboard/Direction sign may be constructed in either of two alternative sizes, depending on the amount of text required. For a single line of text, a 2"x 6", preferably cedar, should be used. Length may vary according to the length of the text line, but should not exceed 30 inches.

For 2 lines of text: a 2"x 8" should be used, so that the lettering does not appear crowded. The end of the sign is cut to form a point, the angle within the point being 90 degrees. The lettering on the sign should be 7 cm (2-1/2 inches) in height.

MOUNTING: The sign should be mounted parallel to the direction of travel on the Main Trail, directly opposite the entry point from the Side Trail, with the top about 2.5 metres above ground level. Holes should be predrilled near the centre of the sign, top and bottom, for 5/16" or 3/8" lag screws. Lag screws of 3-1/2" to 4" in length will be needed. Mounting on a solid wood post is preferred, but a sturdy tree of at least 8" diameter is also an acceptable mounting.

COLOUR: This sign will preferably be made of cedar wood, treated with a medium brown, penetrating type wood stain. The lettering is made with a V-groove router bit, and then painted white in the groove. It is not necessary to be very careful with the white paint, if the surface of the sign is sanded with a belt sander after the paint has dried.

Note: The Destination/Distance sign and the Fingerboard sign are intended for the same purpose and locations. The two sign types may be used interchangeably, depending upon personal preference and the presence or absence of trees or posts convenient for mounting each type. For example; the Fingerboard sign requires a suitable mounting tree precisely at the junction point, whereas the Destination/Distance sign may be mounted a short distance along the trail from the junction.

iii) Road Name Sign

PURPOSE:

- Advise the hiker, upon arriving at a road crossing, the name of the road, so that he or she can gauge their progress, and associate their location with Guidebook references.



HOCKLEY ROAD



HOCKLEY ROAD

LOCATIONS FOR USE: On the main Trail or side trails, immediately in advance of reaching a crossing of a named road.

SIGN TEXT: Generally one line of text giving the official name of the road, as indicated in the Bruce Trail Guidebook. If necessary, add the town or township name to ensure clarity, for example, 7th Street Louth, or 5th Line Mono.

SIZE AND CONSTRUCTION: at the discretion of the club. Letters routed into wood may be used, in which case the size and construction would be similar to Fingerboard, for example, 2"x 6" or 2"x 8" lumber. Alternatively, the text may be computer generated on adhesive transparency applied to a metal sign blank, backed by Pressure Treated 1/2 inch plywood. Letters should not be less than 7 cm (2-1/2inches) in height.

MOUNTING: On a tree or post, a minimum of 2.5 metres (8 feet) above ground, immediately in advance (i.e. less than 10 metres) of the road crossing. If using 2"x 6" or 2"x 8" lumber, fasten with minimum 3" by 5/16" lag bolts with washers; if using metal on plywood backing, fasten with minimum 2-1/2" by #10 Robertson head wood screws.

COLOUR: Either white routed letters on dark brown or black painted lumber, or black letters on white aluminum sign blank.

A special note regarding custom signs

As a trail worker you may become aware of a situation where you or a landowner feel a sign would solve a problem at a specific location on your section of the Trail. Notify your Trail Captain or the Trail Director of the problem immediately. Signage alone may not be the solution, or any part of a solution. Landowner relations are critical to the success of the Trail – consultation is the BTA strategy to landowner concerns and every effort will be made to resolve the problem. Should a sign be required, contact your Trail Director.

iv) Computer generated signs

From time to time it may be necessary to make signs quickly as circumstances on or near the Trail change. When making a computer generated sign, use the typeface family called Frutiger Condensed, by Adobe, if you have a Macintosh or PC. You can also use Humanist 777 Condensed, by Bitstream, if you have a PC.

Frutiger Condensed Light or Humanist 777 Light Condensed

ABCDEFGHIJKLMNOPQRSTUVWXYZ

Frutiger Condensed or Regular Humanist 777 Condensed

ABCDEFGHIJKLMNOPQRSTUVWXYZ

Frutiger Condensed Bold or Humanist 777 Bold Condensed

ABCDEFGHIJKLMNOPQRSTUVWXYZ

Frutiger Condensed Black or Humanist 777 Black Condensed

ABCDEFGHIJKLMNOPQRSTUVWXYZ

Frutiger Condensed Black or Humanist 777 Extra Black Condensed

ABCDEFGHIJKLMNOPQRSTUVWXYZ

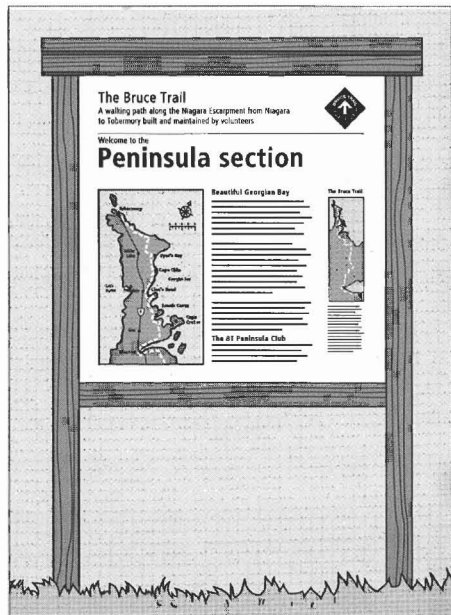
Frutiger Condensed is available from Adobe. Humanist 777 Condensed is very similar to Frutiger Condensed. It is manufactured by Bitstream and is also appropriate for your signs.

10. Trailhead Sign

PURPOSE:

- welcome hikers to a Club's section of the Trail
- provide a map of the section and information about access points

LOCATIONS FOR USE: At the boundary between BT Clubs or at the junction of several major trail systems such as the BT and the Ganaraska Trail. It would also be useful near a parking lot or other major trailhead.



CONSTRUCTION: The sign consists of two supporting posts and the sign board. It can be carried into a location in three pieces and assembled on site. The sign face can be single or double sided and made from 1/2 inch PT plywood, framed with 2"x 4" or 4"x 4" and covered with a vandal-proof cover. Two 10 foot long PT 6"x 6" posts are best for the supports. The sign board would probably be 4"x 4', depending on the amount of information required on both sides.

COLOUR: You can allow the PT wood to slowly weather to a gray colour or you can paint the surface with a penetrating stain or exterior latex. The sign board should have black lettering on a white background.

► Ordering signs

To order any sign, please contact your Club Trail Director and use the *Sign Order Form* found in this guide. Your order *must* be placed through your Club Trail Director to avoid duplication, maintain continuity of placement and inventory control.

Signs Order Form – Part 1 of 2

Keep this form in your Guide. Please make a photocopy and fax or mail your order to your Club Trail Director.



All signs must be ordered through your Club Trail Director

For complete descriptions and applications for all signs, see the *Signs* section in this guide.

| Quantity | Name of sign | Code | Type |
|----------|---------------------------------------|--------|--------|
| | 1. Diamond Trail Markers | | |
| | i) Main Trail Diamond | MTD | Stock |
| | ii) Side Trail Diamond | STD | Stock |
| | 2. Access | ACCESS | Stock |
| | 3. Appreciation/Private Land | AP/PL | Stock |
| | 4. Overnight Rest Area (ORA) | | |
| | Overnight Rest Area | ORA | Stock |
| | 5. Side Trail Information | ST | Custom |
| | 6. Permissive – Non-permissive | | |
| | Hiking | H | Stock |
| | No Hiking | NH | Stock |
| | Hiking – New Route | H-NR | Stock |
| | No Hiking – Closed Trail | NH-CT | Stock |
| | Leash Your Dog | LEASH | Stock |
| | No Pets | NP | Stock |
| | No Horses | NHORSE | Stock |
| | No Snowmobiles | NSNOW | Stock |
| | No Trail Bikes | NTB | Stock |
| | No Bicycles | NB | Stock |
| | No Fires | NF | Stock |

| Quantity | Name | Code | Type |
|----------|--|---------|---------|
| | No Camping | NC | Stock |
| | No Hunting | NHUNT | Stock |
| | 7. Special Use | | |
| | Private Parking – Private Drive | NP-PD | Stock |
| | Private Land – Do Not Enter | PL-DNE | Stock |
| | Natural Regeneration Area | NRA | Stock |
| | Environmentally Sensitive Area – | ESA | Stock |
| | Private Property – Hiking Only | PP-HO | Stock |
| | 8. Bruce Trail Association Land | | |
| | i) Permitted uses | BTAL-PU | Stk&Cus |
| | ii) Do Not Enter | BTA-DNE | Stock |
| | 9. Custom | | |
| | i) Destination/Distance | D/D | Custom |
| | ii) Fingerboard/Direction | F/D | Custom |
| | iii) Road name | RN | Custom |
| | iv) Computer generated | CG | Custom |
| | 10. Trailhead | TH | Custom |

For custom signs text, use *Signs Order Form – Part 2*

Part 2 has space to fill in the text for your sign or signs.

There is a fee for custom signs.

Ordered by:

PLEASE PRINT BELOW

Trail Club name

Trail Director

Date ordered

Date required

Residence telephone

Business telephone

► **Attention: Club Trail Director**

Send your order to the BTA Sign Co-ordinator at:

Mail

Telephone

Paul Beneteau

905-353-0707

1268 Burloak Drive

Burlington ON L7R 3X5

☐ **Deliver to:**

PLEASE PRINT BELOW

Address

☐ **I will pick up**

City or town

Postal code

Signs Order Form – Part 2 of 2

Keep this form in your Guide. Please make a photocopy and fax or mail your order to your Trail Club Director.

Use the space below for the text for your custom sign or signs



Custom signs:

- ☐ Side Trail Information ☐ Destination/Distance
☐ Fingerboard/Direction ☐ Road Name ☐ Trailhead ☐ Other

- ☐ Side Trail Information ☐ Destination/Distance
☐ Fingerboard/Direction ☐ Road Name ☐ Trailhead ☐ Other

- ☐ Side Trail Information ☐ Destination/Distance
☐ Fingerboard/Direction ☐ Road Name ☐ Trailhead ☐ Other

- ☐ Side Trail Information ☐ Destination/Distance
☐ Fingerboard/Direction ☐ Road Name ☐ Trailhead ☐ Other

Additional information or comments

Page 2 of 2

5. Stiles

Stiles have been a hallmark of the Bruce Trail ever since the first few miles of trail were constructed. In the interest of landowners it was decided that we should avoid damage to fences resulting from hikers climbing over them; nor should we use any gates which might be left open, thus allowing farm animals to escape. This is still our policy.

Stiles should therefore be built wherever the trail crosses a fence. They should be easily visible and built well away from gates, so that hikers are not tempted to use a gate instead of a stile. In fact, the Trail should, wherever possible, not go near farmers' gates.

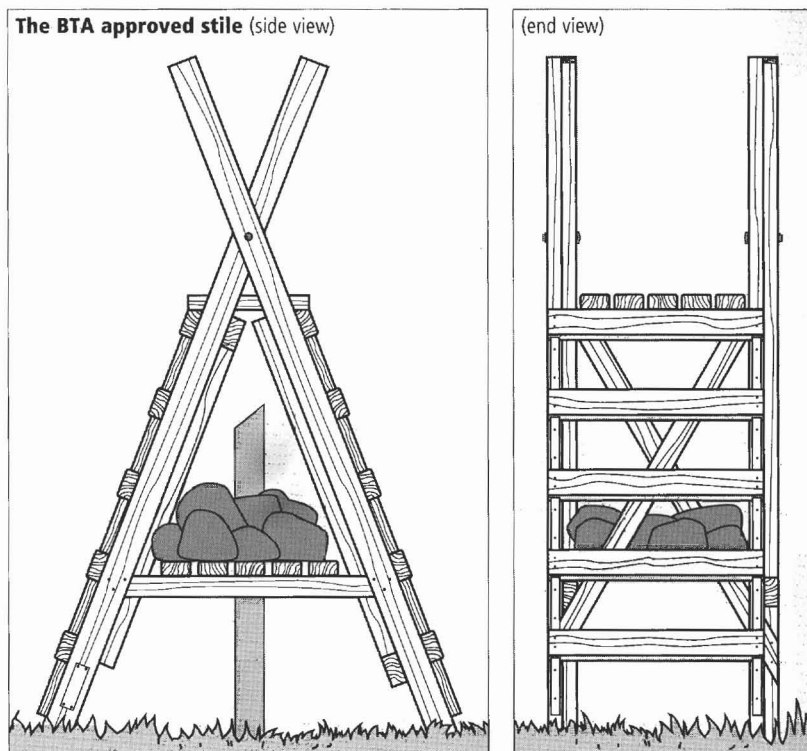
Even fences that appear to be disused may need to be straightened up and have a stile. Landowners will appreciate knowing that trail workers are looking after their boundaries. Although many different types of stiles have been constructed in the past, only one, the free-standing stile has proved to last long enough and be



safe enough to warrant the trouble and expense to build it. For standard fences the free-standing stile can be constructed at home and carted to the site or it can be "made to measure" for difficult approaches. It is easily transported on a car roof rack and has the advantage of being recyclable; it can be taken apart and moved to a new location if needed.

Because of the need to preserve a safe, stable stile over many years, pressure treated wood should be used for all 2"x 4"s in stile construction. Although

galvanized nails work well to hold in the steps, 2-1/2" #12 Robertson head screws work superbly: the steps should be pre-drilled at a work shop and assembled as the need arises.



Because of their reusability, spending the money for a stile will be a good investment. The only other lumber needed is for the braces, and possibly also for step supports. Angle braces are desirable to prevent the stile from lurching to one side, especially if it cannot be attached to a fence post or tree support. 2" x 4" braces running through the fence to link the side rails prevent the legs from spraying out, but they may not be necessary if the stile is well dug in. Step supports 1-1/2" x 1-1/2" should always be included as a safety precaution; because such small pieces of wood split easily, pre-drill holes for the nails used to hold them between the steps. See *Appendix A2 – Stiles*. The number of steps on a stile may vary, but they should be spaced approximately 30 cm (12 inches) top to top. A stile over a high fence may therefore need five steps on each side.

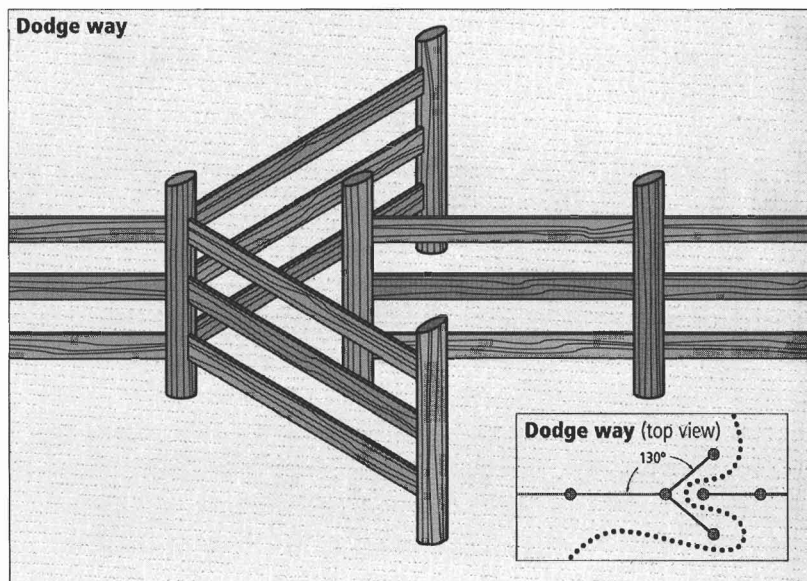
Nothing is more tiring towards the end of a long hike than a succession of 3-step stiles. Some stile builders seem to have been giants incapable of comprehending the needs of shorter-legged mortals!

The portion of the side rails projecting above the bolts is, of course, for the hiker to hold onto when crossing from one ladder to the other.

Securing the stile to the ground is a very important safety feature. Although burying the legs is the preferred technique, rocky ground may prevent this. You will increase stability by driving in an angle iron or T-bar into the ground at the foot of each support and secure to the support using screws. The trail builder will have to look for a tree to tie the stile to or construct a platform between the bottom steps that runs through the wire fence. Load the platform with rocks to weigh down the stile and stabilize it. A platform should be constructed between the two top steps to make it easier for the less agile to turn around at the top of the stile. (This also increases stability.)

Stile maintenance

A collapsing stile is not only dangerous, it is a liability. It will also discourage hikers from using it. Stiles must therefore be frequently inspected and repaired as necessary. When repairing stiles, do not forget to inspect the fence nearby; very often it will have been damaged, if not by hikers, perhaps by snowmobilers. Landowners will welcome your co-operation in keeping the fence in good repair. If the fence is down and the landowner says it is no longer needed, the stile should be removed, as well as any trip wires left from the abandoned fence. In any case, a decrepit stile astride a broken down fence is a very poor image for the Bruce Trail.



Dodge way

Finally, it may be worth mentioning a possible alternative to stiles – the “dodge way”, commonly seen in England but rarely in North America. It consists of a narrow gap in the fence, with two arms projecting at an angle on each side of the fence and allowing about 0.6 m (2 feet) for passage of a two legged human but not of a farm animal or a wheeled vehicle.

Do not construct a dodge way in an existing tension wire fence. Of course, a dodge way should on no account be made without landowner’s prior consent. If in any doubt at all, stick to the tried and true Bruce Trail stile! If you are constructing a new wire fence with the blessing of the landowner, a dodge way is, by far, the best and longest lasting access. It will be necessary to brace the tension wire fence on both sides of the dodge way entrance.

6. Building bridges

Why build bridges?

The obvious answer is: “to keep the hiker’s feet dry when crossing a stream”. Under all conditions? Or for only 15 days of the year? Should we build a bridge if, on the other 350 days, the hiker can easily step across the stream? Yes, if there



is also a need to protect the aquatic environment of the stream from trampling by hikers’ boots. Certainly we should not build unnecessary bridges. In some places stepping stones may be adequate; but in winter they may become covered with ice, and at other times a rise of a few centimetres in the water level can make the stones slippery and dangerous. Sometimes a bridge may be considered desirable over quite a narrow creek to avoid a descent down steep banks with consequent erosion problems.

In some parts of the trail, where vandalism is common, it may be inadvisable to build a bridge even if the hiker is occasionally inconvenienced. The local Club must make the decision. Remember that you must obtain the permission of the landowner, whether public or private. It may be necessary to obtain a Niagara

Escarpment Commission (NEC) development permit: consult the BTA Trail Director or the staff of the B.T.A. at Raspberry House. If considerable time and money is to be spent on the bridge, the Club must consider whether the location of the bridge is on the optimum route.

Where to build a bridge

The best site is the narrowest part of the stream that will work in with the trail and the terrain. Sometimes a small rerouting will help to find a suitable site. A major point to bear in mind is that the closer the bridge is to the surface of the water, the more likely it is to be washed out in a flood or damaged by an ice jam. An ideal location then, is where the stream is narrow and the banks high. If this is not possible, the ends of the bridge must be built up on a foundation crib. Avoid areas where the cribs will be undermined by fast water. See *Appendix A3*.

When to build a bridge

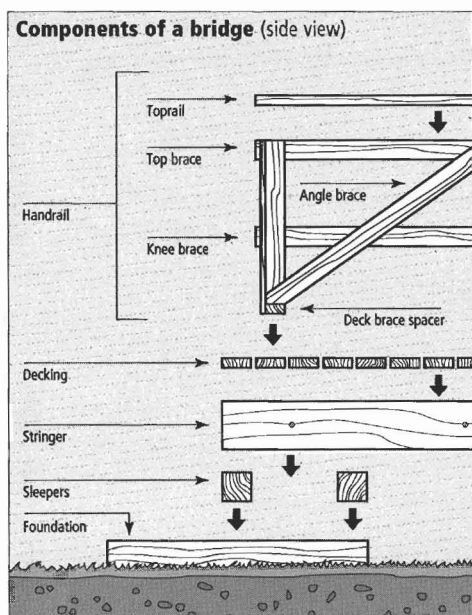
You might say at any time when manpower and materials are available. However, many other factors may affect the decision. In winter, snow and ice make it hard to get the foundations firmly embedded. On the other hand, being able to move materials to an out-of-the-way place by toboggan may help. In spring, flood waters may interfere with your operations; but you can clearly see where the high water mark is. In summer, it may be too hot for the hard labour involved, and black flies and mosquitos are usually thick in river bottoms. Water levels are usually at their lowest in late summer making a river crossing much easier. Early Autumn seems to have the most advantages. The weather is cool, the stream will be running low, there are no flies, and it is a good time to have a wiener or corn roast to feed hungry workers.

Ideally you should observe the crossing for a year before building in order to find out flood levels etc. When you have considered all the pros and cons about location, length, height above water, availability of volunteers and materials, you are ready to build the bridge. The local Conservation Authority will, very often, have useful information about the volumes of low and high flood levels on their major streams.

How to build a bridge

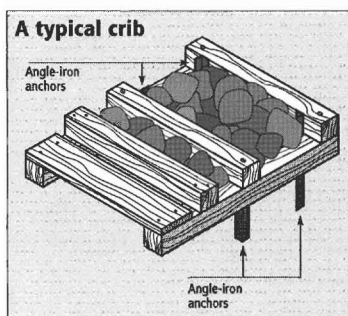
A bridge consists of five basic components:

1. **Foundation** – located on either side of the stream. A crib, a railway tie, flat surfaced rocks, a gabion basket or a piece of 6"x 6" PT lumber can be a foundation.
2. **Sleepers** – a minimum of two stabilizing supports on both ends of the structure. They are anchored to the stringers and the foundation.
3. **Stringers** – the two supports that span the stream or gulley and are anchored to the sleepers.
4. **Deck** – the walking surface. 2"x 6" planks placed across the stringers.
5. **Handrails** – supports on one or both sides of the bridge to assist crossing.



Basic to all bridges are foundations. These are what you rest the ends of the stringers on. Their main purpose is to give the bridge firm, immovable support, and to keep the stringers off damp ground so they will not rot. Once the ends of the stringers have rotted, the whole bridge is useless. Another reason for foundations is to lift the bridge higher above the stream level giving more room for flood waters. One foundation may have to be higher than the other to level a bridge.

Foundations are made of rocks, poles, logs or any combination of these suitable to your location and should be heavy enough or well anchored to withstand ice-out and very high water levels in the spring plus periodic flooding.



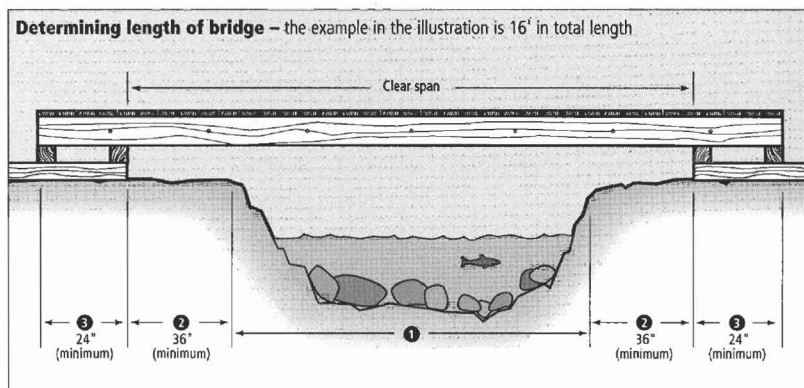
The crib

A crib consists of sleepers and foundation material. Pressure treated 6" X 6" (15 cm x 15 cm) lumber or cedar logs with the bark peeled off make a good crib. Treat the ends and any surfaces that will be in contact with the ground with a preservative. Drill holes through the logs or 6" x 6" lumber to allow insertion of 10 inch galvanized

Ardox™ spikes. Drive pieces of 1" (2.5 cm) pipe at each corner to increase stability. An anchoring alternative is to drive angle iron in the ground at the inside four corners and secure the crib to them. Fill the space inside the crib with rocks to prevent movement during high water. The height of the crib will depend on spring ice levels and the likelihood of objects such as tree stumps catching on the bridge during a flood. A good rule of thumb is to build a metre above normal water levels, and at least 30 cm (12 inches) above the anticipated high water mark.

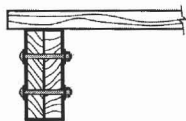
Stringers

The length of the bridge is determined by ❶ the width of the stream to be crossed. Allow at least 1 m (3 feet) ❷ from the water's edge on either side of the stream so

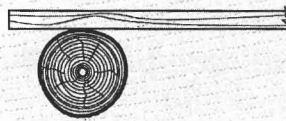
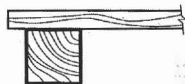


that the cribs will not "crowd" the stream flow during high water periods. Together ❶ and ❷ are called "the clear span". Also allow an additional .6 m (24") ❸ for the foundations. Thus, a 20' bridge will cover a 14' wide creek and a 30' wide river

Types of stringers



Dressed or rough cut lumber



Tree trunks or telephone poles

will need 40' long telephone poles. *Under no circumstances should a bridge be built with a crib in the centre of the normal stream bed.*

Cedar or Hemlock tree trunks are easiest to use for stringers and are often (with landowner's permission) available on location. Try to find trunks which do not taper too much and are not too springy. New, or used hydro poles in sound condition, can be an excellent choice. Check used hydro poles carefully for rot or other damage. Otherwise, use rough or undressed lumber if available – possibly a double, triple or quadruple thickness of 2"x 10" stringers. Undressed lumber is not only cheaper but also thicker, and therefore stronger, than planed wood. Lay the two stringers across the stream about half a metre apart. Make sure they are long enough to rest firmly on the complete width of the foundations. See *Appendix A3* for detailed bridge building diagrams and span tables.

The Deck

The decking of the bridge is now laid across the stringers. Pressure treated 2"x 6" may be used, and rough lumber is less slippery than planed lumber or plywood.



It should be cut into lengths of between 32 to 48 inches which is sufficient bridge width for hikers, but hopefully not for snowmobiles. Bridge decking must allow drainage of rain water, and therefore the planks should be separated by gaps of 3/4 inch, which will also help

to prevent build-up of snow or ice. They should also project about 3 to 5 cm (1 to 2 inches) past the outer edge of each stringer. Use a 3/4 inch spacer board, square and tape measure to lay out the best spacing *before* nailing. Use 4 inch galvanized Ardox™ nails: a strong nail with sufficient length to deter all but the most determined vandal. Use a string or straight edge guide and check that the decking is properly aligned before nailing it down.

Handrails

In all cases where the deck of the bridge is more than 1 m (39 inches) above the bed of the stream, you will need a handrail. The handrail should be made of

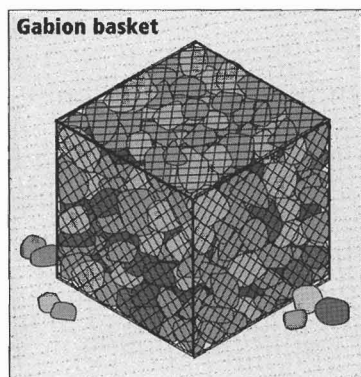


2" x 4" PT wood with the top grip rail from 36" to 42" (91.5 to 122 cm) above the deck. A support 2" x 4" under the grip rail and a knee brace add rigidity. An effective technique is to utilize an extension on the decking as a support for a triangle structure pre-built and brought to the site. The triangle supports should be spaced 4 to 5 feet apart and anchored to the long deck boards with 2-1/2" #12 Robertson screws. A back-brace screwed into the underside of the support will greatly strengthen the handrail above. An alternative hand rail design can be found in *Appendix A3.15*.

At least one longitudinal angle brace should also be constructed in each handrail to ensure it is firm from end to end. Generally, a hand rail on one side of a bridge will suffice. However, where the bridge is very high above the stream or road below (2 metres or more), then handrails should be built on both sides and the deck should be 48 inches wide.

Bridge maintenance

Bridges must certainly be checked at regular intervals, and decaying or missing decking must be promptly replaced. If the stringers start rotting, a reconstruction of the bridge is essential. Maintenance should not be limited to the bridge structure



itself. Inspect the stream bed above the bridge and clear out any logs or large branches which might be swept downstream and cause a dam under the bridge. Watch out for signs of erosion of the stream bank which might affect the foundations of the bridge. Large boulders piled along the eroding portions may slow down the rate of erosion. If only small stones are available, these should be contained in Gabion baskets. A Gabion

basket is made of wire similar to a chain-link fence and measures approximately 1 metre square. To be effective, the basket must be securely anchored and well packed with rocks of approximately the same size. Please, do not be tempted to take the short cut of filling the bottom with large rocks and increasingly smaller rocks towards the top. This inconsistency of packing will dramatically weaken the function of the basket.

Fieldnotes on bridge construction

Overnight Rest Areas (ORA)

Overnight Rest Areas" (ORA's) is the preferred term, since the words "camping" and "campgrounds" have rather specific implications for most Canadians. ORA's on the Bruce Trail are solely for the use of back-packing hikers as overnight stops and are only intended to meet very basic requirements. A typical ORA would include the following:

1. **Cleared areas** – at least three separate cleared areas for tents.
2. **Water supply** – pump water, spring, stream or lake nearby. All water supplies must be considered suspect and must be boiled, sterilized or filtered.
3. **Latrine** – usually a pit privy, bolted to a pit frame.
4. **Site signs** – posted in clear view.
5. **Register** – in a convenient location.

It is not the policy of the B.T.A. to provide garbage containers. Campers are expected to conform to the Trail Users' Code and carry out all their refuse.

Due to environmental considerations and threat of forest fires, campfires are now prohibited at all B.T.A. Overnight Rest Areas.

The policy for the Location and Design of a System of ORA's is a part of the Bruce Trail Comprehensive Plan. Trail Captains must consult their Club Directors for guidance in building an ORA. During the back-packing season campsites must be visited regularly and frequent inspections are desirable between Victoria Day and Thanksgiving.

Tent areas

An area approximately 3 m x 2 m (10 x 7 feet) should be adequate for any tent likely to be carried by a back packer. At least three such areas should be cleared, even if the site contains a shelter, and they should be upwind (generally west or northwest) from the latrine. Weed growth should obviously be cut down, and surface stones removed; woody growth must be pruned to ground level, or slightly below, to eliminate risk of a punctured tent floor.

Poison ivy is a menace for campers, and it is essential to eliminate it from campsites. Use an approved herbicide, in consultation with the landowner. Wear appropriate safety equipment when applying herbicide. This perennial shrub, easily identified by its 3-leaflet form, usually grows close to the ground in semi-open areas. All parts of the plant are poisonous. Do not attempt to grub it into the ground or to burn it – even the fumes are poisonous. If accidentally contacted, an immediate and thorough washing with an alkaline soap may prevent irritation. If soap is not available, treat the affected skin with juice from the stem of the orange-flowered Jewelweed (Touch-me-not).

Site signs

Rest Areas are usually located at some distance from the main Bruce Trail, and a



series of blue blazes should lead from the Trail to the Rest Area. The ORA sign, should have the local BTA club name and site number in the bottom right corner. Mount the sign 2.5 to 3 m high on a clearly visible tree.

Rest area regulations will vary from one area to another, but they should deal with such matters as water supply, fires and garbage. They can be posted on the

inside of the door or the wall of the privy. Inside the lid of the Register (using water-proof glue) is another possible location for them.

Register

A steel mailbox about 30 cm (12 inches) wide and 15 cm (6 inches) deep, fixed with spiral nails, will allow for paper and pencil. This item may give you some maintenance problems, but the record and comments of hikers are worth the time and effort it involves.

Garbage

Some campers will unfortunately not observe the Trail Users' Code or the Rest Area Regulations and will leave some of their garbage behind. Take two or three garbage bags in with you to remove this refuse. If you have to deal with broken glass or tin cans, you will probably need one bag inside another. Campsite maintenance can be a dirty job, and you are advised to wear gloves for your own protection.

Water supply

This should be as close as possible to the camping area and must be sign posted, with blue blazes leading to it if it is not visible from the campsite. No water in Southern Ontario can today be regarded as safe to drink without treatment. The Rest Area Regulations should contain a clear warning that water must be boiled or otherwise treated before being consumed.

Latrine

Assuming the structure is anchored to prevent toppling, maintenance is usually restricted to sanitation, door repair and screen replacement. Use fibreglass screening as this material stands up to corrosion and minor vandalism. An automatic door closure is strongly recommended, as hikers do not seem to realize that shutting the door will keep out unwanted visitors such as gnawing porcupines – and we all know what they can do to a toilet seat!

Keeping the amenity sanitary is unpleasant work, but soaking a large cloth in detergent and carrying it to the site in a plastic bag will provide the "tool" for a thorough clean-up. Don't rinse it in the water supply, but take it home in the plastic bag. An ordinary broom cut down to 1 m (3 feet) is useful in sweeping down walls and cleaning the floor.

A strong solution of Lysol and water in a vinegar squeeze bottle can be used to sanitize the pit and should be sprayed on all wood under the seat. The walls of the privy can also be sprayed to discourage insects - no insecticides, please! In the

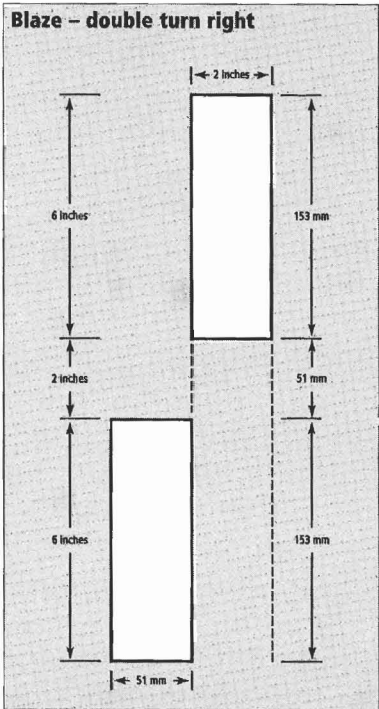
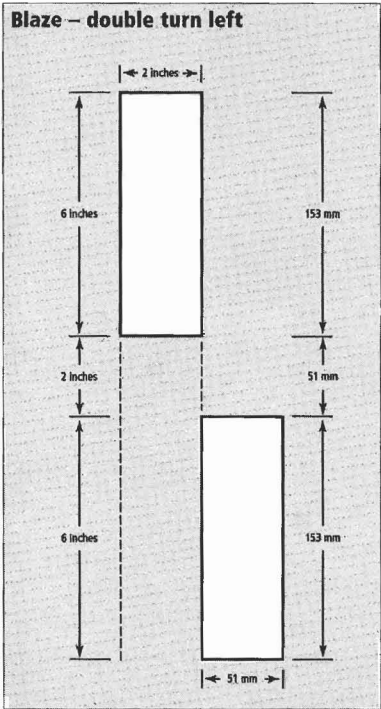
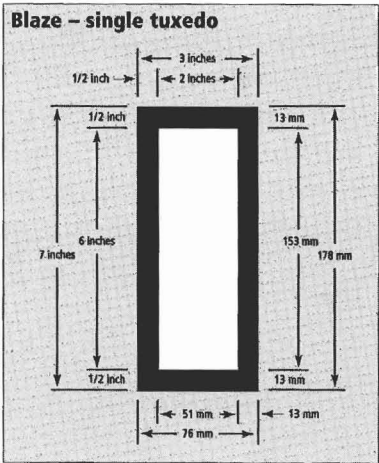
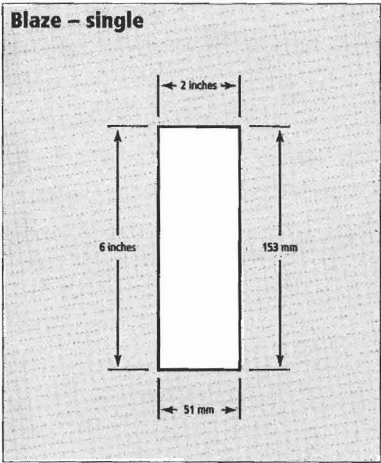
summer, a bottle of the solution can be left for hikers to use instead of chloride of lime, which tends to get lumpy and is liable to be dumped in one shot. A foolproof, low-cost system of sanitation at these sites has not been devised, and regular checks are still the best approach. Tissue for the privy is not necessary. Unless it is encased in steel, mice will soon discover it makes the best nesting material known to the rodent kingdom. Further, this material can be strewn around the site – so let hikers supply their own!

Parks Canada has invested considerable resources to establish composting toilets at the Grotto and at Halfway Dump parking lot in Bruce National Park. These high tech facilities use solar power to operate a fan to vent the toilet and natural composting to decompose the solid waste. Liquids are pumped off (using solar power) to a holding tank for further biological breakdown. This system will eventually revolutionize remote camping in high-use areas on poorly drained soils. For the moment, though, trail workers will have to work within the limitations of tight budgets and traditional privies.

Appendix A1

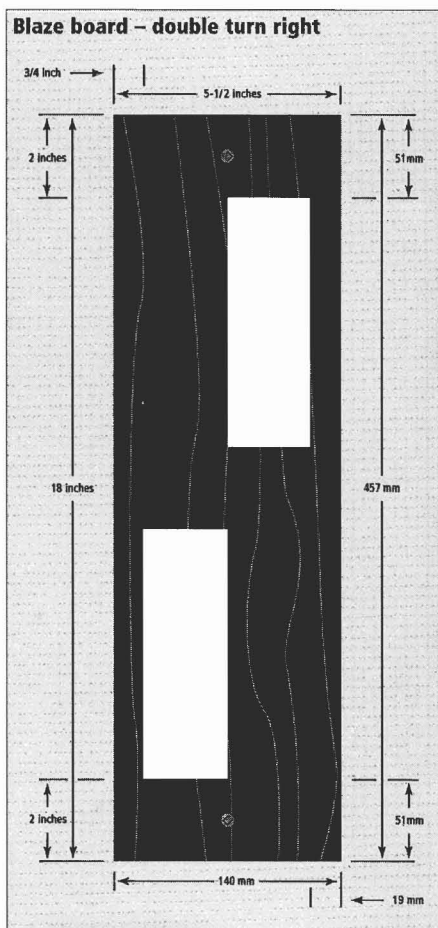
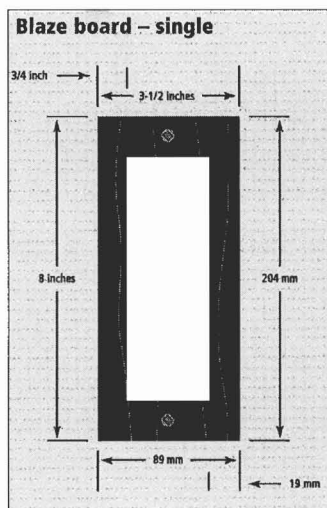
Blaze dimensions

Below are the official dimensions for Main Trail and Side Trail blazes.



Blaze boards

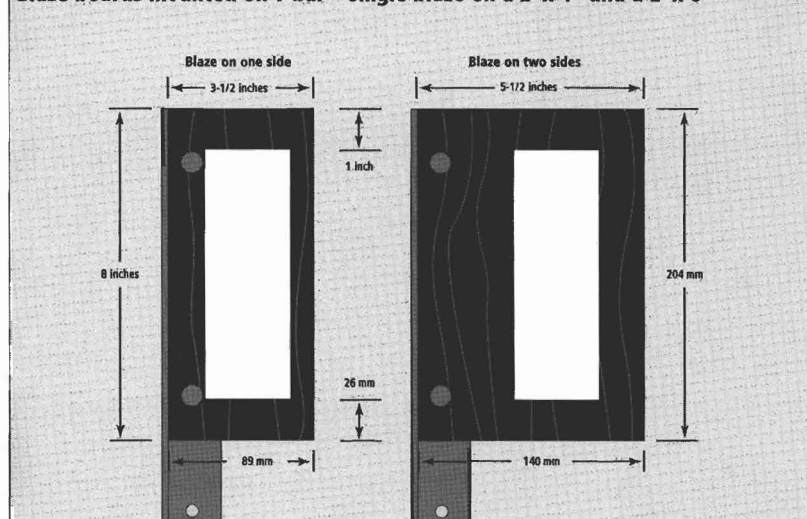
They are an effective alternative when a suitable tree or surface is not available for a blaze. Pressure treated (PT) 2" x 4", 2" x 6" lumber, or 3/4" plywood are recommended. **Remember:** Dressed, milled or planed lumber is smaller than the normal size. For example, a milled 2" x 4" is 1-1/2" x 3-1/2". Mount with Robertson head wood screws on the vertical axis and leave about 1/2 to 3/4" between the blaze board and the tree. As the tree continues to grow, it will have room to expand to the back surface of the blaze and at such time the screw can be backed off allowing continued growth.



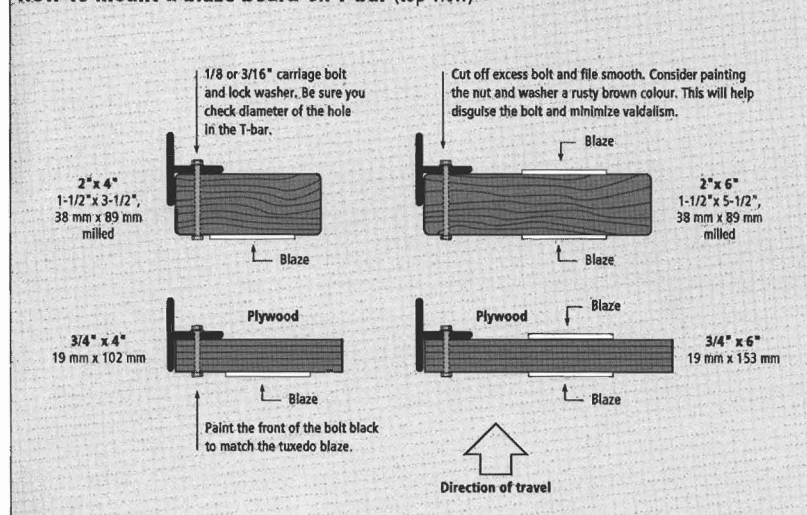
Blaze boards mounted on T-bar

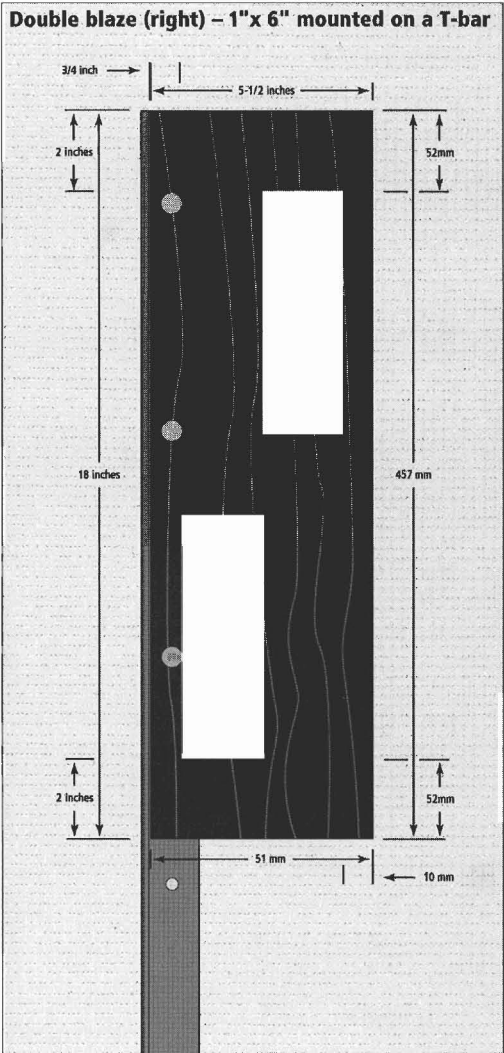
Another effective alternative is mounting the blaze board to a T-bar. Pressure treated (PT) 2"x 4", or 2"x 6" are recommended. PT plywood, 4" or 6" x 3/4" can also be used.

Blaze boards mounted on T-bar – single blaze on a 2"x 4" and a 2"x 6"



How to mount a blaze board on T-bar (top view)



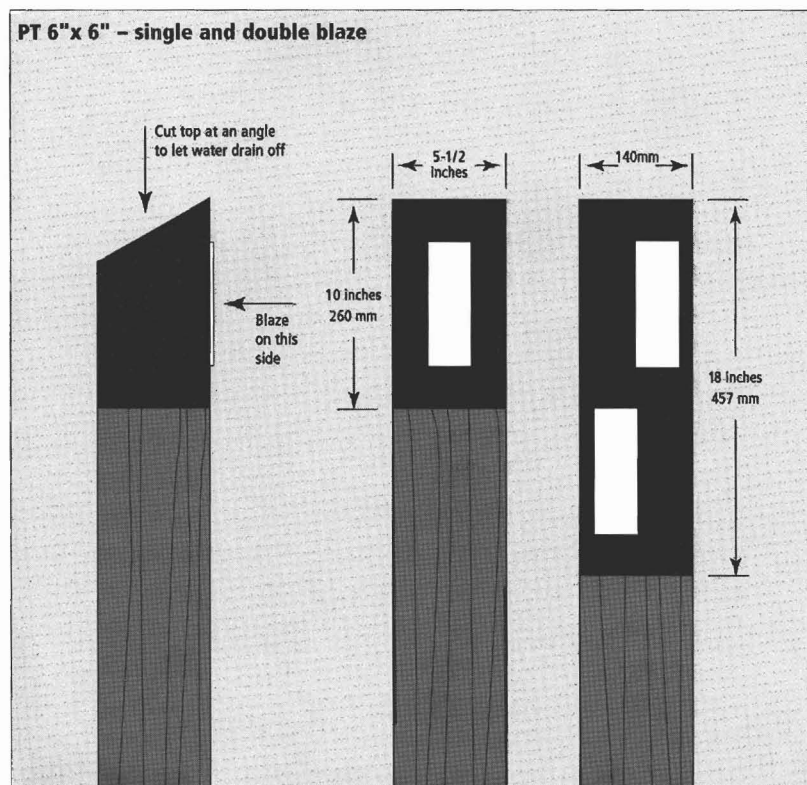


Blaze posts

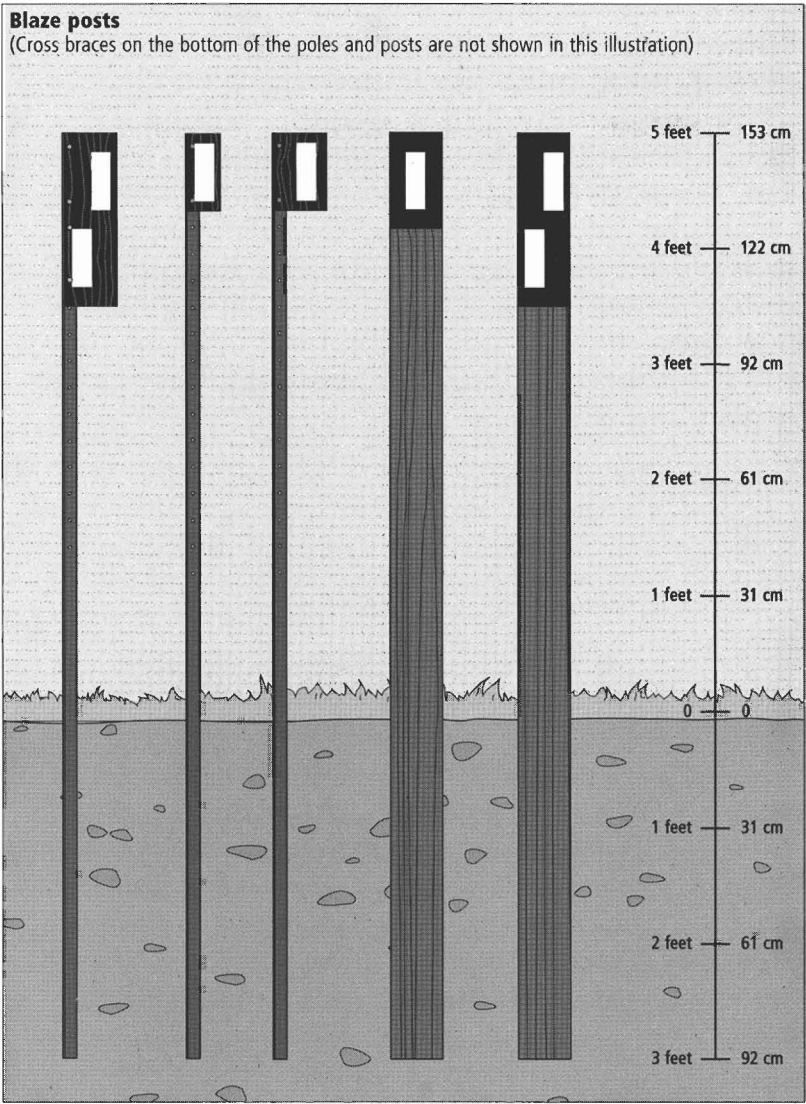
Blaze posts have a more permanent and more visible appearance than a blaze mounted on a T-bar. An 8' long cedar log, 5" or 6" in diameter or a PT 6"x 6" post are the most suitable. The tops should be cut at an angle to shed rain.

The top portion should be painted black, enough to accommodate a single or double blaze. The angled top cut should face away from the direction of travel.

The post should be buried approximately 3' (1 m) below ground level. To help ensure the post cannot be moved, a 2 foot (60 cm) wood or metal cross bar should be anchored at a 90° angle to the bottom of the post. The hole is back filled with 2" to 4" rocks then a layer of gravel. This will ensure a good looking and vandal resistant Trail marker.



Blaze posts or poles should be approximately 1.5 m (5 feet) above ground level.



Appendix A2 – Stiles

Stiles

Stiles should be built wherever the trail crosses a fence. They should be easily visible and built well away from gates, so that hikers are not tempted to use a gate instead of a stile. In fact, the Trail should, wherever possible, not go near farmers' gates.

Standards to follow when building any structure

At this time, the Trail Workers Guide Book, local building codes and common sense are your only guides when constructing structures on your section of the trail.

If you follow these to the best of your ability and structures are constructed of sound materials and you follow the guidelines of existing similar organizations, then you shouldn't have any concerns. However, things change and it is becoming more common for people to file lawsuits.

The best approach is to research your project thoroughly, consult with other clubs and their experienced builders, and make decisions based on the accumulated knowledge. Make a plan and have other experienced BTA builders comment on it. **Do not take any chances** with liability issues. It's never worth it. A lawsuit can be very costly to the organization, and can affect the funding and reputation of the Bruce Trail Association.

A committee is being formed to study and establish standards for our structures. If you would like to participate contact the Bruce Trail Association Trail Director.

Structure identification

Objectives

In April 2001, an initiative was proposed to standardize a method of identifying each defined structure located on the Bruce Trail, as well as the side trails under the authority of the Bruce Trail Association member clubs, in order to facilitate:

- reporting and locating structures in need of attention
- recording the maintenance history of the structure.

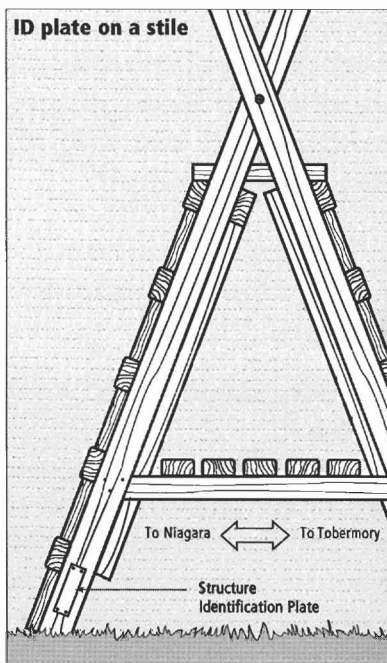
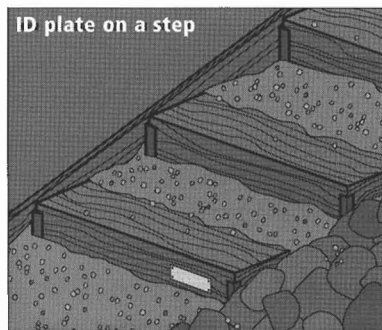
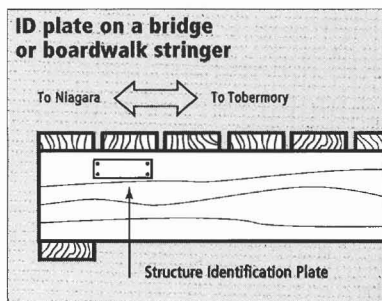
The proposal was approved in principle and will be implemented. The details of the program are to be finalized and will be distributed as they become available. For purposes of this Third edition of the Guide for Trailworkers, ID plates are indicated in some of the illustrations.

What is a defined structure?

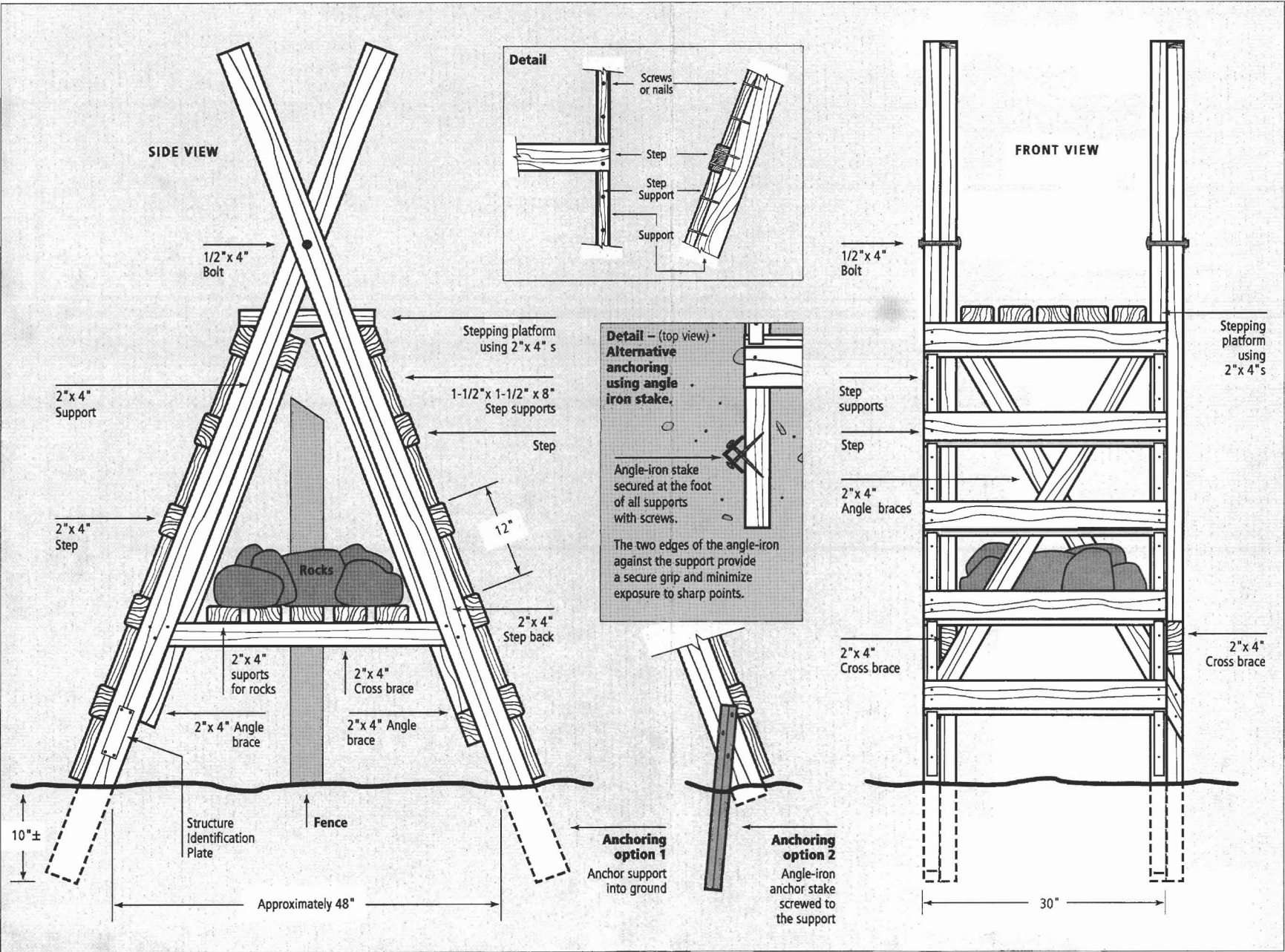
A defined structure is any non-natural structure installed on the Bruce Trail and on all side trails for which a Bruce Trail Association member club is responsible for, for example, stiles, boardwalks, steps and bridges.

ID plate

The ID plate is aluminum and approximately 2"x 6" (51 mm x 153 mm). The Bruce Trail logo and identification numbers are on one side only and anchored with four 1 inch Robertson wood screws. The ID plate is mounted on the down trail side and on the right side of the structure.



Appendix A2 – Stiles



Fieldnotes on stile construction

| Part | Size | Number of pieces needed | Dimensions | Purchase |
|--------------------|---------|-------------------------|-------------------|--------------|
| Supports | 8 feet | 4 | 2" x 4" x 8' | 4 |
| Steps | 30" | 10 | 2" x 4" x 10' | 2-1/2 |
| Step backs | 27" | 6 | 2" x 4" x 14' | 1 |
| Braces | 6 feet | 2 | 2" x 4' x 12' | 1 |
| Step spacers | 9-1/2" | 20 | 2" x 2" x 8' | 2 |
| Stepping platform | 2" x 4" | 5 | 2" x 4" x 8' | 1 |
| Platform for rocks | 2" x 4" | 6 | 2" x 4" x 16' | 1 |
| Cross brace | 4 feet | 2 | 2" x 4" x 8' | 1 |
| Angle brace | 68" | 2 | 2" x 4" x 12' | 1 |
| Screws | 2-1/2" | 40 | ceramic coated | #2 Robertson |
| Nails | 3" | 40 | galvanized Ardox™ | 1 lb. |
| Nails | 4" | 40 | galvanized Ardox™ | 1 lb. |
| Bolts | 4" | 2 | 1/2" | 2 |
| Washers | 1/2" | 4 | 1/2" | 2 |
| Nuts | 1/2" | 2 | 1/2" | 2 |

Appendix A3 – Bridges

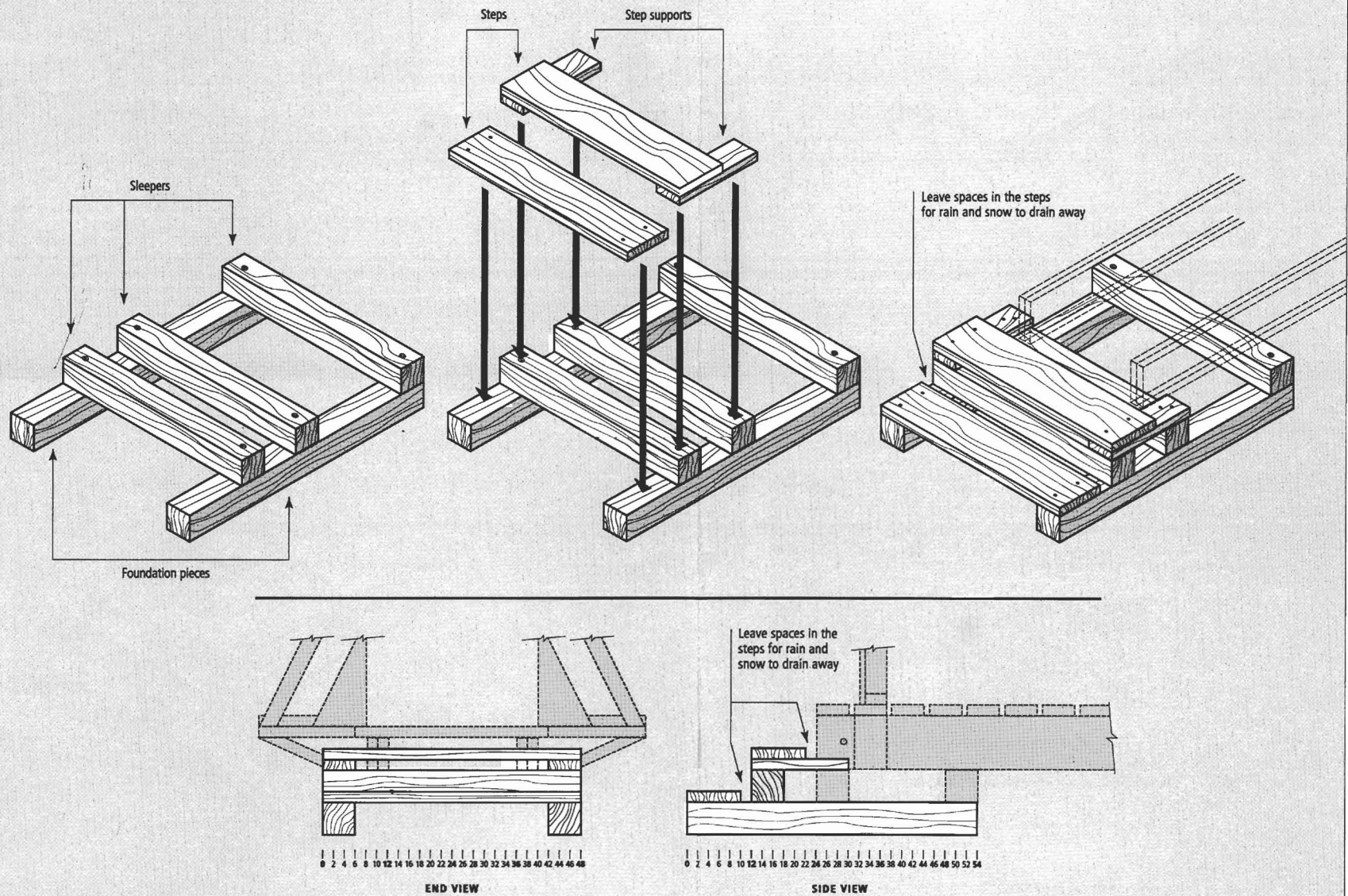
Bridges

The following pages contain a variety of bridge construction options.

Remember that you must obtain the permission of the landowner, whether public or private. It may be necessary to obtain a Niagara Escarpment Commission (NEC) development permit: consult the staff of the B.T.A. at Raspberry House.

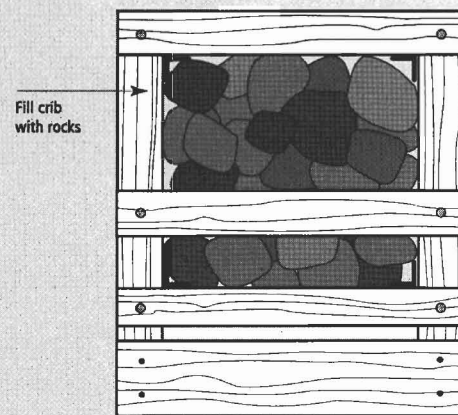
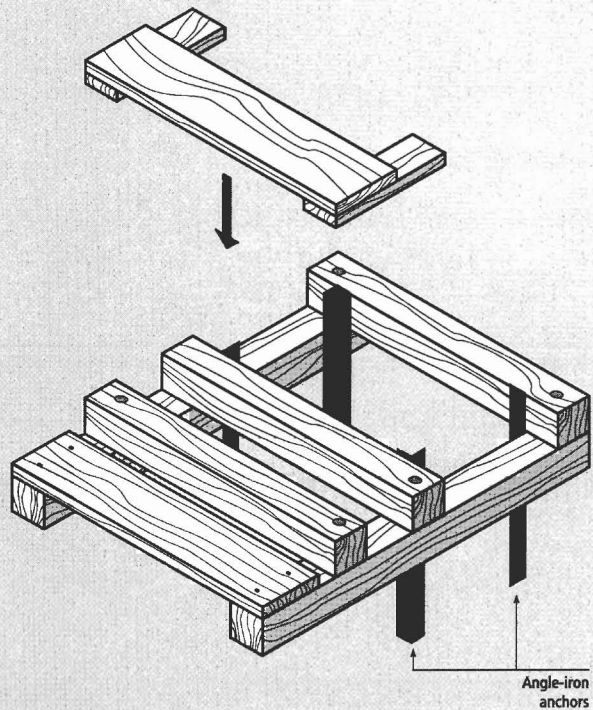
If considerable time and money is to be spent on the bridge, the Club must consider whether the location of the bridge is on the Optimum Route.

Fieldnotes on bridge construction

Appendix A3 – Bridges – Crib**A typical 2 step crib**

Crib (continued)

A typical crib – anchored with angle-iron and stones



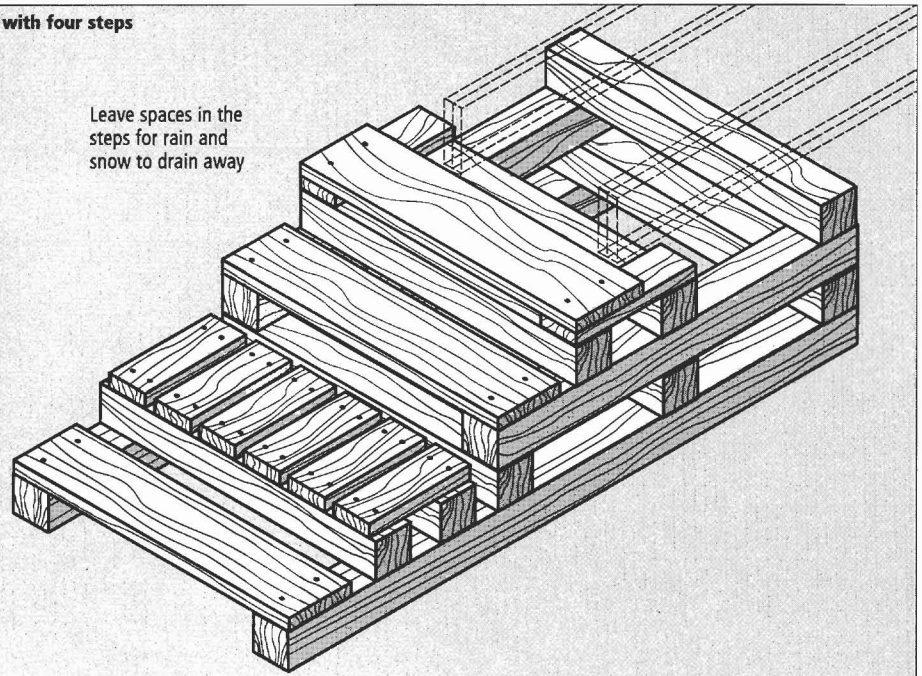
TOP VIEW

Typical crib



A crib with four steps

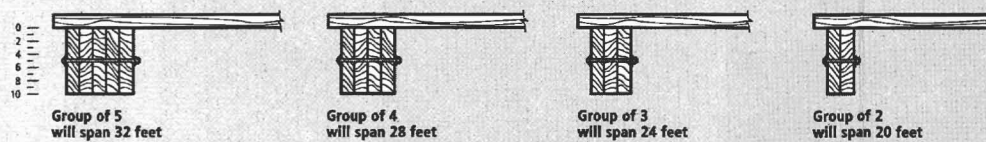
Leave spaces in the steps for rain and snow to drain away



Types of stringers

Types of stringers

2"x 10" laminated stringers – dimensions are for full-size (rough cut, non-finished) lumber



Log or telephone pole stringers



6 x 6" stringers



4 x 4" stringers

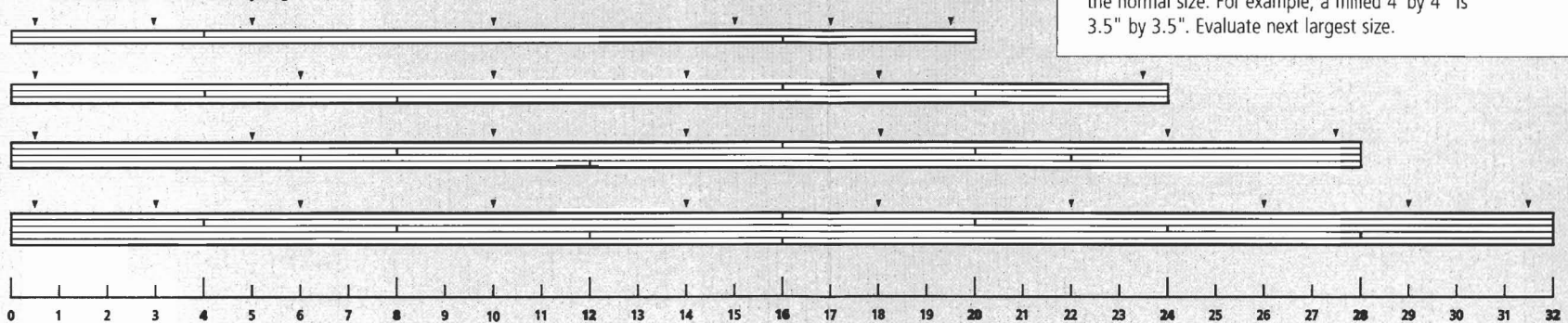


Laminated stringers – Full size (non-finished) lumber is 2" wide x 10" in depth
Dressed (planed) lumber is 1-1/2" wide x 9-1/2" in depth

| Span | Length combinations | Span | Length combinations | Span | Length combinations | Span | Length combinations |
|---------|----------------------|---------|--|---------|--|---------|--|
| 20 feet | 4 16 16 4 | 24 feet | 16 8 4 16 4 8 16 | 28 feet | 16 12 8 12 8 6 16 6 12 16 | 32 feet | 16 16 4 16 12 8 16 8 12 16 4 16 16 |
| | Laminations: 2 | | Laminations: 3 | | Laminations: 4 | | Laminations: 5 |

Top view of laminated stringers

▼ Recommended location of bolts when joining



Beam span table (in feet)

From the Appalachian Mountain Club and the Florida Trail

| Round log beams | | Rectangular beams (width x depth) | |
|-----------------|---------------------------|--------------------------------------|---------------------------|
| Log diameter | Span using double beam | Lumber dimensions | Span using double beam |
| 4" | 8 ft | 4" x 4" | 8 ft |
| 5" | 12 ft | 4" x 6" | 15 ft |
| 6" | 14 ft | 4" x 8" | 20 ft |
| 7" | 18 ft | 6" x 4" | 12 ft |
| 8" | 22 ft | 6" x 6" | 17 ft |
| 9" | 25 ft | 6" x 8" | 23 ft |
| 10" | 29 ft | 6" x 10" | 29 ft |
| 12" | 37 ft | 6" x 12" | 35 ft |
| 14" | 45 ft | 8" x 4" | 13 ft |
| 16" | 54 ft | 8" x 6" | 19 ft |
| 18" | 63 ft | 8" x 8" | 25 ft |

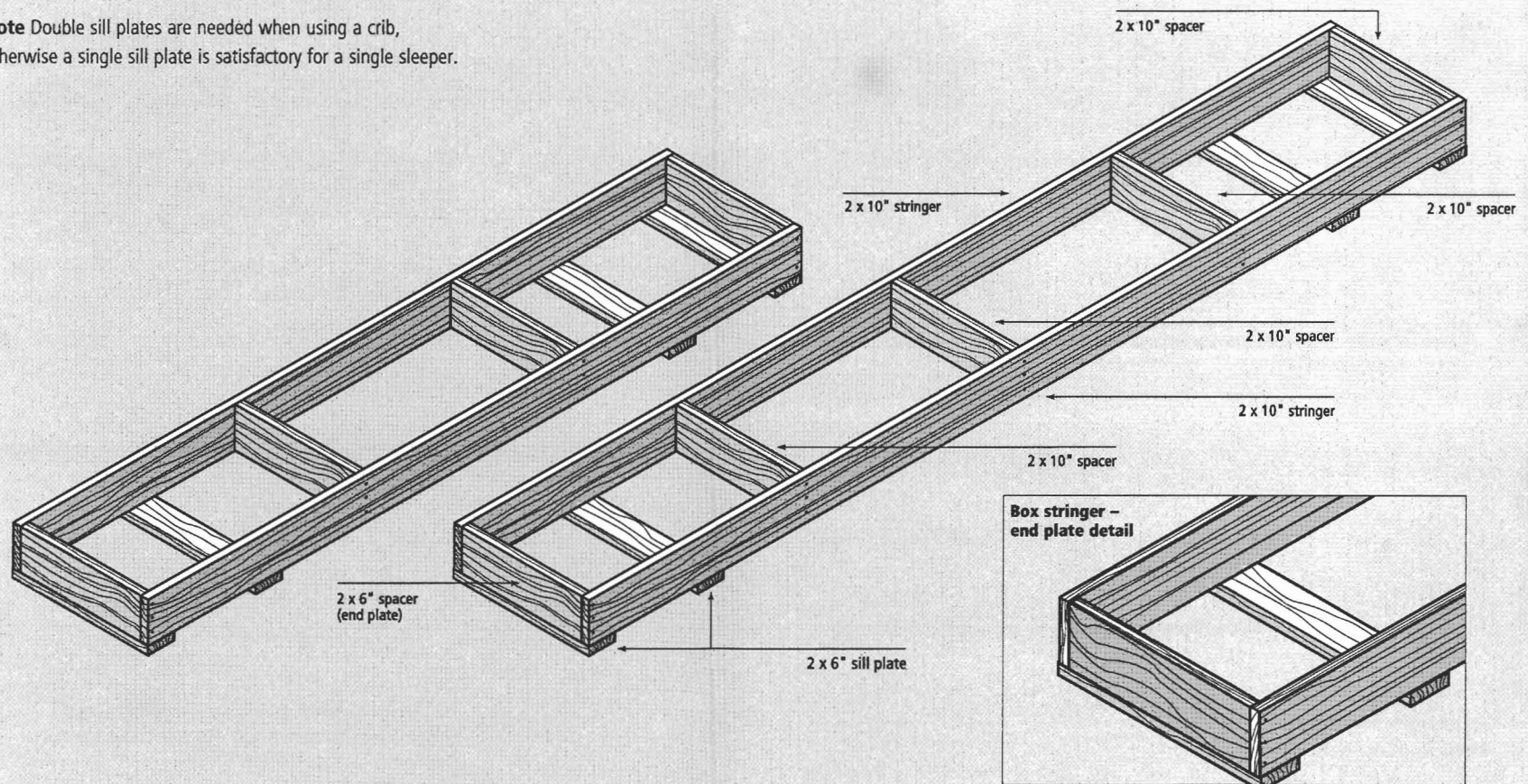
| | |
|-----------|-------|
| 10" x 4" | 14 ft |
| 10" x 6" | 21 ft |
| 10" x 8" | 28 ft |
| 10" x 10" | 34 ft |
| 10" x 12" | 41 ft |

The dimensions above are for full-size (non-finished) lumber. Standard milled or planed lumber is smaller than the normal size. For example, a milled 4" by 4" is 3.5" by 3.5". Evaluate next largest size.

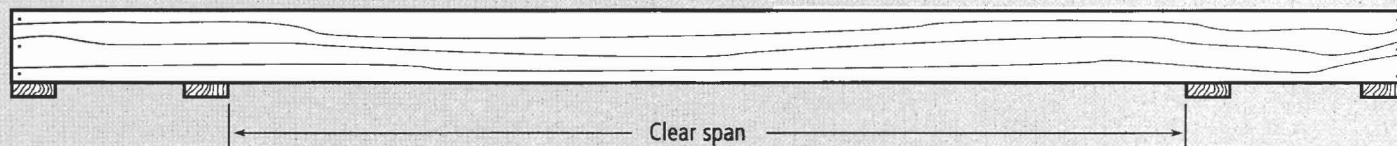
Box stringer

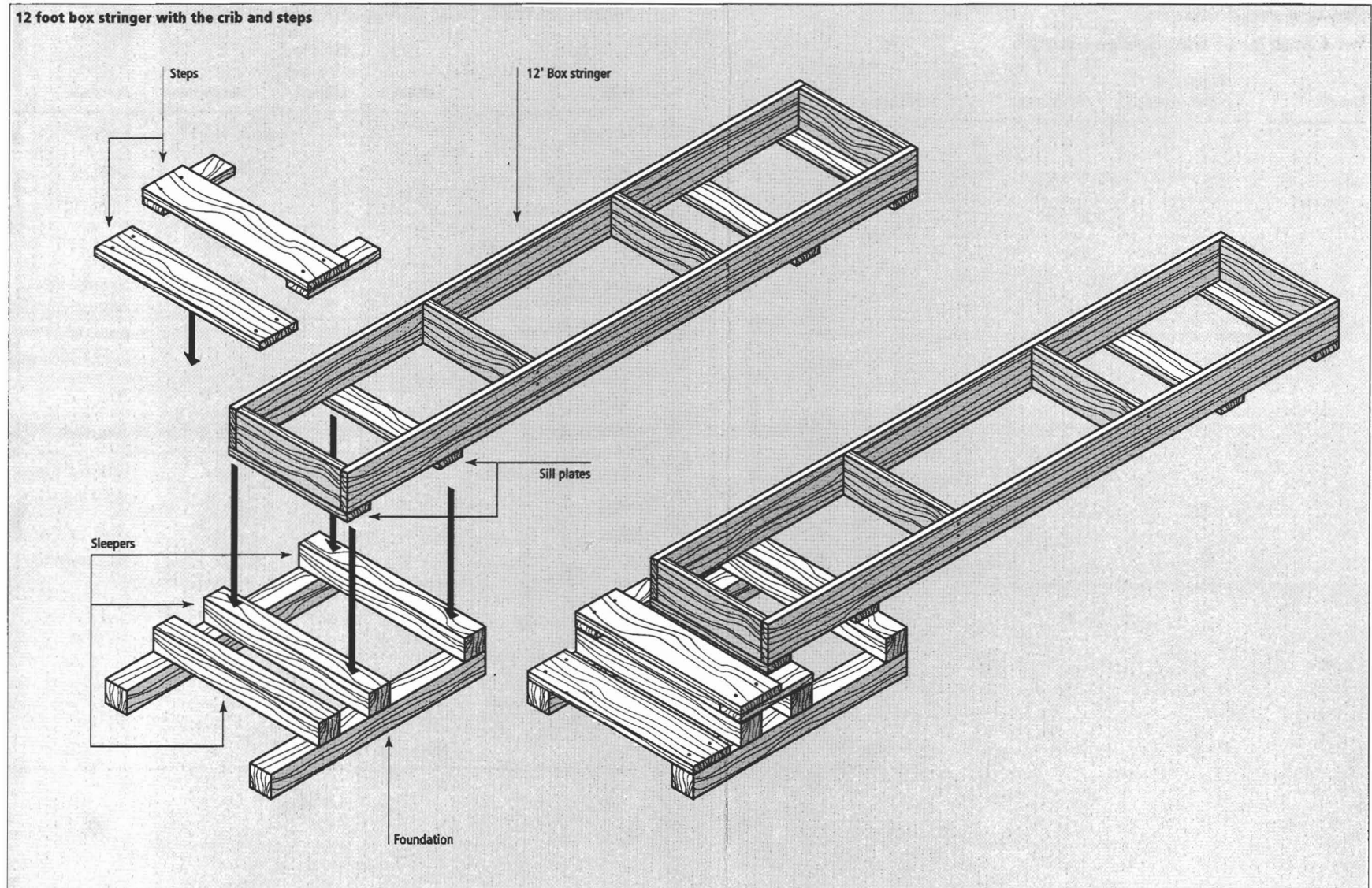
Box stringer – 12 foot and 16 foot

Note Double sill plates are needed when using a crib, otherwise a single sill plate is satisfactory for a single sleeper.



Clear span



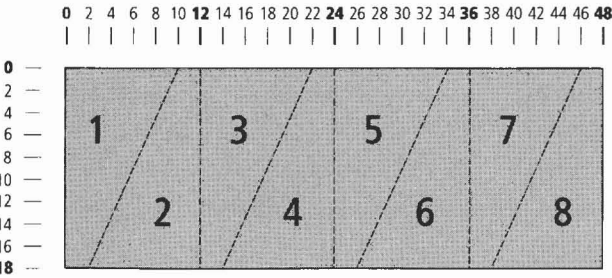
Box stringers (continued)

Stringer requirements
for 6 foot to 14 foot bridge lengths

| Length | Number of pieces needed | Dimensions | Purchase |
|--------|-------------------------|------------|----------|
| 6' | 2 | 2" x 6" | 2 |
| 8' | 2 | 2" x 6" | 2 |
| 10' | 2 | 2" x 8" | 2 |
| 12' | 2 | 2" x 8" | 2 |
| 14' | 2 | 2" x 10" | 2 |

Materials for a 16 foot box stringer bridge

| Part | Length | Number of pieces needed | Dimensions | Purchase |
|---------------------------------------|------------------------------------|-------------------------|------------|--|
| Stringers | 16' | 2 | 2" x 10" | Two, 16' |
| Spacers | 27" | 5 | 2" x 10" | One, 12' |
| Decking boards | 36" | 32 | 2" x 6" | Eight, 12' |
| Handrail deckboard | 72" | 4 | 2" x 4" | Two, 12' |
| Handrail | 16' | 6 | 2" x 4" | Six (provides a cap, outrigger brace and knee brace) each side |
| Handrail post | 36" | 8 | 2" x 4" | Two, 12' |
| Handrail brace | 40" | 8 | 2" x 4" | Two, 14' |
| Handrail deck spacer | 18" | 8 | 2" x 4" | One, 14' (yields eight lengths) |
| Bottom brace | 20" | 8 | 2" x 4" | One, 14' (yields nine lengths) |
| Screws – #2 Robertson, ceramic coated | 2-1/2" | | | 2 lbs. |
| Nails – galvanized Ardox™ | 4" | | | 5 lbs. |
| Brace plate | 10" x 18" (see illustration below) | 10 | 1" plywood | 36" x 48" |

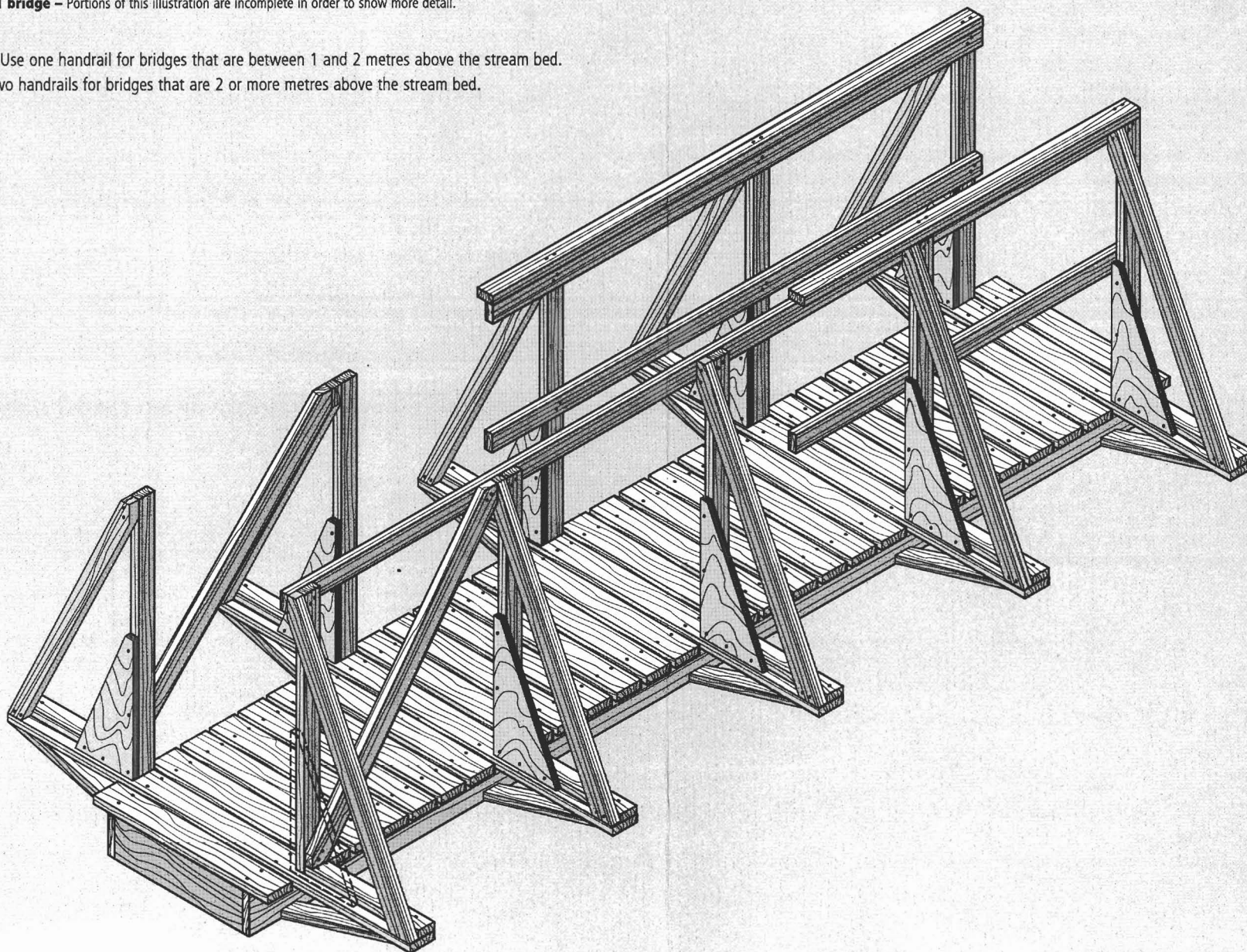


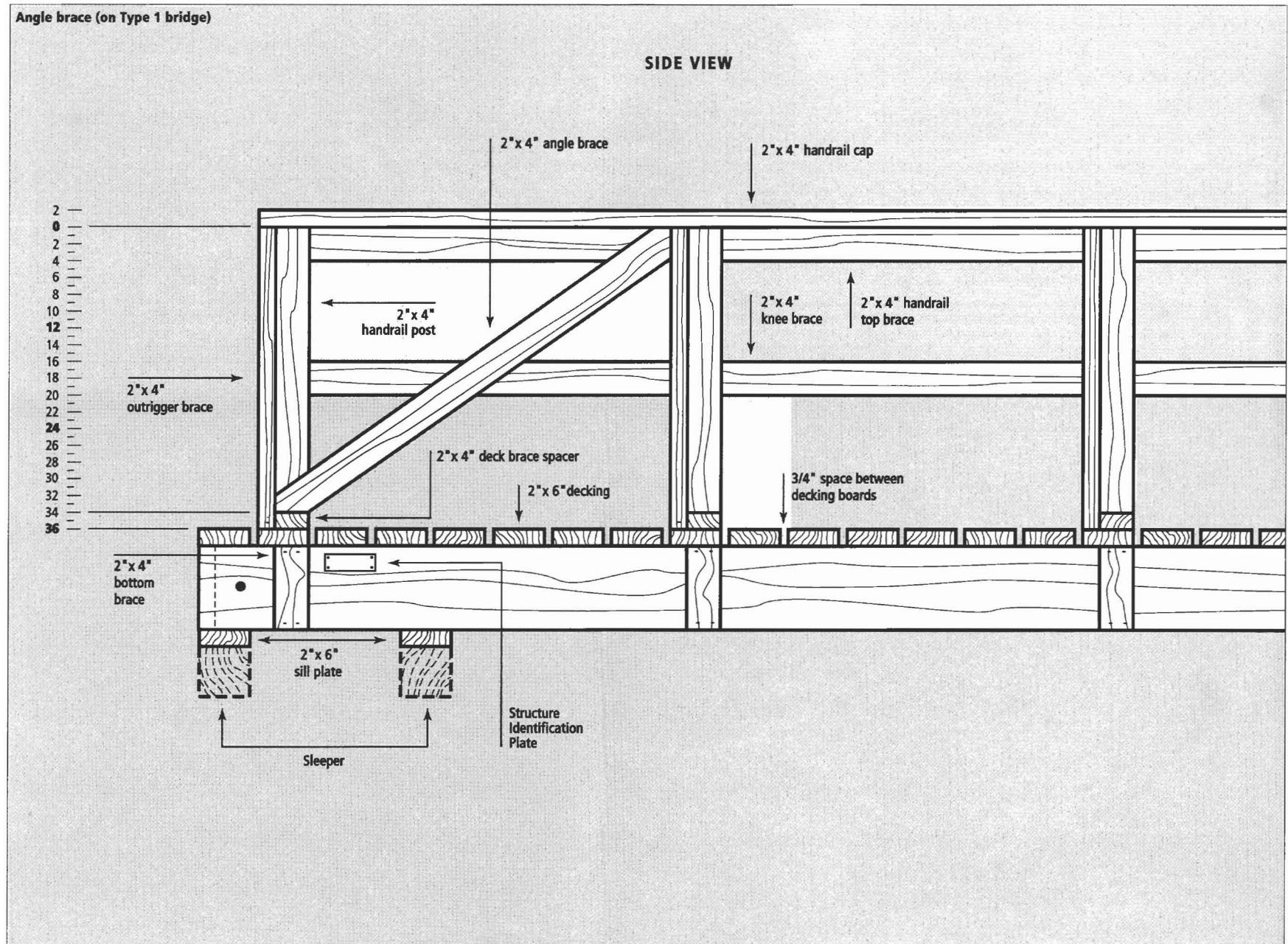
Type 1 bridge

Type 1 bridge – Portions of this illustration are incomplete in order to show more detail.

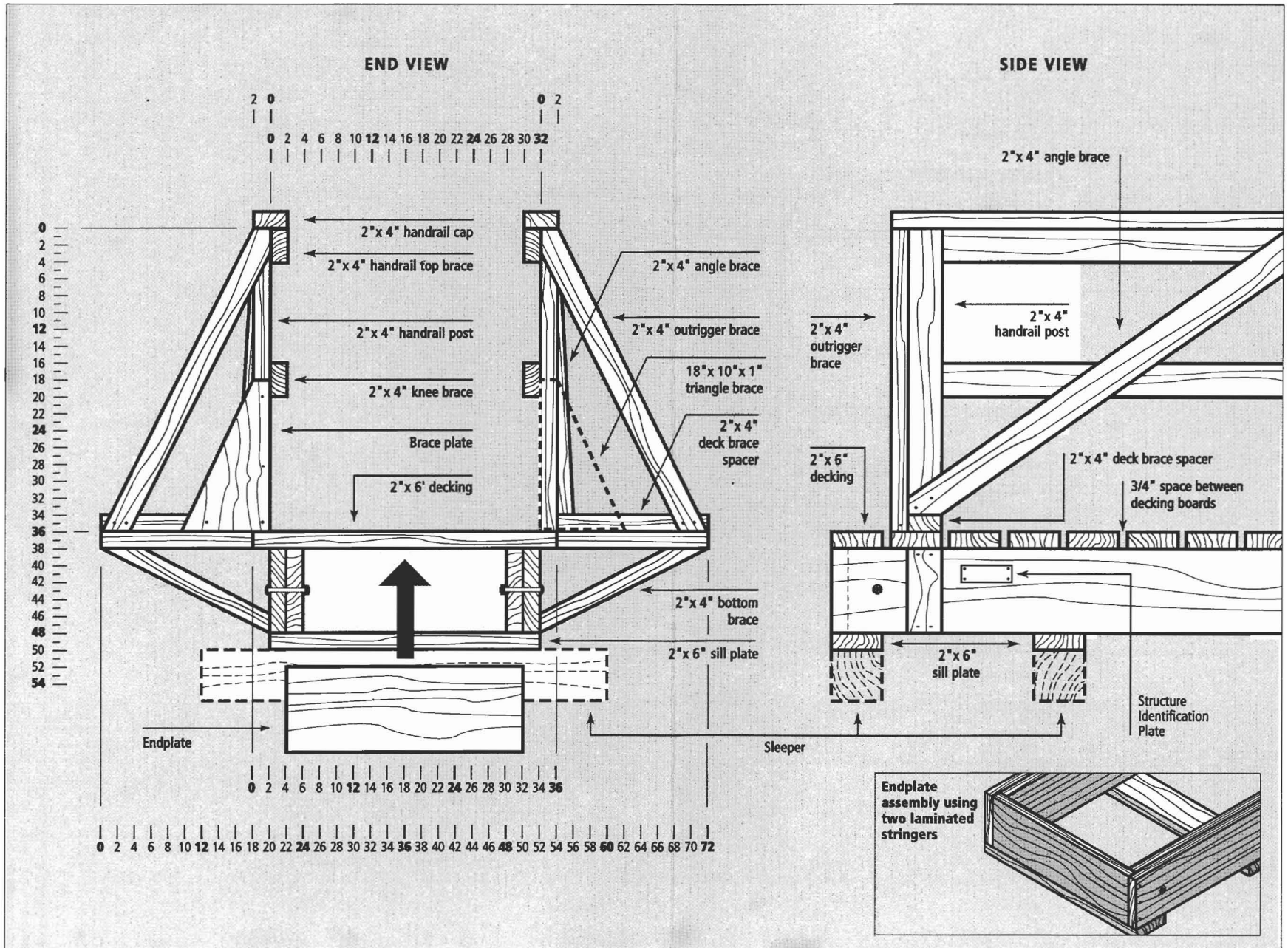
Note Use one handrail for bridges that are between 1 and 2 metres above the stream bed.

Use two handrails for bridges that are 2 or more metres above the stream bed.



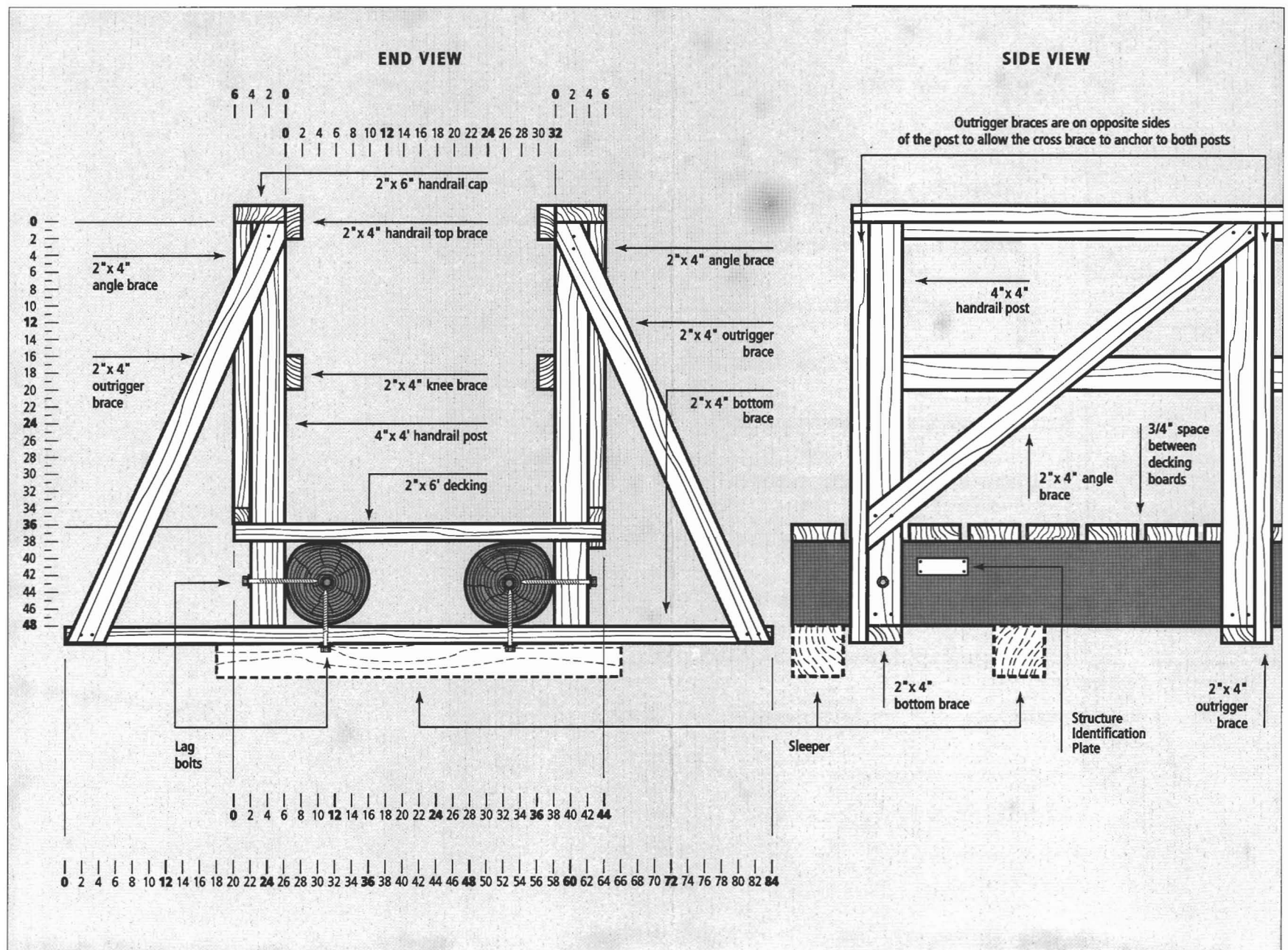


Type 1 bridge (continued)

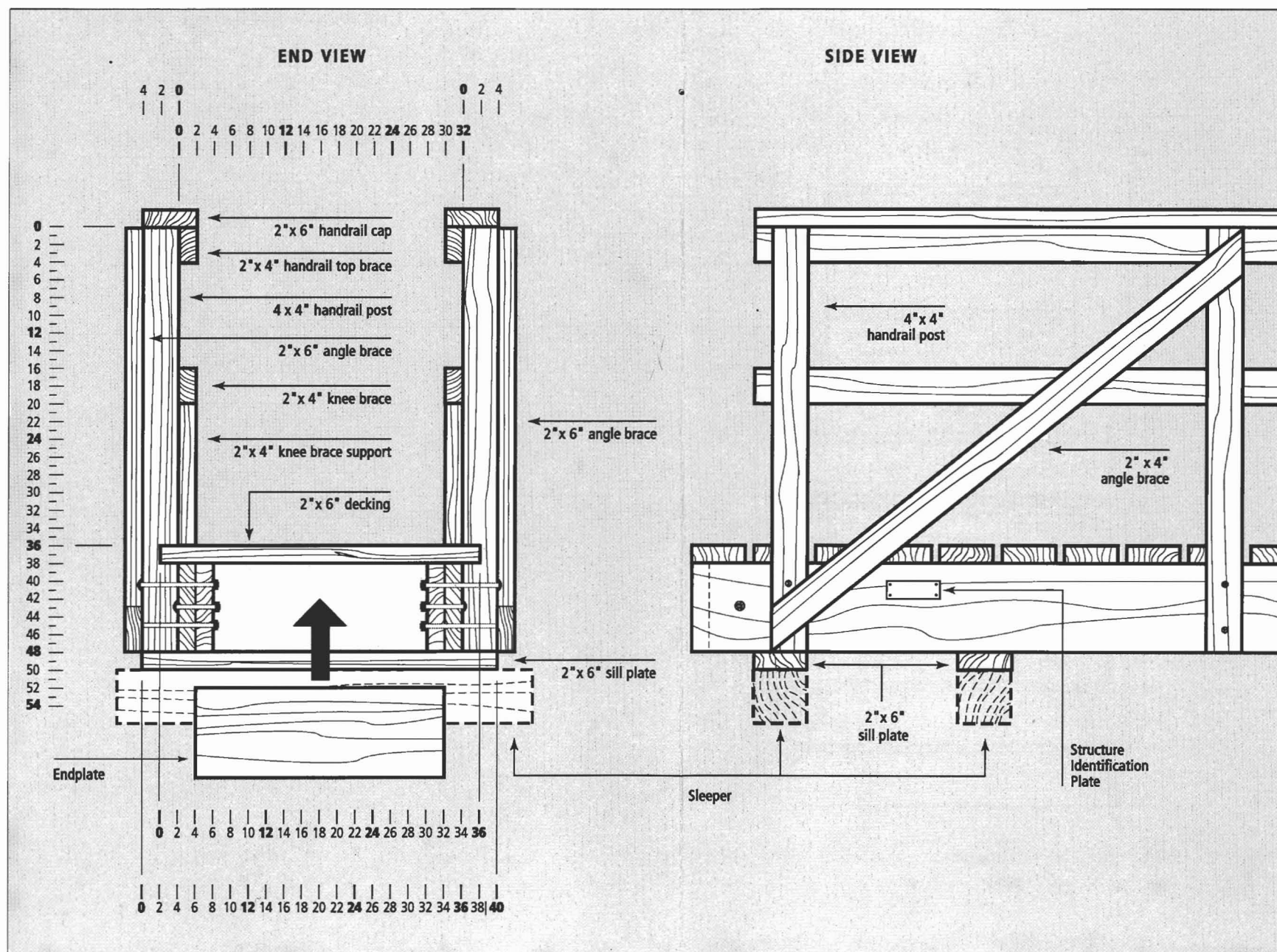




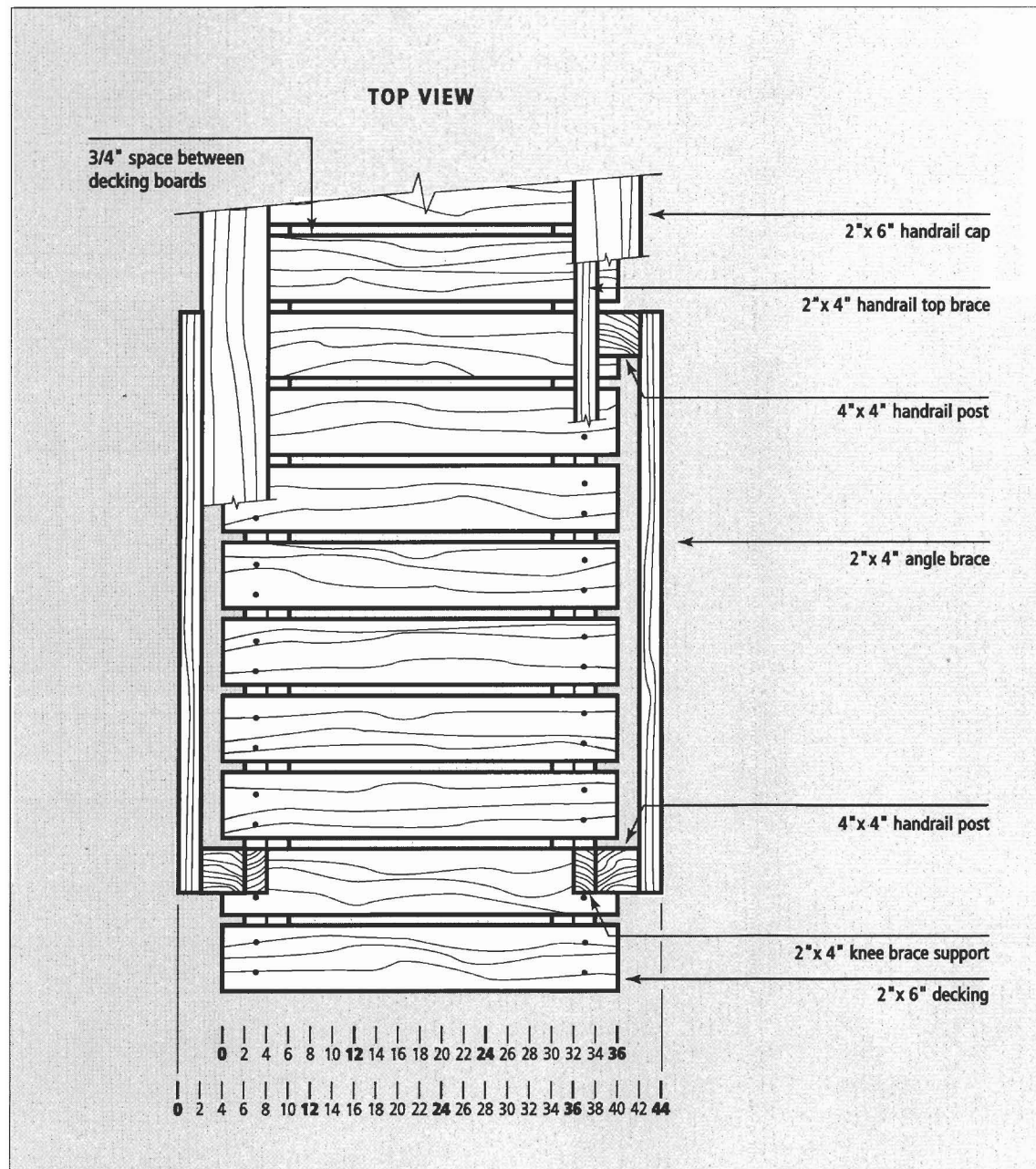
Type 2 bridge



Type 3 bridge



Type 3 bridge (continued)



Field notes on type 3 bridge construction

Appendix B

Trail condition reports

Although overall responsibility for trail maintenance rests with the Bruce Trail Association, the Clubs have always been recognized as "having as their main objective the construction and maintenance of a section of the Bruce Trail". The Association discharges its responsibility through its Trail Director and Committees. Clubs have their own methods of organizing their trail-related functions. Most allot a few kilometres of trail to individual members, and these Trail Captains undertake to keep their sections in good order and report back on trail conditions to their Clubs. Clubs with few local members may find it more effective to organize work parties to do their regular trail maintenance or import volunteers from Clubs with more supporting members.

Whatever method is adopted, it is essential that all Clubs have a proper system of regular reporting on the condition of the Trail. The *Trail Status Report Form*

designed for this purpose is contained in this Appendix. Such reports might be expected from trail captains or work party leaders two to three times a year. Report forms should be sent out to Captains a month before they are due to be returned. If they are not completed and returned within a week of the due date, the Trail Co-ordinator or Club Trail Chairman should contact the Trail Captain to find out the cause of the delay. The system will, of course, break

Trail Status Report Form

Change of Property Status Report is for owners. *Keep the form in your Guide. Please make a photocopy.*

With this report, you are certifying property status. You will be required to complete this report fully and accurately by the end of the month indicated. *Please discuss in person, mail, e-mail or fax this report to zone co-ordinator.*

1. Trail Modified by:

| | | | | |
|-----------------------|-----------|--------------|------------------------------|-----------------------|
| Trail name | Signature | Printed Name | Trail Coordinator Signature | Date Submitted (YYYY) |
| New Trail Coordinates | | Printed Name | Trail Co-ordinator Signature | Date received (YYYY) |

2. Trail description - Item status

| | | | | |
|------|----------------|---------------------|----------|---------------------------|
| Zone | Section number | Impacted from (and) | Footings | Date of inspection (YYYY) |
|------|----------------|---------------------|----------|---------------------------|

Section or impacted section number is as defined in the local trail book

The trail inspection report must be submitted 1 or 2 zones a year (the end of the month indicated as required by club policy)

☐ Trail "new"
 ☐ Trail "new" - new
 ☐ Trail "renovated"
 ☐ Trail "renovated"

3. Trail condition - Item status

Indicate the status of the Trail Status Common Item
 When a major repair is required, record the type of work in the Club Coordinator or organizational minutes
 Indicate whether you are reporting on the following 3 Check appropriate column

| | None None done | Minor Minor done | Major Major done | Major Initiation Continuation of |
|--|--------------------------|--------------------------|--------------------------|--|
| <input type="checkbox"/> Trailgate: trail on either side on the trail | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Brush, stumps or undesirable weeds on the trail | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Branches: <input type="checkbox"/> Leaving trees: 1. 10' diameter or less: check, open trail | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Limbs: conditions within the "open" 10' zone: trail open | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Limbs: open on either: <input type="checkbox"/> Dead trees: 1. 10' diameter: 2. 10' diameter: 3. 10' diameter | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Other unsafe structures such as: 1. Side logging 2. Voles 3. Gates 4. Fences | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Wet areas: leaving debris on the closed trail | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Unsafe areas: trail on which need repair | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Branch: weath: 1. 10' diameter or less: 2. 10' diameter or less: 3. 10' diameter or less: 4. 10' diameter or less: 5. 10' diameter or less: 6. 10' diameter or less: 7. 10' diameter or less: 8. 10' diameter or less: 9. 10' diameter or less: 10. 10' diameter or less: 11. 10' diameter or less: 12. 10' diameter or less: 13. 10' diameter or less: 14. 10' diameter or less: 15. 10' diameter or less: 16. 10' diameter or less: 17. 10' diameter or less: 18. 10' diameter or less: 19. 10' diameter or less: 20. 10' diameter or less: 21. 10' diameter or less: 22. 10' diameter or less: 23. 10' diameter or less: 24. 10' diameter or less: 25. 10' diameter or less: 26. 10' diameter or less: 27. 10' diameter or less: 28. 10' diameter or less: 29. 10' diameter or less: 30. 10' diameter or less: 31. 10' diameter or less: 32. 10' diameter or less: 33. 10' diameter or less: 34. 10' diameter or less: 35. 10' diameter or less: 36. 10' diameter or less: 37. 10' diameter or less: 38. 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down if this is not done. In addition, the Club must inspect the reports and take action on items which require it.

Annual State of the Trail Report

Clubs are expected to report to the Association once a year on the condition of the Trail in their sections. This will normally be part of a *State of the Trail Report* from the BTA Trail Director at the time of the Annual General Meeting of the Association.

All members of the Association should be encouraged to take an interest in the state of the Trail and to report on trail deficiencies (poor blazing, broken stiles, cases of slope erosion, windfall blockages etc.) not only to their own Clubs but also to other Clubs. Such reports should be welcomed by Clubs. Individual members may also be witnesses of incidents of vandalism. In minor cases (unauthorized fires, motorized vehicles on the Trail etc.) a few words of advice to the miscreant may be all that is needed; but at other times it will be necessary to report the incident with full details to the proper authorities (e.g., landowner, Conservation Authority, local police) and to the B.T.A. as soon as possible.

Trail audit

A trail audit is carried out every five years by the BTA. Auditors must report on:

- a.** determine accurate distances between features along the Trail
- b.** problems of blazing and routing
- c.** condition of structures
- d.** condition of the Trail.

The audit is distributed to the nine BTA club presidents and the Club Trail Directors. The club presidents and the Trail Directors are expected to address issues detailed in the report.

Trail Status Report Form

Change of Property Status Report is on reverse. Keep this form in your Guide. Please make a photocopy.



NOTE: Trail risk management policy requires that the trail be inspected and this report filled out completely and accurately by the end of the month indicated. Please deliver in person, mail, e-mail or fax this report to zone co-ordinator.

1. Trail checked by PLEASE PRINT

| | | | | |
|-------------------------|-----------|---------------|-------------------------------------|------------------------|
| Trail captain | Telephone | E-mail or Fax | Trail Captain's signature | Date submitted (m/d/y) |
| Zone Trail Co-ordinator | Telephone | E-mail or Fax | Zone Trail Co-ordinator's signature | Date received (m/d/y) |

2. Trail inspection information

| | | | | |
|------|----------------|----------------------|---------|----------------------------|
| Zone | Section number | Inspected: From (km) | To (km) | Date of inspection (m/d/y) |
|------|----------------|----------------------|---------|----------------------------|

Side trail or trails inspected (please include the name or number of the side trail or trails)

This trail inspection report must be submitted 2 or 3 times a year near the end of the month indicated as required by club policy.

| | | |
|---|--|---|
| <input type="checkbox"/> Spring – March | <input type="checkbox"/> Summer – June | <input type="checkbox"/> Fall – September |
| (day) | (day) | (day) |

3. Maintenance details

List multiple locations on the *Trail Status Comment Sheet*.

*When major work is required, please use the latest edition of the GTA Guidebook or geographical references.

Item On your section do you have any of the following ? Check appropriate column

| | None or done | Minor Will do soon | Major Need help | Major work location *Guidebook ref. |
|---|--------------------------|--------------------------|--------------------------|--|
| 1. Garbage, litter or other trash on the trail | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 2. Brush, stumps or undesirable weeds on the trail | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 3. <input type="checkbox"/> Branches <input type="checkbox"/> Leaning trees <input type="checkbox"/> Windfalls over 8 inches thick, over the trail | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 4. Unsafe conditions within the 8' high x 5' wide trail corridor | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 5. Unsafe major structures: <input type="checkbox"/> Bridges <input type="checkbox"/> Stairways <input type="checkbox"/> Boardwalks | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 6. Other unsafe structures such as: <input type="checkbox"/> Side logging <input type="checkbox"/> Stiles <input type="checkbox"/> Gates <input type="checkbox"/> Fences | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 7. Wet areas causing detours off the blazed trail | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 8. Unsafe areas on trail which need repair | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 9. Blazes which are: <input type="checkbox"/> Overgrown or confusing <input type="checkbox"/> Need repainting | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 10. Blazes without 3/4" black edge (tuxedo blaze) for higher visibility | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 11. Old unnecessary blazes – still visible because not scraped off | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 12. Diamond markers that are: <input type="checkbox"/> Damaged <input type="checkbox"/> Missing <input type="checkbox"/> Growing into a tree | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 13. Access signs that are: <input type="checkbox"/> Damaged or <input type="checkbox"/> Missing at all access points | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 14. Private land signs that are: <input type="checkbox"/> Damaged or <input type="checkbox"/> Missing at boundaries to private land | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 15. Other authorized signs that are: <input type="checkbox"/> Damaged <input type="checkbox"/> Missing <input type="checkbox"/> No longer necessary | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 16. Other signs that are: <input type="checkbox"/> Obsolete <input type="checkbox"/> Unnecessary <input type="checkbox"/> Non-standard <input type="checkbox"/> Unmounted | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 17. Campsites that are: <input type="checkbox"/> Neglected <input type="checkbox"/> Require improvement | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 18. Vandalism: <input type="checkbox"/> Firepits <input type="checkbox"/> Trail bikes <input type="checkbox"/> Parking problems | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 19. Property for sale or under development. <input type="checkbox"/> yes <input type="checkbox"/> no If yes, please list location and details on reverse | | | | |
| 20. Need for additional signs. <input type="checkbox"/> yes <input type="checkbox"/> no If yes, please use the <i>Signs Order Form</i> in this guide | | | | |
| 21. Other suggested changes or comments. <input type="checkbox"/> yes <input type="checkbox"/> no If yes, please list on the <i>Trail Status Comments Sheet</i> | | | | |
| 22. Trail Captain's Log attached. <input type="checkbox"/> yes <input type="checkbox"/> no | | | | |

continues on reverse

Change of Property Status Report Form

Keep this form in your Guide. Please make a photocopy and fax, mail or e-mail your order to your Trail Club Director.

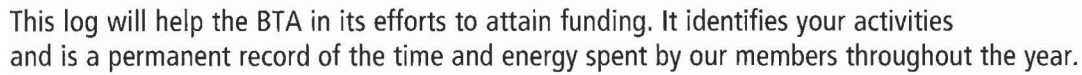


If new information, please notify your Landowner Relations Director as soon as possible.

| List of properties for sale or under development | 1: 10 000 map property reference number | Telephone |
|--|--|--|
| <div></div> <div><input type="checkbox"/> Landowner's name <input type="checkbox"/> Real estate company or real estate agent's name</div> | | <div><input type="checkbox"/> Landowner</div> <div><input type="checkbox"/> Real estate company or agent</div> |
| <div></div> <div><input type="checkbox"/> Landowner's name <input type="checkbox"/> Real estate company or real estate agent's name</div> | | <div><input type="checkbox"/> Landowner</div> <div><input type="checkbox"/> Real estate company or agent</div> |
| <div></div> <div><input type="checkbox"/> Landowner's name <input type="checkbox"/> Real estate company or real estate agent's name</div> | | <div><input type="checkbox"/> Landowner</div> <div><input type="checkbox"/> Real estate company or agent</div> |
| <div></div> <div><input type="checkbox"/> Landowner's name <input type="checkbox"/> Real estate company or real estate agent's name</div> | | <div><input type="checkbox"/> Landowner</div> <div><input type="checkbox"/> Real estate company or agent</div> |
| <div></div> <div><input type="checkbox"/> Landowner's name <input type="checkbox"/> Real estate company or real estate agent's name</div> | | <div><input type="checkbox"/> Landowner</div> <div><input type="checkbox"/> Real estate company or agent</div> |
| <div></div> <div><input type="checkbox"/> Landowner's name <input type="checkbox"/> Real estate company or real estate agent's name</div> | | <div><input type="checkbox"/> Landowner</div> <div><input type="checkbox"/> Real estate company or agent</div> |
| <div></div> <div><input type="checkbox"/> Landowner's name <input type="checkbox"/> Real estate company or real estate agent's name</div> | | <div><input type="checkbox"/> Landowner</div> <div><input type="checkbox"/> Real estate company or agent</div> |
| <div></div> <div><input type="checkbox"/> Landowner's name <input type="checkbox"/> Real estate company or real estate agent's name</div> | | <div><input type="checkbox"/> Landowner</div> <div><input type="checkbox"/> Real estate company or agent</div> |
| <div></div> <div><input type="checkbox"/> Landowner's name <input type="checkbox"/> Real estate company or real estate agent's name</div> | | <div><input type="checkbox"/> Landowner</div> <div><input type="checkbox"/> Real estate company or agent</div> |
| <div></div> <div><input type="checkbox"/> Landowner's name <input type="checkbox"/> Real estate company or real estate agent's name</div> | | <div><input type="checkbox"/> Landowner</div> <div><input type="checkbox"/> Real estate company or agent</div> |

May 2001

Keep this form in your Guide. Please make a photocopy.



This form is confidential and for internal use only.

| | | | |
|----------------------|------|-------------------|-------------------|
| Trail captain's name | | Section number | Zone |
| BTA club | Year | Daytime telephone | Evening telephone |

Please list all your activities except time on work parties: for example, committee meetings, club executive meetings, workshops and Trail maintenance.

[illegible]

Keep this form in your Guide. Please make a photocopy.

Keep this form in your Guide. Please make a photocopy.

[illegible]

Trail Status Comment Sheet

Keep this form in your Guide. Please make a photocopy.



This form is confidential and for internal use only.

1. Trail Captain PLEASE PRINT

| | | | |
|----------------------|------------------------|--------------------|-------------------|
| Trail captain's name | Section number | Location: km to km | Zone |
| BTA club | Date submitted (d/m/y) | Daytime telephone | Evening telephone |

2. Comments

| Trail Status Report Item | Guidebook edition # km reference | Details |
|--------------------------|----------------------------------|---------|
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| 11. | | |
| 13. | | |
| 14. | | |
| 15. | | |
| 16. | | |
| 17. | | |
| 19. | | |

Trail Status Comment Sheet (continued)



| Trail Status Report item | Guidebook edition # km reference | Details |
|-----------------------------------|--|---------|
| 20. | | |
| 21. | | |
| 22. | | |
| 23. | | |
| 24. | | |
| 25. | | |

Other comments

Appendix C

Procedure for trail rerouting

1. Find the best possible route (see Part A). This should only be done in consultation with the Club's Trail Director.
2. Find out who the landowners are. Your Club's Landowner Relations Director must be involved in this task. The Bruce Trail Association has prepared extensive mapping of all properties near the optimum route of the Trail at 1:10 000 scale. Your Club's Landowner Relations Director will have a listing of all properties and landowners to help you make initial contacts. If this mapping does not cover your proposed route you may have to search township and/or regional maps showing property boundaries and examine the municipal assessment rolls. Do not guess, or assume that you know, whose land you propose to cross.
3. Obtain the permission of the new landowner or landowners. This may be done either by the Club Landowner Relations Director (LOR) or a trail worker if authorized by the LOR Director. Explain carefully the objectives of the Bruce Trail and our desire to create the minimum of disturbance to the environment or inconvenience to landowners.

Explain also the protection afforded by the Occupiers' Liability Act, 1980, which provides that **"those who take their recreation without paying a fee will take care of their own safety"** and **"willingly assume the risks"**, thus absolving the landowner from any liability for accidental injury. This Act and the *Trespass to Property Act, 1980*, are explained in the booklet *This Land is Whose Land?* available from the Ministry of the Attorney General of Ontario, or from the B.T.A. office. The B.T.A. has published a booklet designed to answer many questions commonly asked by prospective landowners.

Whether or not the new landowner is a strong supporter of the Bruce Trail, he or she may be interested in granting long-term security to the Trail by way of an access easement registered on title to the property (either in favour of the B.T.A. or possibly the Ontario Heritage Foundation, which may be able to grant a tax receipt representing 100% of the value of the easement granted). Without getting into details – certainly not during the first meeting or contact – you should try to get a feeling for the landowner's attitude toward such an

arrangement; then contact the B.T.A. office with the necessary information. Similarly, the landowner may be interested in selling all or part of the property. If you get some idea that this is a possibility, contact the B.T.A. office so that the Staff and Executive Director can pursue the matter. Finally, impress on any prospective landowner that he or she will be performing a valuable service by allowing the trail to cross his land. As a small token of our appreciation, landowners receive free copies of the Bruce Trail News and the BT Calendar.

4. If the new route is to pass through Conservation Areas, Provincial or Municipal Parks, Hydro easements or other publicly owned lands, permission must be obtained from the appropriate authority.
5. When permission has been obtained for the rerouting, tag the proposed route with surveyors' tape for approval by the landowner. Although it involves more time, it is wise to visit the proposed route through four seasons to see if your route is high, dry and does not interfere with endangered plants and animals.
6. Once the proposed new route has been selected and flagged, the Club Trail Director should inspect it, and obtain necessary approvals from the BTA. When the new route has been approved, you can organize a work party to clear it, blaze it, install stiles etc. and post signs.
7. Obliterate all blazes and remove stiles and signs from the old route. Camouflage the treadway with brush, rocks, logs, small shrubs and trees. Failure to do this promptly can cause a great deal of confusion for hikers.
8. Put up specially designed signs at each end of the rerouted section. An arrow with a simple inscription, for example, "New route of the Bruce Trail" is usually all that is needed; black lettering on a white background is effective. The pictograph "No Hiking" and "Hiking" signs can also be posted to indicate the closed and new routes of the trail. Such signs should be left up for at least a year – certainly until the new route appears in the next edition of the Bruce Trail Reference. To order signs, follow the directions on the *Signs Order Form* found in this guide. Remember you must order through your Club Trail Director.

9. Send a clear sketch-map, reproduced directly from the 1:10 000 maps, to BTA Headquarters at Rasberry House, showing the new route with distance changes, if any, and any necessary amendments to the Guidebook text. Full information on any new landowners should also be included. Rasberry House staff will distribute to the BTA Trail Director, and BTA Landowner Relations Director as required. These individuals are responsible for informing the Guidebook Committee, Bruce Trail News, and updating of the landowner database. You should also notify your own Club Board of any changes to the Trail as well as any new structures or Trail improvements. Your Board of Directors will want to know about Trail changes, tools or materials required so that budgets can be approved and the necessary funds set aside.

Suggestions for making Trail maintenance more enjoyable:

- work with other Trail Captains so they can help you on your section
- invite friends and relatives to assist you
- plan work on the trail on a regular basis
- take turns organizing and leading work parties
- have a central tool depot
- give everyone on the work party a specific job and the tools to do it
- have roving work parties and do all maintenance such as brush cutting, pruning, trail clearing, blaze touch-ups, garbage pick-up, etc. as you go
- set up a car pool between access points, four to five km apart for each outing
- organize both a mid-week and week-end crew to do trail maintenance
- advertise for trail workers in your newsletter or local paper frequently. Be consistent, and eventually people will respond
- schedule work parties for the same days each week
- use the audit and trail status reports to determine which projects are required
- have someone coordinate the projects
- plan ahead so you have the people, money, materials, tools and approvals required
- wear proper clothing and boots
- bring proper safety equipment
- take time for breaks and lunch
- take time to enjoy the scenery around you
- do everything as best you can
- make new friends, have fun and grow healthy.

Helpful hints

- use updated 1-10,000 maps to plan work parties and mark:
 - all parking locations
 - all local roads
 - mileage at all geographical references, and update for each new trail user's guide
 - start of each trail captains section
 - location and number of all structures
 - updated location of optimum route
 - location of potential side trails and reroutes
- location of major projects planned
- access signs at all road crossings can be maintained by car. Just travel down roads until you reach the trail crossing
- while there, cut back any overgrowth, repaint the blaze and pick up any litter
- consider tuxedoing blazes at road crossings to increase visibility
- think of our access points as doorways. They should be kept as inviting as possible
- two people in a car can do 15 to 20 road crossings in an 8 hour day
- the team approach to trail maintenance works. It's great to have company when you're having such a good time. Incidentally, it makes the job a lot easier and faster too.

How to get help

Recruit:

- friends and relatives
- other trail captains
- people from other outdoor trail groups
- older scouts and guides
- service clubs
- senior citizen groups
- outdoor education clubs
- other club members
- hikers
- other BTA clubs
- those required to do community service
- referrals from volunteer bureau's.

Also:

- publicize your upcoming events in your newsletter
- invite the press to attend a work party
- make sure everyone knows you are looking for help
- follow up quickly with any potential volunteers
- accurately describe what you want from them
- have someone coordinate volunteers.

How to organize a work party

A work party is a group of people who have been called out and equipped to work on a project on the trail. Before this can happen a number of things need to occur.

- choose a project based on priority
- select a leader for the project
- develop a step by step outline with detailed plans
- calculate the cost along with the materials required, and the time and manpower required
- obtain landowner approval
- set the date, time and meeting place for the project to begin
- make arrangements to transport materials and tools to the closest roadside access
- arrange a car pool to minimize the number of vehicles
- have enough people available to carry in materials and tools for the day
- advise people to bring appropriate boots, gloves, lunch, drinks, bug spray and sun screen for a seven to nine hour day
- arrange or pray for good weather
- have *fun* so all involved will want to do it again.

Tools needed for your Club’ central tool depot

(listed in no particular order)

- | | | |
|---|--|---|
| <input type="checkbox"/> 1" paint brush | <input type="checkbox"/> Files to sharpen cutting edges | <input type="checkbox"/> Safety equipment – helmets, glasses and ear protection |
| <input type="checkbox"/> 2" paint scraper | <input type="checkbox"/> Flagging tape | <input type="checkbox"/> Sharp pruning shears |
| <input type="checkbox"/> 3-1/2" and 4" galvanized spiral nails | <input type="checkbox"/> Folding pruning saw or small bow-saw | <input type="checkbox"/> Short ladder |
| <input type="checkbox"/> 8 pound sledge | <input type="checkbox"/> Garbage bags | <input type="checkbox"/> Skill® saw |
| <input type="checkbox"/> Angle iron – 2' and 3' | <input type="checkbox"/> Generator | <input type="checkbox"/> Small (10L) plastic pails |
| <input type="checkbox"/> black semigloss latex paint for tuxedo blazes | <input type="checkbox"/> Good by-pass loppers | <input type="checkbox"/> Stone chisels |
| <input type="checkbox"/> Blaze boards - large and small | <input type="checkbox"/> Hammer | <input type="checkbox"/> Stone sledge |
| <input type="checkbox"/> Blaze posts | <input type="checkbox"/> Hand saw | <input type="checkbox"/> String trimmer |
| <input type="checkbox"/> Block and tackle with 120 feet of rope | <input type="checkbox"/> Hand sledge | <input type="checkbox"/> Sturdy tine rake |
| <input type="checkbox"/> Cant hook | <input type="checkbox"/> Heavy duty ropes – various lengths | <input type="checkbox"/> Tape measure |
| <input type="checkbox"/> Caution tape | <input type="checkbox"/> Lawn mower | <input type="checkbox"/> Tool marking tape |
| <input type="checkbox"/> Cell phone | <input type="checkbox"/> Level | <input type="checkbox"/> T-post driver |
| <input type="checkbox"/> Chain saw | <input type="checkbox"/> McLeod | <input type="checkbox"/> T-posts – various lengths |
| <input type="checkbox"/> Clinometer | <input type="checkbox"/> One ton chain fall | <input type="checkbox"/> Weed Wacker® |
| <input type="checkbox"/> Containers for gas mixture and chain lubricant | <input type="checkbox"/> Pick mattock | <input type="checkbox"/> Wheel barrow |
| <input type="checkbox"/> Cordless drill | <input type="checkbox"/> Plastic jars of white, blue and black paint | <input type="checkbox"/> Wheeled string trimmer |
| <input type="checkbox"/> Crow bar | <input type="checkbox"/> Post hole auger | <input type="checkbox"/> Wilderness first aid kit |
| <input type="checkbox"/> Cutter mattock | <input type="checkbox"/> Ratchet winch or come-a-long | <input type="checkbox"/> Wire leaf rake |
| <input type="checkbox"/> Digging and tamping bar | <input type="checkbox"/> Rock bar | <input type="checkbox"/> Work gloves |
| | <input type="checkbox"/> Round point shovels with long handles | <input type="checkbox"/> _____ |
| | | <input type="checkbox"/> _____ |
| | | <input type="checkbox"/> _____ |
| | | <input type="checkbox"/> _____ |

Fieldnotes on tools and equipment

The easy way to blaze a trail

- work with another person
- paint the first blaze at the roadway, below the trail access sign
- paint a confirmation blaze within 10 meters of that blaze
- look down the trail and pick out the most obvious tree 50 to 100 meters away
- have your partner walk to the tree, while keeping an eye on a spot at eye level or slightly higher on the tree, which remains visible as he or she approaches it
- once at the tree hold the scraper on the spot and look to your partner to confirm that the location is still clearly visible. Avoid small diameter trees.
- as one partner paints a blaze, the other continues down the trail to prepare for the next blaze by scraping a spot, and pruning all vegetation within one meter of the blaze
- if the trail bends, wait until after the bend to sight on the next most obvious tree
- a turn blaze must be used at bends where the turn is sharp, or if there could be any confusion as to the direction of the path, where there are other visible paths that could be used, or if it is important that hikers make the turn
- a turn blaze is a double blaze (two parallel marks, one lower than the other) with the upper mark slightly offset in the new direction of travel, to indicate a turn
- a turn blaze must be used within 3 meters before the turn, never after the turn
- if there is no suitable tree, use a large blaze board on a T-post or a cedar post, with the top painted black for the blazes
- a confirmation blaze on the new direction within 10 meters of the turn is required.

- no blaze should be more than arms length away from the center of the trail
- even though the right side is preferred, the key consideration is where the blaze would be most visible
- a good test of your blazing is to invite someone totally unfamiliar with your trail to walk it, in the fall when it is covered with leaves, or in the winter when it is covered with snow
- if there are any areas that cause confusion, attach a piece of flagging tape and add an extra blaze as soon as possible.

For further information on blazing see pages 27 to 33 and *Appendix A, pages A1.0 to A1.6.*

How to paint a 2"x 6" rectangle blaze

BTA standards require that our blazes be painted to look like the one on the back of the guide for trail workers. For some people getting the right size and sharp corners consistently, is easy. For others it is impossible. We need to find a consistent way to achieve the required look.

After years of experimenting and talking to experienced blaze painters, here is the summary of a method which, with practice, will produce the results required.

1. The surface must be relatively smooth

The easiest way to smooth bark is to use a sharp paint scraper. Scrape only where you plan to paint. Bark is inert and the tree will not be harmed. Sharpen scraper often.

2. Use a template

For doing a blaze only, a thin plywood template, 2"x 6" (51 mm x 153 mm), with a small handle is laid against the tree or post, and a nail is used to scribe a line around it. Then just paint between the lines.

3. Use upward brush strokes

By using upward brush strokes, surplus paint does not run down the tree. Thicker than normal paint is better than paint that's too thin. Use exterior latex semi gloss **white** for the main Trail. Use exterior latex semi gloss approved **blue** for the side trails. See page C15.

4. Tuxedo blazes are much more visible

On every background, the contrast with a white blaze increases dramatically if a 1/2" black line is painted around it. The result is that less blazes are required, because they are more visible. A 1/2" wide template can be used to paint around the blaze. Wipe off excess paint frequently.

When starting with no blaze, you can use a 3" x 7" (7.5 x 17.5 cm) template and scribe a line around it as described above. You can then paint a black line around the inside of the line. You only need to be sure the outside edges are straight and the corners are square. The line can be any size over 1/2" (1.5 cm). When the black paint dries, return and paint a white blaze as described in tip number 2.

5. The tuxedo method on existing blazes is difficult

When scraping old paint, if most of it flakes off, it would be best to proceed as in tip number 4. However, if the blaze is to be kept, a linoleum or aluminum template cut to approximately 5" x 9" (12 cm x 22 cm), with a 1/2" (1.5 cm) slot cut around the 2" x 6" (5 cm x 15 cm) blaze mask, will enable someone with a narrow brush and a steady hand to paint the tuxedo. Alternatively, black spray paint can be applied in short bursts, so it doesn't run. This can be effective and much faster in both cases. You will need to wipe excess paint off the template between blazes.

6. Do not blaze on an irregular sized black area

Do not use a brush or spray can to paint a large rectangular or irregular sized black area on which a blaze will be painted. The result is very unprofessional looking and it gives trail users the impression that we don't care how our trail looks.

There are many other methods of painting both a blaze and a tuxedo. Let us know what works best for you.

Blazing Kit

| Tool | Size | Use | Have | Need to get |
|----------------|-----------|---|------|-------------|
| Scrapers | 1" and 2" | Preparing surfaces for painting and removing old blazes | | |
| Chisel | 1" | Removing rough bark before painting | | |
| Utility knife | | Cutting "stringy" bark and new shoots | | |
| Hacksaw | 5" | Cut nails off out-dated signs, diamond markers etc. | | |
| Secateurs | | Cutting small branches "obscuring" blazes | | |
| Safety glasses | | Keep old paint, tree bark etc out of eyes when scraping | | |
| Wire brush | | For "scrubbing" old blazes off rocks, concrete posts etc. | | |
| Sand paper | 100 grit | Delicate removal of blazes from lamp posts etc. | | |
| Screwdriver | #2 square | Installing or removing diamond markers | | |
| Template | 5 x 15 cm | (2"x 6") internal for painting blaze | | |
| Template | 5 x 15 cm | (2"x 6") external for outlining blaze | | |
| Template | Tuxedo | Painting black tuxedo before blazing | | |
| Black marker | | Outlining before blazing and tuxedoing existing blazes | | |
| Square | 12" | With spirit level attached for 15 cm (6") guideline | | |
| Paint brush | 1" | For blazing. | | |
| | | Note. Use natural hair not synthetic | | |

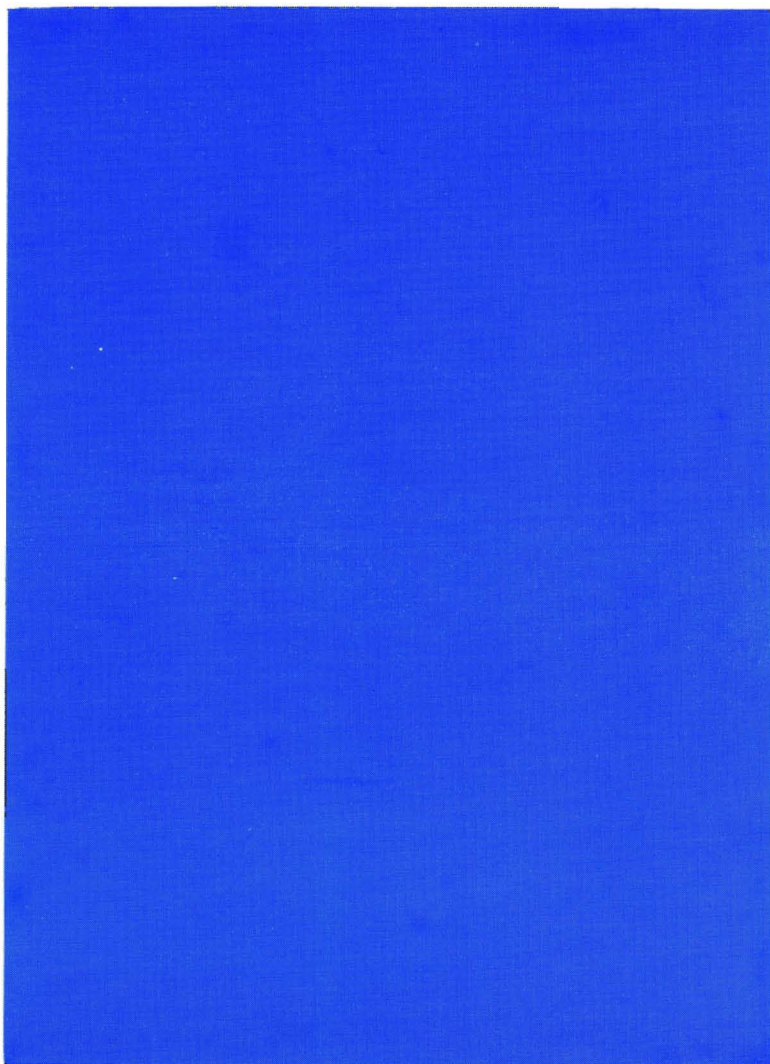
continued

| Tool | Size | Use | Have | Need to get |
|------------------------------|-------------|--|------|-------------|
| Paint brush | 1" | For blazing second colour or as a spare | | |
| Paint brush | 1/4" & 1/2" | For tuxedos. Again use natural hair. | | |
| Side Trail paint | 1 pot | Regulation blue paint for Side Trail blazes as shown on page C15 | | |
| Black paint | 1 pot | Exterior latex flat for tuxedo blazes | | |
| Spray Paint | Grey primer | Paint out old blazes on metal posts | | |
| Jar of water | | To clean brushes in | | |
| Old face cloth | | To clean hands. Wipe out blazing mistakes before they dry! | | |
| Cotton gloves | | Help keep hands clean | | |
| BTA brochures | | To give to potential new members | | |
| Basket or bucket with handle | | To contain all the items in the blaze kit | | |

Note: In some cases the material for this kit are supplied by the Trail worker. If requested, they should be obtained by the Club's Trail Director with money allocated to Trail maintenance.

Side Trail blue

Below is the colour used for side trail signage. Take this swatch with you when purchasing paint. Spread a sample of the paint on a piece of white card and let it dry to see if it matches. Keep trying until you match or come as close as possible. The type of paint you need is exterior latex, semi-gloss.



Fieldnotes on blazing

[illegible]

Retail outlets selling paint

Brand name

**Paint code
number**

Figure 1 displays 12 line plots arranged in a 4x3 grid, showing the evolution of the number of nodes in different classes over time. Each plot has a y-axis labeled 'Number of nodes' and an x-axis labeled 'Time'. The plots are arranged in four rows and three columns. The first row shows the evolution of nodes in class 1 (top), class 2 (middle), and class 3 (bottom). The second row shows the evolution of nodes in class 4 (top), class 5 (middle), and class 6 (bottom). The third row shows the evolution of nodes in class 7 (top), class 8 (middle), and class 9 (bottom). The fourth row shows the evolution of nodes in class 10 (top), class 11 (middle), and class 12 (bottom). The plots show various trends, including increasing, decreasing, and oscillating behavior, depending on the class and the parameters of the model.

Appendix D

Other sources of assistance

Sometimes Club Trail Directors will be faced with projects that may seem rather too big to handle. Contacting other Clubs for help will always be a first resort, but other "outside" sources of potential help should not be discounted. Remember that the Bruce Trail, although managed by volunteers, is in fact a local, provincial and even national recreation resource. Public agencies such as municipalities, the Ministry of Natural Resources and Conservation Authorities are sometimes willing to provide limited help in the form of labour, materials and vehicles, provided such involvement can be justified in terms of their own particular objectives, work schedules and budgets, and provided the requests do not happen too often.

For example, if a section of the trail crossing a stream on Crown Land or on an unopened road allowance needs a bridge or some major stream bank erosion control, the local M.N.R. office or Conservation Authority or municipal Public Works Department may be able to provide some recycled lumber, a reclaimed Gabion basket or two, a load of crushed stone, etc.

On some sections of the Trail co-operation between Bruce Trail Clubs and such agencies has existed for years, to the point where Conservation Authority staff have done most or all of the trail work themselves on some Authority lands. In other cases the Club has done most of the work and received significant benefits as thanks from the Conservation Authority.

In every case, some simple rules of thumb for getting such assistance should prevail:

- a. Club Trail Directors, Co-ordinators or Landowner Relations Directors (not individual trail captains or workers) should take the initiative in approaching the agencies for help; and
- b. Good personal contacts should be developed and maintained between Club officials and persons in authority in the agencies.

Some agencies may be more co-operative than others, but there is no harm in asking. The two public agencies listed below may be approached for help from time to time:

- i) **Local municipalities** – Get to know the Parks, Recreation and Public Works Directors and Supervisors (or Township Road Superintendents in the northern parts of the Trail). Work with them and one or two local council representatives to get things done.
- ii) **Conservation Authorities (C.A.) and Ministry of Natural Resources (M.N.R.)** – Use your Club Trail director or Landowner Relations Director to access the people responsible for liaison with the BTA at these agencies. People change jobs and offices close or change location: your Club leadership should have the latest information.

With all these agencies, remember: do your homework first (know the scope of the job and what materials are needed, have a rough idea of the work-time needed, do a good map and sketch, etc.), and don't just go after handouts. In times of tight budgets and limited staff, most managers may be unable to do very much.

If you do develop a strong working relationship between the Club and an agency, help with specific trail projects may be more readily available if it is seen as mutually beneficial and if the agency sees that it is getting something in return for its efforts. This "return" may take the form of publicity and public recognition for its contribution, or support (perhaps through Club newsletters) for its public relations or conservation programs.

If you need help in establishing or expanding personal contacts with staff in these agencies, contact the B.T.A. main office or the BTA Trail Director.

Appendix E

Safety

- Pressure treated (PT) lumber contains arsenic and paint-on-preserveds contain copper naphthalate; environmental hazards in that they are potentially hazardous to the soil - but in the interests of safe maintenance of a solid trail, PT lumber must be considered the best material for stiles and decking on bridges and boardwalks. Recent advances in PT technology and new standards for processing have virtually eliminated the possibility of leaching from PT wood.
- Use gloves when working with PT wood. Don't burn remaining bits – put in land fill and avoid breathing fumes.

Chainsaw use and safety

The following is official BTA policy with respect to power equipment:

BTA Policy on Operation of Power Equipment on the Trail

To ensure that persons using power equipment in the construction and maintenance of the Bruce Trail do so in a safe manner, thereby minimizing risk of injury and associated liability to the BTA and its affiliated clubs and officers.

Regulations

1. This policy applies to volunteer trail workers and employees of the BTA or its Clubs, who are engaged in construction or maintenance of the Bruce Trail and its side trails.
2. Power equipment includes, but is not limited to, chain saws, string trimmers, brush cutters, and any other machinery which is powered by gasoline or electricity.
3. All operators of power equipment shall be properly trained in the safe use of the equipment, to a minimum as outlined in the manufacturer's owners' manual.
4. All operators of power equipment shall use appropriate safety equipment and protective clothing.

5. In the case of chainsaws and brush cutters, appropriate safety equipment consists of a minimum of:
 - hard hat with eye and ear protection
 - safety footwear
 - chainsaw pants or chaps
 - chainsaw gloves
6. In the case of string trimmers, appropriate safety equipment consists of a minimum of:
 - eye and ear protection
 - high top safety boots
 - long pants
7. Operators shall not operate power equipment, except in the presence of at least one other responsible person.

Procedure

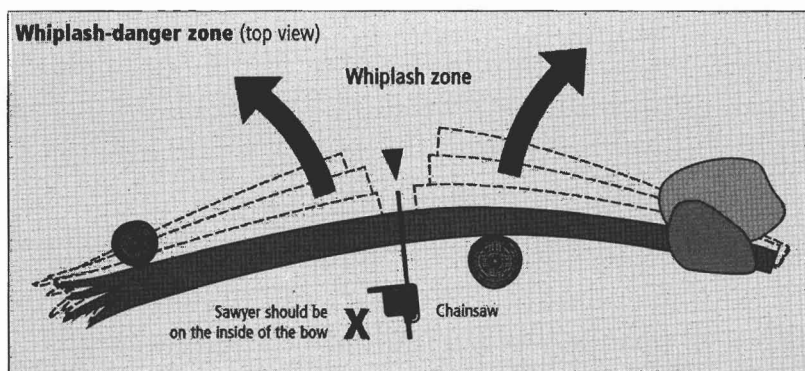
1. For the purpose of chainsaw use, proper training consists of participation in a chainsaw safety course, at least equivalent to the "Cutter" program recognized by the Ontario Ministry of Labour.
2. Experienced chainsaw users who have not had formal training, will be allowed a period of two years from the date of approval of this policy, to obtain recognized training.
3. All volunteers and employees will be made aware of this policy.
4. Any person wishing to receive training may advise the BTA Trail Director, and when there is sufficient interest, training courses will be arranged.
5. Costs of training courses will be shared, 50% by the Association, and 50% by the Club and/or trainee.
6. A list of trained, qualified persons will be kept by the Association and made available to the Clubs on a regular basis.

The following article is reprinted from *The Register* (Newsletter of the Appalachian Trail) November, 1989 by kind permission of the Appalachian Trail Conference.

According to U.S. workers-compensation statistics, the most dangerous nonagricultural occupation is commercial logging. While most trail work does not involve heavy timber-cutting, spring cleanup after winter storms requires that trail workers pay attention to chainsaw hazards.

The single most dangerous logging condition exists after a wind throw, where trees, limbs and trunks are mowed down by a hurricane or tornado. This results in a mass of sticks, stacked and twisted together, each under extraordinary tension. Understanding these situations is critical to safe cutting with a chainsaw.

Trunks and branches should be cut only after careful study of the tensions of each tree and the whiplash-danger zone(s) that could result from releasing these tensions. The sawyer's escape route must be carefully planned, and coworkers must

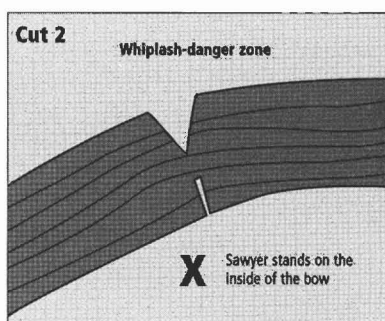
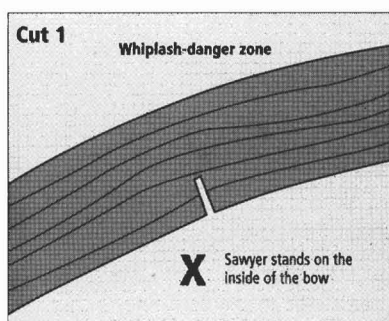
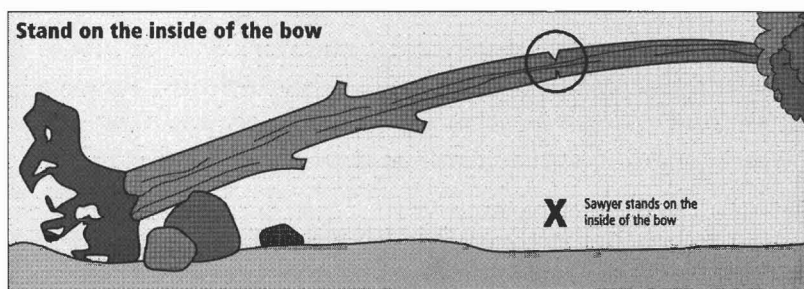


be well clear of the area before cutting begins. An escape route is essential, as the release of tension on a single tree can redistribute the tensions on other trees.

Solid footing is also essential. The simplest cuts – usually higher limbs that are not under any tension other than their own weight – should be made first; this allows better access to trees below. If done correctly, this process will reduce tension on

lower branches and trees and simplify the tangle as one proceeds. Take your time, and be patient! Moving heavy logs requires a safety-conscious approach as well. Do not lift except with the legs and a straight back.

Usually the sawyer should stand on the inside of a bow that is under tension, so that when the tension is released, he or she is behind the whiplash-danger zone. To prevent the saw from binding in the cut, the first cut should be about one-third



through the limb on the inside of the bow, with the finishing cut on the outside. Occasionally, a chainsaw wedge is necessary to prevent the cut from closing on the bar of the chainsaw. (Plastic wedges are most desirable because they will not damage the chain if inadvertently cut by the saw.)

Crew members should stand behind and out of the way of the sawyer, and the crew should talk about escape routes and other safety precautions *before* the cutting begins, since the saw's noise may obliterate shouted warnings. A whistle should be blown when the tree starts to fall or move. **Never cut alone in the woods!**

The sawyer should be equipped with proper safety equipment, including heavy boots, gloves, a Bilson logger's helmet (helmet with face shield and ear protectors), and ballistic chainsaw chaps. The crew should be equipped with heavy boots and gloves, should carry adequate tools and fuel and oil for field repairs, and would have an appropriate first-aid kit.

Safety and the power brush cutter

- The same cautions apply to maintenance and use of a power brush cutter as apply to a chain saw. The brush cutter operator must be given a wide berth: concentration on controlling the swath and the direction of the blade coupled with the noise of the machine will make the operator oblivious to other workers "in the way".
- Operating a brush cutter can be tiring when used continuously for long periods. It is a good idea to have several members of a work party take turns operating the machine.
- One person should precede the cutter to remove rocks, branches, bottles, cans and other debris which could become a projectile or damage the equipment.

Fieldnotes on safety

Names and contact information (continued)

| | | |
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| Name | | |
| Address | City or town | Postal code |
| Telephone <input type="checkbox"/> Res <input type="checkbox"/> Work | E-mail | |

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| Name | | |
| Address | City or town | Postal code |
| Telephone <input type="checkbox"/> Res <input type="checkbox"/> Work | E-mail | |

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| Name | | |
| Address | City or town | Postal code |
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| Address | City or town | Postal code |
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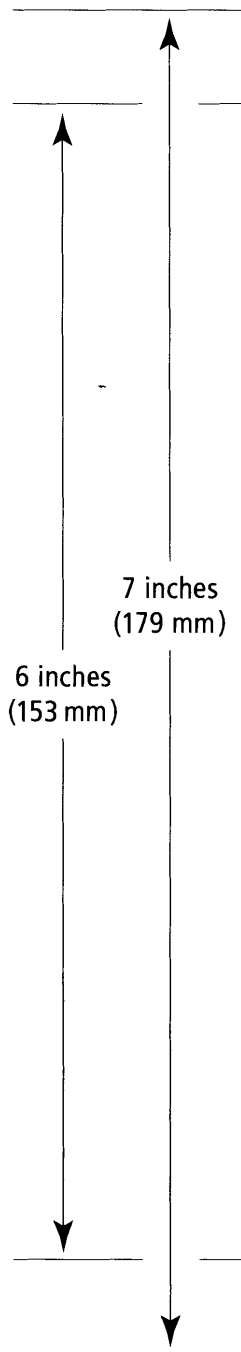
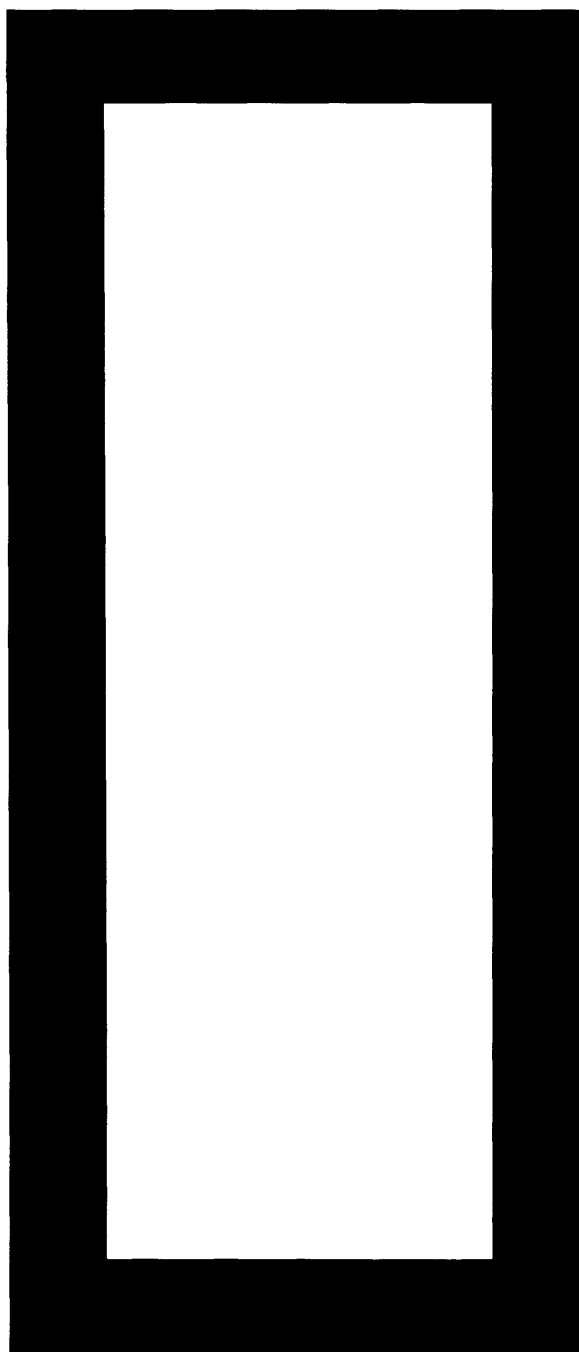
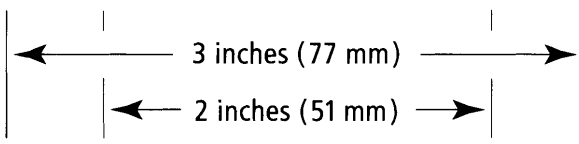
| | | |
|--|--------------|-------------|
| Name | | |
| Address | City or town | Postal code |
| Telephone <input type="checkbox"/> Res <input type="checkbox"/> Work | E-mail | |

BTA Trail Development and Maintenance Committee – 2001

| Name | Address | Contact information |
|------------------------|--|---|
| BTA | | |
| Eric Best | 3032 Britannia Road, RR 2 Milton, ON L9T 2X6 | 905-335-8669 |
| Niagara | | |
| Kym Burt | 20 Lowell Avenue St. Catharines, ON L2R 2E1 | 905-688-9365 |
| Iroquoia | | |
| Andrew Costley | 1013 Falgarwood Drive Oakville, ON L6H 1N7 | 905-845-8427 axemandrew@home.com |
| Toronto | | |
| Frank Chow | 71 Berkinshaw Crescent Toronto, ON M3B 2T1 | 416-447-7086 fkpchow@home.com |
| Caledon Hills | | |
| Jim Swalwell | 95 Brentwood Drive Brampton, ON L6T 1R1 | 905-793-6312 james.swalwell@sympatico.ca |
| Duffern Hi-Land | | |
| Ron Yorke | 48 Colbek Crescent Alliston, ON L9R 1B7 | 705-435-4649 rgyorke@sympatico.ca |
| Blue Mountains | | |
| Mike Carter | RR 1 Wyevale, ON L0L 2T0 | 705-322-2790 mkcarter83@hotmail.com |
| Beaver Valley | | |
| John Corrigan | P.O. Box 64 Clarksburg, ON N0H 1J0 | 519-599-2590 corrigan@georgian.net |
| Sydenham | | |
| Ron Savage | RR 2 Owen Sound, ON N4K 5N4 | 519-371-2276 savey@sympatico.ca |
| Peninsula | | |
| John Appleton | 128 Moore St. Box 962 Lion's Head, ON N0H 1W0 | 519-793-4838 japple@kanservu.ca |

| Name | Address | Contact information |
|--------------------|--|---|
| Past BTA TD | | |
| Dave Moule | 44 Lurgan Drive Willowdale, ON M2R 1K6 | 416-225-2069 519-940-9258 HCFarm salydave@pathcom.com |
| Signage | | |
| Paul Beneteau | 1268 Burloak Drive Burlington, ON L7R 3X5 | 905-335-0707 |
| Treadway | | |
| Clint Pulley | 38 Townsend Avenue Burlington, ON L7T 1Y6 | 905-639-0583 clint.pulley@cciw.ca |
| Trail Audit | | |
| Chris Walker | 15 Edith Street Georgetown, ON L7G 3A7 | 905-877-8913 cwalker@aztec-net.com |
| Structures | | |
| Ross Wood | 557 Hayward Crescent Milton, ON L9T 4T8 | 905-876-1492 rosswood@aztec-net.com |
| Webmaster | | |
| Dave Paape | 54-1227 York Mills Road Toronto, ON M3A 1Y4 | 416-445-9028 dpaape@sympatico.ca |

Additional names



Standard Bruce Trail Blaze – actual size

