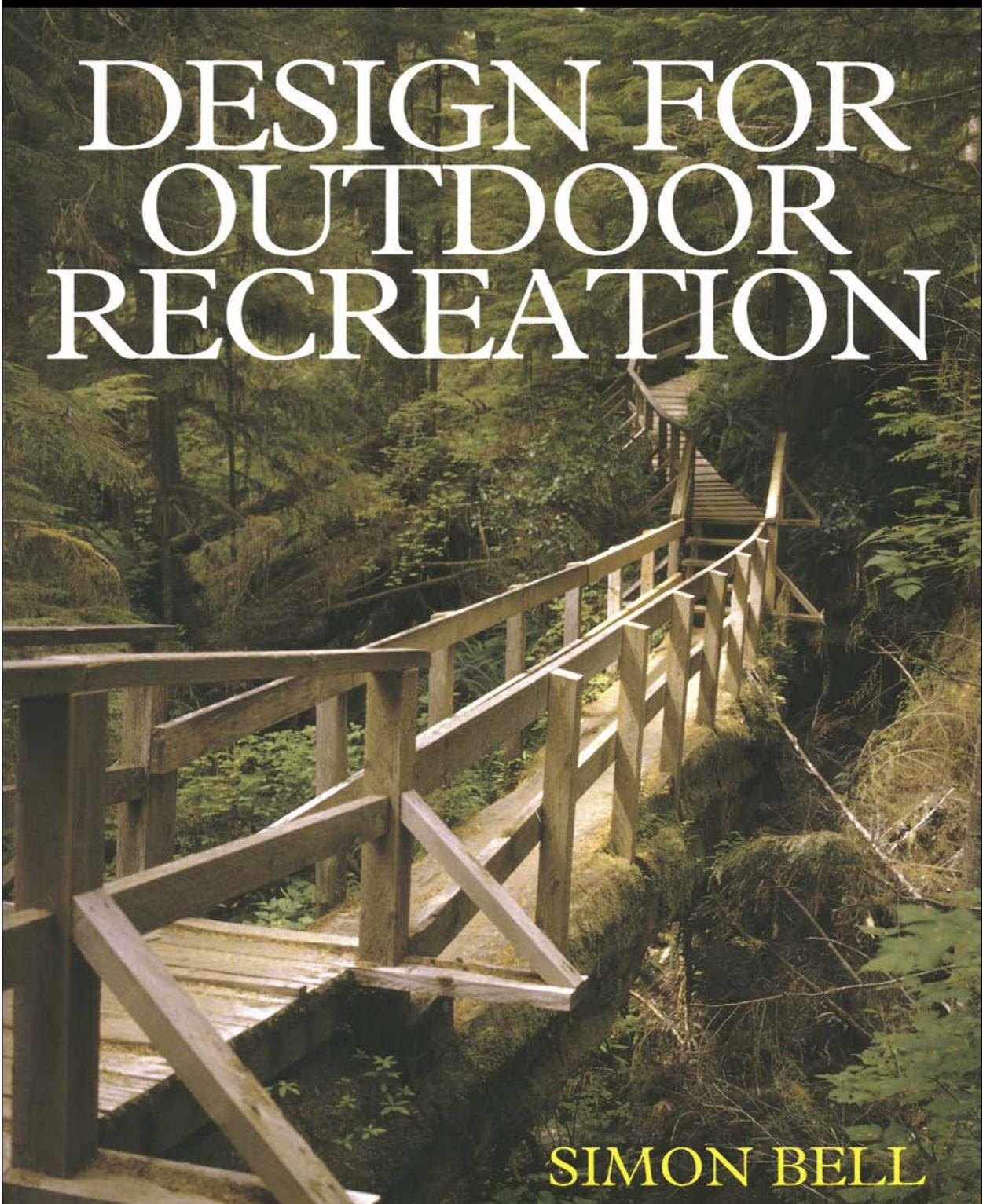


DESIGN FOR OUTDOOR RECREATION

A photograph of a wooden boardwalk with railings winding through a dense forest. The boardwalk is made of light-colored wood and has a simple railing design. The forest is lush with green foliage, and the lighting is soft, suggesting a shaded area. The boardwalk leads the eye from the foreground into the distance, disappearing into the trees.

SIMON BELL

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Design for Outdoor Recreation

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Simon Bell



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This book is the fruit of a number of years spent working in and visiting places designed and managed for recreation, so my first debt of thanks is to all those who went before, creating and managing places where many people have enjoyed themselves in the outdoors. I hope they will look in a positive light on any criticism levelled at their work.

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Thank you all.

Simon

Bell

Introduction

What is recreation, and why is it important?

Outdoor recreation and its cousin, nature tourism, are the big growth areas in leisure and holiday activities today. As the populations of most Western countries become more urbanized, and as work becomes less and less connected with the land, many more people are seeking to regain a connection with nature and with wild landscapes. There are many reasons for visiting and exploring the great outdoors: physical exercise, release from the stresses of city life, fresh air, getting closer to nature, enjoyment of the scenery, hunting and fishing...the list goes on. For most people it is probably a combination of reasons. The trends in how people spend their time change from year to year, but contain broadly the same ingredients: a chance to escape from the city, to be alone, to be close to nature, and to relax and enjoy oneself. The activities that people pursue range from strenuous hiking into wild mountainous areas, days from the nearest settlement, to a gentle stroll in a park or woodland a short distance out of town, or just sitting and looking at the view.

'The outdoors' is an all-embracing term that covers all those places where people feel they can achieve that special feeling of being 'away from it all'. To some, born and bred in the city, it may be an area of farmland a few steps away from home. Urban forests, increasingly common in Europe and North America, can provide opportunities for solitude and quietness well within the city limits. Other people may need to go further afield, such as to the emptier, less humandominated landscapes of the Scottish highlands, the Blue Ridge Mountains of Virginia, or the Black Forest of Germany. Further afield are the mountain ranges above the settled valleys of the Alps or Pyrenees, the fells of Lapland, or the Cascade Mountains of Oregon and Washington, where a few hours' hike from a road or village

can take you into areas where nature dominates. Finally, there are truly wild, remote areas, accessible only by long hike, float plane or helicopter, boat or kayak, where civilization is utterly absent.

In most of these landscapes people can make their presence felt: creating paths and trails, leaving rubbish behind, lighting fires, disturbing wildlife, and damaging crops. Some areas are so fragile that it takes only a few visitors to damage plant life and cause erosion that takes decades to heal. Other areas are more robust, but are so attractive to visitors that they start to wear out under the sheer weight of numbers. Visitors need managing if landscapes, habitats and wildlife are to survive, and if the enjoyment and purpose of the visit are to be fulfilled. The places that we visit generally need some help in order to cope with the pressure that we place on them, and we need facilities to help our enjoyment. So we have to design and maintain a wide range of features in all but the wildest, remotest landscapes, where the absence of anything man-made is a key aspect of their attraction. We have to respect the landscapes we visit and avoid reducing their essential character and spirit of place. This is the greatest challenge to the designers and managers of recreation sites: how to avoid spoiling the very qualities that people have come to visit, while providing the facilities that are so necessary to the enjoyment, safety and hygiene of the visitors and the physical protection of the immediate site. Much depends on the scale and vulnerability of the landscape in question. The Grand Canyon is hardly going to wear out, but a small valley and waterfall might be more delicate.

We do not come to recreation design from first principles. Visiting wild and scenic landscapes has quite a history. Many of the places, the existing facilities and the expectations of what a visit to the great outdoors should consist of are almost traditional. Some wonderful designs date from the nineteenth or early twentieth Century. Some of the best were created by the Civilian Conservation Corps for the National Parks Service in the USA in the 1930s. These are now part of the landscape, and have helped to establish a character or style for site and artefact design: generous scale, use of local materials, and a generally 'rustic' appearance. This is echoed in most countries, which have borrowed the idioms from each other. We should appreciate this lineage, and consider the history of outdoor recreation so that we are worthy heirs of a great tradition.

The history of outdoor recreation

For most of the history of humankind, and still for huge numbers of people, the main goal of life has been to ensure the survival of themselves and their families. At the same time, civilizations have developed, allowing elites to arise who provide priestly, leadership or royal functions. Such individuals and their families can pursue other activities, as they are largely relieved of the task of obtaining food. Hunting and hawking have been important forms of recreation for the monarchy, from ancient times until the present. Thus it is obvious that civilizations must reach a certain level of economic and cultural development (usually quite advanced) before concepts such as 'recreation' or 'leisure' can be entertained.

Following the agricultural and industrial revolutions in the eighteenth and nineteenth centuries, particularly in Britain, wealthy landowners and industrialists could afford to pursue outdoor recreation in field sports: hunting, shooting and fishing. Many also ventured on sightseeing tours, as an interest in scenery developed and became fashionable, especially with the 'picturesque' movement in Britain. Poets and painters celebrated nature, and philosophers pondered on 'natural' law and the 'noble savage'. Arduous tours were made across the Alps to view the scenery. Later, the English Lake District, the Scottish Highlands, the German Black Forest, the Finnish Lakeland, Niagara Falls and numerous other places became fashionable resorts, made more accessible by the advent of the new railways.

In North America, John Muir began to spread the message about the dramatic landscape of Yosemite and other wonders of nature, to campaign for their protection as places not just of beauty but also where the spirit might soar and where people might commune with nature. His efforts eventually bore fruit, and visitors made their way to the many new national parks of the USA founded in the later years of the nineteenth century.

In Canada, at a similar time, the railways across the Rocky Mountains were developed in close partnership with the resorts of Banff and Jasper. Mountainous scenery, wildness, thermal springs and modern amenities provided by resort hotels helped to promote the national park system of that country. Visitors to such areas were essentially nature tourists—as are many today, driving to see the marvels of Yellowstone in Wyoming, the Grossglockner Pass in Austria, the North Cape of Norway or Uluru (Ayers Rock) in Australia.

During the Industrial Revolution a new kind of recreational demand arose among the middle and lower classes. Urbanization of former rural populations provided the labour to operate the new industries, which hugely influenced

the development of Europe and the eastern USA during the nineteenth century. Britain was one of the first and still remains one of the most urbanized countries in terms of the percentage of its population living in cities. Later in the century, working people began to question the quality of their lives in grimy, smoky slums, and to desire some freedom to escape from this poor environment. In cities such as Manchester or Sheffield, which expanded close to wild moorland landscapes, groups of people formed clubs to walk or bicycle into the countryside at weekends. These people wanted the freedom to roam about the countryside, and this was perceived by private landowners to conflict with their interests. By the 1920s and 1930s outdoor recreation in Britain, Europe and America had become an established pastime for many people. Day trips on the train or bus or by charabanc, picnics and walks, boating, swimming and nature study became common.

In America, pioneering settlers living off the land are an important aspect of the nation's folk history. Technology—paved roads, electricity, automobiles and radio— increased the nation's well-being, and put people closer to each other because of better communications. As this developed, parts of the pioneer way of life became nostalgic and important as recreational activities to reinforce and maintain the old connections with the land. Hunting, hiking and trail-riding converted survival activities into leisure pursuits.

The demands for recreation stimulated the designation of national parks, where scenery and to some extent wildlife protection were combined with opportunities for recreation. The work of the Civilian Conservation Corps in the 1930s to restore degraded areas like Shenandoah as parks in the USA, the establishment of national parks in Britain in the late 1940s and early 1950s, and similar developments elsewhere in Europe, Australia, New Zealand and Canada, all reflected similar demands.

The next major impetus for recreation was the increase in car ownership. The availability of mass-produced cars and good roads to drive them on was pioneered in the USA. In the 1950s and 1960s the Interstate system of freeways and major highways put previously remote areas within easy reach of a wide range of people with cars or trucks to go hunting, fishing or hiking. Camping was a cheap way of staying in an area, and it remains popular.

In Europe, mass car ownership took longer to develop, although a road system already existed. By the early 1960s places like the New Forest in England began to disintegrate under the pressure of cars and visitors. Traffic jams became common in the Lake District, and convoys of trailer caravans—a favourite means of holiday transport in Britain and Europe—became regular sights during the summer months on many roads.

As access to the outdoors has become easier, and people have become more adventurous in what they can do there, so a plethora of different activities have developed. Some, such as all-terrain bike riding, were unknown a decade or so ago but are now very popular. A whole host of specialist, often seasonal markets has been developed by enterprising people. These include whitewater rafting trips, outfitting for guided back-country trail hikes, and heli-skiing, where skiers are flown to remote mountain locations and dropped off to ski back to base.

Now that outdoor recreation is a well-established regular activity for millions of people every year, what precisely do they get out of it? What are the benefits of the great escape from the city? What does this tell us about the kinds of settings, sites and facilities that need to be provided?

Escaping from the city

In 1901 John Muir wrote:

Thousands of tired, nerve shaken, overcivilized people are beginning to find out that going to the mountains is going home; that wilderness is a necessity; and that mountain parks and reservations are useful not only as fountains of timber and invigorating rivers, but as fountains of life.

From that time to this there has been a widely held belief that cities are somehow bad for us, and that in order for a complete feeling of well-being we must be able to escape, to connect with nature, to 'get in touch with the nerve of Mother Earth', as John Muir phrased it. What evidence is there that this is so? Those who study the subject find it hard to detect much difference between the physical and mental health of urban or rural dwellers. However, people suffering some stress do seem to become more relaxed and to feel more positive about themselves and their lives when they have seen or visited natural areas. Indeed, it has been suggested that we become too stimulated by the almost constant need to concentrate on our activities when living in cities, so that the sight of nature provides stimulation where no effort is required. Even the colour of trees, water and sky, their greens and blues, can have a calming effect.

The thesis that the physical crowding of cities is bad for us seems to lack evidence, but the trappings of cities—noise, life regulated by the time clock and transport timetables, as well as the many ugly landscapes of industry and decay—all seem to make us tense, fatigued and depressed or sad. The knowledge that we can escape appears to have some benefit, and there are obvious benefits in being able to visit a more natural area, close to home, whenever we want.

However, to many people wild landscapes—especially forested ones—can have frightening aspects. Women especially are afraid of being attacked. This may be the result of exaggerated assessments of risk; or it may go deeper, to feelings arising from long-established cultural associations with forests expressed in legends and stories such as Little Red Riding Hood. Perhaps we have had some of our natural instincts for survival bred or tamed out of us, and like pet rabbits let loose, we are unable to cope with freedom.

The purpose of this book and its audience

Some of these themes will be explored further in this book, because they pose real challenges for the designer. The major message is that the outdoors offers particular qualities and benefits for people, which have evolved and become recognized over the past two and a half centuries. Today's demands can also cause adverse effects on certain landscapes, habitats and wildlife where outdoor recreation and nature tourism occur, and can place burdens on those who use and manage land.

It is vital that designers and managers work to maintain a good balance between the qualities and special value of the outdoors, which offer such benefits to people and the ways in which land is used. It is important to create and maintain opportunities for people to enjoy and understand nature, but recreation has to be sustainable. Future generations must be given the opportunity to experience Yosemite, the Lake District or the Alps just as we can, and preferably at an enhanced level. Past intervention, such as bad design and lack of management of sites or people, has damaged the special qualities of many places. We should seek to reverse that damage, and to design the features and facilities sensitively, allowing nature, not people, to be the dominant influence on how things ultimately shall be.

Outdoor recreation is provided by many people and organizations. Some of the major providers are national, federal or local government bodies such as national park services, forest services, states, provinces, counties; there is also a vast array of private companies and individuals. Some operate huge areas with recreation as a primary objective; some fit recreation alongside utilitarian functions such as timber production or water management. Some are small businesses: campground operators, trail guides, horse and bicycle hirers. Some employ skilled recreation professionals, landscape architects and designers. Others do it themselves. Some have distinct corporate styles and long traditions; others are newcomers who replicate what they like from others. It is to all these people that I offer this book.

It is not a bible or a cookbook; it is more a synthesis of what I believe, in the light of experience of working for one of the major outdoor recreation providers in Britain and of travelling widely around the world, to be the best and worst practice in the field of site and facility design.

It should help to stimulate the old hands, and give useful guidance to the newcomer. All sites benefit from a reappraisal, a spring-clean and some new ideas from time to time. The book is intended as a guide to the factors that should be considered in design so as to achieve a good balance between the needs of the visitor, the site and the manager. Examples are drawn from a wide field representing several years of travel in Europe, North America and elsewhere.

One aspect that I wish to stress, which is often overlooked, is that of influencing the experience of the visit itself through the design process. Think of how visitors are likely to use the area, what they need, what they expect and how the design can be developed from this perspective. Planning the visit starts at home, often aided by media advertisements, travel programmes and literature, and with anticipation of the trip ahead. Images of the place fill the mind, and travelling to the area allows these expectations to build up. The experience of the arrival and the subsequent visit must fulfil these expectations as far as possible, making the most of the positive features and minimizing the negative ones. The journey home is usually where some sadness sets in, but recalling a good experience retains the positive values of the visit for a long time to come. In addition, such good after-feelings are essential to persuade the visitor to return, and to tell his or her friends to come. This is as important for the variety of commercial ventures as it is for the reputation of government agencies with multi-purpose objectives.

The approach is also worth using when refurbishing existing facilities and sites—a common activity for many providers. Often problems with existing layouts, the effects caused by changes in demand and wear and tear can be

solved by a complete reappraisal of the site from the point of view of the user.

Owing to the wide range of countries and varieties of land managers with differing skills and resources available who I hope will use the book, costs, while an important factor, are impossible to deal with in a meaningful way. One general rule, however, is that cheap construction frequently means expensive maintenance or repairs, while good-quality, more expensive solutions can save much time and money in the long run.

It is also worth mentioning at this stage that a number of design examples shown in this book are proprietary makes or are otherwise covered by copyright. If anyone wishes to use or copy a design they would be advised to consider this issue. The book is not meant to be a design catalogue but a stimulus to ideas and approaches for recreation design. Many of the photographs or illustrations give credit to their sources, and these are most likely to be copyright.

In addition to the comments on cost and copyright noted above, it is relevant for readers to consult their local sources of standards for construction, safety and quality, such as the British Standards Institution (BSI), the International Standards Organization (ISO), the German DIN (Deutsche Institut für Normung) or the American National Standards Institute (ANSI), together with the local planning, zoning, building, highways, pollution control and other regulations and codes that apply.

As the book covers practice in the USA, Canada, Europe and elsewhere, dimensions have been shown in metric and imperial units, converted from one to the other or vice versa unless local sizes are quoted. Normally metric is shown first followed by imperial.

Many of the names or terms used for structures and facilities vary from country to country, particularly between North America and Britain. In most cases the British term is used, but the alternatives are shown in brackets when it is first introduced. Most terms are, in any case, commonly used and fairly interchangeable, so that a glossary is unnecessary.

Finally, I hope that readers are stimulated and excited by what they find within the following pages, so that design is accorded its rightful place in helping visitors to have a rewarding experience when they visit the outdoors.

Chapter One

Recreation planning

Before designing sites and facilities it is important to put the right kinds in the right places. Site planning is essential if conflicts between different users, and between users and the landscape setting and wildlife, are to be minimized. Difficult or costly management and maintenance activities also have to be avoided.

As with the development or marketing of any commodity, the operator has to match supply with demand. If this is not achieved, problems are likely to occur. Visitors may fail to obtain the most out of their experience; the setting or site may suffer undue wear and tear; expensive investments may be underused; or other resource values such as habitats may be damaged unnecessarily.

Many of the organizations or individuals that provide recreation own or have access to a land base of varying extent. They are providers of opportunity. How much they provide depends on the demand from actual and potential visitors, the capacity of the site or land base to supply that demand without damage over time—that is, sustainably—and the resources available, including income from visitors, to provide and manage the necessary investments in facilities needed to meet the demand.

Recreation planning is about assessing the demand, both actual and potential; about assessing the capacity of the land base to meet that demand in a sustainable way; and about using available resources wisely to optimize the potential. This chapter concentrates on planning as a preamble to design.

Trends in demand for outdoor recreation

Observers of recreation management over recent decades will have noticed two things: first, that demand for outdoor

recreation has grown continuously, and shows no sign of stopping; and second, that the types of recreation that people are using have changed in several ways.

This could mean that existing destinations may be having difficulty in coping with increased numbers of visitors, and that the facilities and opportunities provided may not be meeting people's desires and expectations. A car park built to accommodate 30 cars may have to be doubled or trebled in size if people are not to be turned away; the advent of a newer activity such as all-terrain biking may mean that conflicts with existing users arise, and special trails may have to be created to segregate uses and reduce wear and tear on the ground.

There are several key factors shaping the changing trends in recreation demand in developed countries that can be identified and their influences analysed.

Demography

The population structure of most developed countries is changing. The proportion of children and younger people is declining while that of older, retired people is expanding. This trend is likely to increase during the lifetimes of everyone living today. Older people have more free time, which may extend up to 20 or even 30 years beyond working age, given greater life expectancy.

Of course, not all elderly people are affluent, fit or live in places where access to the outdoors is easy. They may not have cars. However, a great many take up at least some of the opportunities presented to them. Many are active walkers (with or without a dog), and may visit the same area up to twice a day. Many participate in nature-watching activities, enjoying driving into the countryside at any time of the week or season, and this helps to keep them active and feeling fulfilled. Senior citizens in great numbers go on coach trips to visit scenic attractions, and enjoy the chance to see wild and natural places, albeit briefly.

Older people also have particular requirements. They may need easier, smoother paths, shorter routes, more seats, more access to toilets and fewer steps or stiles. They may appreciate a chance to drive to a viewpoint rather than having to walk to it. They may prefer places where wardens or rangers are nearby to help them if they are worried about getting lost.

Households

Nowadays there are fewer nuclear families of the variety once featured on most television commercials for breakfast cereal: married couples and their dependent children. More people are living singly, as child-free couples or as lone parents.

The ways in which many of these new types of household use their free time to visit the outdoors are different from the those of heyday of car-borne family camping holidays or visits to the seaside. Single people may be more likely to find friends with similar tastes, perhaps of the same sex, to pursue particular types of activity. Young people, especially, may favour more risky forms of recreation, and if they are reasonably affluent this may require special equipment (see 'Specialized tastes' below). Childless married couples are freer to maintain the activity patterns of their youth, unencumbered by small children. They may pursue similar activities to single people, but favour those where mixed sexes can more easily share the experience.

Lone parents may present the most varied characteristics. Frequently, single-parent families are less affluent, less likely to possess a car, and less able to take up the opportunities available to other people or families. Because many are less affluent, such families may want to visit places nearer to where they live, where access need not be by car, and which are free or cheap to visit (see 'Polarization'). If divorced or separated noncustodial parents have access to their children at weekends or during holidays, they may want to make the most of such times by visits to special places.



Older people are now one of the major user groups of the outdoors. Their requirements have to be considered, along with those of other groups, to ensure that they have a chance to obtain the most from their visits.

Polarization

Available leisure time and spending power have both increased, but in different sectors of the population. With the changed economic patterns of many countries, higher-earning people tend to work harder and have less leisure time, while the lower earners and unemployed have more enforced spare time but, in many cases, little cash for leisure spending.

If these groups participate in outdoor recreation, then the highest earners are more likely to go for weekends at ski resorts or to take expensive long-haul holidays to exotic locations, where the most is made of the limited opportunity for leisure. The lowest earners, on the other hand, may have to be content with visits to local areas on a regular basis to walk the dog, fish in a canal or lake, go jogging or sit on a bench in a public park.

There are a wide range of groups in between, but with relatively high numbers at each end. Another feature is the demand for high-quality experiences and high-quality service by the more affluent. Less affluent people may already live in less attractive residential areas, so that the quality of experience may matter less than its value as an escape from the increased stress that unemployment is known to bring.



The visitor centre at Mount St Helens, Washington, USA. The scenery devastated so dramatically by the eruption in 1980 is a major attraction. A centre like this not only provides facilities such as toilets and interpretation, but also offers a chance to earn revenue from the sale of souvenirs and refreshments. If the designers are not careful, the building itself becomes the attraction, and can become divorced from its surroundings.

Specialized tastes

With increased experience and more activities to pursue, recreation consumers are becoming more sophisticated, and the market is diversifying in order to meet the wide range of specialist markets. There are now many 'communities of interest' who participate in specific activities, often requiring special areas, equipment or access during particular seasons. Success in leisure markets depends much more on identifying the specialisms. This poses great challenges for managers and designers, as special facilities may be needed with particular design requirements, such as segregation, zoning and other forms of management strategies in order to deal with potential conflicts.

Commercialization

In the past, many public-sector recreation providers allowed people free access, or charged for permits to control the amount or season for different activities such as fishing or horseriding. However, governments and other public agencies are finding that funding to maintain sites and facilities, to cope with increased demand and wear and tear on the landscape, is becoming difficult to maintain. Opportunities to charge visitors for appropriate services to help offset these costs, or to upgrade old or provide new facilities, are being considered as one solution. This is a sensitive matter, as in many European countries free access for all people to the outdoors is a much cherished tradition or right. There is also an additional dilemma for public agencies where recreation facilities are already provided from public money, and it could be argued that the taxpayer is being charged twice. Thus care is needed by public bodies to ensure that charges are only made for services that are clearly additional to the provision of free access.

Notwithstanding these reservations, many people are willing to pay for better facilities and better services. This in turn may persuade managers to develop more commercial opportunities at high-capacity, high-demand sites in key locations, such as gift shops, restaurants and unique attractions such as cable cars to scenic viewpoints. Equipment to collect money—such as ticket machines, pay booths and the need for increased security at commercial sites—all have an impact on design and management.

Environmental concerns

Governments and the public at large are displaying more concern for conservation, heritage and wider environmental issues. It may be easier to manage areas where excessive visitor demand endangers the landscape due to wear and tear, overloads sewage facilities or causes pollution from motor vehicles. People may also be more willing to be managed or even prevented from visiting areas that are fragile or damaged if the reasons are explained to them.

The demand for specific forms of recreation may increase, such as nature watching where rare species have captured the imagination of people through publicity or special projects. Another facet may be the use of sustainable materials in the design of facilities and artefacts, for instance types of timber from renewable resources, rather than products made from finite resources or which depend on fossil fuel.

It is worth finding out the pattern of demand for a particular destination, how it has changed in the past, and how it may change in the future. Areas that are within easy reach of large cities or centres of population may be the main local places to visit for day trips by certain groups in the population. A study of the demography of the area, the range of socio-economic classes, and the number and variety of special-interest groups, can be carried out by specialist agencies who prepare such reports on behalf of people or firms who market all sorts of different products.

A location further afield may be more likely to attract tourists who want to spend more time there, perhaps overnight or for several days. Therefore the market may already be determined, by catering for those who can afford transport to get there and by the possibilities offered by the landscape setting.

There is also a link between what people know is possible and the demand that is realized for it. Information to raise awareness of the opportunities available is essential, and will have an important effect on converting potential into actual demand. This may be counter-productive if the actual demand becomes too great for the site to cope with.

The landscape as a setting for recreation

While it is possible to take part in many activities in an artificial or unattractive environment—for example, climbing on an indoor artificial rock face, or fishing from the bank of a canal in a derelict industrial area—for most people the setting in which the recreation takes place is a very important part of the whole experience. In many instances it is the landscape that they have come to see, and often the facilities needed are only those that enable them to obtain the most enjoyment from a scenic view.

A landscape embracing habitats, wildlife, cultural heritage and different land uses may have the potential to supply the opportunities to meet some or all of the demand, by way of the type of recreation, by its carrying capacity or land use, or all three. However, because of its fragility it may have no potential for recreation. The activities, the carrying capacity and the quality of the setting in which they take place are considered together. As the market is highly differentiated, the recreation planner has to match the aspirations of different people with what the landscape has to offer and can accept. This depends on the extent of the land base and its current use, its variety and robustness, the climate and the alternative opportunities offered by other leisure operators working in the same vicinity.

Land base

The extent of the land base will determine how many visitors can be spread out so that some can find true solitude while others can enjoy more gregarious situations. For example, larger areas can allow potentially conflicting activities to be zoned in space: a large lake can be zoned so that dinghy sailors and speed-boats are kept separate, while each type of user has enough room to maximize the experience of the visit. Larger areas also mean more scope to move activities from place to place if wear and tear shows signs of getting serious, or if there is conflict with other land uses. In a managed forest, logging will move from place to place, and may have to disrupt the use of an area for certain recreation activities, such as orienteering, for a number of years. Larger areas also enable use to be dispersed instead of concentrated, so that the pressure of wear and tear can be spread out and reduced. This has implications for design, depending on what facilities are needed and how much recreation is amenable to dispersal. Also, the management and maintenance implications of shifting and dispersed use as well as the logistics needed should be assessed.

The existing land base might be used for some recreation already. Proposed new developments might not be compatible with either the existing land use or recreation activity unless there is space to alter one or both and achieve a compromise.

Landscape variety

The variety of the landscape and its components can suggest what might be provided. A landscape of extreme topographic variation, such as a mountainous or hilly area, will probably offer more scenic attraction. It might also provide mountaineering, rock climbing, hill walking, hang-gliding and other pursuits not offered by flat terrain. A variety of vegetation types will provide different settings. For example, forests can hide a great many people: they have a high visual carrying capacity, and tend to be robust landscapes containing particular animals and birds. Meadows or grassland provide good walking country with open views, places to camp, and different wildlife. Sand dunes are fragile and easily damaged, and can tolerate only very light or controlled access. Bogs and marshes offer limited possibilities, an abundance of biting insects and very low carrying capacity.

Water is always an important element, and greatly increases the attractiveness of an area. Whether the water is flowing or still it has special attractions—reflection, movement, drama, the play of light, the sound the water makes, and its cooling effect. It is also a place where numerous recreation activities can take place, thus combining in a unique way the satisfaction of the activity with the beauty of the setting.

In general the more varied the landforms and range of vegetation and associated wildlife the more attractive an area tends to be for scenic and wildlife viewing. There is a widely held view that variety tends to be preferred over monotony.

Carrying capacity

The robustness or fragility of the landscape, and of the habitats and wildlife it contains, is termed its carrying capacity. The landscape's resilience to wear and tear, and its ability to recover from damage, are key factors in determining what can or cannot be provided.

Rock and soil are the first aspects to be considered. Hard rock is hard-wearing, but alluvial soils, scree and talus are fragile and easily dislodged. Wet soils, clays, soft rocks and peat are easily eroded, so that significant access is acceptable only if specially surfaced paths are constructed and maintained. Unrestricted trampling over peat moss in the English Peak District has shown how difficult it is to put right the serious effects of this type of damage. Sand dunes are the most vulnerable of all (see above). Volcanic lava is very uncomfortable to walk over, even in tough boots, for any distance.

Vegetation is another important aspect to assess. In high alpine mountains or polar regions, vegetation grows very slowly, and site recovery after damage is extremely slow. Hence significant access should be avoided. Pasture grass may be one of the most robust surfaces, but it can only stand so much wear and tear. Forest vegetation may be dense and impenetrable, but when opened by paths offers opportunities for access without too much risk of people straying from the trail.

Constructed facilities

A major opportunity for managers to increase the physical carrying capacity of an area is to construct various facilities. Hard-wearing surfaces can improve the robustness of access and confine the visitor to predetermined locations, as many are disinclined to stray far from a trail. Such action requires investment, continuing management, maintenance and good design. Although built facilities can contribute to the robustness of a site they can also stimulate increased demand and adversely affect the visual carrying capacity in certain circumstances. Nevertheless, built facilities are important in increasing the potential for barrier-free access for disabled people.

Climate

The climate is often a vital factor in the capacity of an area to supply a particular range of recreation opportunities. For example, it is obvious that snowy winters are needed in order to ski under natural conditions. Areas with more extreme climates—that is, hot summers and cold winters—tend to favour a concentration of recreation at certain times of the year: for example, the winter season for skiing and snow mobiling or the summer for sailing, sunbathing, windsurfing and swimming. Oceanic temperate climates such as that of Britain, the coast of Oregon or parts of New Zealand facilitate a wide range of activities all year round.

Some climates pose risks to people outdoors. In mountains the weather can close in and become dangerous for less experienced hikers in areas where it can change very quickly, such as in Scotland or the Cascade Mountains of Oregon and Washington. Deserts can cause heat exhaustion and dehydration at the hottest times of the year. This limits the range of activities and the type of people who can cope unless special measures are taken—for example, waymarking of tracks in mountains, provision of shade and water in desert areas—so that others beside the young, fit

and experienced can enjoy the area.

Seasonal changes are linked to the climate in many ways but also have different features. Some seasons such as autumn or spring are the prime times for scenic viewing, when the vegetation colours are at their best and wildlife is active. Many people prefer to visit forest landscapes during these seasons—New England is noted for the brilliance of its leaf colours in the fall, for example. Seasons for fishing or hunting may be important in many areas, and hunting may cause potential conflicts with other users due either to disturbance of game or the risk to humans of being accidentally shot.

Alternative opportunities in the area

The major recreation providers, such as national parks and forest services in the USA and Canada, frequently have large tracts of land in locations where there are few if any alternatives provided by other operators. In more crowded countries such as Britain, the Netherlands or Germany there may be a wide variety of different opportunities provided by a range of public and private operators. It is unnecessary in most cases for an operator to try to provide all of the potential activities if someone else is in a better position to do so. In many cases, as facilities may be provided free, particularly access, it is sensible to consider where respective strengths may lie. For instance, two neighbours might possess different types of landscape such as a lake or reservoir and a forest. In this case it is easy to provide different experiences such as sailing on the lake and hiking in the forest. It may furthermore be sensible for there to be one car park to serve both facilities instead of two separate ones, and for hiking trails to include access to the water at certain points. In another case, two adjoining owners might both possess lakes. Rather than each trying to satisfy demands for fishing and powerboats it might be better for the landscape, wildlife management and the recreation experience if the lake best suited to fishing was solely used for that purpose and the other concentrated on powerboating. In this way the demand is catered for while the carrying capacity of the wider landscape is respected.

Appraisal of opportunities

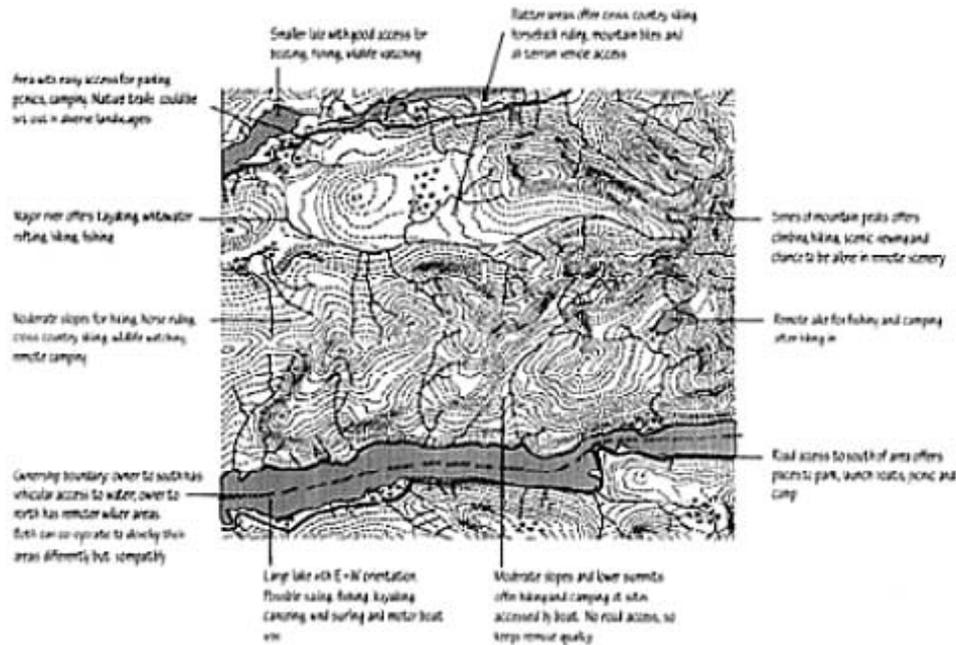
As part of the initial recreation planning, a survey or inventory of the landscape should be carried out. The area can be classified into areas of particular visual characteristics based on the landform and vegetation types, presence of water, land use, cultural heritage and so on. Special note should be made of sensitive places, those with fragile soils and vegetation, the presence of rare plants or wildlife that are easily disturbed, or where there are dangers of rock fall, avalanche or steep cliffs. Note should also be made of places with unique or prominent features which give them a strong identity or ‘spirit of place’, often termed *genius loci*. These might include hidden lakes, waterfalls, ravines, curious rock formations, areas of old-growth forest, places with dramatic or surprise views, or flat landscapes where the sky dominates.

On the basis of this inventory and the knowledge about the demand for various types of recreation, the places where different activities could take place can be identified. Sensitive areas can be avoided completely or, if this is difficult, special measures to prevent damage can be identified, such as a boardwalk across a boggy area. Potential conflicts between recreation activities can be identified using a matrix technique, and from this solutions by design or management can be identified, for example by activity zoning, according to carrying capacity and compatibility.

SWOT analysis

There are various ways of refining the analytical process following from the basic inventory. One is to evaluate each character area or landscape zone. SWOT analysis provides a useful method.

SWOT stands for Strengths, Weaknesses, Opportunities and Threats. It is usual to divide the analysis of an area into those factors that are aspects of the site itself (strengths and weaknesses), and those that are affecting it from outside (opportunities and threats). There are two ways of completing an analysis. The first method is to list the factors under



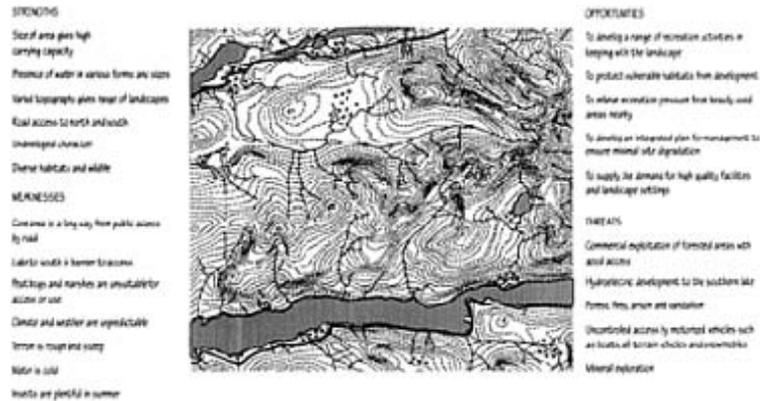
A plan showing the possible range of opportunities for recreation in a landscape. Co-operation with neighbouring owners should always be considered.

the four headings on a sheet of paper using a matrix format. This has the advantage of making it possible to see the relationships more easily, especially when factors can be both strengths and weaknesses at the same time. The second method is to identify the factors and record them on a map of the area. This helps to locate these factors and the way in which they are spatially related. It is of course possible to use both methods.

The advantage of a SWOT analysis is that it is quick, yet produces useful results and arranges them in a way that is of immediate use. The aim in design and management is to build on the strengths, minimize the weaknesses, take up as many of the opportunities as possible and avoid the threats. A useful method of initiating an analysis is to 'brainstorm' the issues: once a basic knowledge of the area has been gained from site visits, consider these, perhaps with other people or a project team, and classify all the issues into the various categories as they emerge from the discussion. Then sift them for importance and assess the implications of each for design and management.

If the area is used already and has some facilities, then the SWOT analysis can be used to appraise these so that they can be redesigned if necessary and improved to meet any new circumstances.

The SWOT analysis can be very helpful in developing the brief for the designer on the range of issues that need to be solved in order to achieve the objectives of a project. The designer is then able to develop creative solutions in design and management terms that best fit the objectives and the requirements to sustain the characteristics of the landscape.



A plan showing how the landscape has been appraised using a SWOT analysis.

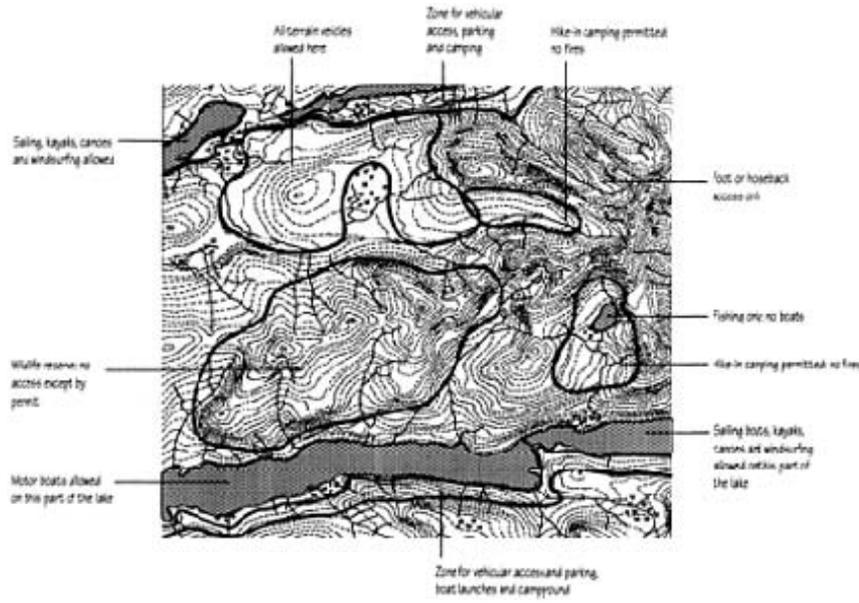
Zoning

As already mentioned, zoning is one of the major ways in which to resolve conflicts between different users and between users and the landscape. The inventory and analysis described above may simplify the job. Zoning identifies what is acceptable where, although it can include more than just physical factors. Aesthetic considerations and expectations of the experience to be enjoyed can also be built into the exercise. Zones can be based on any convenient and comprehensible unit that helps to manage activities and the landscape in compatible ways.

Following the first coarse sieve of allocating activities to appropriate areas, more refined zones can set limits on what, how much and when activities can take place. Different scales might be employed, from the whole land ownership unit down to subzones within broad categories. Zones might be based on areas: for example a large zone for hiking might be subdivided into zones in which camping is permitted. The camping zone might be further subzoned into an area for tents and one for trailer caravans, and so on.

Zones can also be based on linear routes. Different trail systems might be subzoned, for example, by mode of use—horse, foot, cycle—or by degree of difficulty for people with various disabilities.

Zoning in time is another approach. This might be long term: for example, lease of an area for use by a particular interest group for a set period. Seasonal zoning is easy to administer, especially when particular weather is necessary, such as snowy conditions for skiing. Weekly or daily use can spread out and lessen the impacts of activities; examples are booking a permit to go fishing or for access into back country for a particular time duration. Once again, any convenient time interval can be adopted that meets the management objective.



Examples of spatial zoning of use applied to a landscape.

The idea of zoning to meet aesthetic and aspirational needs is one that has been developed in particular by the US Forest Service, and is now used in various forms elsewhere. This is called the Recreation Opportunity Spectrum or ROS. While designed for large scales of landscape, the general principles can be adapted for the smaller areas more common in Britain and parts of Europe.

The Recreation Opportunity Spectrum

The ROS takes as its major premise the fact that recreation is more than just the activity, such as hiking, fishing and camping, in which people participate. It also includes the quality of the specific setting in which that activity takes place. This was alluded to in the introduction, and may seem to be common sense. Yet to incorporate this concept will not only raise the standard of experience gained by people but will help the designer and manager to refine the match of activities to appropriate landscape zones in space and time and avoid any conflicts that otherwise may arise. The concept therefore deserves further consideration.

The spectrum is one of **recreational experience** correlated to the **type of landscape setting** where that experience is most likely to be fulfilled. It ranges from the experience of solitude allied to a sense of challenge, some risk taking and the feeling of being self reliant, to the other extreme of feeling secure, comfortable and having a chance to socialize with other people. The spectrum is then divided into six categories, which describe the degree to which these experiences can be achieved. The terminology is chosen to be compatible with other aspects of land and resource management planning carried out in the US Forest Service. The names are not as important as the qualities that they are meant to convey. Each category can be broken down into three components: the activities most suitable, the character of the setting, and the expected experience to be gained.

The categories are summarized as follows.

1. **1. Primitive:** that is, natural areas unmodified by human activity and large enough so that visitors can find solitude and feel close to nature. The remoteness means that one has to be self reliant, using back-country survival skills, and thus experience challenge and some risk. The activities are all those using muscle power and basic equipment.
2. **2. Semi-primitive, non-motorized.** In this category are factors such as size of area, degree of human intervention or chance of meeting other people, which reduces slightly the primitive experience of the first category. Minimal site controls may be needed, but the overall experience should be similar to primitive. The same activities

are appropriate.

3. **3. Semi-primitive, motorized.** This is essentially the same as the previous category, but because motorized activities such as motorboats, snow-mobiles or all-terrain vehicles are allowed, the qualities of quietness and absence of disturbance are likely to be impaired.

4. **4. Roaded, natural.** This category is mainly natural in character, although management activities may be present, and there will be more evidence of use, including roads that provide easier access. The experience will be some solitude and some social interaction but risk taking and self-reliance aspects will be reduced in importance.

5. **5. Rural.** This is where human activities start to dominate over the natural character, although the landscape contains significant natural components. Thus solitude and closeness to nature are highly compromised, and there is little scope for risk taking or using backwoods skills. There is more chance to socialize, and as use is more concentrated there is a need for more facilities.

6. **6. Urban.** The widest range of activities are possible but the setting is more or less completely dominated by human activities, and generally constitutes an urbanized environment. Consequently a large amount of design and management is required, as well as many facilities. The setting makes solitude difficult to accomplish although by good design and management some representation of this element may be possible. The need to find challenge and risk is not apparent in most users' minds.

This brief resume of the ROS shows that it is possible to zone the landscape into the various categories depending on the settings present. Thus in many US national forests there will be everything from wilderness providing the primitive setting down to at least the roaded rural if not the urban setting. In Europe it may not be possible to have such a range in many countries. In the Netherlands—one of the most densely populated and managed landscapes—the major categories are probably rural and urban. However, it is possible to develop a miniature ROS within a land area by careful design and management. For example, in the Amsterdamse Bos—the city forest to the south of Amsterdam—the layout of the forest is such that even on busy days when certain areas are crowded it is possible to walk or cycle to empty places, with a good chance of feeling alone and close to nature. Of course, the sense of self-reliance is missing, and this landscape is far from being natural, but it is the relative degree of naturalness compared with other elements in a particular setting that is important.

A further use of the ROS is to help determine the amount and types of facilities and artefacts provided in each category, as these also affect the experience. For example, a primitive setting does not call for paved paths, which would be out of keeping and make it appear 'tame'. The general rule is that in the **primitive** area, only work to protect the site should be undertaken without any facilities being provided. Any materials should be local to the site so that they can blend in completely. If necessary, the **semi-primitive, non-motorized** areas can have some rudimentary facilities, but these should be rustic in nature and use locally native and natural materials. For the **semi-primitive, motorized** areas more site protection is probably needed, and more facilities could be appropriate, as many people will make their way into the landscape in a vehicle rather than hike in. The

Recreation Opportunity Spectrum							
	P Primitive	SPNM Semi-Primitive Non-Motorized	SPM Semi-Primitive Motorized	RN Roaded Natural	RM Roaded Managed	R Rural	U Urban
Physical Setting	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]
Physical Facility	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]
Social Setting	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]
Management	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]
Management Facility	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]
Management Facility	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]
Access	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]
Water	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]
Wild & Open Space	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]	[Image]
	P	SPNM	SPM	RN	RM	R	U

The Recreation Opportunity Spectrum relating activities, settings and facility designs together to provide

the optimum experience. (Courtesy Warren Bacon).

roaded natural and the **rural** areas are likely to require more facilities than either of the semi-primitive categories. As a reflection of the more managed character of the rural landscape, these facilities can be more highly finished, but should nevertheless aim to use natural materials and finishes as much as possible. In the **urban** setting there is nothing wrong with any of the previous levels of provision if the situation warrants it, but more facilities will be necessary to deal with greater demand, higher visitor expectation of ease of use and comfort, as well as provision for more formal activities. More robust artefacts may also be appropriate to stand up to the wear and tear and possibly vandalism.

The ROS can also be used to assess the amount of intervention necessary to minimize the impacts of visitors on the landscape habitats and wildlife. Ideally, the primitive areas should have a low, well-distributed use, while the urban areas can have high, concentrated use. However, sometimes wear and tear occurs that needs repair. Outside the most sensitive areas, where it may be appropriate to discourage access, the emphasis should not be on trying to prevent any impacts but on considering how much change can be allowed and what actions are appropriate for controlling it. This approach has been developed into a concept called **limits of acceptable change**, in which a range of people, including managers, experts in the landscape and ecology, and users, decide what change, if any, can be allowed. Some of the actions will be managerial, such as closing areas to allow them time to recover, and others will relate to design, such as provision of paths and boardwalks.

For the designer, the ROS can help to determine the framework for the range, type and number of facilities and artefacts. It is another way of helping to develop the brief and for evaluating the design ideas put forward to meet its requirements.

Planning to reduce negative factors and perceptions

While recreation managers try to meet the demands and expectations of people who want recreational experiences of various kinds, there are a number of factors not mentioned so far that, unless addressed, prevent many people from making the most of their visit. They are those things that tend to prevent people from enjoying themselves because they are uneasy or frightened, or feel at risk in some way. The main worries appear to be as follows.

1. **1. Are we allowed here?** This is fundamental in those countries where it is illegal to trespass on private property. People feel uneasy in case they meet an irate owner, occupier or employee. Signs and information help to reassure people, so that they can relax and enjoy themselves.
2. **2. Are we going to get lost?** Many people are not very good at map reading and worry about getting lost. Waymarking of trails helps, as does a pictorial map showing landmarks that are easy to identify.
3. **3. Am I going to break a leg/fall off a cliff/drown in a river?** In other words, safety is important to people, especially in less wild areas where fewer risks are expected. The design of facilities should incorporate as much appropriate safety thinking as possible without taking away the quality of the experience.
4. **4. Am I going to be attacked by animals?** In some places people unfamiliar with an area may feel or be genuinely at risk from being bitten by snakes, attacked by grizzly bears or even bulls in a pasture. However, while the risks might be small, some

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thought is needed as to how people can be reassured and protected when necessary.

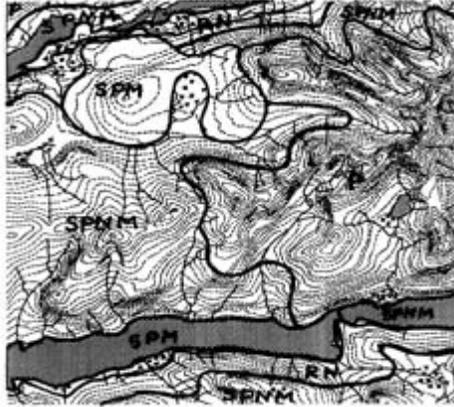
5. Are the trails suitable for my level of ability or disability? It is important that as much of the area is as accessible as possible for all abilities. This does not mean making paths up to the top of remote mountains for wheelchairs, but it does mean thorough planning and design to help all people make the most of their outdoor experiences. The design of facilities to be free of barriers is an important topic (see Chapters 3–14), and the brief for the designer is best developed with the aid of people representing different types of disability, who can evaluate whether or not proposals meet their needs.



A relatively remote, quieter part of the Amsterdamse Bos, Holland. The fact that it is possible to find solitude and escape in such a relatively small area subject to many urban influences shows how skilled the planners, designers and managers have been.

6. Am I likely to be attacked/mugged/raped? This is a widespread fear, particularly amongst women, not only in urban parks and forests but also in other places. While this may be only a small risk it does prevent a large sector of the population from making the most of their visit. Designers and managers of facilities can go some way to ensuring a greater feeling of security (see Chapters 3–14).

In Britain the programme of creating new woodland near cities (community forests) has focused on this last problem. Some research carried out for the Countryside Commission has explored issues of safety and fear. Much of the problem stems from the appearance of the areas: if they are untidy, poorly maintained, if litter and rubbish is dumped there, or if a lot of vandalism has occurred. This makes the area seem unmanaged, uncared for and likely to be a haunt of antisocial people. In urban fringe areas the need for solitude is not so widespread. People frequently visit in groups and prefer to see more people, giving them a sense of security or of help being available. Some strategies to be adopted in planning for recreation include different types of landscape that give different atmospheres, from visible open woodland or spaces to wilder areas that more confident people can choose to use. The same applies to routes, where main paths should be designed for maximum visibility and with fewest places where people might feel trapped. Other paths can be wilder, more winding and more enclosed. Signs and waymarking also increase confidence, as long as they are clearly understandable and easy to follow. Finally, the presence of wardens, rangers, workers and other staff in uniform or otherwise recognizable adds confidence, as visitors know that the area is being watched, and there is a source of help or policing.



The application of the Recreation Opportunity Spectrum to an area, aiming to match the setting and activities to maximize the quality of the experience. P=primitive; SPNM=semi-primitive, non-motorized; SPM= semi-primitive, motorized; and RN=roaded, natural.

Sustainable recreation

As far as possible, any recreation provision should be planned and designed with sustainability in mind. At its simplest, sustainability means that the present needs of the people and their environment should be met without compromising the ability of future generations to meet their own needs.

An example of how sustainability could be included in recreation planning is recent work by Scottish Natural Heritage, the government body with a responsibility for the landscape, nature conservation and outdoor recreation in Scotland. The following section is reproduced with their permission.

The approach is founded upon five main principles. These principles are based on common sense, and are designed to promote a sense of responsibility and understanding in how we all use the natural heritage. Enjoyment of the outdoors causes relatively little environmental damage, compared with major land-use impacts, but all the principles—as set out below—have relevance to access planning and design.

Wise use

Non-renewable resources should be used wisely and sparingly, at a rate that does not restrict the options of future generations. A major call on non-renewable resources (particularly hydrocarbons) by outdoor recreation activities is the use of the motor car. Use of the car is central to the freedom and flexibility with which people enjoy open-air recreation. But we should aim to be less dependent on the car, especially for the more frequent short and medium-length journeys. The provision of better local access, especially where this can be reached on foot or by public transport, will benefit both the environment and the natural heritage, and should therefore be a key objective.

Carrying capacity

Renewable resources should be used within the limits of their capacity for regeneration. Many areas of natural vegetation, and some wildlife, are inherently vulnerable to the impact of too much recreation. Scotland lies at northerly latitudes, with harsh winters and cool summers, both of which inhibit quick recovery of damage to natural vegetation on high ground. 'Carrying capacity' refers not just to the physical impacts of people on land, but also to the risk of causing undue disturbance to valued wildlife, and sometimes to the loss of a sense of wildness or solitude—the very qualities that attract people to remote places. The practical implication of this guidance is that there may be a need for restraint on the use of the most vulnerable areas.

Environmental quality

The quality of the natural heritage as a whole should be maintained and improved. Recreation is becoming a major user of land. As outdoor recreation continues to develop, its effects on the natural heritage will become more widespread. There is a need for greater commitment to resolve problems through management, through environmental education, and by strategic planning of the means of access in terms of roads, parking facilities and footpaths.

Precautionary principle

In situations of great complexity or uncertainty we should act in a precautionary manner. Access measures are sometimes concentrated on places that are ecologically or visually sensitive. Where there is reasonable doubt whether substantial or irreversible damage would be caused to places of special value, the management process should start much earlier, as soon as the problem starts to emerge, and it should seek to identify limits of acceptable change. Meanwhile it is only sensible to constrain and divert activities that might prove damaging to the health of the natural heritage.

Shared benefits

There should be an equitable distribution of the costs and benefits (material and nonmaterial) of any development. We are all 'land users' in our own ways. Access to the countryside confers great non-material benefits on those who can participate in outdoor recreation. But there can be drawbacks, which mainly affect local communities and those who manage land used by the public. Damage now should not compromise the future, either in reducing the enjoyment of generations to come or in creating problems for landowners and managers.

Hence it is important for recreation planners to consider the effects of their actions on the wider environment, on transport, on energy and on the local traditions and economy. Designers need to assess whether their work protects the site from damage, degradation and pollution. The use of materials has to be considered: for example, the implications of using timber from natural and sensitive tropical rain-forests; the effects of timber preservative leaching into the soil; effects on drainage systems; the impacts of construction; the ease of re-vegetation after site work; the ability to restore a site completely after use is finished. This may favour the simplest, most economical solutions, the use of local and native materials, a reluctance to construct anything too permanent, and an adherence to the principle of 'less is more'. This is a good principle, and is particularly valid when arguably one of the central concepts of design in the outdoors is to allow the landscape to maintain dominance over human activities.

At the conclusion of this chapter the designer should be able to assess the requirements of a comprehensive brief for the kind of recreation best suited to a particular place, its likely impact on the site, and the amount and location of constructed facilities and artefacts needed to limit site damage and provide for the safety, comfort and convenience of recreational visitors. The next step is to consider what concepts are appropriate for design, how these relate to different settings and, most importantly, how they will be used by the visitors themselves.

Chapter Two

Design concepts for outdoor recreation

In the last chapter, some of the trends in recreation demands and the expectations that people have when they visit the outdoors were examined. How to realize the opportunities that a landscape offers, and how to zone or plan in order to meet the demand sustainably, were also considered. What emerged from this examination is that the quality of recreational experiences is significantly dependent on the quality of the setting in which the activity takes place. By this is meant the whole quality of the environment as perceived by the senses. Of the senses, sight is by far the most important, although smell, hearing and touch are also significant. This means that special attention should be paid to the aesthetic qualities of the landscape setting, the facilities and artefacts provided, and the overall

maintenance of areas that people visit.

Quite often, a destination will be chosen because of its particular qualities as scenery or at least as a scenic backdrop in which to pursue a particular activity. The beauty of the landscape will be particularly important to the large numbers of people who visit areas repeatedly during the year. The anticipation of returning to an area is often heightened by a sense of expecting its beauty to be the same as the last time, with the exception of seasonal change. When there has been a change, perhaps due to a management activity such as logging or a natural event such as a fire, then expectations are disappointed, and feelings of anger or sadness can replace those of satisfaction.

It is impossible to keep any landscape from changing. However, some changes are slow and so are barely noticed. It is the sudden and dramatic changes that are difficult to accept. Here lies a challenge to managers: to inform people about the dynamics of a particular landscape and prepare them for change, and to accomplish this—whenever possible—in such a way as to make the change either seem to be for the better or fit in so well that its impact is neutral. This requires design skills that are applied to large-scale landscapes. Such design is largely outside the scope of this book, which is mainly concerned with facility and artefact design, but it does give a sense of the wider context.

Contrasts between city and wilderness

One of the major reasons why people go to the wilder, more natural areas is to escape from the daily life of the city. As societies become more urbanized, and as people tend to work less in industries such as agriculture or forestry, they tend to lose the sense of connection with the land that such work brings. The life of a city dweller, culturally rich as it may be, tends for many people to be stressful in some way, dominated by timetables of transport and work. The city is crowded; this is not always a negative situation, given the gregariousness of the human species, but personal space is often limited. The city is also almost completely a human construction. In large metropolises, there may be very little remaining of the natural landscape that once existed. The layout of many cities is based on a giant grid. Landform, old tracks, small streams and former agricultural areas are ignored by this layout, which is relentless in its taming of nature. It is a reflection of the world view dominant since the Age of Enlightenment in the seventeenth and eighteenth centuries, under which humans consider themselves above nature and destined to tame it and bend it to their will. This view has caused major consequences for the exploitation of the world's resources, and only recently has it had any kind of sustained challenge. Many people now believe that it is important to be able to escape from the city in order to reconnect ourselves with our roots in the wilderness, the forest, or the natural and semi-natural landscape of the countryside.

As the city represents order, control, the geometric grid, noise, pollution and overcrowding to many people, they perceive its antithesis in the outdoors. The converse qualities of chaos, lack of control, absence of geometry, quietness, cleanliness and solitude are very important. They provide cues for the kind of landscapes and facilities that designers should consider.

At one extreme, parts of the 'wild' landscape of the English Lake District were spoiled by geometric gridded plantation forests, which seemed to reflect the philosophy of human domination over nature by creating 'factory forests' in natural places.

At the other extreme in terms of scale is the urban style of car park, complete with concrete kerbs, white lines and ornamental shrubs in a remote moorland setting. This reduces the sense of contrast between the city and the outdoors, and removes the illusion that such landscapes are wild and unspoiled.

A design philosophy for the outdoors

Arguably, it is therefore important to maintain and reflect the character of the landscapes in the design of facilities and artefacts, while providing many functions that are the same as those needed at home, as well as reinforcing the contrast between the city and the more natural landscapes of the outdoors.

However, it is possible to develop designs that are more redolent of the stylized settings of Tolkien or Disney than those reflecting the real qualities of nature. This must be avoided, as must all forms of pastiche or superficial imitation, in favour of honest, robust, simple, unobtrusive designs, which serve to provide their function with the

minimum of fuss. These must not upstage the greater landscape setting that people have come to enjoy.

At this point we can return to the Recreation Opportunity Spectrum (ROS) described in Chapter 1. This helps us to define the type of landscape setting and the most appropriate approach to facility and artefact design. In some locations the correct solution is no facilities, no artefacts, and only repair to physical damage. It is crucial to develop a modest approach, and to resist the need to make grandiose statements or to follow a



(a)



(b)

(a) A city view where human activities and structures dominate. The plan is based on a geometric grid, the buildings are rectangular, and the whole is tightly controlled, as are traffic movement and the regulation of peoples' lives to some degree by timetables. Toronto, Ontario, Canada. (b) A remote, uninhabited wilderness area, untouched by direct human activity. The mountains, glaciers and hard climate dominate. It is possible to wander freely and feel far from the urban world; to obtain solitude; and to use the skills of selfreliance when facing natural hazards. Alaska/Yukon border, USA/Canada.

flamboyant style more suited to pretentious office developments.

The correct approach is epitomized in many ways by the 1930s designs of the US National Parks Service, which used natural materials in a sturdy, simple way, reflecting their settings very well. Some later designs were overly 'trendy', and have become very dated as a result.



A design for a shelter, taken from the design manual prepared for the Civilian Conservation Corps and the National Parks Service of the USA in the 1930s. The style is simple and robust, and uses materials as close to their natural state as possible: round logs, wooden shingles and rough stone all left to weather naturally.

The succeeding chapters will concentrate on the design of facilities and artefacts, but as a broad concept it is relevant here to consider the types of materials that might best suit use in the outdoors. Without doubt, a fundamental criterion should be to use as much local material as possible. Stone is best in rocky landscapes; timber is appropriate, especially in forests, but also in most other places. Artificial materials such as plastic, concrete or stainless steel are not always out of place, but should be used with care in small amounts for particular purposes in relevant locations such as rural and urban settings, or associated with buildings, particularly their interiors. Some materials will work when least expected. Plastic-coated profile steel (a modern version of corrugated iron) works surprisingly well as a roofing material, usually in a range of dark colours. Dull iron or weathered, galvanized or 'Corten' controlled-rusting steel does not look out of place in the countryside, and can be a useful protection against vandalism.

The use and appropriateness of various materials for use in the outdoors are best explored using a couple of examples. The visitor centre at Glenveigh National Park in Ireland, recently constructed for the Office of Public Works (OPW) to the designs of Tony O'Neill, offers some interesting contradictions. The setting is a majestic, bleak, barren, windswept, empty valley amongst dramatic bare mountains. The narrow public road that takes the visitor there passes through a similar, virtually uninhabited landscape for some miles. In order to respect the character of the landscape, the concept sensibly places the building low down amongst the landform, so that it barely impinges on the view. The building is composed of a number of circular concrete pods, and is roofed in turf, thus becoming almost a part of the landscape. It houses information, displays, toilets and offices to service the many visitors who come there, and acts as a gateway to the park.

The design of the external layout incorporates many elements that are somewhat urban in form and material. The use of black tarmac surfacing, concrete kerbs, paving setts and steps and tubular metal handrails is questionable in the landscape setting. All these artefacts would be completely at home in an urban park but probably not a wilder setting such as that found at Glenveigh. There is little of the contrast that would otherwise mark a distinct change in the experience from that of city or managed landscape to that of this wild area. What is accomplished in the architecture is less happily continued into the external treatment.

At the heart of all design concepts where we want the landscape to remain dominant is the need to identify and respect the *genius loci*, the spirit of the place. This intangible quality is what makes places individual and special. It is what marks them out in the first place, and what makes them attractive to visitors. The designer must take pains to identify the *genius loci* and use it as a source of inspiration. It must also be respected and not compromised by the facilities created to allow visitors access and to protect the site.

An example of the *genius loci*'s being overlooked is at the Athabasca Falls on the Athabasca River in Canada's Jasper National Park. The waterfalls are dramatic, and have a strong attraction for visitors on a river that flows through some of the most majestic scenery in the world: the Rocky Mountains. The park is accessed along the Icefields Parkway, and a side loop from this road takes visitors to the falls as an incident along the route from Jasper to Banff. The waterfalls have cut through the horizontal layers of rock to form a ravine. Instead of providing a path to a lookout point to see the falls, a complex and monolithic series of steps, ramps and a bridge have been constructed. Their size is too large for the landscape, and they are of a very urban construction and finish. Although providing barrier-free access, the structures seriously harm the *genius loci* of the falls. Even though the location, being close to the parkway, is intended to be accessible for all visitors and is therefore 'roaded natural' in ROS terms, such treatment is out of all proportion to that which is appropriate. It would not be difficult to dismantle the structures and restore the landscape to its former glory, as well as providing more sensitive access.

The design of the visit

So far in this chapter the issue of design concepts most appropriate to the landscape setting has been considered, and how this contributes to the experience a visitor might expect. This issue should also be turned around and considered from the visitor's point of view. What do visitors expect from their visit to the outdoors, particularly in the facilities, help and information provided, to help them obtain the best experience and to persuade them to return? Many of the perceived problems that managers have are not from visitors behaving badly so much as their requirements being inadequately thought through, so that conflicts inadvertently occur. In this section the concept of 'designing the visit' as a sequence of events will be explored, together with actions and decisions made by the visitor, which can be helped or hindered by the manager. A typical example of the most common kind of visit—a day trip for picnic and walking to a particular place for the first time—will be used.



(a)



(b)

(a) The landscape at Glenveigh National Park, County Donegal, Ireland. The lake, bare mountains, subdued colours and natural textures present a character that should determine the use of materials and finishes. (b) Part of the external landscape around the visitor centre, where urban materials and finishes used in a fussy design are out of keeping with the character of the landscape as a whole.

A visit to an outdoor recreation facility does not begin when the carload of passengers rolls past the entrance sign into the car park. It begins when, prior to the occasion, someone decides they will make the visit. After several suggestions they decide to go to one particular area. In order to make the decision they must obtain information from somewhere or someone. Perhaps they have a leaflet, or perhaps a friend suggested the place. Either way, they will have some kind of image in their minds and an expectation of a wonderful setting in which to have an enjoyable time.

The next stage of the visit is preparation: packing the kit, the picnic and setting off. The journey from the city to the outdoor destination will be marked by a changing landscape. The city will gradually be left behind, the roads will become less urban, and the rural or wild landscapes will eventually appear. At some point the family will start to look for signs to lead them to the area. These should help them to prepare for the arrival, and will also heighten the anticipation of what is in store. The absence of advance warning signs may make the family anxious: are we lost? How far is it now? What if we overshoot the entrance? Signs that give good warning and allow a safe turn-off from

the road in possibly heavy traffic are essential. The quality of the landscape along the route, especially the last mile or so, is particularly significant: first impressions are those that count, and expectations rapidly fade if the general setting is of a poor standard.

At the entrance to the area, a sign reassuring the visitors that they are at the right place is important. A short drive into the area before arriving at the parking area helps them to wind down, and to become accustomed to the slower pace of the wilder landscape. This is especially valuable if the main highway was busy and fast. It also enables the family to look out for the actual point of arrival: the threshold where something of the landscape can be glimpsed as well as the car park itself. At that point an orientation sign can be helpful: where are we and where do we go? This can either help to negotiate a large parking area or be present when the family first get out of the car.

On arrival, the first basic requirement may be a visit to a toilet, depending on the travelling distance, the age of the children and whether there are any elderly people. Is there one? Where is it? Is it clean? Does it smell? are common questions. The toilet is frequently considered an important amenity, whose absence or poor quality can greatly diminish the experience of a visit. After that a chance to relax for a moment, stretch limbs cramped by the journey and let the children work off some pent-up energy (dogs as well) is often appreciated.

At this point the next thing usually needed is some information in the form of a display board, a leaflet or a person from whom the visitors can find out more on what there is to do. The information needs to be clear, accurate and brief, and conveyed in a friendly way that most people can understand. Symbols instead of words can be used to simplify the amount of material presented, while maps may be less meaningful than pictures for many people.

If the family want to eat something they may look for a picnic area. An attractive spot with some views but also with corners where a little bit of private territory can be established is ideal. Absence of litter, and possibly some picnic furniture that signals 'it is all right to eat here' and a choice of sun or shade will also help.

Once fed and relaxed, the family may perhaps wish to go off on a hike, or to try whatever other activities are available, or to just have a nap. The young children will usually need to be occupied if the parents want a longer rest. An area where they can explore and play safely can be helpful. This might involve active play, some learning through exploration and some social interaction with other children. Some families might use the visit especially for the purpose of adult rest and children's play.

If the family decide to go for a hike they may be capable of using a map to navigate their own route to a landmark or viewpoint. Many other people usually prefer a trail set out for them, and along which they know they will not be in danger or liable to get lost. Information on the choice of routes, their length, the approximate time it will take to walk



(a)



(b)

(a) The mountainous landscape of Jasper National Park, Alberta, Canada. (b) The bridge and steps over the Athabasca River at the falls are heavy handed and urban in design. The use of pale-coloured concrete conflicts with the ruggedness of the whole landscape, both the surrounding mountains and the cliffs of the river gorge.



Visitors to an outdoor recreation area may have different needs and limitations, all of which should be considered in designs from their point of view.

them and how strenuous they are, is important to help them plan the hike with consideration for the needs of young children, older relatives, baby buggies and wheelchairs. A pleasant day out can easily be spoiled if the hike turns out to be too long, too rough, or too steep, or if some of the party get too fatigued.

The trail should incorporate views, rest stops and varied scenery so as to make walking it a journey of discovery and a rewarding experience. There may be explanatory or interpretative material available for those who want to know more about the area, but the pleasure of the walk itself will be enough for many people.

After the hike, refreshment and visits to the toilet, the family might decide that they are ready to go home. Hopefully they have had exercise for the body and stimulation for the mind, and are relaxed and happily tired. The journey back and recollection of the visit, once at home, complete the experience. If they have had a good time the visitors may tell a few of their friends. If they have had a bad time it is possible they may tell more, advising people to stay away. If they picked up a leaflet this might be shown to other people, used to remind them to visit again, or just to help them recall the pleasure of a nice day out.

All aspects of any visit to pursue other activities can be considered in the way described above, and also from the point of view of a range of visitors: old, young, fit, disabled, men, women and so on. It is very interesting, if you are a professional recreation manager or designer, to visit an unfamiliar area and assess your experience stage by stage to see how well your needs are catered for in the design and management of the area. If you are a manager you can develop a checklist and put yourself in someone else's shoes, visiting your own area for the first time. It is surprising how many items for improvement can usually be found!

Chapter Three

The journey to the destination

In the last chapter, several key concepts to be applied to the design of recreation sites, facilities and artefacts were

considered. The need to reflect the character of the setting, to contrast and avoid urban qualities and therefore to use an appropriate and site-specific range of materials and finishes was emphasized. This concern for the setting and the experience that it helps to invoke was balanced with a concern for the needs of the visitors. The sequence of actions, decisions, impressions and feelings that actually constitute the experience of a visit are influenced by the setting, the facilities, the information and the ambience present in the visited destination. From this it is an easy and logical step to unite the needs of the setting and the needs of the visitors, and to look in detail at the layout, design and maintenance of the site facilities normally provided for each stage of a visit. Periodic monitoring of visitor reactions to facilities provided or charged is also important.

This chapter and the following 11 will cover all aspects of a typical day out in the outdoors. This day out will follow a similar pattern to the one described in the previous chapter. For reasons outlined in the introduction, sheets detailing or specifying standard items will not be provided. Instead, the main considerations and examples of what to do and what not to do will be demonstrated.

Anticipation

As briefly explained in Chapter 2, the visit starts with planning and the anticipation of what enjoyment might be gained from the visit in prospect. Managers and designers can influence this through the quality of information that is made available to the prospective visitor. Leaflets that promote attractions are commonly provided at tourist information centres, in hotels, in libraries and at a number of other places. Tourists are frequently bombarded with a wide range of leaflets, so that the choice of where to go may depend on the impressions conveyed by the cover and main text.

While wishing to present the destination in the best light in order to attract visitors, it is important to be honest in the information and images used. It is a terrible disappointment to be lured to a so-called attraction by information that overstates its charms. The letdown is something remembered for a long time, and is likely to discourage a return visit.

A big advantage of many of the destinations being considered here is their naturalness, their larger scale, and their scenic attractiveness. This can be put to advantage by using photos of seasonal colours and local features, which are often hard to overstate. However, the smaller-scale, more rural or urban fringe locations can be spoiled by badly designed and maintained facilities, which may be the first things seen on arrival.

On the road

The next stage of the visit is travelling to the destination.

Most people travel to the outdoors by car. In many places the distances involved and the lack of alternative transport methods make this unavoidable. In some cases float planes or boats are used. There are also places where access on foot, by bicycle, horseback or public transport is common, such as urban forests or country parks that are close to where people live.

Where the car is the normal mode of transport then the journey itself and the unfolding landscape seen at travelling speed are both part of the day out. If there is a choice, it is hoped that the visitors take the most scenic route, and this should be encouraged by promoting scenic byways or specially signed tourist routes. However, direct control over the landscape is exercised by those who own or manage it. If the route passes through a reasonable stretch of land in the same ownership or management as the destination then the sense of expectation can be influenced more directly, in the quality of the landscape seen along the route, and by the judicious use of signs.

The landscape along the route will change as the visitors progress through it. The change may be subtle and gradual, so that there is a slow realization that they are approaching the general area of the destination. This might be the case where the landscape is rural rather than wild, and the destination is an area set in this landscape. More commonly, there might be a distinct threshold where the landscape changes quite dramatically. This could be where the landform changes—the start of the mountains, the entrance to a narrow valley or the beginning of coastal scenery. It might be where the land use also changes—the entrance to a forest out of farmland, the change from managed to natural, undisturbed forest; the onset of heathland, coastal vegetation or open, unenclosed countryside

from enclosed agriculture.

Threshold signs

If the opportunity to manage the landscape begins at this threshold, or if influence can be exerted, then it may be a good idea to identify this in an appropriate way. This can be by using an obvious sign, such as is common in national parks, Forestry Commission forests and other designated landscapes. The signs can be simple, merely announcing that a special area is being entered, or they can be used to advertise and promote the attributes of the area and the organization involved, where this is permitted in local regulations.

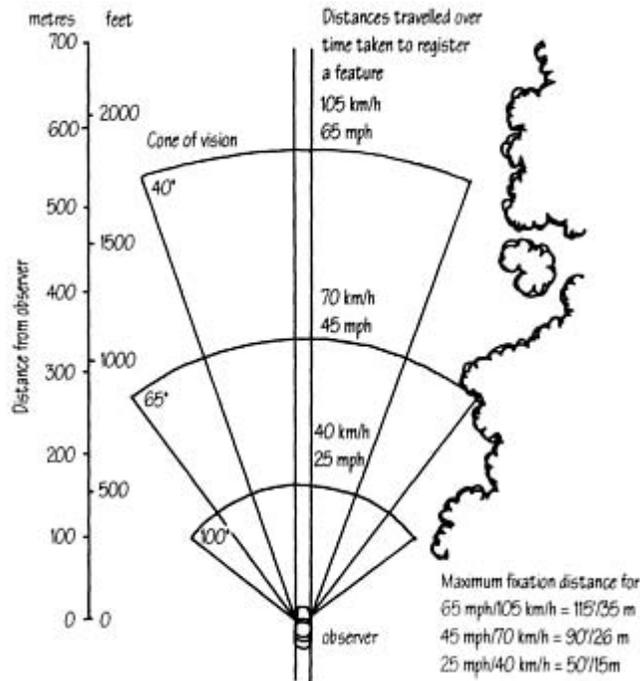
Many organizations have standard sign structures designed to be easily recognizable by their shape, symbols, logos and colours when seen from a moving vehicle. The typeface for the names is also usually of standard type. Variations may occur, but too much can confuse visitors if they do not recognize the name or logo of the organization and the destination. This aspect of corporate identity has three features. First, it maintains awareness of an organization as the provider of a particular product. Second, it gives messages about what kind of experience, its atmosphere and the quality of service are likely to be found at the destination. The third feature is a subliminal one: it could maintain the perception about a particular organization's doing a good job, providing value for money and thereby worthy of continued support.

Whatever the conclusions from the above observations, the design of a threshold sign should include the following features.

- .– It should be large enough to enable all the messages to be read at the average speed of passing vehicles. This table shows the size of letters so that they can be read easily:
- .– The name of the destination or area should dominate over that of any organization.
- .– The structure should be simple and sturdy, and its size and shape should fit the setting; it may need specific components to resist high winds or to deter vandalism.
- .– The structure should be positioned against a simple, uncluttered backdrop with a clear, unobscured foreground; it should not become an intrusive feature.
- .– Symbols or images of the landscape can be used to establish the identity of the area, but these need to be simple: almost caricatures of the salient points.
- .– The colours used for the structure of the sign should be chosen from the ranges found in the landscape, and should not be too bright or gaudy. Lettering needs to be contrasting, but structural components should be more subdued.
- .– Text and typography should be large, simple and clear, and should usually employ capitals and lower case. The constant use of capital letters can be difficult to read. Text should be depicted in light, bright colours to contrast with the duller sign structure.

Approach speed		Reading distance		Letter	height	
km/h	mi/h	m	yd	mm	(capitals)	in
	80	50	120	130		12
	80	50	90	97	225	9
	50	30	60	65	150	6
	30	18	45	49	115	4.5
	15	9	30	32	75	3
	15	9	23	25	56	2.25
	0	0	15	16	38	1.5
	0	0	11	12	28	1
	0	0	8	8.5	19	0.75

The landscape at the threshold can be managed so as to intensify the contrast and the sense of entering a special place—a 'pinch point'. A narrow, closed-in part of the forest; some large trees; massive rocks; a dramatic view of a landmark or portal feature—these are all examples of such thresholds.



This diagram shows how the speed of traffic along a road can be used to determine the scale of variation along the edge, the duration of views and the size of openings.

Roadside landscape design

Beyond the threshold, the landscape on either side of the road can be developed. This might include creating and maintaining views towards attractive components of the landscape, and managing the edges along the road. If the approach is through a forest there are opportunities to manage the trees: by thinning; by felling, to create spaces of different sizes and shapes; by pruning, to let light through; or by allowing sections to close in. In more open country the quality of the foreground in the vicinity of the road should not detract from the broader views. Fences, walls, earth banks, hedges or areas of trees should be well maintained. Occasional views towards focal points can heighten the visitors' sense that they are nearing the destination, and that their expectations are about to be fulfilled.

The roadside landscape must be developed at the speed at which the motorist is expected to drive. This determines how far ahead it is possible to focus on the landscape, and at what angle from the car it is possible to see it. Also, open views need to be of a minimum width in order to be seen; the faster the speed of the car, the wider the view needs to be. For example, a 1 second duration at 60 mi/h (100 km/h) requires an opening of 30 yd (27 m), while at 25 mi/h (42 km/h) the space need be only 12 yd (9.6 m) wide.

A survey of the road should be carried out by driving its length in both directions at a typical speed, noting features observable at that speed. A video recording is quite useful, because it can be used to check the location of features, and to time the duration of their appearance in view. If other vehicles, such as coaches or bicycles, or pedestrians use the same stretch of road then similar surveys can be carried out. Coaches give better views over the tops of fences, walls, hedges and embankments than cars do, while more detail is seen from a bicycle or by a pedestrian. If the general sequence of spaces is developed for the fastest travellers, then successively finer layers of detail can be added subsequently for slower ones.

As well as making the best of the landscape, it is also important to try to avoid or reduce the impact of intrusive features such as pylons, derelict buildings, transmitters and quarries. These can be screened if they cannot be redesigned, removed or otherwise blended into the landscape.

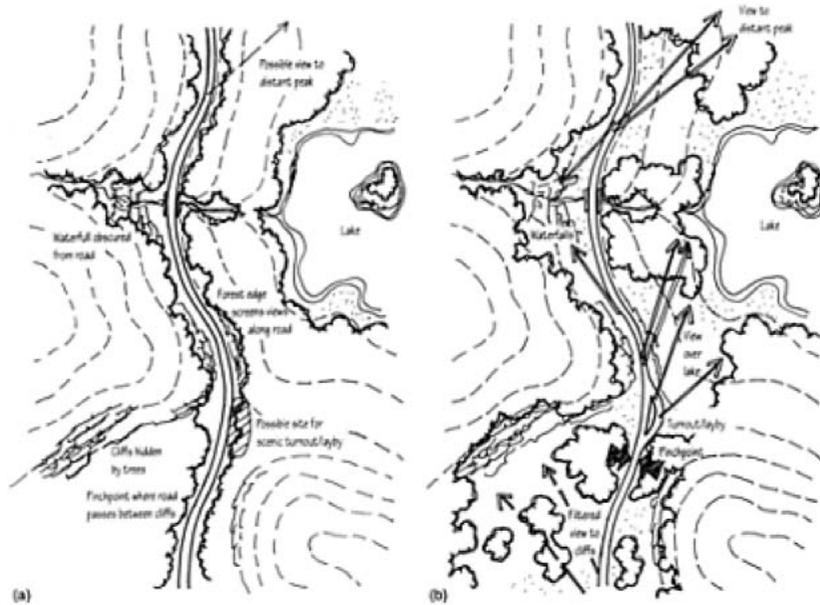
The entrance

The point where the visitor turns off the public highway, or emerges from a coach, railway station or other form of transport, into the specific area where the visit takes place is important for several reasons:

- The visitor is likely to be on land under your management from now on. He or she is your guest and deserves the right treatment.
- Because the visitor is on your land there are factors of liability for damage or injury to consider. Safety issues need to be included in the design and management of the area.
- The visitors have chosen your area to visit. The facilities that help them to have an enjoyable experience that matches their expectations, and the setting in which it will take place, are all bound up together.
- The entrance may mark the point where payment has to be made by visitors and collected by site staff.

The design of the entrance itself needs some thought. If the entrance is from a public highway on to an access road there are several factors that must be considered.

- highway safety, such as sightlines for vehicles turning out of the entrance onto the highway;
- the signs warning approaching drivers of the entrance, giving them adequate time to slow down and make the turn;
- correct surfacing at the entrance to ensure safe braking and to prevent loose material spilling on to the highway;



(a) The survey or inventory along a road, identifying features and views that might be exploited. (b) A design for the same stretch of road develops a sequence of different views, while varying the spaces along the route.

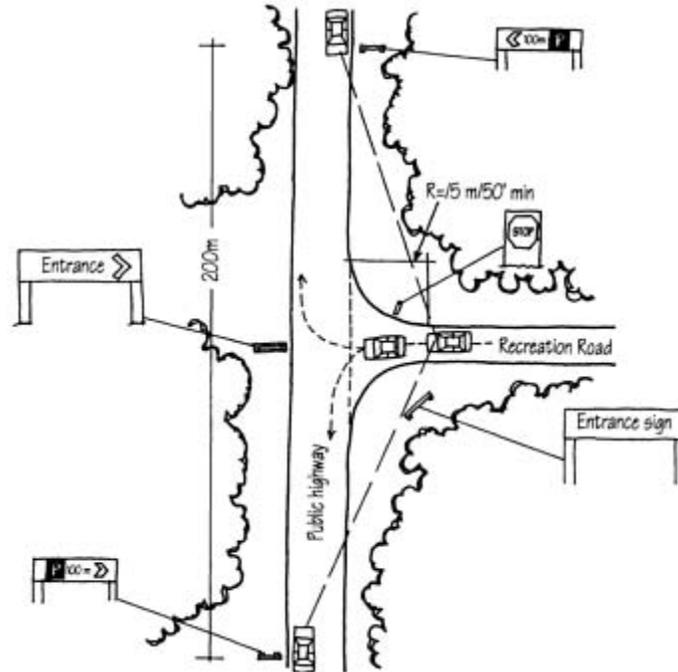
- signs and information announcing the entrance to the area, and reassuring visitors that they have come to the right place (fear of trespassing, taking the wrong road or getting lost can be significant factors).

Additionally, some succinct information indicating what visitors can do at the area, using symbols as far as possible, is helpful. Some important safety or regulating information such as fire risk warnings, which people need to be aware of as soon as they enter the area, should also be plain to see, although most of the information should be left until

deeper into the site.

Security requirements in the form of gates, barriers or cattle grids (guards), which are needed to help manage people and animals at particular periods, may also have to be accommodated. Their design will have to balance robustness with simplicity, the use of appropriate materials and ease of operation. Heavy metal barriers may be effective, but will look ugly and out of place in a wild setting, as well as being awkward for some people to use. Less intrusive methods, using reinforced lighter materials, may be possible.

The design and management of the landscape at the entrance should seek to unify the various signs and structures that may be needed; it should form an attractive threshold and set the standard for the setting of the main visitor facilities. Pruning of trees or shrubs and mowing of ground vegetation may be necessary to maintain visibility of signs and



The layout of an entrance to a facility from a highway should combine an attractive landscape with the safe movement of vehicles. Signs, sightlines and road geometry must conform with safety requirements to reduce the risks of accidents in often unfamiliar landscapes and foreign countries.

sightlines needed for access.

The capacity of the entrance should be based on expected visitor levels, length of stay and distribution over time as well as the type of vehicles likely to be using it. A significant length of the access road in the vicinity of the highway may need to be double lane to facilitate passing and queuing, depending on the traffic on the highway at peak time. Large vehicles, such as camper vans, trailer caravans and recreation vehicles (RVs), take up more road width and length and so may need greater queuing space.

If payment has to be made at the entrance, as is frequently the case in national parks and similar places, two-way traffic segregation, temporary parking ahead of the pay station and an exit loop for those visitors who change their minds at the last minute, may be needed. This should prevent congestion at the entrance during peak periods or complicated reversing to turn around across the flow of traffic. The location of pay stations should be far enough down the entrance road to prevent queuing back onto the public highway (see Chapter 5).

Pedestrian entrances should contain broadly the same elements: a gateway with signs and information, perhaps a barrier for closing the site, or special gates to keep animals out or in. If the entrance also acts as an exit to a highway then some sort of deflector device to prevent people, especially children, from inadvertently walking or running out into the traffic will be advisable. Management of vegetation and structures, and good visibility into the area, will maintain the sense of welcome and help to allay fears in those areas where some people are worried about being attacked or mugged. Signs to the entrance from the main directions of approach will usually be helpful to the visitor,

as will reassurance at the entrance with a sign or nameboard welcoming them.

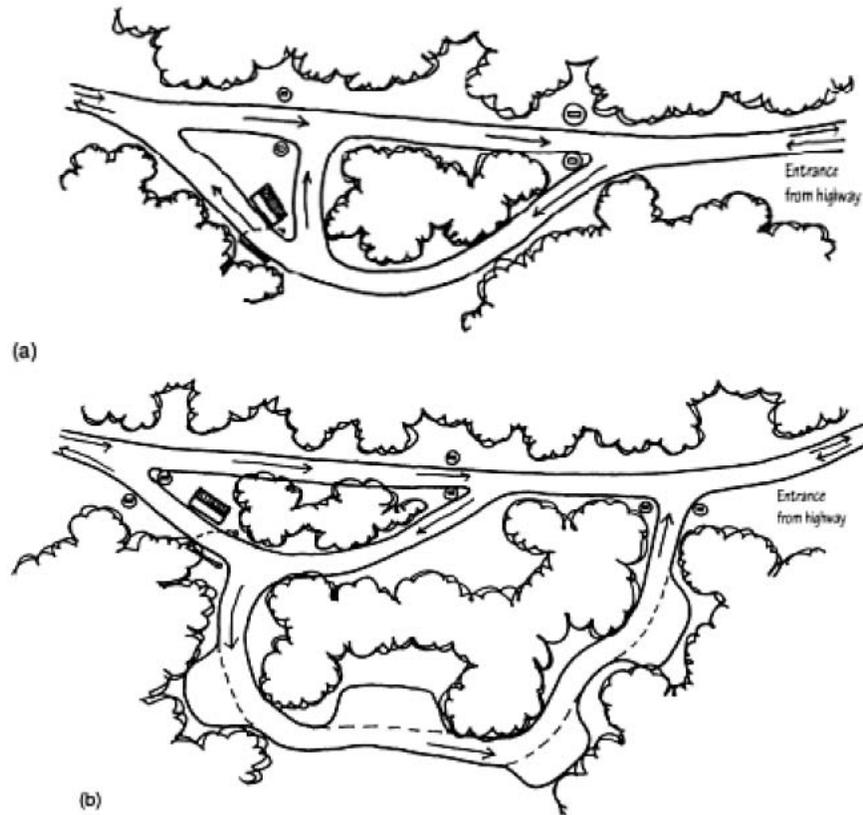
All entrances of this sort should be barrier free to people of all abilities. Any gates or other structures required to prevent animal access or unwanted use by vehicles such as motorcycles should be designed to be accessible by wheelchairs, strollers/pushchairs, small children etc. This means good surfacing, avoiding kerbs from highways and overly steep gradients (see Chapter 9).

The main entrance sign may be part of a sign system that includes the threshold signs described previously. The same design principles apply, although the sign may convey more information about the area. If the information is necessarily more than can be taken in at a glance while driving past, the sign should be beside the road in a lay-by or turnout, allowing first-time visitors to pull in for a few moments without holding up others who want to drive on. Ideally, the information should be designed so that drivers and passengers can read it without leaving the car. The height at which the sign is erected, the amount of information, the size of the typeface and clarity of maps need to be suitable for reading over 2 or 3 yards/metres from inside a car.

The wind-down

After having driven, often for long distances and perhaps in heavy traffic and stressful conditions, it takes a little time to adjust to the ambience of the outdoors. The adjustment can be aided by a stretch of road between the entrance and the first stopping point, such as a car park or scenic turnout, which helps the car occupants to relax a little, absorb the scenery and become used to the possible presence of wildlife near or on the road, walkers crossing or small children playing. The length need not be very long if space does not allow it, but even a short wind down can be very useful.

As well as benefiting the car occupants, the wind-down also helps to ensure that there is adequate physical separation between the main car parking area and the public highway. In Europe, where traffic is heavy, getting away from noise, pollution and physical danger to children and pets is an important issue. Noise may be difficult to avoid unless landform can be used to absorb it, but physical separation should be as great as is feasible. Even in remoter, quieter landscapes the drive down a winding lane from the highway can increase anticipation and the sense of mystery, as well as helping to slow vehicles down.



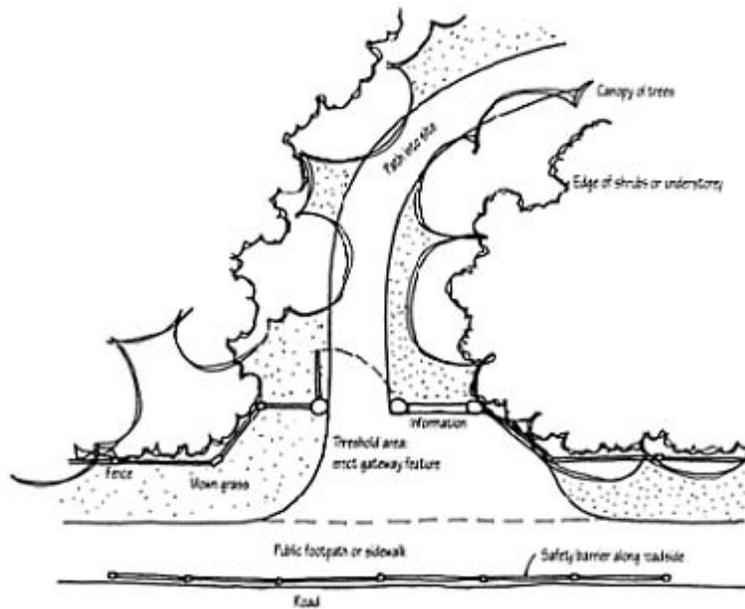
Two layouts for entrances with pay-stations. These show arrangements for the British, Australian or New Zealand driving side: reverse them for North America, Continental Europe etc. (a) In this example a loop allows people to leave before they pass the pay-station in case they decide that fees are unacceptable. The entrance can be closed while one-way flow control allows for people to leave after the entrance has closed. (b) Some parking for limited use is worth providing for local, frequent users or during the low season, when the main site is closed: shown here as a short loop off the entrance area.

The slower travelling speed can be achieved with a narrower road width, rougher surface and tighter curves, as well as speed limit signs. Glimpses of scenery along the road (see 'Roadside landscape design' above) can also be used to increase anticipation and reduce speed.

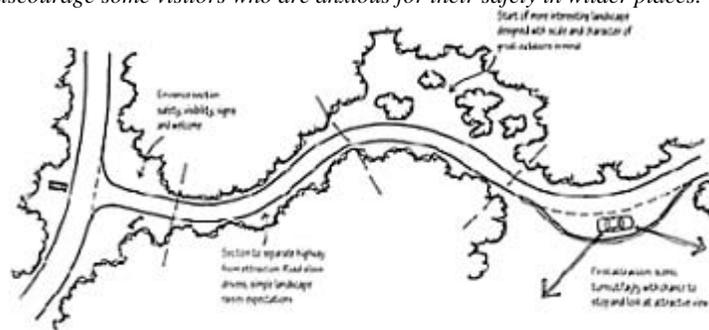
The arrival

The culmination of the journey—the arrival at the main destination—is now at hand. After all the careful development of the landscape and provision of information along the way, the first experience on arrival must live up to its promise. How this is handled depends on what is there. If it is a natural wonder such as a mountain range the visitor should be rewarded with a stunning view to a dramatic peak, unobscured by parked cars or other clutter. This technique can be used widely: for example, for a lake, canyon, grove of giant trees or sand dunes and cliffs.

A less dramatic destination should make the most of the features it possesses, perhaps even a building containing a visitor centre if one is present. The management of the setting can help, creating or enhancing a sense of *genius loci*, by reducing the impact of car parking, reflecting the qualities of the place in the use of materials and so on. It is at the point of arrival that the *genius loci* is at most risk, especially in places with subtle qualities. For this reason it is important to the subsequent design to consider the factors



A pedestrian entrance from a public road should present an attractive, unthreatening appearance. Information and safety near the road should be considered, while the visibility and attractiveness of the area should be maintained. Litter and vandalism may discourage some visitors who are anxious for their safety in wilder places.



The wind-down stretch of road helps the visitors to develop a more relaxed frame of mind, ready to make the most of their experience.



At this recreation area at the Pacific Rim National Park, Vancouver Island, Canada, the sense of arrival is given by the view of the shore, the waves of the Pacific Ocean and the backdrop of forest. Unfortunately, the impression is spoilt by the cars parked along the edge, which screen much of the view.

that contribute to *genius loci*, and to develop a concept for the site development around them.

The visitors should also obtain some impression of the organization of the site on arrival. Not everything there will be visible, but a reasonable degree of orientation is advisable. This can be achieved by, for example, a glimpse of the main attraction, the visitor centre or a picnic area, before the last stretch of access road turns into the car park. This is an old but effective device, which subtly reinforces the expectation just before arrival.

The general layout of the site should then be organized around the axes between the point of arrival and the main attraction, if there is one. The movement of people and their associated activities, from car parking and toilet facilities to picnicking, playing, hiking or whatever, needs to flow in an easy and obvious fashion. This is particularly important in heavily used sites with a large throughput of people. Congestion caused by confusion slows down the movement of people and reduces the carrying capacity of busy sites.

Chapter Four

Providing visitor information

At the point of arrival, some information is normally needed so that visitors can make the most of opportunities to enjoy their visit. This may be in the form of a leaflet picked up from a dispenser at or near the entrance or pay station, or in the form of boards or panels in a strategic location on the site, or both.

Information requirements

This information is part of the range of signs that are needed for visitor management. It is useful to develop a hierarchy of signs, starting with the threshold or entrance sign described in Chapter 3, and including orientation signs placed at the point of arrival at each facility, vehicle management signs and way markers. All these signs need to be properly planned during the comprehensive site design phase or at the time of major refurbishment. Each category of sign planning and design will be covered in subsequent chapters. An example of different sign functions is given here, developed by Scottish Natural Heritage. Any of the functions can be combined in a single sign. While the information board may not be visited and read until after parking the car, its location and use as a key orientation and visitor management feature can be so important that it is worth considering first.

From the point of view of the visitor, the information needs to convey the essentials about the site, such as the layout of different areas, the routes of paths and trails, special activity areas, toilets and campgrounds, hours of opening, codes of behaviour and any special dangers or safety information. This is the basic information to enable visitors to find their way around the site and into the landscape beyond without getting lost, straying into danger, trespassing or missing the best features. Additional information such as site or landscape history, interpretation of special scenic attractions or wildlife and natural history are secondary at this point.

The manager may also be interested in conveying certain information to visitors, such as rules and regulations, safety information, advice on footwear, equipment, registration before proceeding on trails into back country, any permits required for certain activities such as fishing, or warnings about locking cars and leaving valuables out of sight. There may be legal requirements to display by-laws, but all such information should be conveyed in as positive and user-friendly a way as possible. When the information is about protecting the environment from damage by trampling, fire, allowing stock to stray, feeding wild animals and so on, then a code of conduct is useful, such as the Country or

Description Function

Pre-arrival Advance roadside information.

Threshold Marking the main entrance to the area of management or ownership.

Orientation Helping people to locate themselves, perhaps before deciding where to go and

what to do. Direction Guiding traffic and pedestrian navigation. Identification Labelling a feature or object.

Information Displaying details of opening hours, events, facilities etc. Interpretation Revealing the significance of the landscape or an aspect of it. Regulation Displaying rules and warnings.

Forest Codes used in Britain. This invites the responsible cooperation of visitors, and offers them a 'partnership' with managers in looking after the environment. In remote locations this information may be vital to prevent inexperienced visitors from coming to harm, while in the urban fringe it might concentrate on avoiding damage to the landscape.

When providing information structures there are three components to the design: the message, the medium used to convey it, and the structure used for displaying it.

The message

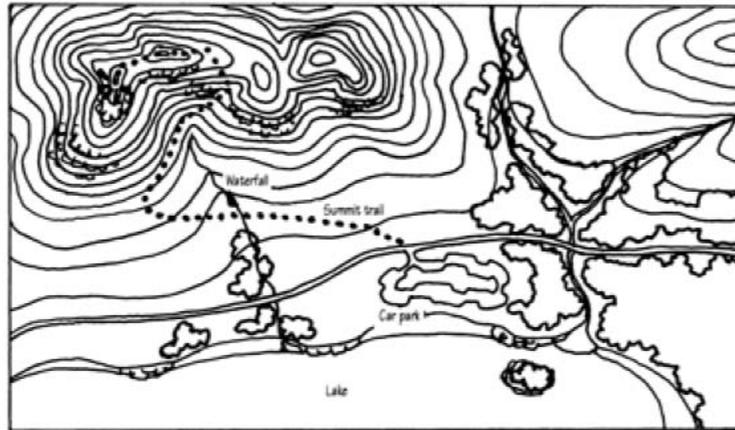
There are some basic features of any message: it should be short, to the point, and should use as many symbols, pictures, maps and diagrams as possible instead of words.

A map or maps showing the area being visited, the immediate site and any other smaller areas within the main area, such as a trail or special feature, are vital. Scales should be chosen to show sufficient detail and context without taking up too much room. A main map at 1:50000, 1:25000, 1:20000 or 1:10000 for larger areas, or 1:5000, 1:2500 or 1:1250 for smaller ones, may be presented, with inset details at larger scales. The cartography should be to the highest standard, with a linear scale, a north point, and an indicator of where the information panel is. Contours, roads and paths, forest and open areas, cliffs, viewpoints, rivers and lakes, buildings, boundaries and special features such as archaeological sites should be shown.

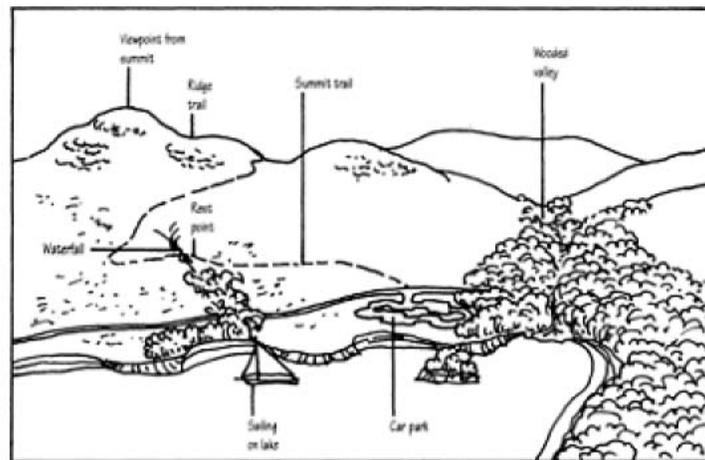
There is wide evidence to suggest that many people have difficulty in reading maps, even those of a high standard. The three-dimensional 'landscape view' map is often easier to interpret for many, and should be considered as an option.

The detailed site area should show the layout of car parks, toilets, picnic areas, the start of trails, play areas, water, boat launches etc. This might be diagrammatic or pictorial rather than cartographic in style.

In all cases, landscape features should be named, but most other features shown should use standard symbols as far as possible. The library of international symbols for different



(a)



(b)

(a) A generalized layout of an information panel using a map. Some people find such maps difficult to understand. (b) The same layout using pictorial information is more accessible to many people, who can gauge the scale of the landscape and a sense of its three-dimensional form.

places, activities, safety instructions and so on is now extensive and well used. Its use reduces the space required, and minimizes the need for translation into foreign languages.

Other information might concern the various activities possible in the area. This can combine pictures depicting these with short descriptions. Path or trail conditions, suitability for disabled people, recommended footwear, or anticipated duration would be the kind of information to give about a hiking trail, for example.

Information of a temporary nature might also be provided, such as fire danger rating, expected weather or water conditions, recently seen wildlife, warning of theft, lost property, work in the woods and so on. These can be posted daily in a special area.

Finally, the chance to welcome visitors and to ask for their comments is always useful. A phone number, a contact person or an address to write to can be provided. This gives unmanned sites a human touch, and offers some reassurance to those visitors apprehensive of wild places that they are looked after

The medium

To convey the message, a medium is required. There are two main possibilities: leaflets or signboards. Leaflets are

an important alternative or supplement to fixed signs. They can be reprinted annually with up-to-date information. As they are carried around by the visitors, they can be easily referred to at any time. Their preparation requires skill in graphic design and printing techniques, for which expert advice should normally be sought.

A fixed signboard, if chosen as the medium, needs to withstand a wide range of changing weather conditions, such as heat and cold or wet and dry. Accidental damage or vandalism may also take place. Hence materials need to be either robust, long lasting and durable, or cheap, easily replaced and short lived. Early techniques used to convey information were either some form of printed material such as paper protected by either glass or Perspex (Plexiglas), painted wooden panels normally routed (often freehand) with the information, or (later) the use of screen-printed panels. All these media are limited in their durability when placed in the open air. Paper gets damp, printing fades, paint cracks and peels, and all may be damaged by accident or vandalism and need frequent maintenance. In addition, some of these techniques limited the quality of graphic design that could be achieved.

The following paragraphs describe materials that can be considered.

Solid wood panels

Wood used outdoors always has the tendency to move or distort by shrinkage, swelling or warping as temperatures and moisture conditions vary. This poses problems for many types of printing, painting or graphic design. The choice of wood is important. Closegrained, slow-grown varieties of hardwood or softwood are preferred, as these are less likely to split and can be finished smooth for the application techniques described below. Durability is also important. Some species are naturally more durable than others although some, like western red cedar, are highly durable but not good for the application of printing, routing or sandblasting. Fir, pine, larch, oak or chestnut are among the better woods to use, although resinous conifers can cause problems for paint application.

The message can be applied using the following techniques:



(a)



(b)

(a) Information about facilities conveyed in text occupies a lot of space. (b) The same information presented using symbols takes up less space, is quicker and easier to read, and needs no translation into foreign languages.

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An example of an information sign provided at the Oregon Dunes National Recreation Area, Oregon, USA. Screen-printed on the reverse of Perspex sheets, this presents information in several ways: a map of the whole area, sketches of the range of activities, a view of a nearby attraction, and a message explaining the purpose of the area and its designation. This message starts 'Dear visitor', but appears to be signed 'Public Law 92-260'!

.- **Routing.** Text, diagrams and maps can be engraved into the surface using hand-held or computer-guided routers. These produce very fine lines and accurate reproductions of text types and symbols. The routed information can be left natural, or can be infilled with paint of different colours. However, routing is best used for simple graphic designs. Complex maps, for example, are beyond the scope of the technique.

.- **Sandblasting.** This method uses sandblasting to erode and cut away areas of wood between the letters or symbols, which then stand out in relief. The grain of the wood also becomes more obvious, often making attractive textures. The information is made into a mask, which is overlaid onto the panel surface before sandblasting. As with routing, the technique has limitations, and should be used for what it is best at: simple bold type, symbols or diagrams. The finished panel can be painted or left natural.

.- **Screen printing.** Smooth-surfaced panels can be screen printed in one or several colours. Quite fine detail is possible depending on the original surface quality. However, such printing weathers poorly unless protected by a varnish of some sort.



This sign structure, formerly at Grizedale Forest in the English Lake District, is an example of a once commonly used type. It is massive, made of many parts, and dominates the messages it bears. It is costly to build and to maintain. The information is crude, using hand-held routers or simple painting, which needs protection from the weather but cannot present much detail. This overdone design is now redundant with the advent of more sophisticated and durable materials.

Composite wood panels

Plywood is the usual type of composite wood panel that is used. Marine-quality ply is durable, less prone to warping than ordinary plywood, and does not shrink or split. It can be used as a base for laminate application (see below). Marine ply is often made from tropical hardwood, which might be an unsustainable source and therefore unacceptable under certain circumstances.

Enamelled steel

This is long lasting when undamaged, and can be produced to a very high standard. Good reproduction, a wide range of colours and fine detail are possible. This is an expensive medium, and when chipped it is difficult to repair properly. Stones or metal implements can easily chip it, and the steel base will rust quite quickly in the open air.

Glass-reinforced plastic (fibreglass)

This can be used to produce extremely durable panels in a variety of colours and finishes. It can be used as a base for printing or painting, or can be constructed with printed materials laminated into it (see below).

Perspex (Plexiglas)

Transparent unbreakable materials like Perspex can be screen printed in reverse so that the message is visible through the material. High-quality printing is possible, but the surface of the Perspex is easily damaged by scratching or gouging.

Laminated paper

Printed paper can be encapsulated in a hard-wearing resin to produce a durable and highquality result. The printing can include photographs, and if an ultraviolet filter is inserted the problems of colour fading in sunlight can be reduced. These resin laminates, when bonded onto a plywood or fibreglass base, are resistant to scratches or chips and can be repaired relatively easily. They are expensive but very durable.



This roofed sign structure from Finnish Lapland has recently been erected, but it repeats the mistakes of older examples. The ponderous roof is topheavy, casting shade on the information. The siting on the edge of the car park means that one quarter cannot be used. The information is densely printed with large amounts of text, which most people are unlikely to read. The structure was probably quite expensive to construct, but little thought seems to have been given to the quality of information.

All the sign types described so far can be quite expensive to produce, and many are designed for a long life. If the information is unlikely to change or become out of date they may be the most cost-effective solutions. If the information needs to be changed within two to three years of production it might be sensible to opt for cheaper sign materials of a temporary nature. One version is to laminate paper between two sheets of thick, clear PVC film, heat-sealing the edges. This can be damaged but it is very cheap to replace the whole thing, attaching it to a baseboard in such a way that it can be easily removed.

Sign structures

Early information boards erected by the US National Park Service or Forest Service have provided models that have been frequently copied elsewhere. They were substantial structures with a heavy framework set in stone-built bases, topped by a shingle roof to protect the information panels located beneath. Some shelter or shade was also given by the roof to those reading the information.

Nowadays, while shade or shelter may be necessary in some locations, it is often better to keep the structure as simple and unobtrusive as possible, thus concentrating on the message and reducing the number of artefacts that the site has to manage and maintain.

Natural materials usually fit best into the wilder landscapes, although metal structures can have a purpose. Any structures need to be sturdy, easily maintained and positioned so that the message can be read by all, including children and people in wheelchairs as well as standing adults of varying sizes. This means keeping the structure fairly low while maintaining its visibility on a crowded site.

The following materials can be used.

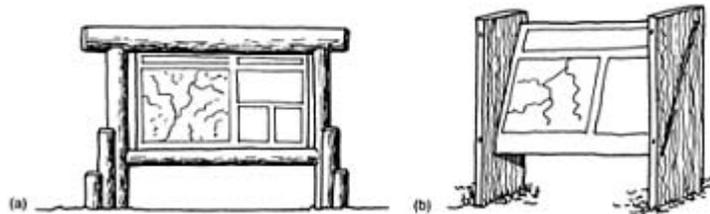
Stone

A substantial and robust structure can be erected using locally occurring stone such as boulders or quarried rock. A low wall upon which the signboard is fixed, or a plinth, can be built either dry or mortared. Mortar will make the structure stronger, but pointing should be recessed out of sight, so good workmanship is essential. Boards can be secured by bolts set into the rock or mortar, and the whole structure is very robust. It is best used in mountainous areas where rock is the main material, where digging post holes is difficult or where strong winds may shift lighter structures.

Alternatively, a flat surface can be cut onto a large boulder or rock face, the panel being anchored directly onto this; or the message could be sandblasted directly onto an appropriate rock surface, this latter technique being very effective.



A stone structure used as the base for an information sign. Although used in a forest this might be more suitable in an open rocky landscape where stone is a dominant material. The workmanship of this example is good, but there is wear and tear around the unpaved sides of the structure. Glen Affric, Scotland.



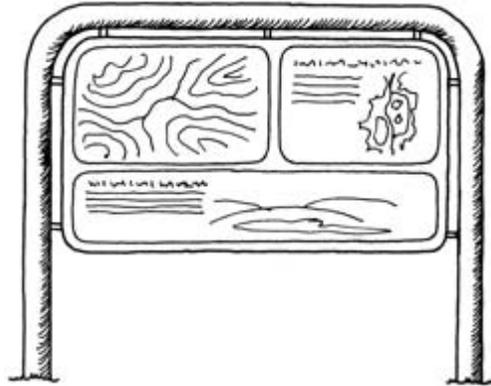
(a) Round timber can be used to build a sturdy yet simple frame upon which to mount an information panel. Here two deep slots in the horizontal members hold the panel in place, the top section being removed to extract the panel. (b) A structure using sawn timber, where the panel slides into place through slots in the uprights. Hidden bolts secure it into place. This design was developed by Forest Enterprise in Britain, and is used widely with laminated panels.

Wood

This is frequently the most common material, used either in the round or as sawn components. Round timber should be straight, cylindrical, of low taper and debarked. Large dimensions work best, especially in forests of big conifer trees. Upright poles with horizontal cross-members provide a simple framework. Panels are fixed onto this by recessed bolts, whose holes can be plugged to hide the nuts and tidy the end result.

In most other circumstances sawn wood, either hard or soft, is used. Once again, sturdy, well-proportioned members jointed simply with good workmanship are better than fussy composite units. Some recent examples include pairs of upright flat slabs between which panels are fixed using diagonal slots and hidden threaded rods with nuts at both ends. The fewer components there are, the better. This example has three.

Recent techniques use slabs of timber, singly or in groups, carrying routed or sandblasted messages. These look simple and unfussy in a wide range of settings, and require much less maintenance.



Tubular steel, either galvanized or of the 'Cor-ten' rusting type, can make a strong frame. A panel can be bolted to flanges fixed to the tubing.

The choice of timber to be used will partly depend on what is available, perhaps from sources nearby, and on its durability. Many species of tree are not durable in contact with the ground. Spruce, some pine, hemlock, birch, poplar, beech and ash are not durable, whereas cedar, oak, larch heartwood and chestnut are naturally durable. Many other species, especially pine and fir, are ideal when pressure treated. The chemicals used in pressure treatment—copper, chrome and arsenic—might not be appropriate, or might be considered unsustainable in some environments. A compromise might be to treat only those parts in contact with the ground. The rest of the wood can be left to weather and blend into the surroundings, or can be stained. There are a wide range of coloured wood stains on the market, many of which are of suitable colours to blend with different landscapes.

Metal

Galvanized tubing, enamelled or plastic coated structures can be used. The galvanized option will weather to a dull grey matt finish, which fits into rocky landscapes. Enamelled or plastic finishes are acceptable as long as they are undamaged, but work better in more urban areas. Where vandalism is common the galvanized tubing is a deterrent, as is the use of 'Cor-ten' steel, which weathers to a rust patina.

Composite materials

Laminate materials can also be used: for example, resin-bonded plastic-wood, or recycled plastic made into a material that can be worked like wood. These are also extremely durable and can be very cheap while actually looking better than initially might be expected.

Vandalism

There are many situations where vandalism might be expected. Not all are in urban or urban fringe settings. Many of the materials described above are sturdy and durable, and can be used with confidence in such places. Others can easily be repaired or repainted if vandalism is sporadic or rare. Materials such as Perspex, plastic-coated steel, enamel and screen-printed wood should be avoided in high vandal risk situations. The alternative of low-cost, temporary installations is well worth considering if information must be provided in high-risk areas.

Chapter Five

Parking the car

Having arrived at the destination, the visitor needs to park the car. The design of car parking has to take several factors into account.

– Cars may be left on the site for some time if visitors go off to hike a trail or do some other activity. Security of the car and its contents from theft, shade in hot weather, and the prevention of accidental damage from other car park users, ensure that the car will be protected until the occupants return. If people feel that their car is safe they will enjoy their experience more.

– Once the more relaxed landscape of the site has been reached, and the attractions of the facility start to divert attention, then car speed and disorientation should be reduced by laying out the car park with simple, easy-to-follow routes.

– Equipment such as bikes, boats, sailboards or other large objects often have to be unloaded. Space is needed around the car in order to get things out of the back or side doors, or off roof-racks, and put onto the ground nearby out of the way of other cars.

– People on the site are likely to be more relaxed, wander around more and be less vigilant, so that there may be some risk of accidents: from reversing vehicles, for example. Small children and pets may be particularly at risk.

– Sites may be used all the year round. Snow and ice, hot dry summers, rainy periods or other extreme climatic conditions may have to be accommodated in the use of materials, their durability and maintenance and the layout of the area with respect to drainage, snow clearance operations, dust and glare.

– The character of the landscape and the concept of contrast with the urban scene will determine how far the layout of the car parking will blend into its surroundings and reinforce the sense of difference. The Recreation Opportunity Spectrum or other planning tool should already have determined this.

How many spaces?

The first design consideration concerns the number of spaces and the types of vehicle required to be accommodated, as this may dictate to a large extent the type of layout to be adopted in the space available.

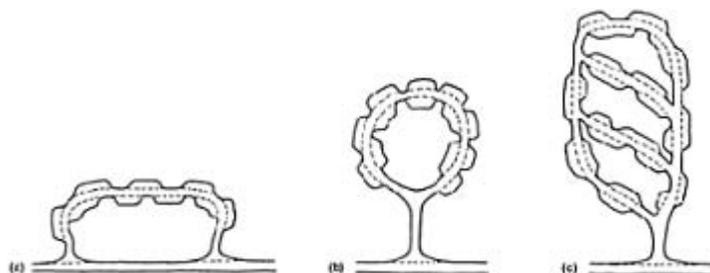
Accurate calculation of the number of car spaces required for a new facility is not possible, as the pattern and level of use will vary from one site to another. However, it is worth comparing figures for other similar sites and locations to obtain an idea of the right order of provision. Seasonal and weekly fluctuations in use also need to be assessed and some judgement made as to whether to cater for the busiest periods or average demand. On many sites there may be peak usage on certain public holidays that is significantly higher than the rest of the year. It is unlikely to be economic to cater for this demand, and so the provision of overflow parking may be a better option.

A formula has also been used to calculate the expected number of car spaces. It provides a rough guide in the absence of other information, but depends on the assumptions used to provide the initial figures:

$$N = \frac{v \times s}{p \times h}$$

where N =number of spaces required, v =number of day visits, p =average number of people per car, s =average length of stay, and h =average daily period for which the site will be in use.

The parking requirement may be complicated by other factors. In many areas coaches may be used to bring visitors to a particular beauty spot. In others, trailers for boats, kayaks, horses or trailer caravans may need to be accommodated. Such large or unwieldy vehicles have less flexible requirements for turning or manoeuvring, and take up more space per unit.



(a) A simple layout where a side loop is made from the access road. Bays to accommodate varying numbers of cars are made along either side of the loop. (b) A loop that can operate on a one-way system from a main access or public road. The circular shape would be varied in practice to take account of local terrain, trees, rocks etc. (c) This version contains several sub-loops accommodating many more cars, and is suitable for busier sites. It should operate on a one-way system, and can be laid out for either left-hand or right-hand driving sides.

Types of layout

The type of layout will also depend on the space, the terrain limitations and the budget available. Generally the layout should respond to the terrain and the shape of the landform. This will help to ensure that the least impact is caused by cut and fill; that the landform can be used to create irregular, naturalistic layout shapes and to help screen vehicles from external views; and to ensure that easy grades and good drainage can be achieved. To make the best use of awkward terrain, more travelling surface may be needed per parking bay. This may increase the overall cost but may make maintenance easier.

A linear layout to avoid is one where the road is positioned on the main attraction or view with an avenue of cars on either side. This puts the cars before the view and is very intrusive.

In forested areas it is frequently ideal to disperse the parking amongst the trees. In this way the ambience and character can be maintained, shade can be provided during hot weather, snow can be intercepted during the winter, and the impact of the whole can 'lie lightly on the land'. Damage to tree rooting can be avoided by careful construction and the use of porous surfacing materials.

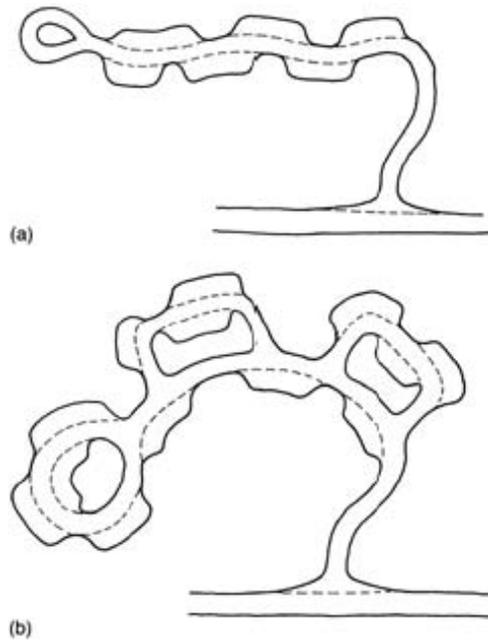
Vehicular circulation can be one-way or two-way. One-way traffic is generally easier to control and safer for all concerned. The following examples of different layout plans are suitable for a variety of circumstances. The precise setting out needs to be adjusted on the ground to accommodate local landform variation or the precise position of trees, as detailed site surveys may not be carried out in many circumstances.

Loop layout

This is usually a one-way system, but may be two-way if need be. The simplest layout consists of a loop road along which are spaced bays capable of holding between three and seven cars. These may be all on the one side of the circuit (either exterior or interior) or on both the exterior and the interior sides. In the latter case they should normally be staggered. Multiple loops may be used in various combinations, depending on the site and the capacity. Such car parks tend to fill up from those areas nearest the main focus of the site, so the layout should allow for short alternative loops so that cars do not have to go right round again if part of the parking area is full. The advantages of this type of layout include the ease with which it can be extended, either by enlarging parking bays or adding extra loops. It is often a good idea to plan for additional parking from the outset, so that if demand increases quickly, enlargements can be made quite easily without a major redesign.

The loop layout is especially suited to fairly flat forested landscapes, where the road can wind its way amongst the trees and bays can be tucked in between them. It does require a significant amount of room, although quite dense layouts are possible in more open landscapes.

Loop layouts are also good when passengers need to be dropped off from coaches. A drop-off zone can be provided near the focus of the site, and the coach can then be driven to a special parking area away from most of the cars. This prevents coaches from dominating the site or becoming a safety hazard. Equally, where boats or other large equipment need to be delivered they too can be located in a special storage area on the access section before the empty vehicle moves on into the car park. One requirement is that longer vehicles or those with trailers need larger bays, which must be clearly identified: pull-through parking is not so easy to accommodate with this layout.



(a) This linear layout is suited to terraces or side slopes, where it is aligned along the contour. A turning loop is provided. The layout must operate a two-way traffic system. (b) This version has greater capacity, with small loops giving greater bay numbers and the use of the turning loop for parking.

Linear car park

Linear car parks are often better suited for restricted terrain, for example along a river bank terrace, on a ridge top or along a lake shore. A two-way access road has parking bays along it on one or both sides, with a turning area at the far end. This layout is suited to places where good views can be had from each parking bay, where a long frontage is attractive and helps to spread people out for activities such as fishing or boating. Landform, such as a natural terrace, can help to fit the car park into the landscape and reduce its impact. A second variation of this type is to provide small side-loops off the main spine road. This makes turning easier, particularly for trailer-towing vehicles. Oneway linear layouts can be designed with a separate exit road back to the entrance, in effect using the public highway to close the circuit.

Area car park

This is the more common urban type of layout, where an area is surfaced and divided into sections for parking or manoeuvring, perhaps subdivided with patches of trees or shrubs or surface markings. This type is the most compact, and uses least ground. It is suitable for smaller sites or where intensive developments such as a visitor centre have a high turnover of large numbers of visitors. It is also easily maintained when, for example, snow has to be cleared, except that large amounts of snow have to be disposed of somewhere. Security is easier with this type, as more cars are visible and more people are generally around. Hence it might be very appropriate in some urban fringe situations. This layout also enables pull-through spaces to be incorporated more easily for vehicles towing trailers. This avoids reversing, with its attendant problems and danger to pedestrians. The shape of this type of car park can be made less geometric and urban by creating irregular, more naturalistic outlines, and the impact of its size can be reduced by breaking it up into smaller subsections, with vegetation and/or earth mounds.

These basic car park layouts can all be multiplied, extended and modified to suit the design requirements. When planning the layout it is a good idea to think of how the car driver will use it, what circulation problems may arise, and how the layout relates to the siting of all the other requirements such as toilet blocks or trail entrances, as well as respecting the character of the site.

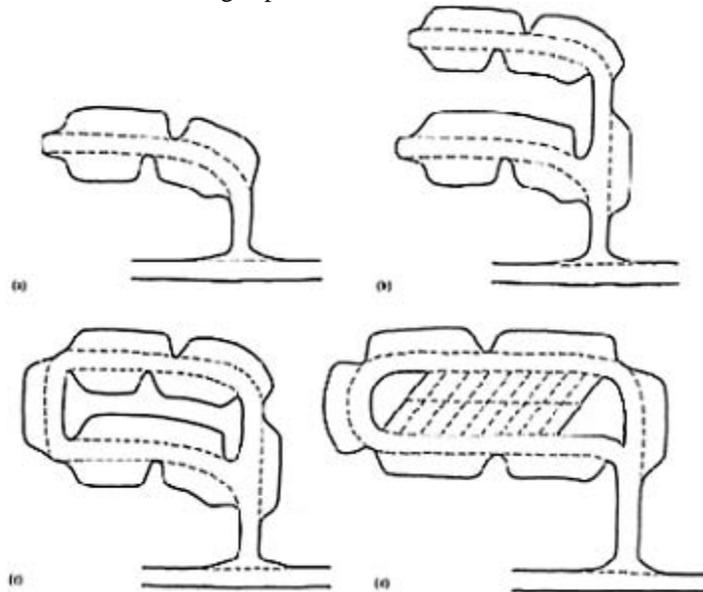
Parking design

Once the planning aspects relating to site layout, vehicular circulation and management of the expected vehicle types have been dealt with, then the car park designer will fit the layout to the landscape and decide on the appropriate use of materials, vehicle barriers and direction signs.

Parking Spaces

In the loop and linear layouts, where parking bays adjoin the sides of the road, the best arrangement is to make bays that can accommodate anything from three to seven vehicles parked at right angles. Because of the importance of the setting in the more natural landscapes, and the need for more space around each vehicle, it is better to give a generous space allowance per car.

The following design assumptions should be made for each car parking space: Parking spaces at right angles to the road are more economical of area, although spaces



(a) An area car park where the scale of parking is partly broken up by small indentations, perhaps of trees. It is a very cost-effective and denser parking layout. (b) The basic layout can be extended. (c) Instead of two separate arms the two are linked with a space divider to break up the mass of cars and allow for level changes. (d) This layout allows for a number of pull-through spaces, which permit trailer-towing vehicles to park without reversing. This version is set out for lefthand drive countries. The reverse would be used in Britain or Australia.

set parallel may be used in certain circumstances. Either type is acceptable for one-way or two-way traffic. In one-way circulation patterns, parking in echelon to the road is also possible. This is also economical of area, and prevents cars from inadvertently driving the wrong way around a one-way loop.

The parking spaces are set within bays whose outline needs to be designed to blend into the road shape and features of the landscape. A curving design works well with flared outer edges running smoothly into the road edge. This reduces the regularity of the geometry, creating instead a series of flowing lines and shapes, which can be fitted into those of local landform and amongst trees. This shape is also useful for construction and maintenance purposes, especially where unpaved or gravel surfacing is used, which needs occasional regrading or rolling.



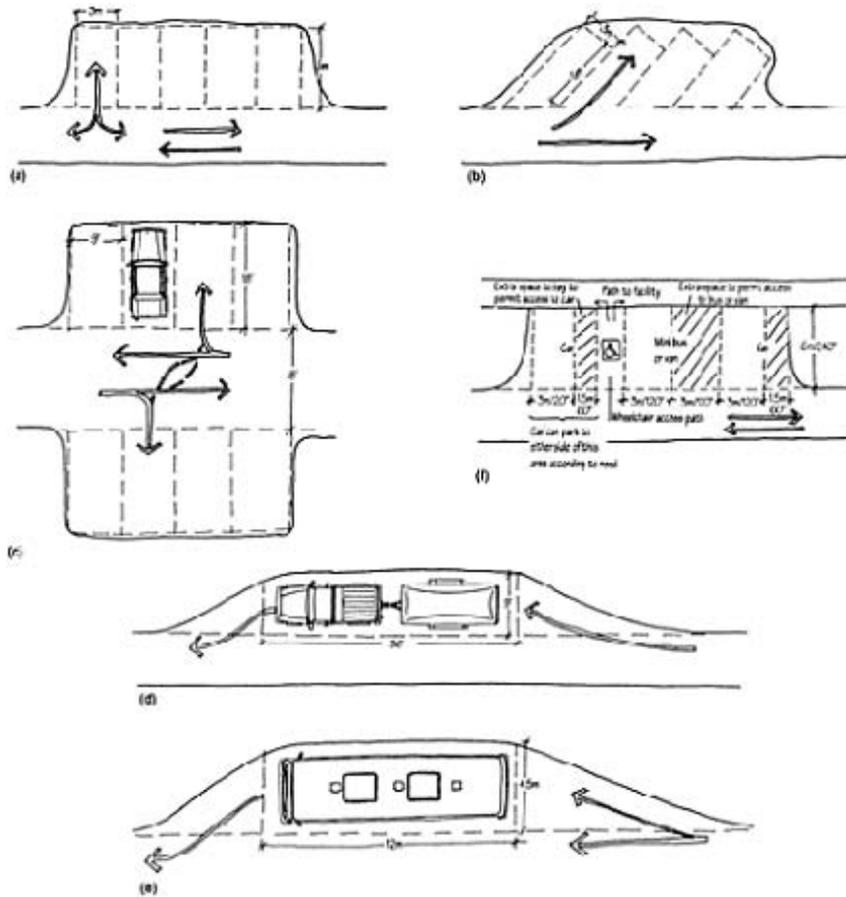
This area layout at Mount St Helens, Washington, USA, uses a natural bench in the landform to accommodate the parking. Small islands help to break up the parking and establish the vehicle circulation. Pullthrough bays are provided.

Space

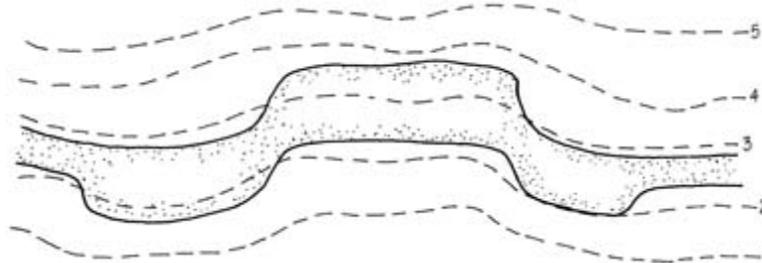
Vehicle	Length		Width		Road width	
	(m)	(ft)	(m)	(ft)	(m)	(ft)
Car	6	18	3	9	4.6	14
Mini-coach	6	18	4	12	6	18
Coach	12	36	4.5	14	7	21
Disabled car	6	18	3.6	12	5	15

If the bay is slightly bigger all round, the notional spaces within it do not need to be marked, and if the parking is looser than in urban areas this does not normally matter.

Designing the parking area into the setting is usually best done on the ground. The general alignment of the access road should be laid out to minimize cut and fill and to wind gently amongst the landform and/or trees. Parking bays should, as far as possible, be located in hollows or other places where only minor excavation is needed, such as on the slopes above the road. This ensures that the cars are always nestled in amongst the landscape, thus reducing their visibility and impact. Using the cut material to build up bays on the slope below the road should be avoided unless mounds can also be created to give some screening. The cut material should be taken off site, or used to make mounds that reduce the visibility of vehicles further and prevent them from driving onto other



(a) British and European parking dimensions for the more generous scale needed in the countryside, for right-angled parking and two-way traffic. (b) The same dimension takes up more space with en echelon parking for one-way traffic. (c) American dimensions are actually smaller than British ones, despite the generally larger car size. It would be sensible to adopt the British/European variety, with its roomier sizes and less formal result. (d) A parallel parking bay with dimensions for American long vehicles such as trailer-towing cars. (e) European dimensions for coach parking and other long vehicles. Once again these are more generous than the American sizes. (f) Dimensions for parking for people with disabilities.



This diagram shows how to use the contours to minimize cut and fill. The bays either push up into hollows and concavities or extend down onto spurs or convexities.

parts of the site (see below).

One circumstance where parking in prominent areas is acceptable is to give a view to people who cannot reach a proper viewpoint, perhaps through age or disability. In this case earth mounding or planting can be used to reduce the intrusion of the vehicle. When designing the car park amongst trees it will be necessary to remove some trees and

keep others. Any disturbance to the site and creation of gaps in the canopy may cause problems of wind damage later on. Thus trees to be kept should be of stable, well-rooted species, and should be in locations where root damage or alteration of the water-table will be at a minimum. A good tree canopy over the parking area is ideal in many situations, as it keeps the cars screened from views into the site and gives shade in hot weather. The choice of trees to be kept and the location of bays in relation to those trees should aim to maximize shade at all times of the day but especially at or shortly after noon in summer when the sun is usually at its hottest. Shady trees also reduce glare or reflection from cars, which might otherwise increase their impact and intrusiveness. Any dead, decayed or diseased trees should also be removed before construction so as to reduce the risks of falling timber or branches during construction and subsequent use.

Parking for visitors with disabilities

The layout of the parking area, bay markings and location of facilities should take account of the needs of visitors with disabilities. Usually a number of bays should be reserved for their use, located as near as possible to the main features, the toilets, access to other areas and so on. People with disabilities need more space around their vehicle for moving equipment like wheel chairs in and out, for transferring themselves to wheelchairs from car seats, and for slower movement generally. Kerbs should be flat, surfaces firm, smooth and level and gaps in barriers sufficiently wide to allow wheelchairs through them comfortably. Signs showing the standard disabled symbol should be placed at the centre point of each bay to signal to other users that the parking is reserved for users with disabilities only, and to show drivers of cars permitted to use this parking where the bays are if no surface marking has been provided.



Urban materials and finishes used in a wild setting: sealed surface, white lines and light-coloured concrete barriers. 'Big Four', Mount Baker-Snoqualmie National Forest, Washington, USA.

Surfacing materials

There are two main options available: sealed (paved) or unsealed (unpaved) surfaces. The choice depends on the following factors.

The expected wear and tear and thus the maintenance cost

Unsealed surfaces are cheap to install and maintain if this needs to be done only infrequently. Sealed surfaces are expensive to lay but need little maintenance. Unsealed surfaces can be made with locally won material, which is frequently cheaper.

Appearance

Natural materials, especially those from the site or nearby, can reduce impact and blend into the landscape. Used for unsealed surfaces they also present a coarser texture than sealed surfaces and so tend to fit better into the wider landscape. Sealed surfaces such as bituminous macadam or asphalt are darker in colour, usually black, and very fine in texture. However, this can be ameliorated by using a spray-and-chip top layer (tar spray with spread and rolled chippings) of local material. The same technique can also be used on an unsealed surface in order to improve wear and tear. This is the kind of surface finish commonly used on rural roads in many places. The spray-and-chip finish can be added to the access road but not the parking bays, where wear is less. The slight difference in texture and colour then helps to delineate the two areas.

Climate

In hotter, dry areas dust from unsealed surfaces can be a serious problem all through the summer. Any vehicle travelling even at slow speeds tends to throw up dust, which is very uncomfortable when breathed in or deposited on skin or clothing. In other places a very wet climate may result in frequent potholing on unsealed areas with much reduced surface quality. Snow clearance in winter may be necessary, and unsealed surfaces are more easily damaged by snow ploughs than smoother, sealed ones.

Distance from sources of material

Stone, tarmac and asphalt are expensive to transport over long distances. When budgets for recreation provision are limited it makes sense to use locally won materials where these are cheaper and suitable for the degree of wear and tear expected.



Unsealed surfaces can be subject to heavy wear and tear, erosion, potholing and puddles unless regularly maintained. 'Sheepwash', North York Moors National Park, England.

Expected degree of use

In remote, lightly used locations the lower wear and tear expected will favour unsealed surfaces; the converse will apply at popular, heavily used areas. This also applies at shortstay facilities, where the turnover of visitors means that the surfaces are likely to be heavily used by vehicles.

Location

If the ROS is being followed then the remoter, wilder areas will favour unsealed surfaces, whereas in the more urban settings sealed finishes will be more acceptable. It may also be appropriate to use unsealed surfaces near urban areas to emphasize the more relaxed, rural or wild setting and atmosphere being created.

Drainage

Surfacing must include proper attention to drainage. Sealed surfaces produce more runoff, which has to be channelled away. Expensive pipe drains can be entertained only on large developments. Laying the surface to gradients allowing run-off into french drains (rubble-filled ditches), into open ditches or over the surface of nearby areas may be acceptable instead. Care must be taken to avoid drainage water flowing directly into streams, as the silt and pollutants (oil, fuel, and exhaust particles) could be harmful to aquatic life.

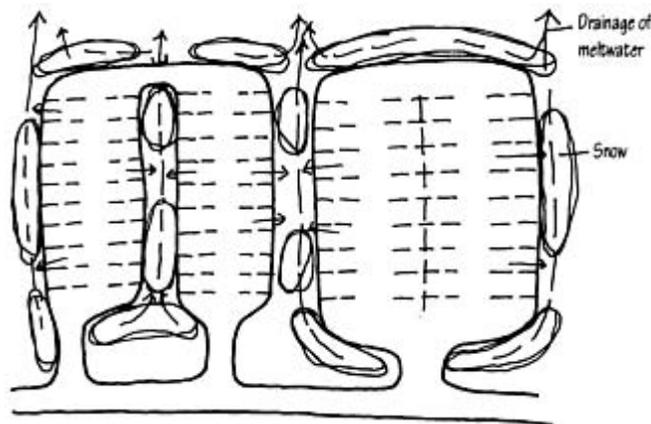


Diagram showing how snow storage can be designed into the car park layout together with the meltwater drainage.

Unsealed surfaces also need to be kept drained, although water may percolate through them to a greater degree. Good gradients across the area are needed, but areas to be drained should be broken into sections to avoid the danger of erosion, particularly during heavy rainstorms. Unsealed surfaces can be prone to washout. Excess water in the structure of the road weakens it and can make it more prone to structural failure under heavy loads such as fully laden coaches.

Construction

The car park construction will normally include a certain amount of excavation, which should be done in stages. For example, turf should be stripped and stored, followed by topsoil removal and storage, and then subsoil should be excavated to a depth to create the road and parking bays with the appropriate gradients for drainage. Roots, wood and other organic material must be removed. The rocky base material for the car park can then be laid out and rolled to a sufficient depth for the strength required. Hard rock, crushed and angular in form to include all sizes down from 50 mm (2 in.) to dust should be used. Then the surfacing is added, either the sealed paving or unsealed material, which will be similar to the base. Lastly, the preserved topsoil and turf can be used to cover excavated surfaces and to tidy

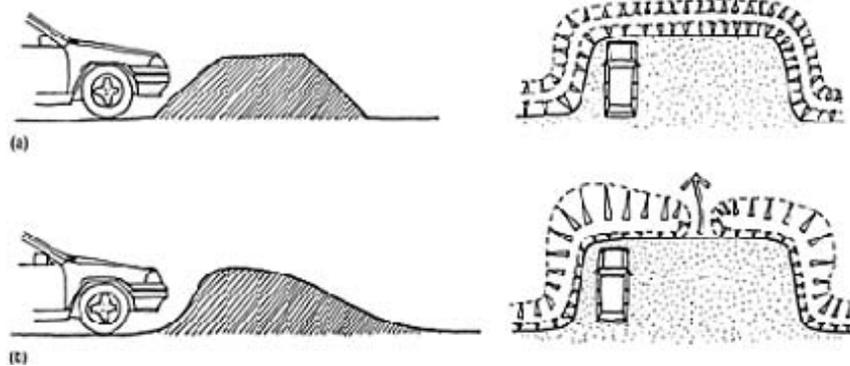
up the road and bay edges. Zones where no traffic or materials storage is permitted should be fenced off. Care will be necessary in the vicinity of trees to be retained on site. Soil should not be built up around the bases of trees. The drainage should not seriously affect the degree of water received by the trees or alter the water table.

Excess excavated material can be used to make mounds (see 'Vehicle control' below), spread over areas to be grass seeded, or taken off site to be disposed of in an approved way.

Vehicle control

In many areas the landform and open nature of the site are such that there is nothing to stop vehicles from being driven off the road or parking areas and into other areas. This is usually undesirable because it poses dangers to pedestrians, and causes damage to soil and vegetation. Access into the hinterland may cause all manner of problems. Visitors with four-wheel drive vehicles and motorcycles are often tempted to go beyond the car park, while ordinary cars may well be parked off the surfaced areas during busy periods. Where the natural terrain does not prevent such access, control devices are needed. All need openings sufficient to allow wheelchairs, prams and baby buggies through. Few will restrict motorcycles, but all will restrict cars and most all-terrain vehicles.

The following types are most commonly used.



(a) A plan and section of a poorly designed earth barrier. It is too symmetrical and angular in form. (b) A better-designed barrier, asymmetric, rounded and blended into the local contours. It also allows a way through into a picnic area beyond.

Earth mounds

These can be constructed from spare excavated material. They need to be steeply graded on the side facing the parking spaces, and should be graded into the landform on the other side unless they are intended to resemble hedgebanks or similar rural features. The steepness and height are essential to prevent four-wheel drive vehicles from climbing over them. In confined areas the face nearest the parking can be constructed of timber or stone revetment. Trapezoidal-section mounds should be avoided as these look too engineered. The mounds can be sown, planted or turfed with appropriate vegetation. If they are of a height similar to that of the bonnet/hood of the cars the mounds will help to screen them from views back to the car park. Trees can also be planted, which will hide the cars further and provide some shade and shelter. The gentler slope of the mound can also be used as informal seating.

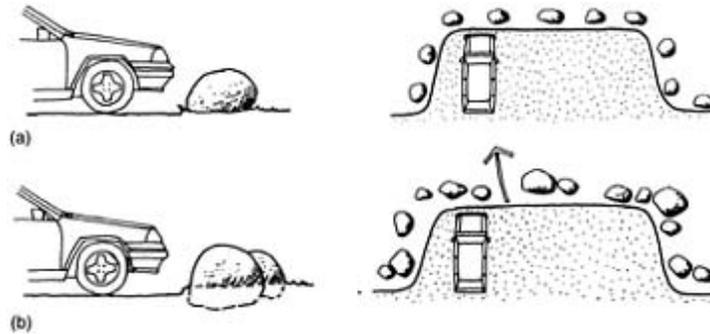
Rocks

In areas where rocks are commonly found, either as individual elements or as outcropping, they can be used to make very suitable barriers. Large rocks can be dug into the ground so that they look fixed and are difficult to shift. They need to be big enough so that high-chassis vehicles cannot attempt to drive over them and so that any cars that accidentally bump into them do so with their bumper and not their sump! Rocks look better placed at irregular distances apart rather than in equally spaced rows. If some of the rocks have flatter tops they can make informal

seats.

Log barriers

Simple, stout barriers constructed from thick, straight logs placed on two short, upright posts of similar dimensions and set fairly deeply into the ground are quite effective. Varying the length and direction of barrier sections enables them to be aligned in different ways to follow the outside edges of the parking areas. Solid debarked logs should be used, sufficiently thick to be both physically and visually strong. The wood can be left to weather or can be stained to blend into the landscape, although the logs do need



(a) Poor design of rock barriers: too even in size and spacing, parallel with the bay edge and sitting on the ground. (b) Here the rocks vary in size, spacing and alignment and are partly sunk into the ground.



Horizontal log barriers of large size laid close to the ground are effective and fit into this wooded landscape of large trees.



This diagram shows how to lay out and construct log barriers. Their height should match that of most car bumpers.

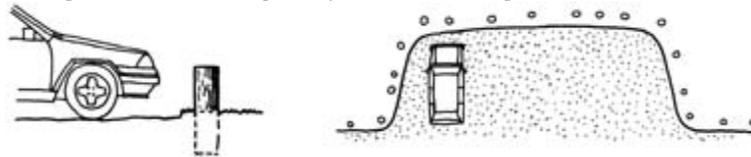
to remain visible. They should be set at car bumper height, which also makes it difficult to lift a motorcycle over them. If vandalism is a problem the logs can be protected against chainsaws with a wire inlaid along their length on at least two sides.

Log posts

Stout wooden posts can be set into the ground at suitable intervals following the edge of the parking areas. They should be of large diameter, set fairly deeply into the ground for strength and slightly angled at the top to permit water to run off. Spaced at slightly irregular intervals they look especially good in forested settings. Their height should be slightly above that of the average bumper.



Log posts set into the ground work well, especially in wooded settings. Near Hilversum, Holland.



This diagram shows the layout of log posts. Their spacing is important in order to prevent small vehicles from slipping in between them.

Hedges

A hedge planted on a low mound is not so physically strong but is an attractive and effective screen, which can save space. A wire or post-and-rail fence can be used while the hedge is becoming established. Once the hedge is established it should be a suitable barrier in more rural settings.

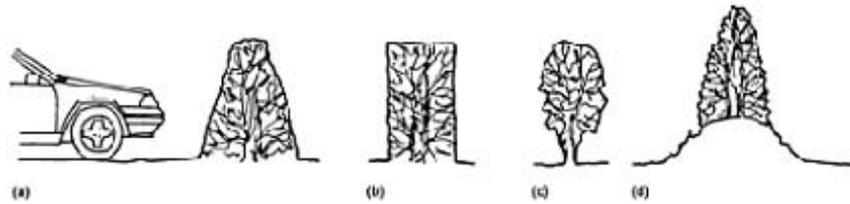
Walls

These can be very effective as screens and physical barriers. Drystone construction is traditional in many rural landscapes, while mortared stone is appropriate in more urban settings or near buildings or other structures. Local stone which weathers usually fits the setting admirably.

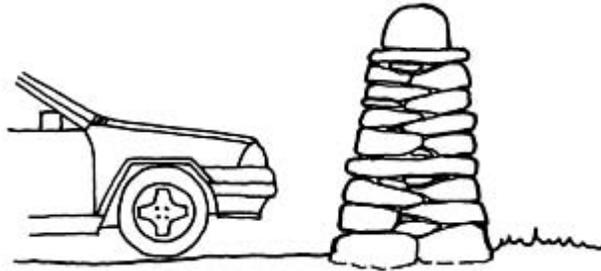
Fences

Post-and-rail or other traditional constructions can also be used. They may not prevent determined people from

breaking through them, nor are they so visually useful. They are best in rural settings where such forms are appropriate and robustness is not required.



Hedges used as a barrier. Their structure is important: (a) A tapered section is easier to maintain and keep dense at the bottom. (b) Square shapes are difficult to trim properly at the top. (c) Poorly trimmed hedges lose their lower branches to become thin and transparent. (d) A hedge on an earth mound is both physically and visually more effective.



A drystone wall makes an effective barrier in areas where they are traditional. They are easily repaired, and will last a long time if left undisturbed.

Vertical board-on-board fencing provides a visual screen where this is needed. It will usually be appropriate to use a range of these barrier types on many sites. The sight of one type of barrier used extensively can be overpowering. Rocks in mounds, mounds with posts in between, barriers alternating with posts and so on all give variety. Also, the choice should reflect the setting. Mounds and rocks are more appropriate to wilder, more open settings; posts to forests; and log barriers, walls or fences to rural or urban situations.

Vehicle management

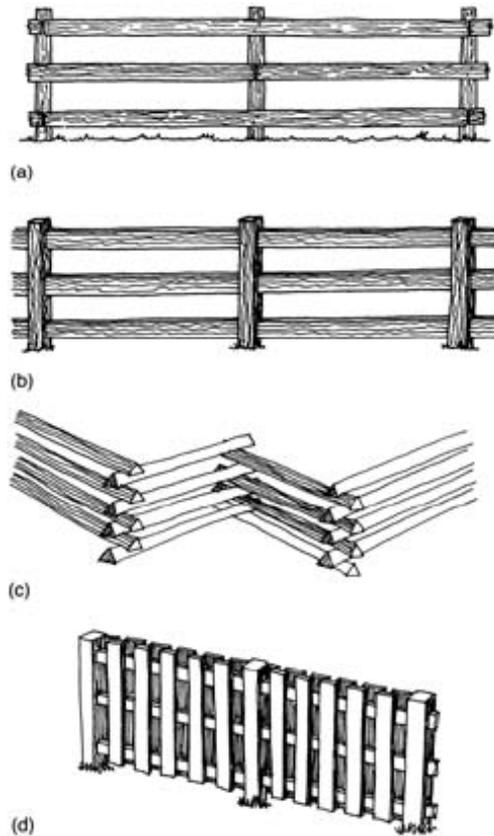
Most car parks require some form of vehicle management signing, particularly the larger ones. Drivers need to be informed if one-way systems operate, when rights of way vary, and where special areas for coaches, trailer-towing vehicles and people with disabilities are designated. As the general rule is to keep signs to an absolute minimum, the site layout should be analysed at the design stage in terms of the driver's requirements, and a schedule of signs should be proposed showing their positions and messages. Siting of signs should ensure that they will not be obscured by other vehicles.

The signs should use standard symbols in standard colours so far as possible. Where text is necessary it should be expressed in positive terms ('Please do not park along the road edges'). As the scale of the landscape and road areas is usually smaller and the speed of vehicles slower, the signs can be smaller than those needed on public highways. Sign structures should be as unobtrusive as possible, being of a simple yet robust construction and materials. Slabs of wood or stone set vertically into the ground and routed or sandblasted with the symbol, which is painted in the appropriate colour, are one type. Plastic, wood or metal symbols fixed to wood or stone are another.

Low-level signs will work in car-only areas, but signs may need to be taller where higher vehicles such as coaches use the site. Vegetation should be kept trimmed around signs, and damaged signs should be quickly repaired or replaced.

Marking of parking spaces should not be necessary unless long ones are needed, or pull-through spaces in an area

car park are provided. Surface markings are not easy to provide in car parks with unsealed surfaces, but stone setts, can be used if required. Horizontal barriers can also be used as indicators. In some area layouts, marking may be unnecessary if people follow the habit of parking around the edges first and then using the middle area. Car parks with sealed surfaces can be marked with white or yellow lines, but these appear urban and should be avoided if possible, especially if continuous lines are used. Pull-through spaces can be signalled by island beds of trees or shrubs, which help to direct traffic flows.



Wooden fences can be used as barriers: (a) A simple post-and-rail construction works well. (b) This version is mortised for a stronger finish. This is a traditional form of construction in some places. (c) The zigzag fence is a traditional type in North America. (d) A vertical board-on-board fence makes a visual screen, perhaps more appropriate in urban fringe areas.

Payment for parking

If the site operator intends to collect money from visitors as a means of payment for parking or for general use of the area, the method and arrangement of payment collection has to be fitted into the design. There are several basic methods.

Payment at the entrance to the site

This can be by means of a manned kiosk, such as are commonly found in US national and state parks. The entrance layout is split into two lanes—an entrance and an exit—so that all can pass the payment window on their way in. In large sites where there is a steady use all year round it may be worth manning the kiosk all the time. In other instances manning it at busy times only, and using a machine for all other occasions, ensures economical collection.

A ticket-vending machine can supplement the entrance kiosk in low-use periods or be the sole means of payment

they could be the better choice as they can print out a ticket with time and date recorded, which may be useful for management purposes. They also take a range of coin sizes, and can be calibrated for different lengths of period per payment level.

Mechanically operated machines will work on sites without electricity, relying on the action of the coins falling and the push of a button to activate the dispenser. One rate of payment based on a single coin or combination of coins gives out a set ticket. This means that one payment is made whatever the duration of the visit, thus deterring short-term visitors from paying. The machine is easier to maintain, as it is robust and has no complicated timers to adjust.

Safety and security at the car park

In many areas people using car parks in quiet, wild places are anxious about leaving their cars. This is paradoxical, because it might be expected that getting away to the outdoors and would involve fewer concerns about risks of theft or vandalism to property than in the city. Sadly, places where a number of cars are parked with owners absent can be a lure to thieves in many areas, especially in Britain and Europe. It takes only a few seconds to break into a car and steal the radio or any property lying on seats. In such car parks, people come and go at different times and are normally strangers to one another; someone casually opening a door and entering a car or taking something from it would hardly attract attention even if there were other people on the site. It might be thought that cars spread around in well-screened countryside car parks might increase the risk, as fewer people would be able to see the cars or the presence of thieves. Therefore it could be prudent to incorporate the following precautions into designs of those areas where the risk of car theft is considered to be significant.

– Cluster more cars into bays and keep the bays closer to one another. This increases the turnover of parking in any one place and therefore the numbers of people visiting the parking area.

– Keep the parking visible from picnic areas. Many people prefer to move only a short distance from their cars so that they can keep them in sight. Often this is partly anxiety about security as well as about getting lost; the car becomes a landmark for them.

– Place warning signs to remind people to lock their cars and to put their property in the boot/trunk or to carry it with them.

– Management of the area can also reduce the risk, perhaps through the use of rangers to maintain a presence, which reassures visitors and deters would-be thieves. It is also important to liaise with the police for warnings, for advice, and to ensure that the thefts that do occur are reported.



1 An area of hot springs at Yellowstone National Park, Wyoming, USA. The attractive nature of these features contrasts with their vulnerability. In order to allow people close to the vents, paths and walkways have been laid. These protect both the site and visitors, but unfortunately detract from the quality of the setting and the sense of wildness. This conflict is the main challenge facing recreation designers in the outdoors.



2 The waterfalls at Yosemite National Park, California, USA. This is where it all began. The unsurpassing beauty of the place convinced John Muir that it should be protected as a place where people might get close to nature just as he had done. Nowadays the main threat to it is from too many people. In recent years the number of visitors has been restricted by the park authorities to avoid overloading the facilities.



3 A scene showing visitors to the New Forest in Hampshire, England during the 1960s. Unrestricted access by car to many parts of the forest resulted in site damage, danger to people, litter and pollution. After planning and design, access was controlled, and facilities were installed that now allow visitors to enjoy the forest without seriously damaging it.



4 Visitors to Banff National Park, Alberta, Canada enjoy the scenery. Even at a small lay-by or turnout along the parkway they need parking that is safe to drive in and out of and is clearly laid out. An interpretative structure and a bear-proof litter bin have been provided. The use of forms, materials, colours and the position of artefacts in relation to the scene can blend in or detract from it. Here the mountains dominate the scene, but the interpretative structure and the litter bin are not designed together or positioned to reduce their impact. Thus they detract from the foreground of the scene.



5 A more recent example from Germany uses natural stone, gravel and weathered rough sawn timber, which work together and fit their surroundings. Simplicity and good attention to the detail of construction make this a timeless solution.



6 A collection of leaflets from various sources giving information about places to visit. They also promote their location. Some oversell their area, leading to an anticlimax when the destination fails to live up to its promise.



7 A point along one of the roads to Killarney in County Kerry, Ireland. As the road climbs, it reaches a summit, and the view of the Killarney lakes suddenly appears, giving a sense that a threshold has been crossed. The anticipation of arrival increases from here onwards.



8 The threshold sign at the start of the Blue Ridge Parkway in Virginia, USA, is a simple structure that relies on the silhouette of the landscape for impact, rather than the words. The name of the facility is more dominant than that of the organization.

The siting of the sign against a simple backdrop of vegetation maintains its high impact.



9 A good example of an entrance to a forest recreation area at Glenmore Forest Park, Scotland. The layout is clear and simple. The sign is of subdued colour, relying on symbols to convey much of the information. The foreground landscape is uncluttered and well maintained. The only feature to spoil the scene is a pothole in the road surface, probably caused by cars stopping and starting as they leave. Such wear and tear should be repaired as quickly as possible.



10 This information sign uses a simple, minimal structure with durable, laminated panels capable of presenting photographs, text and maps in a crisp finish. Blue Ridge Parkway, Virginia, USA.



11 An informally laid out car park in a woodland setting, where the cars are parked in bays separated by clumps of trees and shrubs. The natural crushed stone surfacing completes the contrast between this and a typical urban layout.



12 Forested car parks like this one help to provide shade for most of the day. This is important in sunny and hot summers, when cars can heat up severely if parked in the sun. The shade also reduces glare from surfacing. 'Head of the Metolius', Deschutes National Forest, Oregon, USA.



13 A well-designed earth barrier prevents cars from straying off the car park, and partly screens them in the open setting.
Beechenhurst, Forest of Dean, Gloucestershire, England.



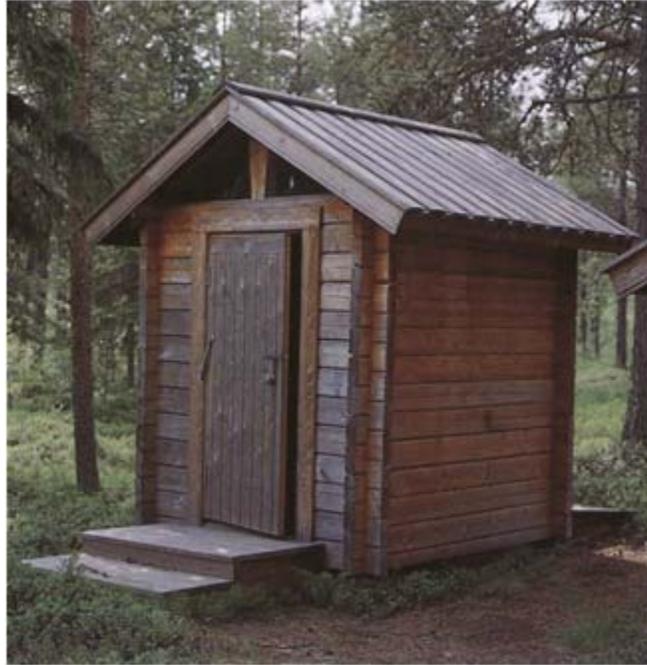
14 A bold sign reminding people to lock their cars and take care of their valuables. Amsterdamse Bos, Holland.



15 A toilet building at a highway rest stop in the north of Norway. The wooden building positioned by some trees and a rock is stained dull grey in colour and blends in well with the wild, remote landscape.



16 A large toilet building with over-hanging pyramidal roof of sawn timber construction. The large skylights give good illumination to the interior. Cannop Ponds, Forest of Dean, England.



17 This Swedish example is an excellent composting toilet. The sawn log construction is sturdy. It uses traditional overlapping boards for the roof. Windows in the gable give adequate light and privacy.

Chapter Six

Toilet facilities

Once the visitors have parked their car, it is frequently a call to the toilets that is next on the list of priorities. If it has been a long journey to the site the urge to respond to the call will probably be acute for any children present. The presence of a clean and well-ventilated toilet block in such circumstances is very welcome. Whether to provide toilet facilities, the capacity and the type of sewage disposal required as well as the design of the building are all important decisions to be made. On the one hand, the comfort and hygiene of visitors is important; on the other hand, the cost of construction and maintenance of toilet blocks can be high compared with other costs associated with running the site.

Should a toilet be provided?

The decision on whether to provide a toilet depends on several factors, as follows.

– **Location and character of the area.** Remote locations of wild character suggest that the impact of human activities should be kept to a minimum. Toilet buildings, however well designed, may spoil the atmosphere of remoteness attached to such places. However, if there are large numbers of visitors the risk to health and the problem of pollution caused by too many people resorting to ‘going behind the bushes’ may be worse evils. Urban, rural or other locations containing more buildings do not present such a dilemma.

– **Numbers of visitors, especially at weekends.** In places where there are fewer visitors it may be difficult to justify the capital outlay of a building, especially if there are no apparent problems on the site or its surroundings. In areas of limited size the smell and sight of previous visitors’ use of the bushes may be excessive, especially in hot

weather, requiring either some small-scale facility or a regime of burying, covering or removal. On larger sites with more visitors the need for facilities becomes self-evident.

– **Duration of the visit.** If the majority of users come for only a short time, such as an hour's stroll with the dog in a country park near a town, then facilities should be unnecessary. If visitors spend most of

a day at the site they will need toilet facilities, especially if refreshments are consumed.

– **Distance travelled to the site.** A short journey to the area reduces the need to use a toilet, while a long one usually makes use unavoidable. This is especially true if there are no obvious alternative facilities elsewhere on the route.

– **Presence of water-based recreation at the area.** The risks to health from polluted water are of ever-present concern. If the water is to be used for bathing, swimming, boating or similar activities then toilets are essential for hygiene purposes, and probably for changing too, although separate buildings are often appropriate (see Chapter 10).

– **Presence of food outlets at the site.** Some sites have food vendors who come during high-use periods. This will attract more people, and could emphasize the need for toilets, although not necessarily more than if people brought their own refreshments.

– **Winter use of a site.** If a site has regular use throughout the year, this may tip the balance towards providing toilets for the comfort of visitors in very cold conditions.

refreshments are consumed.

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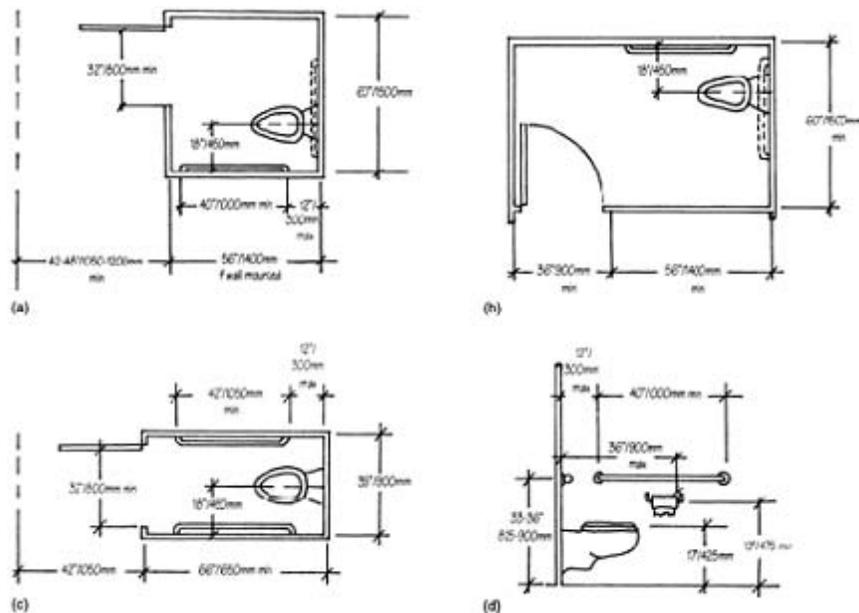
Scale of provision

Having made the decision to provide toilets, the extent to which they are provided is in part determined by the factors described above. A remote location where small to medium numbers of visitors spend some time might justify a single, unisex all-purpose facility, whereas a large site with many visitors staying for long periods would need multiple facilities divided into male, female and disabled. The actual scale of provision may in part depend on:

- the local and national public health or similar regulations;
- the social acceptance of, for example, unisex facilities;
- the correct balance between male and female provision;
- the need for disabled use;
- use by coach parties including school groups.

National and local public health, employment and other regulations may help to set the minimum provision. As these regulations vary in different countries, provinces or states it is not worth dwelling on them here, but they must be investigated. If employees work on the site, for example as rangers, there may be other regulations that also apply. The social acceptance of using unisex facilities may vary. In many instances it is assumed that male and female facilities should be separate, yet frequently unisex ones are used. Aircraft, the home, small offices or restaurants generally have only unisex toilets. If a feeling of safety and privacy is ensured and numbers of users are low then this approach can be perfectly acceptable. It saves duplicating facilities and the significant extra costs of buildings.

The balance between provision for men and women is difficult to estimate correctly, as their requirements differ. Generally men spend less time using toilets than women do. If a urinal is provided for men



Diagrams showing the maximum/minimum dimensions relevant to toilet facilities for people with disabilities: (a) A basic single cubicle for wheelchair access. (b) A cubicle with more manoeuvrability for wheelchairs. (c) A cubicle for ambulant disabled or elderly people. (d) Height dimensions for wheelchair users.

then the numbers of WC pans supplied can be half of those needed for the women's side in small facilities and a third of those in larger ones. However, sometimes other factors may alter these calculations. For example, some sites are more commonly used by men because of the activities available, such as snowmobiling.

People with disabilities need their own facilities in most instances, laid out with extra space for wheel-chair access, special rails, taps (faucets) and other features. The question of whether or not to keep disabled facilities unisex depends on how they are incorporated into the site. In a large building with a foyer at the entrance to male and female areas, a door leading to segregated disabled toilets is possible, but in a smaller block a single unisex toilet is probably preferable. Another reason for favouring unisex is that a person with a disability may have to be accompanied by a person of the opposite sex. A unisex toilet prevents any embarrassment for companions if segregated toilets contrast with their gender. Of course in many circumstances there is nothing to prevent able-bodied people from using the special toilet thus allowing a single, all-purpose facility on the smallest sites.



A view of a unisex disabled toilet cubicle with a wide door and movable handrail. The slight step into the building should be eradicated, as this will cause difficulties for wheelchair access.

If the site is used by coach parties, including school groups, an increase in toilet provision is likely to be needed because of the large number of people who wish to use the toilet at the same time. If the school use is generally from co-educational schools, roughly equal numbers of boys and girls can be expected. Coach parties of elderly people might include more women than men, as women tend to live longer. The period of use by children or older people also tends to be longer than average.

15–35 cars 35–50 cars 50–100 cars including coach drop-off: 100+ cars 1 M/F and 1 D or 1 unisex 1 M*, and 2F+1 D or 3 unisex 2 M+4 F+1 D 2 M+6 F+1 D 3 M+3x3 F+2 D†

*M assumes one urinal and one pan when segregated toilets are provided, no urinals in unisex toilets.

†Increase ratio to 1 M=3F, increasing total numbers at 1 M per 20 spaces greater than 120.

On the basis of the factors described above provision can be provided on the basis of the following, where M=male, F=female and D=disabled. (All assume an average length of stay and distance travelled to the site.)

Types of provision

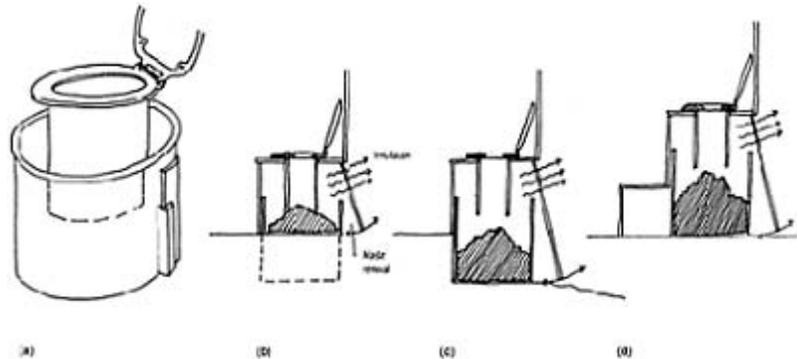
The type of toilet described is based on the method of disposing of the sewage, and related requirements for the structure and other aspects of construction such as ventilation, washing facilities and so on. There are five possible options for sewage disposal, as follows.

Composting toilets

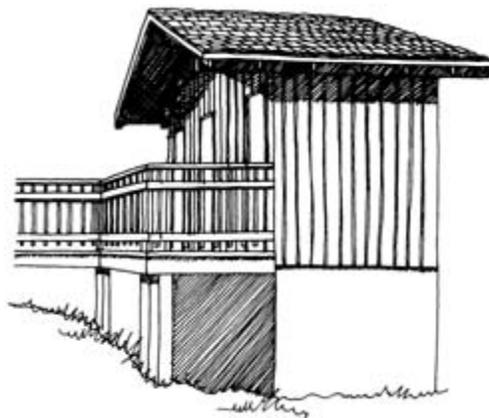
In these the toilet seat is set above a box or hole into which all sewage accumulates. If the moisture content can be kept reasonably low, for example by the addition of soil, ashes or bark, then the material breaks down into a relatively odour-free compost, which can be emptied from sewage receptacles at the back of the toilet building and safely disposed of in a suitable location.

There are various proprietary makes that have developed this type for relatively low-use sites. Plastic containers prevent contamination of groundwater. Special bark is put into the toilet after use by the user, which reduces the odour and helps the process of composting. No water is required, and the unit can be constructed above ground. This is important in areas where groundwater is sensitive to pollution, where the ground is rocky, or where it becomes frozen in winter, so making holes difficult to dig.

These toilets are common in Scandinavia and are increasingly available in North America, where proprietary systems have been



Composting toilets: (a) A unit available as a proprietary set and used in cabins and small toilets in Scandinavia. (b) Arrangement of the unit on level ground. Access for waste removal is via a flap at the rear of the building. (c) A unit with greater capacity dug into a side slope. (d) A unit with larger capacity inside the building with a step up to the seat.



This toilet uses one of the proprietary composting systems such as the 'Phoenix' or 'Clivus Multrum'. The composting unit is built beneath the publicly accessible part of the building. The toilet is built on a side slope to avoid the need for stairs or ramps. This one is at a rest stop along Highway 1 on Vancouver Island, Canada.

recently perfected. In Britain their use has been limited except by groups such as the Scouts, for whom pit latrines are traditional. Interest in this low-cost sustainable technique is increasing.

Vault (pit or big drop toilets)

These are similar to the dry composting toilets except that they have a larger capacity and tend to stay much wetter. Their main drawbacks are the odours that are common in hot weather and, for some people, a fear of falling into them. Adequate ventilation is difficult in many versions unless assisted by fans. These types are widely used on

recreation sites in North America. They have to be pumped out at intervals so that access by special truck is needed. These types can also be provided with chemicals that help to break down the excreta and mask the smells. Various proprietary versions claim to have solved the odour problem with better ventilation systems. Some can be ventilated by fans powered by solar energy or heavy-duty rechargeable batteries.

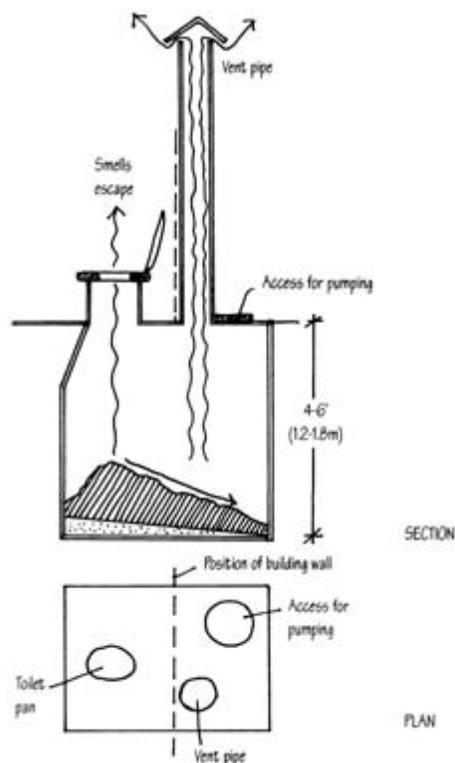
Both the types described above are suitable in locations where there is no water or power supply available. The composting type is acceptable for low usage, but only the vault will cope with a high use. The next categories depend on either a water or a power supply in order to operate.

Flush toilets with septic tank or cesspool

This type requires a consistent water supply to flush the system. This might be obtained from piped water services or by abstraction from a nearby stream, spring or lake. In many places, the water can be collected and stored in a tank or cistern to cover drought periods. The reliability of local water supplies needs careful assessment before deciding whether or not to use it.

Where piped water is available there is no such problem. Flush toilets and a water supply to basins all help hygiene and enable the toilets to be cleaned more regularly and easily. Sewage is then disposed of in a septic tank, which is either connected to a soakaway field or which yields an effluent clean enough to be discharged into a stream (as long as the relevant pollution control standards can be met). A soakaway allows the effluent to soak into the subsoil if it has good porosity (sands and gravel rather than clay) and the groundwater table is at a reasonable depth. Periodic de-sludging of the septic tank is required, but otherwise it operates to produce clean and non-polluting materials by bacterial breakdown.

Cesspools are merely means of storage in large tanks without treatment, so pumping out and transport for treatment are necessary.



The vault, pit or 'big drop' toilet unit commonly used in North America. It has to be pumped out. The build-up of liquid in the vault can cause powerful smells, which the ventilation system cannot always remove.

They can smell foul, and may pollute surrounding areas if tank maintenance is not carried out properly. They are not

recommended.

Chemical toilets

These use a special sterilizing chemical, which flushes through the lavatory pan and kills the odours of the sewage. Such toilets work without water, but generally need some power if the chemical is to be recirculated to act as a flushing agent. The systems work well, and are used most on temporary sites where self-contained trailer units are provided, but can also be used on permanent sites. The chemical renders the sewage sterile, so it can be stored for long periods if need be. It must be pumped out periodically and disposed of in a suitable location; exceptionally it can be discharged into a soakaway if permission or licence to do so can be obtained.

In terms of sustainable development there is a question over the appropriateness of using and disposing of large quantities of sterilizing chemicals anywhere in the environment. For this reason this type may not be widely favoured.

Flush toilets with access to piped water, drainage and electricity

In urban and many rural situations, especially in the more heavily populated rural areas of Europe and parts of North America, full services are often available within a reasonable distance of the toilet site. Usually they will run along the public highway, and can be connected to the site with a relatively short run of pipes or cables. These allow for the highest standard of facility, with fully flushing units, hot and cold running water for hand washing, lighting, heat to reduce the risk of frost damage if the toilets are open all year, electric hand dryers and so on.

As long as a gravity connection with the foul sewer main can be obtained, then low maintenance can be virtually guaranteed, which will offset the increased cost of construction and the expense of connection. If the site does not permit a gravity connection, for example when the main is higher than the toilet, a pump is needed. This will not be a problem, but it will require some maintenance.

Flush toilets with mains services are almost standard in most areas of Britain, and are the most expensive of the types described. Visitors expect such a standard everywhere, and there could be some concern over non-flushing types if these are used. However, if any unit is well equipped, clean and well maintained there should be few causes for complaint.

Toilet block design

There is a very wide range of building types in use for toilet blocks around the world. It might be expected that some standard layouts and forms might have evolved based on best practice, but expensive mistakes continue to be made. Fundamental to the design is how to combine the internal layout of different combinations and sizes of toilet provision within a building form that fits into the landscape without intrusion. This has to be balanced with a toilet block that is welcoming, and not hidden away in a dark corner or camouflaged out of sight.

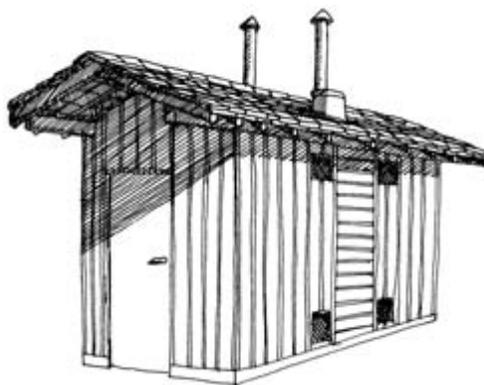
Many of the building forms in use are visually badly proportioned, look domestic or resemble weather-houses or cuckoo clocks. They have small floor plans that need to accommodate an upright adult, and this emphasizes the vertical proportion, which stands out in open landscapes. Where two buildings occur together the result is exacerbated. The scale of such buildings also tends to be too small for the size of standard materials such as shakes (shingles), board-on-board cladding, or pitched roofs.



This toilet block is set away from the car park in the shade of trees. This is not the right way to blend in with the landscape. It is too hidden, and its dark setting might cause anxiety amongst some women users. 'Shadow of the Sentinels' trail, Mount Baker-Snoqualmie National Forest, Washington, USA.

Each site should be considered separately, and the type of building form should be developed to fit its essential character. Forests, for example, have many vertical forms and lines. The scale of spaces is determined by the degree of enclosure of the trees, while subdued, earthy colours and coarse textures are unique to the forest. These characteristics can be expressed in a timber building with forms reminiscent of the tree-trunks and branches that form the canopy. Coarse textures of overlapping vertical board, shakes (shingles) and protruding beam ends further enhance the sense of a forest 'style'.

A more open site may require a stronger horizontal emphasis, with wide overhangs to a low-pitched, monopitched or hipped roof, in order to make the building hug the ground more. Local stone, a turf roof, a location tucked into a hollow or against a bank would add to the effect of a building 'growing out of the landscape'.



A neat solution to the problem of small buildings is to combine two single units into one. Here two vault toilets have been arranged back to back. The overhanging roof helps to improve the overall proportions. Pacific Rim National Park, British Columbia, Canada.

A rural setting may suggest forms based on vernacular buildings, perhaps connected with local farmsteads or small industrial buildings. These links could be reinforced with fences, walls or other structures to tie them into the

landscape. Traditional colours of doors or window frames might also be appropriate. Another alternative is to develop a completely neutral, abstract form, which borrows nothing from other forms yet because of its neutrality fits in and takes second place to the rest of the landscape. This could include the toilet being a 'nonbuilding', such as a palisade with two or three small rooms set into it. This can be a cheap and flexible option, using standard, prefabricated units set into a screening structure.

Initially the form of the building has to be developed from the functional requirement of the facilities. These depend on the resolution of several different issues, as follows.



A toilet building designed for a forest landscape. Coarse textures of cladding and roof, exposed beam ends and the use of large dimension timbers work rather

well.

Is there to be a lobby area?

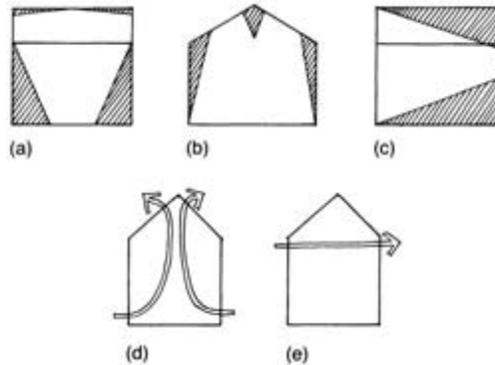
It is normal for simple types such as the single unit with no handwashing facilities to open directly into the surroundings. In larger facilities with separate toilets and hand washing for male and female, there is usually a lobby-cum-circulation area inside the building, from which each toilet is accessed. One reason for including a lobby is to provide shelter when queues are likely to occur. Separate lobbies for separate male and female toilets are more acceptable than shared lobby areas next to unisex units. Other solutions include setting the doors to the respective units at opposite ends of the building so that they are out of sight of each other. A deep roof overhang for a lobby can give sufficient shelter without the lobby's being part of the internal layout.

How is the space to be lit?

Low-level windows are not usually practical, nor do they ensure privacy. High-level windows (above eye level) or skylights are usually preferable. Light spaces always have a better atmosphere than dark ones. High-level windows can be set in the gable ends of pitched roofs or along the higher wall of a monopitch structure. Skylights work with any roof style. The interior can be open up to the rafters or can have a slatted ceiling, allowing natural light to reach the space below.



This design borrows from more domestic forms and materials: a tile roof, stucco, a dormer window/vent and steep roof pitch. It would be suitable where other vernacular buildings are already present.



Light and ventilation are important factors in design: (a) Light from windows set high in gable ends works quite well but can leave corners rather dark. (b) Skylights are very effective and maintain privacy. (c) Side windows leave much shadow and need to be of clouded glass, which reduces their effectiveness. (d) Ventilation needs to be at both ground and roof levels to allow proper air circulation. (e) High-level ventilation clears only the upper area, not the floor.

Artificial lighting may be necessary in some seasons, but it should not be relied upon as the main form of lighting.

Will there be hand washing?

If so, extra space will be needed in the toilet unit to accommodate a handbasin. When there is more than one toilet per side in each unit a lobby space can be used for hand washing. Only one or two handbasins should be needed, even in larger blocks. Together with towel dispensers or electric dryers and mirrors, a space is therefore needed to accommodate two or three people at a time.

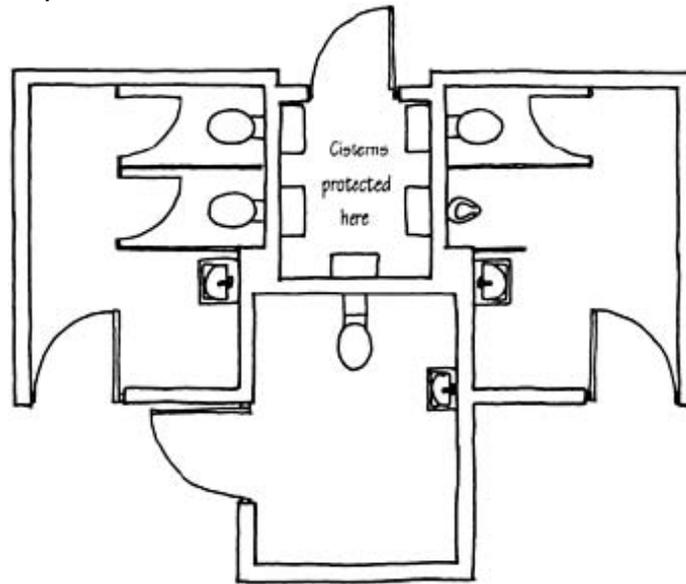
Will the toilet block be open all year round?

There are implications for maintenance, heating and frost protection if a toilet with a flushing system is to be kept open during the winter months. Problems of frozen plumbing can be solved by arranging all the pipework or cisterns

within a compartment that is insulated and possibly heated (at a low level to maintain temperatures just above freezing). Only the pans and handles for flushing are situated in the unheated, ventilated area. The pans can be protected from frost damage by the use of stainless steel or heavy-duty porcelain. This arrangement also has the advantage that all the vulnerable fittings are locked away, and the service room can be used to store refills and cleaning equipment and to house meters for water and electricity.

Is there a risk of vandalism at the site?

In urban fringe areas, or places where antisocial groups might be expected to congregate, some degree of vandalism might be expected. This will affect the use of materials. Wood might be deemed a fire risk; lobby areas or shelters might encourage loitering and graffiti; porcelain fittings are easily smashed. It is tempting to choose materials to withstand a bomb attack, but this can create an uncomfortable and unwelcoming design; it is better to accept some risk of damage that can be repaired



This layout places all the cisterns in a separate space with secure access, which can be frost-proofed or heated, allowing year round use of the toilet building.

easily. Nevertheless, it is prudent to consider a range of design techniques to reduce the opportunity for vandalism, such as robust fittings, high windows, stainless steel, good-sized timber sections, and finishes that make graffiti removal easy, such as smooth wood which can be sanded or re-stained or melamine-coated panels.

There is no reason why a fairly standard internal layout should not be adopted once the best arrangement has been found to suit a particular organization. There are several advantages to this, including the ability to bulk purchase fittings and replacement fixtures, and to specify standard maintenance contracts. Visitors to the site will know that a high standard has been provided and will be well maintained.

The incorporation of a few extras into toilet block layout will also help. Baby-changing shelves can be provided in the disabled toilet so that either parent can use it. (The disabled unit usually has more space and less use, and so a fold-down shelf is easy to fit.) A large sink suitable for washing pots (subject to health regulations), boots and clothes might be provided at larger sites.

Building construction

As previously suggested in terms of building form and function, there are also certain materials and finishes that are more appropriate to the outdoors so as to reinforce the contrast with urban places. Therefore, while the layout should be to a high standard, materials should wherever possible be ones that are the least urban or domestic.

A variety of construction methods can be used, but the choice depends on the location.

Timber

This can be traditional log-cabin construction using round logs of substantial but not over-large dimensions. This works for bigger structures but not smaller ones, as the horizontal emphasis given by the logs conflicts with square or more vertically proportioned buildings. A good overhang to the roof with protruding beams and rafters, shake (shingle), turf or split-log roof looks good. However, this technique is generally not suited to Britain, as it is not traditional, but in central and northern Europe and North America, in forests of big trees it is a good method. This type of construction is naturally well insulated. Interior partitions of boards, open roof spaces with roof lights or high-level windows in the gables work effectively. Materials can be used on site unless special construction techniques are used.

Sawn timber can be used in all manner of ways. In Scandinavia, construction methods traditional to the landscape have been adapted for use in recreation buildings. Timber frames clad in overlapping vertical boarding and roofed with specially milled boards for waterproofing work very well in a drier continental climate. In wetter conditions such as Britain or the Pacific Northwest of the USA, where timber warps, this method is not suitable unless waterproof material can be used beneath the roofing timber. Shakes (shingles) can be used for roofing, as can other materials such as profile steel, which can be obtained with integral insulation. The coarser textures of wide roughly sawn boards and board-on-board or overlapping clapboarding blend with those found in wilder settings. Vertical boarding looks good in forests with plenty of vertical



A toilet building made of logs at Akasamyly in Finnish Lapland. The result is a little 'rustic' because the logs are small. However, the main problem is the sole use of window holes cut into the doors to give light. This is inadequate, and may cause privacy problems.

shapes. Horizontal boarding can look better in open landscapes with more horizontal lines.

Timber can be left to weather to a dull silvery grey, which fits into most landscapes. Stains can also be used to give colour and to help preserve and fireproof the wood. Bright colours should be avoided in favour of the more subdued tones found in the landscape—rusty red, ochre, mossy green, greys, sandy browns and black—which relate to the rock, soil and natural vegetation of the locality.

Buildings often need to be made to hug the ground to reduce their visual impact, and so darker colours should be used on the roofs than on the walls. Emphasis can be given to the doors and certain parts of the framing, perhaps with a brighter colour used sparingly.

Other materials

Stone can be a good material where it is plentiful in the locality. The same basic forms and layouts can be

constructed, with stone used in the supporting walls or as cladding around a timber frame or cinderblock (breeze block). Stone construction needs careful craftsmanship. Different stone types are built using different methods. Drystone walling techniques can be used, with hidden mortar to secure the stones. Natural or rough-quarried rock is usually better than cut and dressed stone except in specific circumstances, such as using a vernacular building form. Artificial or reconstructed stone can have an unfortunate suburban appearance and is usually unsuitable. Brick is an inappropriate material in most circumstances unless reflecting a local style or if rendered with wet or dry dash roughcast (a mixture of wet cement and stone chips spread on the wall surface or dry stone chips applied to damp cement on walls respectively). The same applies to cinderblock, which can be a cheap material for construction, and can be clad with roughcast or stone.

Roofs for stone buildings can be tile, slate or flags, occasionally profile steel or corrugated iron. Wooden roofs do not look appropriate with stonework.

In hot, dry climates other materials such as adobe have been used, for example by the US National Park Service in Arizona and New Mexico. This uses traditional materials and construction which fits very well. Flat roofs are acceptable in low-rainfall areas and are often traditional.

Transparent materials such as toughened glass or polycarbonate can be used for windows or rooflights, occasionally occupying quite a large proportion of the roof area. Coloured varieties such as smoky grey or brown look better than clear.

Details

Details such as door fastenings, hinges and rainwater goods (gutters and downpipes) all need to be considered. Craftsmantype products with chunky, thick dimensions work well. Those produced by the Civilian Conservation Corps for the US National Park and Forest services in the 1930s have a 'folksy' character produced by local blacksmiths, although fussy details should be avoided. Consideration should be given to omitting rainwater goods unless wooden ones can be used on wooden buildings. Plastic gutters and drainpipes look out of place on sturdily constructed buildings in wild settings. Rainwater deflectors above doorways, if needed, can be adequate. Gravel around the building base can collect water without splashing the walls and staining them.

Interior materials and finishes

.– **Floor.** Smooth concrete, quarry tiles or wooden boards are all suitable materials for flooring. Whatever the material, it should be easy to keep clean by hosing and sweeping. Tiles are the best because of their durability and appearance, although they are probably the most expensive. They should rise up the walls slightly as a skirting, and end flush with the paving or path material outside, with no step.

.– **Walls.** Boarding should be left bare, stained or sealed but not painted, unless the building is of a traditional or vernacular form. Melamine-faced board in earthy colours can also work, especially behind urinals. Cinderblock walls, emulsion painted in matt pale earth colours, are a fireproof alternative.

.– **Ceilings or roof linings.** These should be timber boarding or spaced wooden slats to let light in. Light-coloured stains or natural finishes look good.

.– **Doors.** Traditional close-boarded, framed timber construction looks better and is stronger than panel doors or flat plywood finishes. Brighter colours such as reds or oranges frequently help to signal where the entrances are, and give variety and accent points to the design. Handles of wood, zinc-coated steel or chunky plastic look better than some aluminium ones. Self-closing mechanisms are usually essential.

Chapter Seven

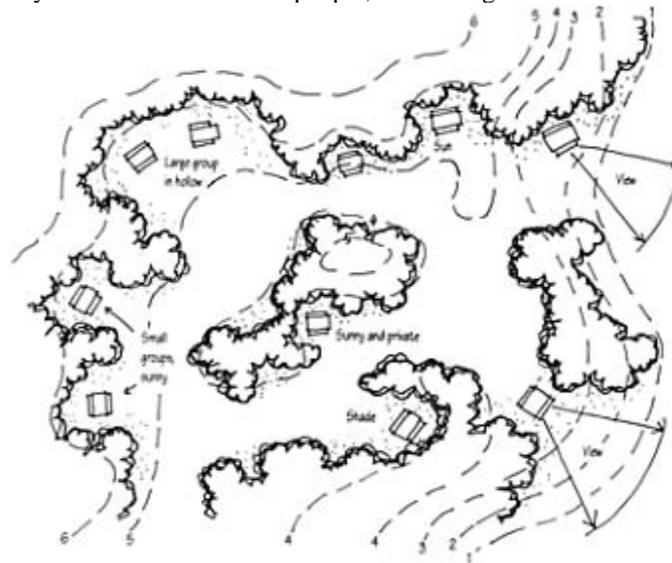
Picnicking

Having completed the preliminary requirements on arrival, visitors are now ready to enjoy themselves. While they are free to hike, fish, sail or whatever, many people will wish to have something to eat. This usually means a picnic

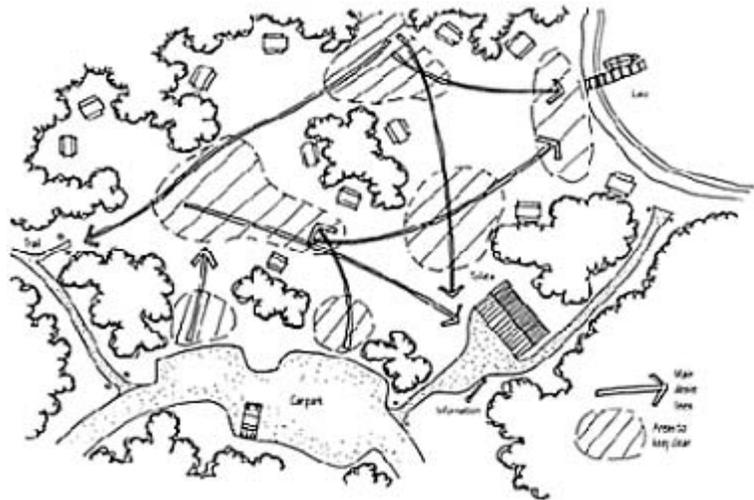
of some sort, perhaps with a fire or stove to boil water for coffee or tea, cook freshly caught fish or grill some steak. To many people it also means finding a picnic table and establishing a base from which other activities may begin.

Behaviour of people in an open space

As well as providing a location in which to eat, with an attractive view and a convenient table and/or fireplace, the picnic spot has to fulfil some territorial requirements. For many people it has to become 'defensible space' for the duration of the visit. Some people establish their space by going some distance along a trail, or to the extremities of the site, where the presence of near neighbours is least likely. Others do not mind the proximity of other people as long as there is some way of creating a physical or psychological distance between them. This is borne out by observation that when people arrive at an area for a picnic or a sunbathe, most try to find an edge—against some bushes, a large tree or the shore of a lake. The next visitor will look for a good spot a suitable distance apart from the first, and so on, until all the first choices are exhausted. Later visitors may choose the widest space between established groups and take up a position halfway between. Others may be forced to use some open ground. What this pattern indicates is that for many people to feel comfortable and relaxed, their personal space is important. There will always be a range of people with different tolerances of human proximity—some who want to be completely alone, others who always want to be near other people, and a range in between. The layout of a site with



This diagram shows a range of locations for picnic tables on a site. Maximum use is made of edges; some locations are in shade or sun, some are for large or small groups, and others give views.



As people walk around sites taking the shortest, most direct routes, it makes sense to predict where these are likely to be, and to ensure that picnic areas avoid them.

picnic tables, fireplaces and benches should reflect this, giving the widest possible choice and making best use of the ground.

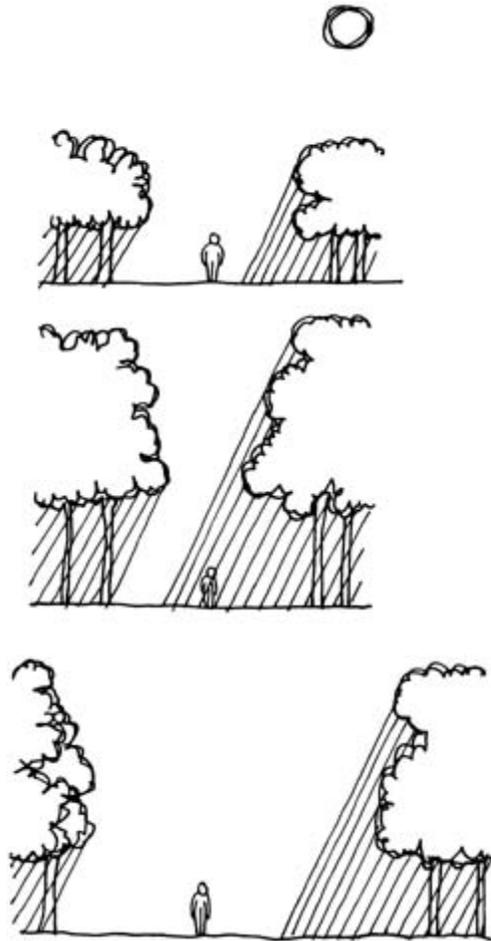
Depending on the character of different sites it may be more or less desirable to restrict the presence of furniture, or put more out. A wild (primitive ROS) area may forgo such things as tables, fireplaces or any structures. Lunch is packed in and refuse packed out. In urban settings with higher numbers of people, especially in the vicinity of cafes or visitor centres, more densely arranged sites with picnic furniture may be perfectly acceptable.

Layout of picnic areas

Any site that contains a picnicking area, whether tables, benches or fireplaces are installed or not, should be laid out to give a variety of spaces by using the structure of landform, vegetation or whatever is available. In forests or at the forest edge spaces can be created that offer a range of shelter, open views, sunshine, shade, large spaces for big families, small spaces for couples and so on. The landform can be used to identify the potential for making spaces and clearings that take advantage of the variety of the sites.

The area should be developed with a hierarchy of spaces of different scales. The first task is to consider the overall extent of the picnic area and the main pedestrian circulation likely to be developed from the car park, toilets and other features such as water edges, viewpoints and trail starts within the immediate vicinity. There will be obvious entry and exit points, which will become important lines of access (desire lines) into the area. Spaces within which picnicking can be set should be developed in relation to these circulation routes and the landform, vegetation and site variety described above. Some locations should maintain views of the car park for those who feel safest keeping their car in view, or who cannot or do not wish to carry a great deal of equipment for any distance.

This large layout can be subdivided into different-sized smaller spaces for one or more picnic units. The orientation of spaces should reflect the micro-site features, giving warm, sunny aspects to some and greater shade to others. This will



In wooded areas, tree growth affects the scale of spaces and the degree to which the sun reaches the ground. Management over time might include gradually enlarging open glades so as to maintain their sunny nature.

depend on the climate. In Britain, or other cool, moist climates, sunshine in summer is at a premium, and so suntrap sites are much appreciated. However, in the Arizona desert, shade is essential, and this will be a deciding factor.

In enclosed landscapes such as forest glades, the spaces can be subdivided with other trees and shrubs in clumps, groups or promontories from the edge. In open landscapes the landform, if there is any, can be reinforced with shrubs, if trees are not appropriate. Where a particular feature such as a water's edge occurs, then this provides a lure. Picnic spaces should be spread along the edge at wide intervals.

The number of picnic places required will depend on the amount of parking to be provided and the way in which the site serves the main functions for the area. If the main purpose of the site is to stop and picnic, the number of places should be roughly the same as the number of car spaces, although not all need be equipped with furniture. At other sites many people might hike or sail and not wish to picnic, thus considerably reducing the number of places needed.

As well as creating a variety of spaces for picnicking, there will be a need to maintain and manage them over time. There are many examples where an attractive sunny space was created amongst trees that subsequently grew and shaded the space. Hence trees and shrubs may have to be cut to maintain the size of the space and its microclimate as well as the access routes or paths amongst the area. Grass cutting may also be required several times a year during the growing season.

Picnic furniture

Once the area has been laid out to present spaces that are attractive and feel comfortable, any furniture to be provided should be considered. There is a wide variety of picnic furniture of different design and construction to choose from. Many of these are functionally inefficient, ugly and look out of place in the outdoors.

Any furniture should be welcoming and comfortable to use, easy to maintain and able to withstand ill-treatment or theft. There are two basic kinds of table: those fixed to the site and dug into the ground, and those that are movable and placed on top of the ground. The former type are not so easily stolen, and can be of simpler construction, such as separate bench and table pieces placed together. The latter can be stolen, unless anchored in some way or extremely heavy, and they are generally made in one piece. This means that strength and bracing are needed, which can often present problems to the user.



These picnic tables are fixed to the ground. They cannot be stolen, but wear and tear of the ground around them can make a mess.

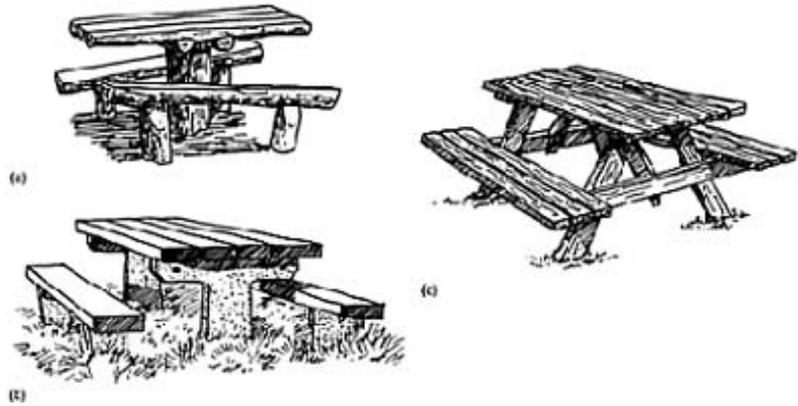
Sets of fixed tables and benches can be positioned around the site, but any maintenance of the area such as grass cutting has to be carried out around them. Wear and tear of the surface, leading to erosion, puddles and mud, can also occur on busy sites unless the furniture is laid on hard surfacing. It is important to adjust the site to enable the tables and benches to be laid level.

Movable tables and benches allow worn areas to be repaired by shifting the furniture to another place. Their positions can be changed to allow mowers onto the site, or to take advantage of locations of better sunshine, and they can be taken off site into storage during the winter. They often need to be anchored by chain to a buried anchoring device, and sometimes it is difficult to level them.

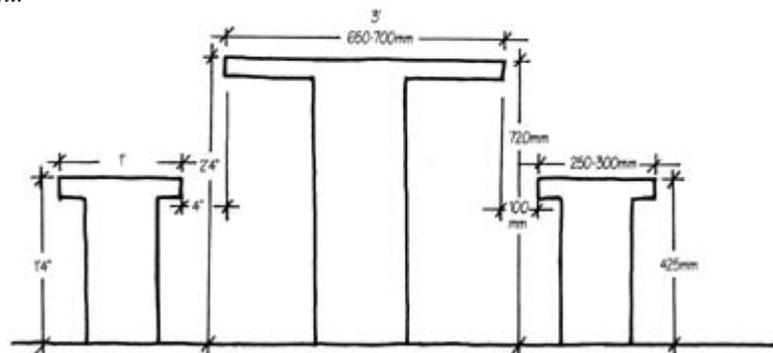
Table and bench sets should be designed so that anyone and everyone can use them. Benches that require agility to swing legs over cross-members or beams in order to sit at the table, or which do not permit wheelchair use, are badly designed. Also, the surfaces should be smooth and flat. Rough-cut warped boards or round timber are not acceptable. Adequate room to move about on benches is needed without the risk of banging knees on protruding bits of wood or bolt ends. Table tops should extend lengthways to allow wheelchairs to fit beneath them.

The dimensions of tables and benches are fairly straightforward (see diagram), based on normal dining table and chair sizes, but the depth to which a bench or table is to be set into the ground must be allowed for. Benches that are too low or too high are uncomfortable to use.

Tables and benches should usually be fabricated in sections so that they can be assembled on site, and so that damaged or worn sections can easily be replaced. Maintenance should include tightening of bolts if the structure loosens in very dry weather. Protruding bolts and nuts should be countersunk and trimmed off to prevent snags to clothing or knees.



These examples are of poor general design: (a) Here unevenly split logs have been used, and no attempt has been made to align the table surface and benches, or to place them horizontally. (b) The concrete ends of the table are hard on the knees, the whole effect being crude and brutal. (c) This very common design is difficult for many people to sit at. The cross-supports for the seats mean that the legs have to be swung over the seat in order to be placed under the table—quite a feat for those who are not so young or fit.



General dimensions for picnic table and bench design (metric and imperial).

While tables might be acceptable on the more developed sites near cars, they may look out of place deeper in the wilder landscape. Benches at the side of a trail, slabs of rock, logs sawn in half or in some circumstances more sculptural solutions developed to respond to the character of the setting are alternatives, easier to install and maintain in more remote locations where materials have to be carried in by hand.



An example of steel tubing for the frame and sawn wood planks for table and bench tops. This offers good leg-room for getting in and out. It fits surprisingly well into this wooded landscape, where the curve of the frame seems to echo the tree-trunks and branches. Acadia National Park, Maine, USA.

Materials that have been used for tables and benches include concrete, steel, plastic and wood. Concrete frames with wooden bench and table tops are sturdy and durable but unyielding on contact, frequently ugly and look urban. Different types of concrete—varied aggregate colour and rough-textured finishes—have been used, but they rarely fit into the landscape. Only when rock is a significant feature of the site and the table supports are simple and of the same colour does concrete fit in at all.

Metal

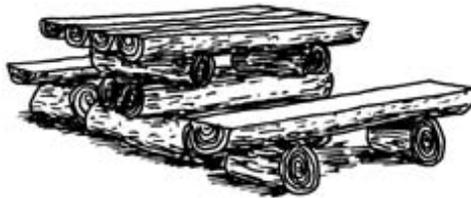
Metal, usually steel, is used as a frame and occasionally for the table and bench tops. Painted steel looks urban, while plastic-coated or enamel-coated steel is similarly too highly finished. Galvanized steel can work in the more urban settings and is vandal resistant. With simple form, and by using wooden table and bench tops, it can be acceptable.

Plastic

Plastic is being used as a wood substitute in some places. This sounds strange, but a material made from recycled plastic looks like some timbers, is hard-wearing, can be worked like wood, and is durable. It might be a substitute for durable tropical hardwoods or chemically preserved softwood on some sites where applying principles of sustainability is important.

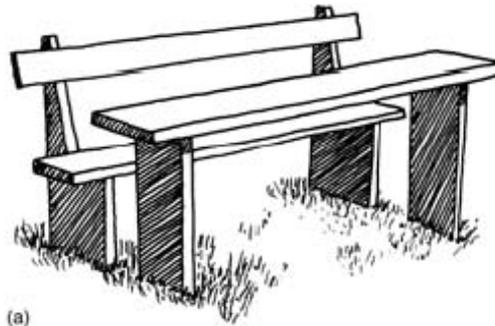
Wood

Wood is the all-round favourite, but it can be used well or badly depending on the site and its construction. The usual problems include the use of round timber to give a 'rustic' effect. This tends to look very suburban if the scale is not large enough or the timber cylindrical. The bench and table top must be level, and can be made from half-round sections of logs properly sawn and finished. Sawn wood is better but needs large sizes to be robust, durable, heavy and to blend with the scale of the landscape. Simply cut sections can be bolted together to form strong structures without the need for diagonal bracing, which gets in the way of people's knees. All surfaces should be planed smooth to prevent splinters. Narrow gaps between planks on the table and bench tops should be left to allow drainage of rainwater. Domestic designs that resemble schoolroom desks should be avoided.



This is a better effort at a table from Norway; it is made from round and half-round timber, peeled and without taper, although it remains quite clumsy and looks potentially unstable.

Good durable timber can be left untreated to weather, and will last for years if water is drained off and air circulates around the wood. Cedar, oak heartwood, larch heartwood and chestnut can be suitable timbers for this, and to a lesser extent Douglas fir and Scots pine. Others need preservative before being left to weather. Stains can also be used to tie the furniture into the landscape or to other artefacts.



(a)



(b)

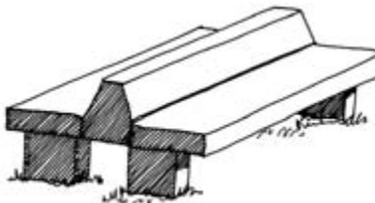
(a) This table and bench look too much like domestic or schoolroom furniture to be successful outdoors. (b) This unit is of solid and robust construction. It is movable, but its dimensions and weight are likely to reduce the risk of its being stolen. Scottish Natural Heritage.

Paints can be a problem if they crack or split with the swelling or shrinkage of timber. ‘Corporate’ or house colours should be used sparingly, as they can frequently look out of place for the local setting. Varnish and paint finishes seal the surface so that in wet weather water tends to stand in globules on the surface, taking longer to dry than on stains, which allow water to run off or soak in a little.

Although the designs of many tables and benches in the outdoors originate from the home, other constructions can be considered. If sitting on the ground in traditional picnic fashion is not ideal because of damp grass or an uncomfortable surface, low pallets can be provided. Wide benches or structures that can double as benches or tables might also allow a more free-and-easy way of having a picnic. All these can be experimented with. Some might be more flexible for parties of different sizes or ages.



(a)



(b)



(c)

These designs try to vary the traditional picnic table theme: (a) An interlocking bench and table can be used in a variety of ways.

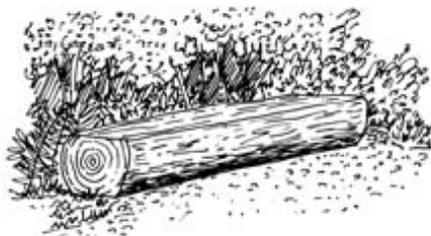
(b) Back-to-back benches can double as informal tables. (c) A pallet can be used to sit, sprawl or lie on, and avoids the perils of sitting on damp grass.

Fireplaces

Although many people bring food and eat a picnic without the need for cooking at the site, the idea of cooking outdoors, or at least of boiling a kettle for tea or coffee, can add much to the experience. In North America or Australia, making a fire outdoors is part of a long tradition connected with frontier life and the quality of self-reliance in wild places. In Europe this is not as pronounced; in fact lighting fires except at specially permitted places such as picnic sites or campsites is generally discouraged. To many people the flavour of food cooked outdoors is quite special, although there can be hygiene risks if grills are not clean or food is not thoroughly cooked. Portable stoves may be safer, and may be preferred by some authorities instead of open fires.



(a)



(b)

Some furniture made from more natural materials: (a) Rocks placed in such a way as to offer themselves as a picnic table and seats. (b) A log sliced across to give a level surface becomes a bench.

Facilities for cooking outdoors are ubiquitous in North America and quite common in Europe, but relatively rare in Britain. Many picnic places in America have a fireplace of some sort with them. Perhaps the better climates of continental areas make outdoor cooking a more reliable activity than in rainy Britain.

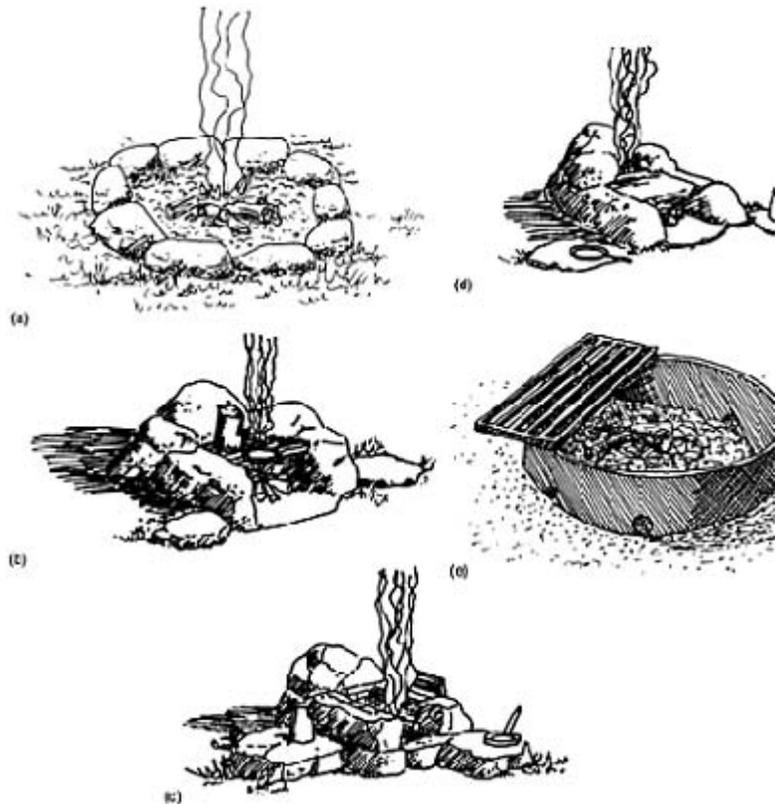
Fire risks to the landscape are so high in many areas that the choice of suitable sites for outdoor fires and their safe use is fairly important. Fireplaces give a clear signal that lighting a fire is welcomed in that spot and nowhere else. The type of fireplace can vary, and can be related once again to the degree of wildness or civilization offered by the site. In the most primitive areas, if lighting fires is permitted on environmental safety grounds, then the visitor would be expected to cut out a sod, build a fire, make sure it is extinguished after use, and replace the sod to leave few traces. Alternatively, a portable safety stove can be used. Elsewhere some form of hearth can be constructed, with varying degrees of sophistication. There are two basic varieties: low-level campfires and waist-level or altar fires.

Low-level campfires



This low-level campfire has a stone surround and an ingenious grill/hot plate, which can swing over the fire once it is hot enough. Mount Orford Provincial Park, Quebec, Canada.

This type generally consists of a circular hole surrounded by stones, or a steel hoop or drum in which the fire is lit. Food is cooked on a metal grating, plate or from a hook on a pole which may be provided. The grill/hotplate/kettlehook can be an integral part of the construction, arranged to be adjustable for position and height. Ugly varieties to avoid include those



This is a range of excellent campfire designs to suit many places: (a) A simple circle of large stones to contain the fire. This is the most primitive, least developed variety, and is suitable for the wildest areas. (b) This example from a 1930s US Forest Service design is made of several rocks placed together. Steel rods set into the side sections form a grill, which cannot be moved or stolen. (c) This version, also from the 1930s, has a firebrick lining to prevent weaker rocks from cracking. A grill secured by a chain can be placed across the firebricks. (d) This 1930s design has a special chimney notch to help the fire draw. A specially shaped hotplate can be laid across, fixed to a chain to prevent theft. (e) More recent examples include the use of cast steel rings or drums to contain the fire. This one has a grill welded part-way over the ring.



*An excellent steel altar fire with adjustable
direction to catch the draught or
shelter the fire, and adjustable
grill/hotplate with stay-cool handles.
Targhee National Forest, Idaho, USA.*

where the stones are cemented together (the cement will crack in the heat), and ones made crudely from old truck wheels. Some excellent proprietary makes are simple to use, with attention to detail such as stay-cool handles and the correct spacing of the grill bars. If wear and tear to the immediate surroundings is a problem, crushed stone or gravel may be laid around the fireplace.

A second version of these campfire types is constructed from larger pieces of rock laid in a U shape, with fold-over grill plates and rudimentary chimneys to help the fire draw. These can be lined with firebrick to prevent the stone from cracking. The large stones can be used as seats or for warming plates, and they look very rugged in rocky terrain. They may not work too well if the wind is in the wrong direction.

The choice of stones or rock is important. Larger rocks usually look better than smaller ones in the large scale of the outdoors. Flatter or more regularly shaped pieces are more stable, and better for warming surfaces or places to keep the coffee pot than round ones, unless these are typical of the area, say a river bed. Hard stones that are less likely to crack in heat should also be chosen if possible.

Waist-high or altar fireplaces

These have greater similarity to the suburban barbecue than the campfire type, and so provide a utility for cooking rather than a social event. They are more convenient, as the food can be prepared on a table and moved back and forth without bending down. It is less at risk from dogs, from being kicked or stood on. There are two basic varieties of this type.

The first is the steel pedestal fire. A steel box with an open side and a grill and hotplate is mounted on a steel pole set into the ground. These can be made by a blacksmith or purchased from proprietary makers. The best can be turned to take advantage of the wind direction, have adjustable grills and stay-cool handles. They can be set in a concrete base hidden below ground to deter theft and vandalism. The tops can be detached using special keys, and stored over winter. Treatment with matt-black stove paint helps to prevent them from rusting.

The second type can be constructed from stonework, with a slab of stone as the floor and, if need be, firebricks to make the three sides of the fireplace. A grill can be set into the stonework or laid over the top. This is a substantial structure, which has to be properly constructed to look right. It can be built with an extension for working and storage purposes, possibly surfaced with wood similar to the top of a picnic table. Such structures should be built facing the prevailing wind direction, otherwise getting the fire to draw can be a problem.

Fuel for fireplaces can be wood collected or provided at the site. If wood is not available in some areas such as moors or coasts, or if it is not sufficiently abundant, or if it is ecologically undesirable to be collected in, then it must be provided by the site operator or brought by the users. If wood is provided, a storage bin should be located to service a number of sites. This might even be a shed, as is found in Scandinavia, in order to keep the wood snow free as well as dry. Wood, cut and split into suitable lengths, can then be provided and, if need be, paid for in some way. This requires maintenance and management, so it may only be appropriate on large sites where the costs can be lower or where unregulated collection of firewood causes problems.

Charcoal can be used, especially in the altar types. Users can bring their own; it provides more heat, is easier to carry and produces less ash.



A stone-built altar fire with a hinged steel grill, which can be lifted out of the way. This is quite well built, but the surroundings are rather muddy. West Forest, Copenhagen, Denmark.



This design incorporates a fixed grill and a lower table on which to place plates, utensils etc.

The area around the fireplace is likely to become trampled and have food remains, spilt fat or ashes and cinders around it. This can be unsightly, and so periodic moving of the fireplace might be considered on heavily used sites. Simple rings and steel altar fires can be moved quite easily. Otherwise, harder surfaces can be provided around picnic tables and fireplaces, which are easier to keep clean and tidy.

Low benches or logs around the campfire types can encourage their use for social purposes. Occasionally, less responsible people are tempted to use the bench tops as fuel, unless they are secured, perhaps by joining them together and anchoring them to chains set into the ground.

Litter

On picnic sites and around fireplaces litter of various kinds is generated all the time. If food sales, such as ice cream on hot days, also take place, then the volume of litter is multiplied many times. There is nothing so unsightly as a site where litter is left lying around.

Thus litter management is crucial, and there are two approaches. One is to encourage people to take their litter away with them, and not to supply bins anywhere on the site. This is usually successful in the remoter sites, but is

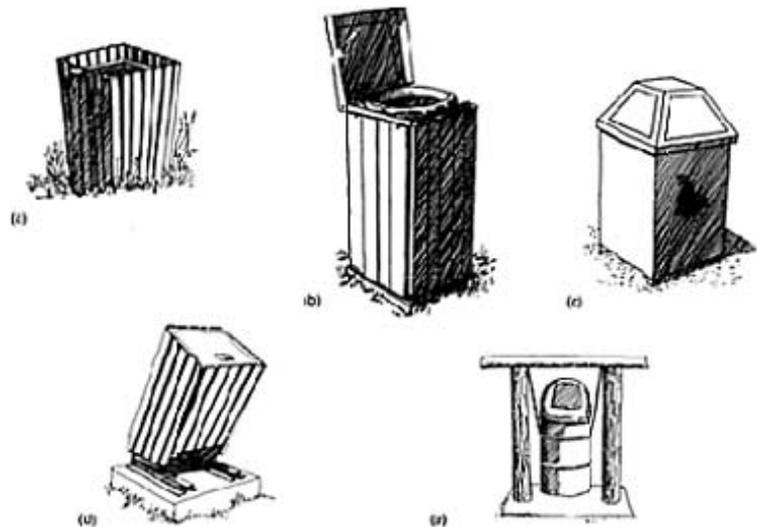
less so in the busy ones where litter left by the small percentage of people who are careless or less responsible will still need to be picked up. Signs suggesting that people should take their litter home should then be posted around the site in key locations to and from the car park.

The second approach is to accept that people will want to leave litter and to provide bins for it. These have to be of sufficient numbers and be located in suitable places, such as next to the exits from the car park to the picnic area and toilets, at the toilets and in key locations in the picnic area. Places to avoid are next to tables (attracts wasps, nasty smells, hygiene risks), attractive views or hidden corners where people have to go out of their way to deposit litter.

Bins have to be convenient for anyone to put litter in and for workers to empty out, and must be secure from vermin, ranging from bears, ponies and sheep to chipmunks, squirrels and seagulls. Depending on the circumstances the bins might require heavy lids of fireproof materials that are chained to frames or posts. While wire baskets made to fit custom designs might be attractive, it is best to use polythene or paper rubbish (trash) sacks placed inside wooden, metal or plastic containers. Many designs for bins exist, most of which suit urban areas but are of inappropriate materials for the outdoors, such as plastic-covered metal, brightly coloured plastic or combinations of them.



The campfire circle: a large fire area surrounded at a safe distance by log seats. Ideal for summer evening singsongs!



Some litter bin designs: (a) A single wooden slat design to hold a wire basket or polythene sack. Unfortunately, the lack of a lid can mean that litter blows away or is attractive to birds and animals.

(b) A well-designed bin. The frame and lid are made from galvanized steel clad in timber slats. Litter is collected in a paper sack. The bin is fixed to a firm base such as a concrete slab. Aarhus City Forest, Denmark.

(c) An unusual bin made of concrete and fibreglass and painted to fit into the character of its surroundings—ancient cave dwellings at Walnut Canyon National Monument, Arizona, USA. (d) A bear-proof steel bin with special lid, unable to be opened by bears, and weighted with a concrete slab so as to make it impossible to push

over. The hard metal character is relieved by the wooden slat cladding, but it should be possible to cover or bury the concrete base. (e) Another bear-proof bin swinging by chains from a stout frame. Made of an oil drum with a special top, this is ungainly and not very attractive.



This is a good design for a large-capacity bin. The wooden slats help it to fit into the forest landscape. The lid, made from black plastic, is unobtrusive. It would probably not be bear-proof. Akasamyly, Finnish Lapland.

Bins should be fixed to a solid base or dug into the ground to prevent them from being knocked over by people or animals. Lids are often needed to prevent the litter from blowing away or animals entering, but sometimes they can be too heavy for small children to use. Smaller, self-closing flaps in larger lids can be used instead. The size of bins should reflect the level of use of the site and the frequency of emptying. Overflowing bins surrounded by rubbish are worse than having no bins at all, and reflect badly on the management of the site.

The best materials for litter containers in the outdoors are slatted timber, half round or sawn and left to weather, or stained to fit into the surroundings, and sometimes zinc-coated steel. Plastic lids of earth tones with animal-proof devices can be acceptable. The enclosing structure can be emptied by opening the top or a side panel to release the internal sack, which can then be tied up and carried to a truck for disposal. Stone-built devices sometimes fit, but they are not movable, and they have to be emptied by lifting sacks out of the top. Metal frames with lids to hang black plastic sacks have also been used, but they look unsightly, and the bags risk being damaged by people or animals, allowing the rubbish to escape.

In environmentally aware places such as Scandinavia, recycling of rubbish is practised in the outdoors. Several bins might be located by the car park and people encouraged to separate glass, aluminium cans and other litter to be sent for recycling. While involving more work for the operator, this vastly reduces the overall requirement to dump rubbish elsewhere and, as good sustainability practice, it should be considered in every circumstance.

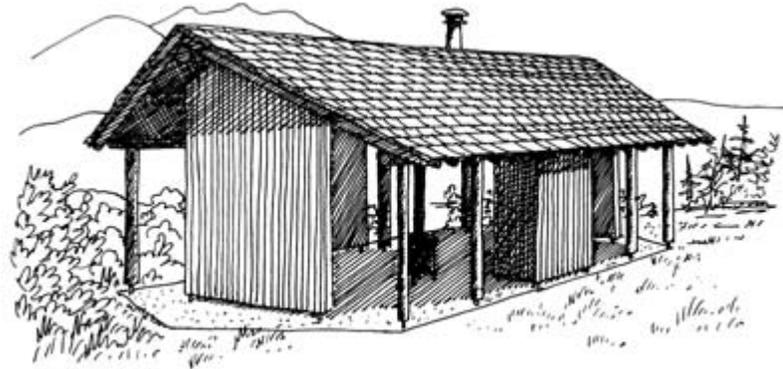
Some site operators may be tempted to install big skips or dumpsters on the site so that low-cost collection can take place. These are ugly and out of place, they often attract unauthorized tippers, and are examples of cost factors outweighing the needs of the visitor and the environment.

Drinking water

In many outdoor areas the climate and the activities taking place demand that plenty of drinking water is available. Hot, dry weather and any form of exercise can result in dehydration; food utensils might need washing, as might hands or fruit. Water on the site, such as a stream or lake, might not be safe to drink, either from pollution or from bacterial infection such as beaver fever in North America. While visitors should be encouraged to bring their own water, they may not be aware of how much they need. Therefore taps or drinking fountains may be supplied, particularly in rural or urban fringe sites where visitors may be less aware of the need to bring their own supplies. Drinking fountains can be



(a)



(b)

Two examples of picnic shelters: (a) This old shelter at a state park in Maine, USA, still exists from the 1930s Civilian Conservation Corps (CCC) design. It has stood the test of time well. Sturdy uprights support a shingle roof. Picnic tables are set out beneath. (b) This shelter also has a shingle roof and some side windbreaks. Inside is a stove as well as tables (not shown in the drawing).

Glacier National Park, British Columbia, Canada.

mounted on simple but elegant wooden posts around the car park or at toilet blocks. Fountains are hygienic to use, waste little water as they are self-closing, and prevent people from using water for other purposes to which they might be tempted by ordinary taps (faucets). If water is provided, a mains supply can often be brought in relatively easily if no on-site sources exist, or water can be filtered from a stream and treated on site.

Picnic shelters

In some places the climate and the landscape may suggest that picnic shelters could be useful. Examples are: rainy climates, where the benches, tables and grass are frequently wet; hot climates, where shade is important but cannot be provided by trees; windy cold climates, where a warming shelter with a fireplace inside is very welcome; or insect-prevalent locations, where a shelter or hut can reduce their annoyance.

In hot climates a roofed shelter with no walls is adequate. Sturdy timber uprights and a simple pitched roof built in similar designs to the toilet blocks described earlier will suffice. Versions that resemble large umbrellas can be effective and decorative, using a single upright around which a table is constructed. Fireplaces can also be included.

Where strong winds occur then some walls may be needed to keep out the rain. These can be devised so that at least one half of the shelter will be out of the wind whatever its direction. Slatted sides may prevent wind eddies back into the sheltered space. Benches can be set against the walls and a fireplace provided, with a chimney and movable sides to help it draw.

In cold climates, particularly when winter sports such as cross-country skiing are taking place, completely enclosed shelters with fireplaces could be appreciated by visitors. In Finnish Lapland the traditional Lapp shelters, which look like wooden teepees or wigwams, are used at recreation sites. These have self-closing doors and a fireplace in the middle. The smoke may be left to find its way to a hole in the roof, or may be given a chimney.

Shelters near the car park should be better finished than more rudimentary structures located in wilder settings. If there are toilets on the site the shelter should relate to them architecturally, in form and materials. Some of the old Civilian Conservation Corps designs for the US National Park Service in the 1930s are excellent examples designed to fit different landscapes.

Chapter Eight

Children's play

Our visitors are now fed and watered. They should have plenty of things to choose to do. For families, one of the options is for the children to play for a while, either with or without their parents' participation. Play provides an important opportunity for children to learn about themselves, their limitations and the world around them. This may be more beneficial than taking children, particularly small ones, along with parents on a hike, where they might become bored, overtired or frustrated.

Play theory

Quite a lot of research into children's play and its place in the outdoors was conducted in Britain in the mid-1980s by the Forestry Commission and the Countryside Commission for Scotland. This has since been developed and more experience of its provision gained by providers of outdoor recreation, particularly in Britain.



This play area, set out along a forest edge, looks slightly more interesting than the average urban example, but it fails to use the forest, the greatest asset available to it. Thetford Forest Park, Suffolk, England.

Many people think of play as a physical activity, letting off steam and getting rid of surplus energy. This concept gave rise to many municipal play areas that used to be, and many still are, just collections of equipment for swinging, sliding and climbing. Most recent research suggests that this is too simple a view, and that play fulfils more important aspects of a child's development. The natural environment presents an ideal setting for play, which should

not be overlooked.

In observing children's play—and they do this either as a natural response or by learning from each other – three broad types emerge:

– **Motor play** is physical activity, such as running, jumping, swinging and climbing. The activities help to develop robust hearts and lungs, and strong, flexible muscles. They encourage children to be fit and healthy.

– **Social play** occurs as children learn to interact with one another in social situations. There are four levels at which social play occurs. The first is **solitary play**, in which the child plays on his or her own and with their own materials. The second is **parallel play**, where the child is with other children and playing alongside them. They may share materials but they do not influence what each other does. The third level is **associated play**. Here all the children are engaged in a similar activity, communicating about it and sharing materials. However, there is no sense of organization amongst the children or a goal to what they are doing. Fourthly, **co-operative play** can develop, in which the children organize themselves as a group to participate in a particular activity. Some will emerge as leaders, others will be more or less content to follow that lead.

– **Cognitive play** occurs when the child begins to learn about his or her relationship with the environment and various cause and effect relationships. This may involve physical effects that can be repeated, or ones where there is some uncertainty and unpredictability involved. Children use this play to develop and perfect aspects of their behaviour.

It is rare for play solely to encompass one of these types: usually they are blended together to a greater or lesser degree. Team games like football consist of lots of physical activity, the social interaction involved with co-operative play, and the development and practice of skills with a cause and effect nature. An activity such as constructing a tree house has a similar mixture. The activity requires the social organization of a task between several children, physical activity in fetching materials and climbing about in the tree, and the development of an understanding about materials, how they fit together, the use of tools and so on. In the right circumstances, when provided with the right stimuli, the play can be constructive as described above.

Children play in different ways at different ages. This needs to be taken into account when considering how to provide play opportunities, as otherwise some age groups may be frustrated. The different stages of play can be described as follows:

– **Functional play** dominates play from 0 to 2 years, and generally starts with simple, repeated actions. Children learn what a different action does, and they repeat it until it is perfected. Later they are pleased with the results of their action. Simple activities of a motor variety and objects to be carried, dropped or thrown should satisfy the early stages. Later such play remains important, but it is subsumed into more complex play. The levels of skill required to become adept at new functions are higher.

– **Constructive play** develops from functional play. Instead of merely repeating actions, the child begins to use materials in a more creative way: for example, building rudimentary sandcastles rather than just filling and emptying buckets of sand. The constructive aspect can be nurtured by providing materials that allow children to build, demolish, alter and rebuild. There should be sufficient materials and equipment for use by a number of children at a time. The natural environment is full of potential materials for constructive play.

– **Symbolic play**. Once children begin to talk they can use words and images in play. The world of make-believe and imaginary situations develops, through which they can explore conflicts and needs. This helps to develop an understanding of the environment and how it can be managed. Without this experience, their capacity to anticipate and adapt to changing circumstances is lessened.

– **Role play**. This is believed to contribute to social, creative and cognitive skills. The child pretends to be different people in different situations together with others. The situations might be ones already experienced by the children, or entirely make-believe.

– **Rule games**. Children eventually become able to organize their experiences into logical concepts, and they become

interested in games with rules. These range from board games to team games out on the sports field. Children can make up their own rules, but unless they are supervised or have some way of keeping to the rules, disputes can occur and frustration can develop. Rule games become popular from around the age of 6 years.

– **Co-operative play** is the most fully developed type of play (see above). This play needs opportunities and facilities such as open areas or structures that will accommodate several children at a time. Solitude remains a valuable asset, and children may want to go off to a quiet place on their own to reflect on things or pursue a solitary activity.

From this it is clear that most of the basic requirements and skills of adulthood are to be found in children's play. Hence providing for play can be an important part of a recreation experience.

The outdoors supplies some wonderful opportunities for play. There is a great range of new environments, features, materials and wildlife to see and explore. This exploration can help children to relate to nature and to learn and understand about food, shelter, reproduction and death, as well as how to respect and care for nature. There are several major advantages that the outdoors can offer to the principles of children's play.

Most children experience primitive fears, such as being alone, being in the dark, falling, monsters or wild animals, loud noises, or getting lost. In a natural area that parents know is safe, the child can explore these natural fears and experiment with the feelings they produce. In this way children can be more easily prepared to face life's dangers. An outdoor recreation area is a good substitute for the home neighbourhood, which may be physically dangerous, for example because of heavy traffic, so that children may not be allowed out to explore their local area.

Getting to know your way around, finding the way between places and the mental mapping needed for this can be developed by experiencing different parts of the landscape, such as landforms, vegetation, rocks or water. Places with winding paths, no street names and different components from the urban setting can help with this.

Children can be as prone as adults to the over-stimulation given by urban settings. The wilder places can help them to wind down and increase their awareness of other things, where to get wet or dirty is expected rather than deplored.

The play that children enjoy in the outdoors is much more likely to be with other members of the family, especially parents who wish to relax and enjoy themselves. This helps in a number of ways. Parents are likely to spend more fun time with their children, and the supervision they provide helps to give the child confidence to test themselves more: climbing higher, jumping further or exploring more scary places. It also means that the play area has to have more challenges for children who still have short attention spans by stimulating their imagination and communication skills. Parents can help children with disabilities to obtain the same thrills as they would normally only watch able children experiencing.

The outdoors as a playground

Compared with most urban environments the outdoors already has many key ingredients in a natural or semi-natural state. These ingredients present no dangers to children if used correctly and managed properly, while at the same time avoiding the reduction of excitement found in urban play areas. A balance must be struck between the need for children to express themselves and unacceptable risks of injury.

– **Space** is usually greater, so that exploring the area takes much longer. Games can take up more space, and it will be easier to find somewhere quiet. There is plenty of room for places for small children to be separated from those for older ones.

– **Landform** can be a great asset. High points, steep slopes, valleys, dark hollows, ledges and natural amphitheatres all provide excellent starting points for role-playing games, as places to explore and conquer and locate challenging equipment. Swings are always more exciting where they fly out over a hollow. Ropeways can run across valleys or down slopes. High points make 'castles', or give views to the wider world. Rolling down slopes, climbing steep banks and hiding in hollows or small caves are further ideas.

– **Water** is a magnet to everyone, especially children. Running water can be dammed or channelled, squirted,

splashed, bridged, fished and used in many other ways. Ponds or shallow lakes can be paddled in, sailed on, made to splash when stones are thrown in, fished in and so on. They may also present dangers unless children are well supervised. Pumps, taps, grooved and hollow logs, stones and planks all help the imaginative use of running water.

- **Rocks and stones** can be used *in situ* if they are too big to move for climbing, although they must not be too high or rough. They can supply hiding holes, shelter, imaginary defences, castles or dens. Smaller stones can be moved to build with, to dam a stream, to make stepping stones, or to be used as seats. Gravel and sand can be dug, shovelled, drawn in, made into hills and used for all sorts of games.
- **Grassy swards** permit all manner of impromptu or organized ball games, as well as running around, lying on and rolling down a hill or slope. Ball games in natural open areas can be more stimulating than on an urban playing field, especially when a ball shoots off into nearby undergrowth!
- **Trees and shrubs** also give plenty of opportunities for play. Climbing trees is a rare pleasure to most urban children, and is usually far less dangerous in a forest with soft earth and dead leaves beneath it. Broad-leaved trees with spreading branches are safer than conifers. Getting used to heights, developing climbing skills and seeing the world from a new perspective are all values associated with tree climbing. Swings may be attached to sturdy branches and tree houses constructed, which children can relate to fairy tales, folk legends or other stories.
- **Shrubs** are often as tall as or taller than children, and so they give a greater sense of enclosure. Adults are tall enough to be able to look into areas where children are exploring and so oversee them. Shrubby areas are also ideal for making 'dens', and they provide other materials such as twigs, leaves or edible fruit. In the right circumstances dead wood can be used to light a fire and experiment with camp cooking (see Chapter 7).
- Vegetation can also be used to separate the overall area into different spaces for different uses. It can give shelter, shade, a physical barrier, for example against dogs, and show seasonal changes to help children become aware of the cycles of the natural world.
- The outdoors offers a chance to observe **wildlife** at relatively close quarters. Shy mammals will mostly move away while birds, butterflies, beetles, frogs and toads may all be more easily seen. Chapter 11 expands on ways to incorporate wildlife watching into outdoor recreation.

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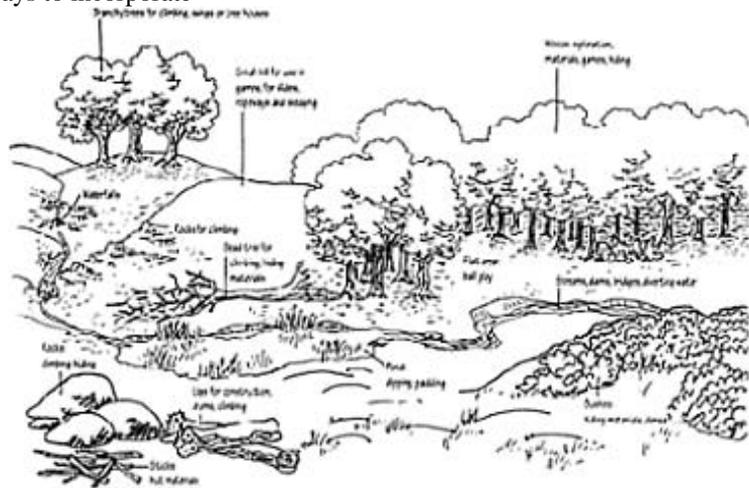
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This sketch shows how the possibilities of a piece of land offer themselves for various kinds of play. Even the most ordinary places have something to offer.



Rocks used for climbing, jumping or hiding— either natural or specially put into place.



*Climbing trees or playing on a platform in a tree
are opportunities that everyone should
be able to experience.*

Provision for play

Although most urban play areas are equipped with elaborate and colourful structures, it does not follow that these need be used in the outdoors; indeed many may offer only a low play value. We should instead start by making the most of what the site has to offer, and add artificial components selectively to enhance and dramatize rather than to substitute for natural objects. In this way the unique quality of play in the outdoors can be highlighted.

The selection of the area in which to develop play is an important decision. Finding a place that is near to the picnic area and car park and yet has many of the resources listed in the previous section would be ideal. Some areas will be well endowed with landform. Others are going to be good for water, while some may have few features unless these are introduced. Mounds can be created in flatter areas; quickgrowing shrubs can be used to provide enclosure and mystery if the site is too open. Natural materials such as rock, sand, logs and branches can be brought onto the site.

Site design will be needed to develop some of the features, and to divide the area into zones suitable for different age groups. Such zones can be signalled with certain key structures to show the size of child expected, by placing more seats for parents near areas for small children and also by signs.

More compact sites may have sections with closely spaced play structures, while larger ones can be more dispersed. A play trail can be developed, where paths lead from one area to another through woodland or amongst shrubby areas. This can heighten the sense of exploration and discovery, and also challenge some of those fears described above, yet reduce the risk of actually getting lost by providing markers or a path.

A few structures of a more dramatic sort can enliven most sites, but opportunities to explore and develop the social and cognitive aspects of play are important. Collecting and using materials found on the site to construct features is usually more interesting and creative than using those that are provided. A 'den' or hut built from branches and other vegetation can provide far higher play value than a readymade hut, however artistic or cunning it might be.

Safety of play areas

Safety aspects must be considered at all times during design. When moving structures are included, whether they be rope swings from branches or something more sophisticated, such as an aerial runway, safety margins around them are vitally important. The circulation for children moving from one place to another around the site needs to avoid crossing beneath such structures in order to prevent injury (see diagrams).

Any structures likely to be moving, or of any height above ground, must be properly constructed in order to take the weight of children and to be durable. Soft materials such as bark should be laid beneath high features, and moving parts should be designed for strength and to prevent trapping fingers. Design can increase the apparent risk while ensuring safety. Beams can be wobbly to walk on yet safely fixed; swings can seem to go higher than they actually do; scramble slopes can appear tall yet comprise several levels with safe ledges in between to reduce possible drops.

Themed play areas

As well as making use of the natural attributes and materials of the site it is possible to develop aspects of play around a



The layout of a play area has to be incorporated with the layout of the other components of a site so that it all works functionally in terms of people's circulation, safety, supervision and freedom.

specific theme. This can be used to impart a special quality to reflect those of the place and thus enhance its cognitive play value. Often the recreation area will have particular geological, historical or natural history features that lend themselves to the development of play. Sculptors can help to create stimulating structures that relate to the special character and thereby add further interest.

In a forest, for example, the trees and the forest animals offer an abundance of ideas:

- .- Climbing structures, tree houses and ropeways can be developed to take children up into the tree canopy, using ropes and swings to descend.
- .- Hollow tree-trunks and holes under root plates can be used for crawling through, while spiders' webs, giant badgers' setts and other animal homes can be recreated.
- .- As fairy tales abound in forests, meeting gnomes, elves or goblins can also be built into the play area.
- .- A maze cut amongst small trees, bridges that tilt as you walk along them, structures that blow in the wind or are operated by ropes to make strange noises, all stimulate the

imagination, spring surprises on the children, and help them to overcome some of their latent fears.

- Hollow logs can make drums to send signals or to create strange music.
- Teams of children can play mystery games, or pretend they are Swiss Family Robinson or Robinson Crusoe.

In water areas, provided the water is not too deep or liable to flooding, there are many ideas to be developed:

- hollow logs, or ones with channels cut along them, which can be used to divert streams;
- suspension bridges and stepping stones;
- small dams with sluices;
- floating pontoons or shallow-draughted boats;
- small waterfalls that shoot out over ledges, allowing children to crawl behind them without getting too wet;
- piers from which dipping with nets can take place;
- paddle wheels that can power pumps or lifting devices;
- shallow, sandy-bottomed pools that permit bathing or paddling.

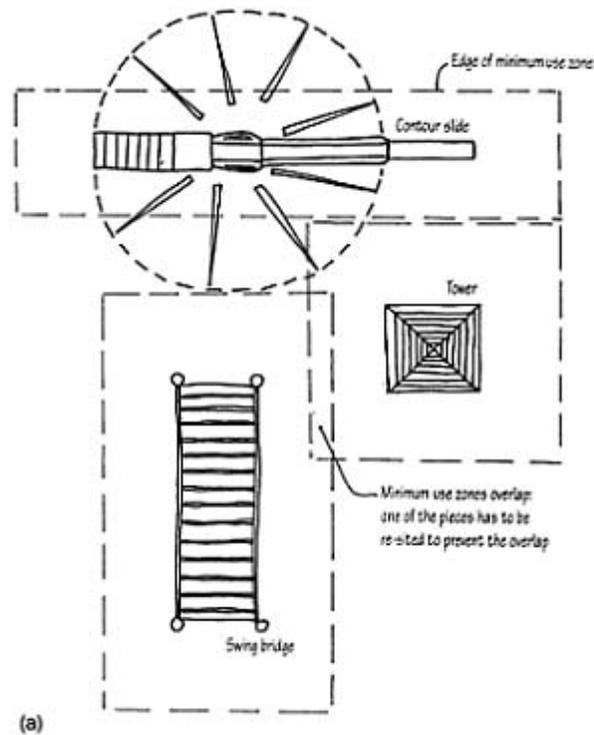
Fitness and strength can be developed using assault-course-style equipment set out along a path. Scramble nets, climbing walls, balancing beams, stepping logs and an aerial ropeway can be exciting and competitive.

For smaller children, structures in the form of animals and their activities can be fun:

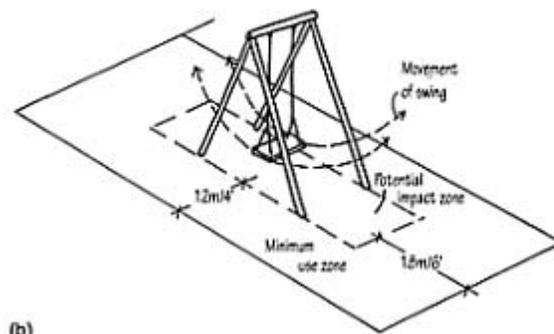
- slides made in the form of birds or animals;
- snakes made from logs to walk along;
- tunnels like rabbit holes;
- spiders' webs to climb on;
- a merry-go-round like a fox chasing a rabbit.

Play for children with disabilities

The play area, structures and activities should be widely accessible to children with disabilities. With some help from their parents or friends they should be able to obtain as much of the play experience as possible. Slides, ropeways, swings, water diversions, pond dipping, mazes and drawbridges are all examples of features capable of being used by children with



(a)



(b)

Safety and the proximity of different pieces of equipment must be considered: (a) This layout allows safety or minimum-use zones around different play structures.

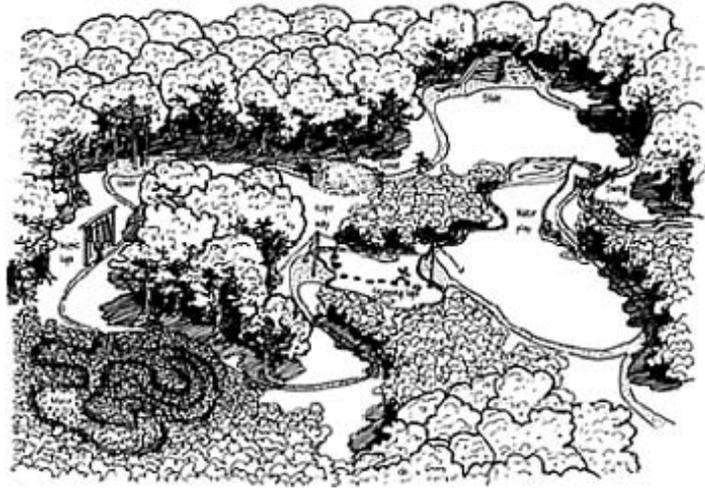
These must not overlap. (b) An example of recommended minimum-use zones around moving equipment such as a swing.

disabilities, under supervision and perhaps with some help. Such delights should be available to all and are worth the extra effort, especially for disadvantaged children, who may be experiencing them for the first time.

Materials and construction

Apart from the naturally occurring materials or earthworks, any structures constructed in the play area should be robust, free from safety hazards, and as far as possible should possess sustainable origins. Timber is likely to be a common material, and is best used in large dimensions because of the larger scale of the outdoors and to distinguish it from urban play areas. Other appropriate materials are sisal and polypropylene rope, galvanized chain and bolts.

All of these are durable, require little maintenance, and can be constructed to meet the various safety and construction standards required by different countries or states. The following are some hints on construction and safety.



A sketch of a play trail where children can move from one interesting piece of equipment, structure or experience to another.



Children can use their own imagination and materials found in the landscape. Here a primitive hut has been made from branches. Dalby Woods, Sweden.

- .- Posts should be set well into the ground, and should normally be concreted in. Take care that the top of the concrete does not protrude above ground level. Even if it is set down low at construction, erosion during use might expose it.
- .- Ensure that bolts are countersunk, and that protruding ends are cut off cleanly and as flush with the nut as possible.
- .- Chains should have links that cannot trap small fingers.
- .- Timber should be peeled and rounded before use. Edges should be sanded and chamfered to reduce the risk of splinters.

Other materials that may be used are:

- old car tyres, which can be recycled as swing seats or shock absorbers on moving parts such as aerial ropeways;
- .- fibreglass for tubes or special constructions;
- .- stainless steel for contour slides;
- .- galvanized steel tube for ladder rungs, strengthening of structures and for firemen's poles.

Not all of these are sustainable: wood laminate may substitute for fibreglass and stainless steel under some circumstances.



This exciting trail high up in the tree-tops offers a new perspective on the world. Ringwood Forest, Hampshire, England.



This interesting bridge has a drawbridge section on it. Walk on to it and it descends, allowing a person to cross. Haldon Forest, Devon, England.

Materials to be avoided are:

- non-galvanized or non-stainless steel, as this has to be painted, and rusts too easily;
- concrete, as this is too hard, urban, unforgiving and dangerous for children.

Surfacing beneath structures, particularly tall ones, should be soft and resilient so as to prevent injury if children fall. The following materials are well proven and sustainable:

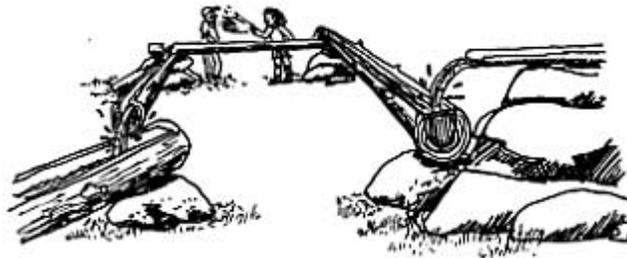
- **Wood chips.** These work well in a forest or countryside setting. They absorb impacts well, are relatively hard-wearing and cheap. Once used or contaminated they can be removed and recycled as mulch.



Music in the outdoors: (a) A series of hollow logs hanging from a frame and arranged to make different notes. Wooden mallets are used to play tunes. Helsinki City Forest, Finland. (b) Large hollow logs make primitive drumbeats for sending messages.



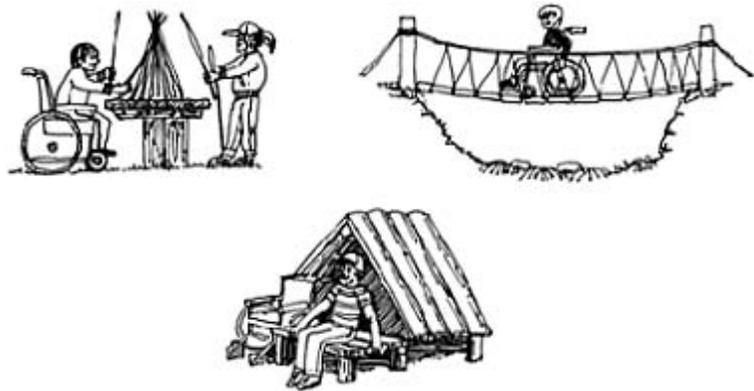
The army-style assault course is always popular with older children. It offers a physical challenge, which fits in with other challenges of the outdoors.



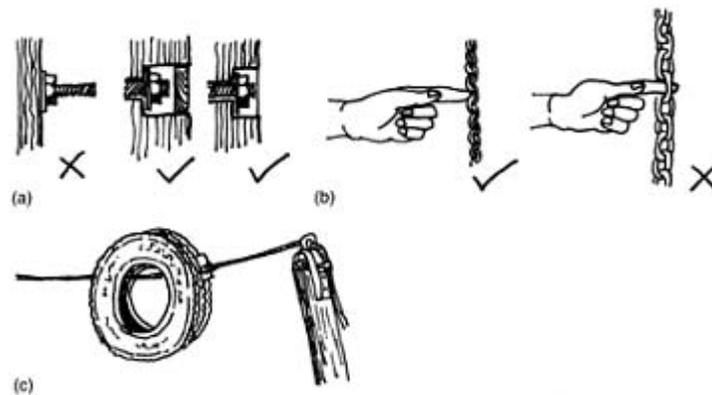
Water is always attractive. Here, hollowed split logs make conduits, which can be moved to channel the water in various ways.

– **Bark.** Pine bark has similar properties to wood chips. It is soft, has a pleasant ‘forest’ smell and an earthy colour that blends with the outdoors, and is cheap.

Both these materials need periodic cleaning to remove litter, and must be laid on well-drained sub-bases, as they tend to soak up moisture. This can cause them to freeze in the winter, or ferment and release tannins from the material, which creates a strong-smelling effluent.



Some structures or equipment can be made accessible to children with disabilities so that they can join in as far as they are able to do so.



Structures must be safely constructed: (a) No protruding bolts—trim, countersink or plug them. (b) No chains to trap fingers—check link sizes. (c) Use tyres as shock absorbers on fast-moving equipment.

– **Sand.** This is better in seaside areas, deserts, heathy places or other sites where bark or wood chips

would not fit in or are not available. It is quite soft to land on if it is dry, but it tends to adhere to clothing, get inside shoes and blow into eyes. The abrasive quality of sand can increase wear and tear on moving parts.

Safety surfaces should be retained within log kerbs, which should follow the outline of the safety zones, thus helping to demarcate them. It is essential that they are kept loose and clean. Pets must be kept clear of the area, and all glass objects should be banned. Surfaces to avoid are anything hard such as tarmac, and grass, which also wears too easily, especially under moving equipment.

Chapter Nine

Trails

Visitors may wish to explore the outdoors on foot, on horseback, on cross-country skis or by all-terrain bicycles. Some may wish to navigate by themselves using map and compass. Others, perhaps a majority, may need a path or trail to follow.

Before considering trail provision it is worth deciding whether a trail is needed. Creating a surfaced path with its accompanying disturbance may have an adverse effect on the spirit of a place, removing the sense of wildness and

introducing an atmosphere of tameness and over-obvious evidence of management. The trail might also disturb fragile habitats and increase pressure by concentrating visitors in one area. If no trails are provided then erosion and unplanned path development may occur anyway unless people are managed so as to disperse their approach and reduce pressure. Guidance to visitors on the fragility of areas and the need to take care might be needed.

Purpose of trails

In many cases the effect of trail development on the special qualities of a place is outweighed by the need to prevent wear and tear and to control the access to an area by visitors. If a trail is needed, consideration should be given to the particular theme that it will be used to explore, and the objectives of its provision. Themes may be one of or a combination of the following:

- general exercise and relaxation by the family with an emphasis on multi-accessibility;
- scenic viewing leading to a viewpoint;
- wildlife viewing;
- visiting archaeological sites or other cultural features;
- educational visits to explore geology, geography or natural history;
- physically demanding routes for serious exercise.

The types of users of the trail will determine its physical

characteristics, such as surfacing, gradients and lengths:

- walking only, bicycle only or horseriding only;
- integrated routes, which may give rise to complications or conflicts;
- partially integrated routes involving loops for horse-riding and cycling where conflicts are more likely;
- barrier-free routes to allow access by people with disabilities.

Trails can provide:

- a means of access into the outdoors and a route for people to follow with less chance of becoming lost, confronting physical dangers or damaging sensitive places—it signals that access is allowed and that the visitor is not trespassing;
- stimulating exercise in attractive surroundings—steep ascents and some rough scrambling can be incorporated in places;
- a variety of scenery, ranging from vista points to obtain panoramic views down to the small-scale details of plants seen along the side of the trail.

A key aspect of trail design is the choice of the route, not only in terms of length and gradient but also in the way the landscape is experienced. For example, dramatic views can be kept concealed until a particular point is needed where a surprise can be sprung on the visitor.

The design and layout of trail routes and surfaces depends on the degree of wildness desired and the wear and tear expected. In primitive settings no surfacing should be provided except to restore erosion. Conversely, in less wild places used by many people, wide, well-surfaced paths on easy grades may be appropriate and necessary.

The needs of people with disabilities should not be overlooked. People with limited mobility, or wheel-chair users, cannot always manage steep grades or rough surfaces, yet they should have a right to experience some of the dramatic views seen by everyone else.

Trail route design

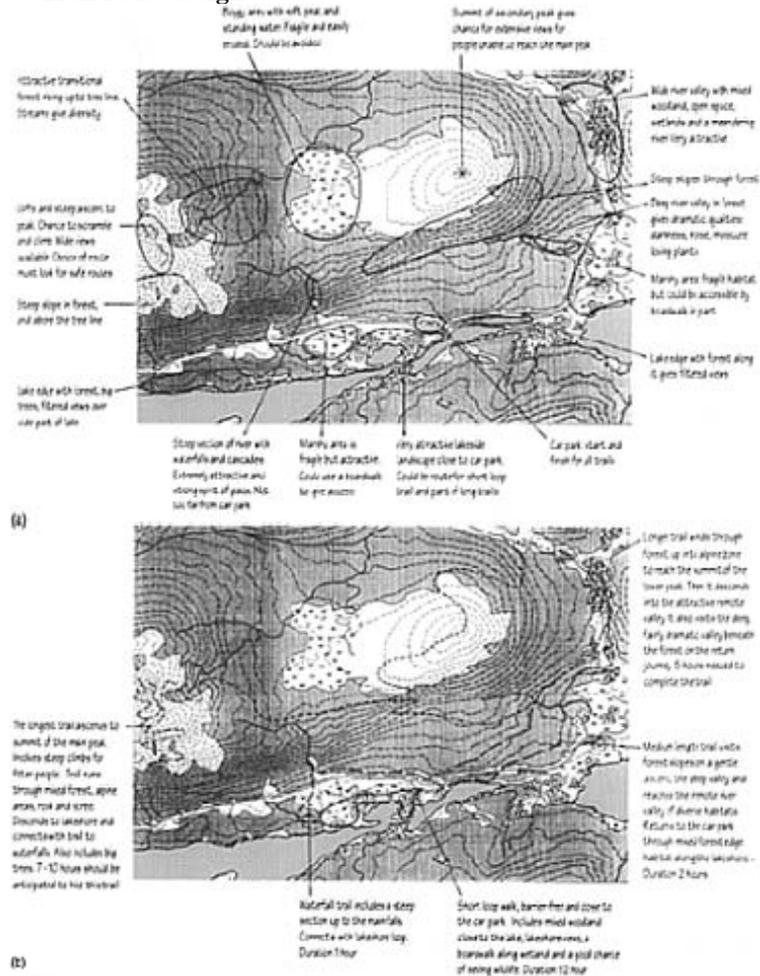
Most landscapes have varying terrain, different vegetation and a variety of places within them. Some may have peaks to climb, others water of various sorts or stands of big trees to walk or ride through. Using maps and aerial photographs a

In

The needs of people with

some

Trail route design



Trail planning: (a) Before laying out a trail it is a good idea to carry out an extensive survey of all the features of interest that might be included on the route, and areas that pose problems for some people or which the trail must avoid because of the risk of damage or disturbance. (b) The trail route is then planned to develop a route or series of routes that offer a range of interesting places, views and atmosphere. The best or most dramatic features should be planned as a climax, such as the view from a summit, a particularly beautiful hidden feature or archaeological site.

survey should be compiled of the landscape by walking or riding through it, to identify and record features of interest. These might include viewpoints of various kinds (see below), peaks, narrow valleys, waterfalls, ponds and lakes, cliffs and rock features, stands of special trees, areas of meadow, archaeological or heritage sites, shorelines, caves, dense vegetation, bogs, areas attractive to wild animals, sand dunes, islands, and sunny places at different times of day. All of these are attractive features that people are likely to be drawn to compared with the less obvious, hidden areas, which nevertheless contribute to the spirit of the place.

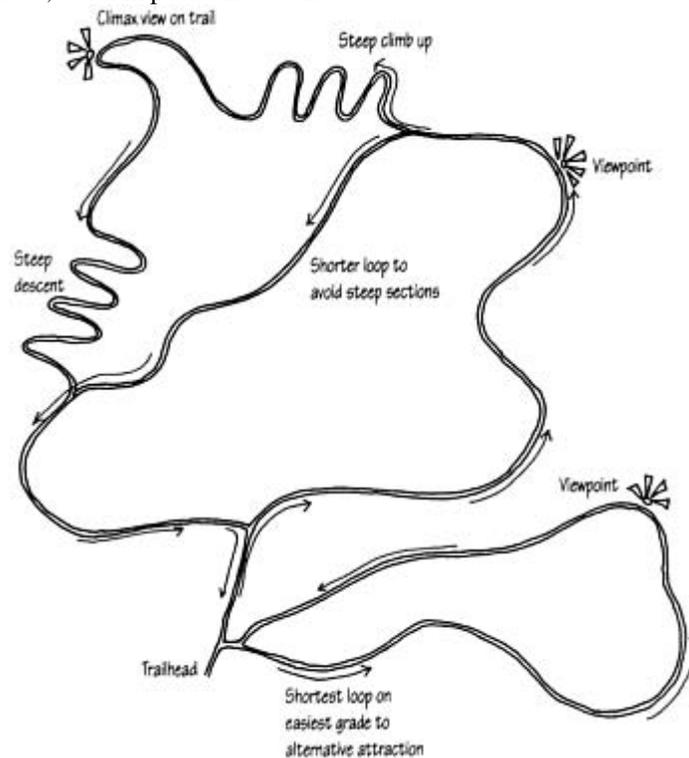
Hazardous areas and sensitive features where access is undesirable must also be surveyed: examples are cliffs, steep loose slopes, easily eroded sand-dunes, wetlands, deep water, areas where dangerous wild animals congregate, old mine shafts, dangerous currents, very cold water, vulnerable archaeological sites, areas where disturbance of wildlife and places for solitude may be a problem, and dangerous caves.

As with all recreation provision, the trails need to provide a reasonable match between the various visitor requirements and the features that the area has to offer. A large demand and a limited area might suggest wider, better-surfaced paths, as dispersal and lower use would not be feasible. The demand may already have been established at the planning stage or it may be obvious because of existing use gradually built up over some time.

Lengths of trail

Different people may be interested in different types and lengths of walk, depending on who they are, how fit they are and how much time they have. These needs can often be fitted into a range of circular loop walks. Walks of around one hour's duration are quite popular. A half-hour jaunt to a particular beauty spot or vista is also attractive for those with little time. Both of these types should have no barriers, in order to cater for people with disabilities.

A two to three hour or longer trail may be attractive to those who want to spend more time in the fresh air and to go into wilder places. The length of time to walk such a trail by an averagely fit person should be increased to allow for stops to eat, look at views, swim in pools and so on.



Trails laid out in loops of different lengths offer people a range of physical challenges, timescales or both.

Even longer trails, taking several days to complete, might be part of a network connecting up with others and ending up at different locations. Walking these routes requires careful planning in terms of food, clothing, accommodation and transport. Examples of these long-distance trails are the Pennine Way in England and the Pacific Crest Trail in the USA.

The sequence of experiences along a trail route

Having established the qualities by survey and the types of trail required by visitors, the detailed route planning can commence. Much of this can be based on the survey/analysis map, but a more detailed survey will be needed on the ground, exploring the landscape and marking feasible routes ready for clearance or construction.

In most circumstances the route design should start from the car park/picnic area at a logical and inviting place. Some kind of threshold is a good idea, such as a dramatic stand of trees, a large rock or a bridge over a stream. Beyond that it is often helpful to design to enable the walker to set a pace and adjust to the type of landscape being entered before the first point of interest is encountered. Wild places may be unfamiliar, so an easy stretch will help to accustom the walker to this before anything too dramatic happens.

Narrow, dark or slightly stressful stretches can be introduced, which have the effect of raising expectations and increasing the sense of contrast between what has gone before and what is coming after. A slight degree of

disorientation can give an impression of a small area seeming larger than it really is.

The appreciation of scenery can be heightened by gradual disclosure through slot or filtered views before being revealed as a panorama. Where points of interest occur, seats can invite the walker to rest and absorb the surroundings or the view.

If the trail leads through a forest, emerging from beneath the dark canopy into an open sunny area can provide relief and a pleasant surprise. Larger open areas can be skirted by the path's keeping partly in and partly out of the forest edge.

Water is a great attraction to visitors, so trails leading to dramatic views of waterfalls, either to the top where the water disappears over the edge, or at the bottom with the noise, spray and churning currents, can provide memorable experiences. Water crossings can also be exciting, whether stepping-stones over a smaller stream, a narrow bridge over a chasm, or a more dramatic structure such as a suspension bridge with its swinging movement.

Lakes and ponds also attract access, at least to some part of the shore. Views across the reflective surface of a still lake, the lapping noises of gently waving water, the chance to paddle or cool one's feet—all give a tremendous value, to say nothing of the wildlife that may be seen. When a small lake occupies a hollow there is also a sense of space and enclosure, which enhances its quality and often gives an aura of mystery.

Curious and unique geological features also arouse interest: caves or overhangs beneath cliffs; strangely eroded rock formations that suggest weird life forms or fossilized trees; narrow canyons or gorges; lava formations; narrow knife-edged ridges or perched glacial erratics.

Seashore areas provide natural access routes; people enjoy following the edge of the sea, and along such stretches there is rarely a need to go inland. Sandy beaches are most attractive, but clifftops or the edges of shingle beaches are also valuable. The sight of the sea, the noise and the movement of the waves at different seasons and in varying weather conditions and the special quality of light at the ocean—all provide variety, which keeps people returning.

Sites of archaeological or historical value should also be included in the trail route if they are robust. Stone circles, burial mounds or earthworks can be found in what are now wild landscapes in many parts of Britain and Europe. Remains of old settlements—even recent industrial relics or wartime defences—can be interesting. Far from detracting from the wild impact they can serve to reinforce it, demonstrating how human endeavour can be reclaimed by time and nature. A poignant reminder can be given of the harshness of life and the vulnerability of earlier people trying to scrape out a living in harsh circumstances.

Opportunities to see wildlife should be identified where they congregate: for example, salmon runs, bears fishing, deer lying up, beavers and their lodges, ospreys nesting or butterflies basking in the sun. The trail might need careful alignment to minimize the noise, sight and scent of people, and hides can give a good view without disturbing the animals. Seeing wildlife can be a rare thrill for many people (see Chapter 11).

A trail should be designed to raise expectations continuously and fulfil those expectations in unexpected ways. The development of the route should pace this, with feature points along the trail interspersed with relatively simple sections, leaving the most dramatic climax until last, to be followed by a calming, more reflective wind-down back to the car park area.

Not every landscape will have all or even many of the features listed above.

A trail can be made more interesting by winding the route amongst different vegetation types, creating spaces in a forest or planting trees in an open area. It should also be designed to respond to landform by rising in hollows and descending in convexities so that it blends in and reduces any feelings of intrusion to a minimum. Features can be created, such as ponds or small lakes; benches can be placed; vegetation can be managed to create a butterfly habitat; or sculpture can be introduced.

Trail construction principles

Once the route of the trail has been selected, it should be cleared, gradients found for barrier-free access (see below) where these are needed, and decisions made on appropriate surfacing.

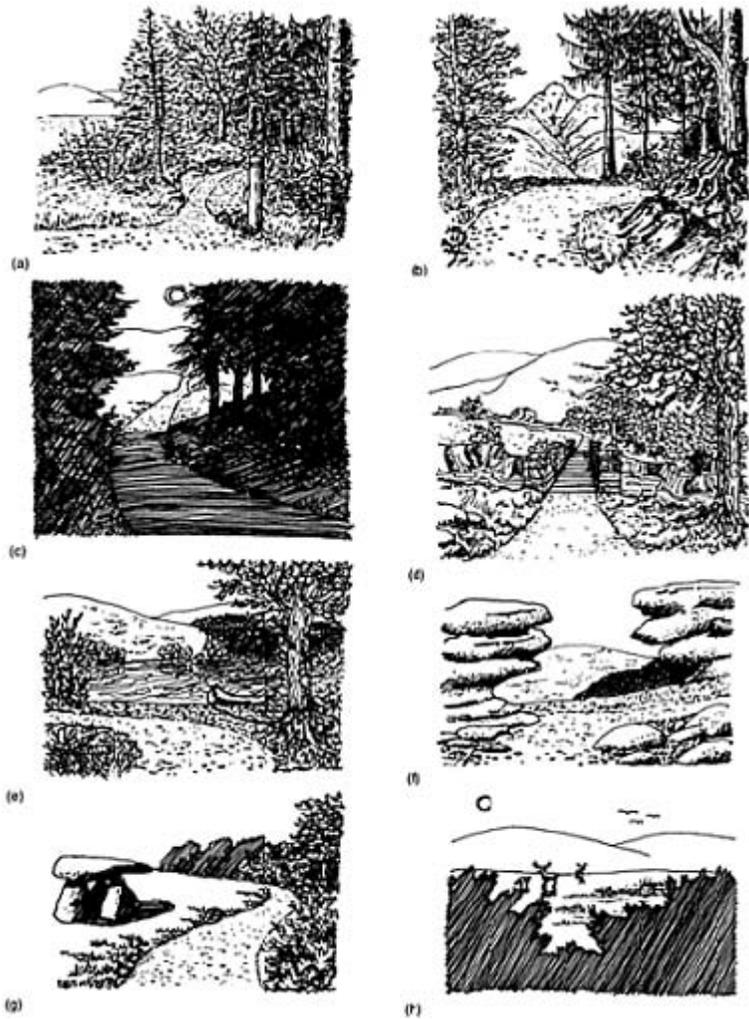
There are some guidelines to follow when considering trail construction:

- Build as little surfaced trail as possible, if the ground is hard, naturally well drained and can withstand the expected traffic.
- Avoid steps and ramps if possible. This is obligatory on barrier-free trails, and is a general principle to follow elsewhere. Use short, steep pitches if needed in the more rugged places, but generally try to find suitable gradients for comfortable walking.
- Keep paths away from wet and soft ground, especially silt, clay or peat soils if possible. Erosion of exposed soil during rain and attempts by people to walk round muddy places exacerbate soil removal and create unsightly scars.
- Try to avoid routes crossing scree or talus slopes or heavy boulder fields. These can be loose, dangerous and difficult to stabilize.

In places where these guidelines cannot be followed, the construction of firm, dry, well-drained surfaces is necessary. The degree of finish that these should be given will depend on the wildness of the landscape, the fragility of the surface to be crossed, the expected amount of use, the availability of materials and the resources available for construction and maintenance.

The standard of construction depends on the kind of trail required. If it is to be used by everyone, including people with disabilities, then a different specification will be appropriate from that expected to be used by fit, energetic people who are well equipped with hiking boots. It is possible to categorize trails as follows.

- **Barrier free:** easily accessible to wheelchairs, pushchairs (strollers), visually impaired visitors and those with walking difficulties. All-weather surfacing, low gradients (not more than 1 in 12 for short stretches only) and no steps are required for such trails, which should be capable of being walked wearing light shoes.



This set of sketches suggests how a sequence of features can be linked together to give an exciting experience when following a trail: (a) The threshold to the trail should be well marked and inviting, the path leading the walker and giving a sense of direction. (b) A slot view out of the foreground, here sited on a curve for maximum impact and effect. (c) The trail emerges from a dark, tunnel-like space, revealing a sunny open area beyond, increasing the feeling of

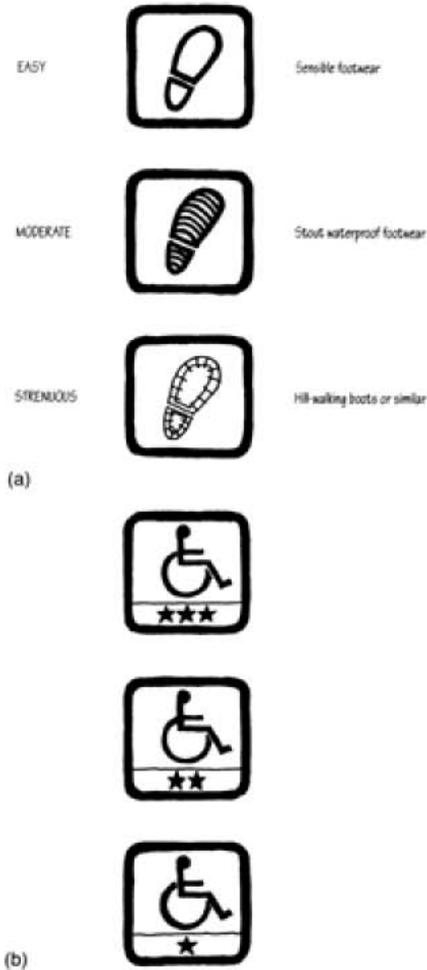
movement through the landscape and of anticipation. (d) A water crossing will always be an attractive and significant feature where sound, light and movement occur together. (e) Access to a small lake is usually important and worth including. (f) Curious or unique geological features such as wind-sculpted rocks lend a sense of mystery and admiration at the forces of nature. (g) Archaeological or historical sites help to connect people with past human use or associations, and also demonstrate the capacity of nature to reabsorb our efforts. (h) A chance to see some wildlife can be a rare thrill for many people. The trail should maximize opportunities without causing alarm to the wildlife or risk to the viewers.

- **Easy:** good conditions underfoot, gentle slopes, short steep sections or occasional flights of steps if absolutely necessary. Sensible footwear such as stout shoes would normally be needed.
- **Moderate:** some rough places, wet surfaces in parts, some larger sections of steep grades up and down. Wellington boots or hiking boots are desirable, especially in wetter climates and colder seasons.
- **Strenuous:** rough conditions underfoot and steep slopes, making hiking boots essential. Where paths lead to higher altitudes there may be sudden changes in weather. Above the tree-line the path may be difficult to detect, and so map and compass skills are likely to be needed. These types of routes include mountain paths, long-distance trails, miners' and stalkers' paths.

Beyond these categories come routes that demand greater physical fitness, stamina and special equipment, and so are beyond the scope of this discussion.

Once the trail has been categorized, a specification can be developed for an appropriate type of surface. This is most important for trails intended for use by people with disabilities (barrier-free). To enable less able people to choose trails suited to their individual capabilities, a star-rating system has been devised by the British Forestry Commission based on surface

Once the trail has been categorized, a specification can be). To enable less able people to choose trails suited



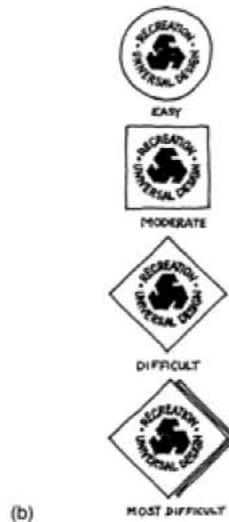
*(a) The symbols make it clear as to what kind of trail conditions a walker can expect.
 (b) These symbols help people with disabilities to decide whether they want to attempt a particular trail. Both sets of symbols are used by Forest Enterprise in Britain.*

criteria set out by the Royal Association for Disability and Rehabilitation:

- Three stars indicates a walk with gradients no greater than 1 in 40 (up to 1 in 20 for lengths no longer than 10 m/11 yd)

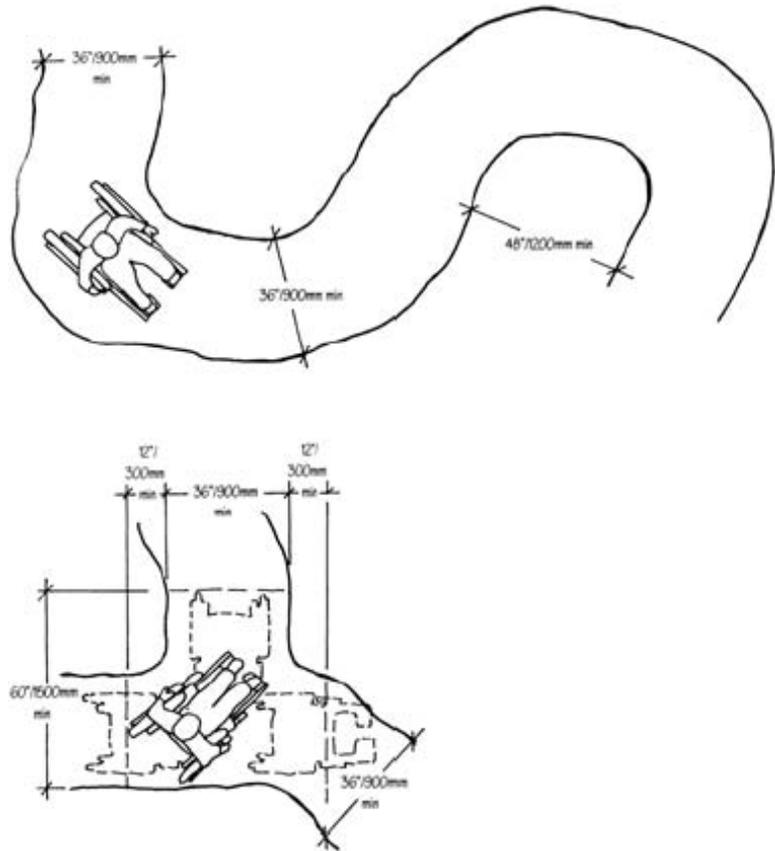
and with a smooth, hard surface without obstruction or potholes.

- Two stars indicates a walk with gradients up to 1 in 20 for stretches no longer than 100 m/111 yd and with a smooth, hard surface with few obstructions or potholes.



These symbols are used in the USA: (a) A useful way of showing the actual trail conditions for anyone to decide whether they want to follow it. (b) Symbols showing the grading system—the graphics are clumsy compared with the British example on the left.

- One star indicates a walk with gradients of up to 1 in 12 for stretches no longer than 20 m/22 yd and with sections of irregular surface no longer than 5 m/5.3 yd.



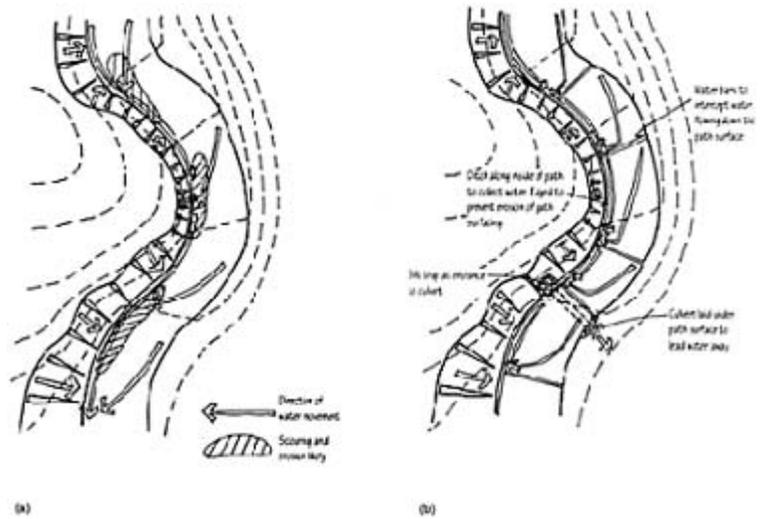
These diagrams give the necessary minimum dimensions of trail that allow a person in a wheelchair to negotiate corners and junctions.

Although building as little trail as possible is preferable when construction is needed, it should be to the highest standard possible. This is because poorly constructed trails using inferior materials are unlikely to last long in the exposed, harsh conditions to be found in the outdoors. When they fail, such surfaces are difficult to repair adequately and become a drain on maintenance budgets.

Path drainage

In wetter climates it is vital that the path is drained properly.

As well as culverting small streams or drains that cross the path, its surface also needs to be drained. Water runs down the cut faces above the path, and if not collected and channelled away can cause serious erosion to the path surface and possibly to the foundations. Cut-off drains should be provided on the inside of the path along the bottom of the cut slope to collect water coming down it, and from the path itself. The path formation is best sloped inwards towards this drain. Culverts should be provided at intervals along the path to divert water collected in the side drains and reduce water flow. Silt traps, such as a basin below the entrance to the culvert, will prevent silt from finding its way into streams (see diagram).



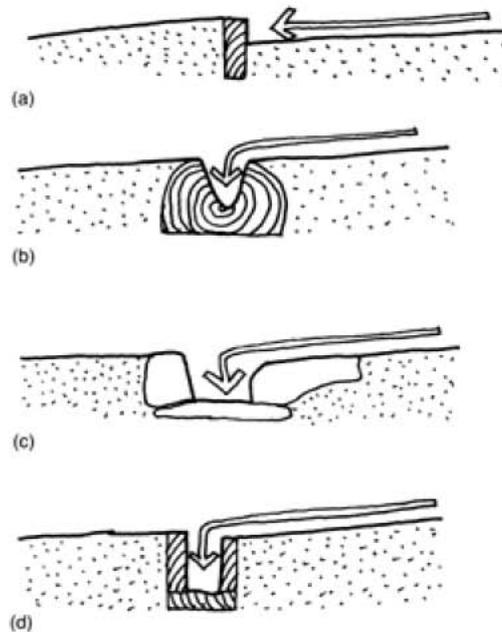
This diagram illustrates how to plan for path drainage: (a) The movement of water and the identification of places where scouring and erosion during heavy rain are most likely. (b) The positions of waterbars, the drainage ditch, culverts and silt traps are planned to intercept the water before it does any damage.

On steep sections where storms might wash out the surfacing, cut-off drains or water bars should be laid across the path at frequent intervals. These are normally open channels, which can interfere with wheelchairs or buggies. Some can be narrow to reduce this problem, but they are more prone to

blockage and need more maintenance to keep them working.

The types of cut-off drain can be as follows.

- A wooden board inserted into the surface across the path at a shallow gradient is functional, but can trip people.
- A log can be laid across the path, sunk into the surface. A V-shaped groove cut along this channels the water. It is simple and effective and less likely to trip people.
- A box drain can be constructed out of durable or preserved timber and set flush into the path surface. It can be partially enclosed to leave a narrow slit so that it impedes wheels less, but it is prone to blockage by leaves or larger stones.
- A similar open cross-drain can be constructed from local stone. Flat stones are laid on the bottom between the sides to keep them apart.



The design of cut-off drains or waterbars: (a) The simplest is a plank set on edge into the path. This can trip people up, and it is no good where wheelchairs or buggies are used. (b) A half-round log with a channel cut into it is simple, robust and easy to lay. (c) A box drain made from stone is very effective. This also presents problems for wheels. (d) A

wooden box drain is similar to the stone example, but it can be prefabricated off site.

Leading water under paths is best done using plastic culvert pipes. These are strong, light to carry into remote areas, and easily cut to lengths using a knife or saw. The pipe is laid in a trench dug across the path at a depth of 300 mm (1 ft) or more on a compacted base to prevent sharp stones from damaging it. The ends of the culvert pipe should be trimmed to match the sloping profile of the path.

If heavier loading is needed, concrete or galvanized pipes are stronger. These take more effort to lay, are heavier to transport, and require special cutting tools.

Box culverts made from durable timber such as elm or from slabs of stone are a traditional type. These have a

place where natural materials are the first choice, but they require more skill to construct than laying a pipe.

If the path edge or the fill material of the base is unstable, a protective surround to the culvert ends should be built of dry or mortared stonework or timber to prevent erosion during heavy storms.

Where the drain across the path may have to cope with sudden, large amounts of stormwater, unless pipes are of large dimensions they can block with debris and cause flooding or washout of the path. In such cases, where early maintenance cannot be guaranteed, wider open culverts may be necessary, and walkers can be expected to step or jump across. If the path is in a remote location in rougher conditions, wheelchair access may be less appropriate, but users could be advised to carry crossing planks.

Path excavation and surfacing

It is important to select the most appropriate methods of design and construction of the trail for different types of terrain.

Gentle terrain and freely drained mineral soils in areas with low or moderate rainfall

If trail use is light, no surfacing may be needed. The route is merely cleared of debris, trees and protruding branches are cut back to clear the way, drains or small streams are piped, and obvious rough places are smoothed or filled with local material. The path width will define itself by the feet of the users, and over time any wet patches or eroding sections can be repaired.

In conditions of greater use and wear and tear, trail construction is relatively easy. Turves are cut from the path route and stacked to one side. Large rocks and roots should be removed from the excavated route, and any drains crossing the route should be piped. Around 150 mm (6 in.) of graded crushed stone is then laid along the route and rolled. The turves are used to neaten the path edges, or to patch worn areas. The surface can be sealed to prevent dust or to improve it for wheelchair access using one of the proprietary glass-fibre-reinforced surfaces, or by spreading tar and rolling on chips of local stone chosen to blend into the landscape.

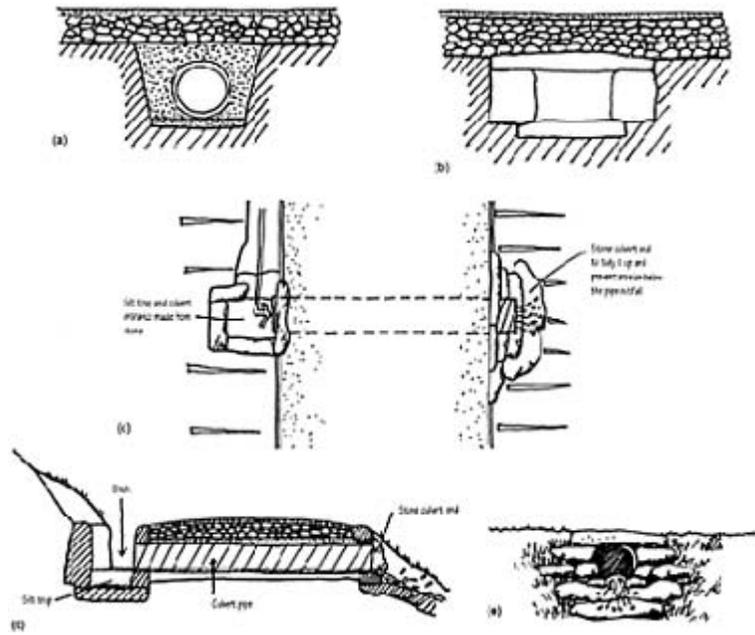
The surface of the path should be formed into a slight crown or double camber to shed water off each side. If needed, ditches can be provided alongside the path. This crowned surface is important for easy use by wheelchairs or buggies, as a side grade tends to pull them constantly to one side.

Construction can be by hand labour using hand-operated rollers and dumpers, or by machine such as one of the miniexcavators now available. These are ideal for path widths of between 1.2 and 1.8 m (4–6 ft).

Gentle or flat terrain in wetter, less well-drained soils in wetter climates

Path construction is similar to that described above except for two factors: the need for more drainage, and the problems of the surface sinking into the wetter, weaker soils beneath. Drainage is provided by open ditches alongside each side of the path; these should lead water away without discharging directly into watercourses. The path can be prevented from collapsing into the ditches by placing stones or timber along its edges to retain the surface, or by setting the ditches a short distance away with side drains leading to them from the crowned surface of the path.

The problem of the surface material's sinking into and mixing with softer ground beneath can be overcome by laying a geotextile mat on the excavated surface before laying the surfacing. The turves replaced at the path edges help to keep the geotextile buried, and tidy up the overall effect.



Culvert construction: (a) Modern culverts are easily made from lightweight plastic tubing laid in a trench cut to a fall across the path. (b) A stone culvert can be made from local materials. This is set beneath the path. (c) A plan view shows the layout of the culvert—its entrance contains a silt trap and its exit is dressed with stone. (d) A section through the culvert, showing the silt trap, the retained path edges and the culvert mouth set around with stone. (e) The culvert exit is tied into the path edge using stone to prevent erosion and to make a tidy result.



An example of a box culvert made from local stone and covered in large flat slabs. This is an attractive and durable solution. Glen Affric, Scotland.

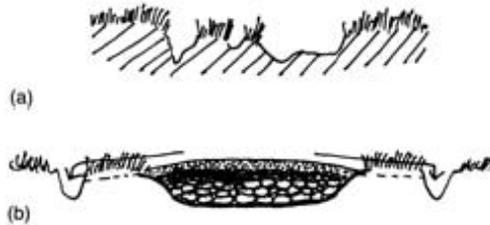


A typical section diagram to show path construction on firm, freely drained ground: (a) Turves are stripped and retained to be used to tidy the edge of the path after construction. (b) The path route is excavated down to firm subsoil, and large

stones or roots are removed. (c) Around 150 mm (6 in.) of crushed stone is laid and rolled. (d) Smaller stone is laid and rolled for the surface, raised in the centre to help shed water and prevent potholes from developing.

Peaty soils on flat or plateau areas

This is the weakest soil of all, but is so extensive in many places that paths may be unavoidable, while wooden boardwalks are too expensive for long stretches. Experience with long-distance paths in Britain indicates that measures for crossing peat are needed at the outset for path use; otherwise, severely eroded surfaces will occur very quickly. There are several techniques for crossing peat, as follows.



Path construction in wetter soils: (a) The worn, rutted and muddy result of wear and tear without a path surface or drainage. (b) A path constructed by excavating the worn sections and laying the crushed stone on a layer of geotextiles. Drains alongside the path carry water away.

Rafting

Round timber of around 100 mm (4 in.) diameter, in lengths to suit the required path width, is wired and stapled together side by side to form a continuous roll. This is laid out along the path after minimal preparation such as levelling hummocks, filling hollows and piping drains across the route. Surfacing material is then laid over the raft, which floats on the peat.

Fascines or faggots

This is a method that has been used for hundreds of years. Bundles of brushwood, slash from logging or similar materials are compressed tightly and bound using wire or nylon twine. The faggots are laid side by side lengthways across the path. They should be longer than the path width, because light wooden poles of around 75 mm (3 in.) diameter are used to hold them together and define the width. Wooden stakes are



*An example of an eroded path across peat. This is extremely difficult to restore or to lay a satisfactory path surface over.
(Courtesy Peter Ford)*



Rafting construction using lengths of timber wired together into a continuous mat. This is laid straight onto the surface once any basic preparation has been carried out. Path surfacing is laid over this, covering the timber to keep out the air.

partly driven in at intervals next to the poles and nailed to them. They are then driven in further. This has the effect of compressing the faggots and clamping them in place. Crushed rock can then be laid over the faggots and turves laid over the exposed ends along the path edge. Deeper holes can be filled with piles of faggots.



Path construction using fascines or faggots of brushwood pegged into place and covered with crushed stone. This is an old, well-tried method.

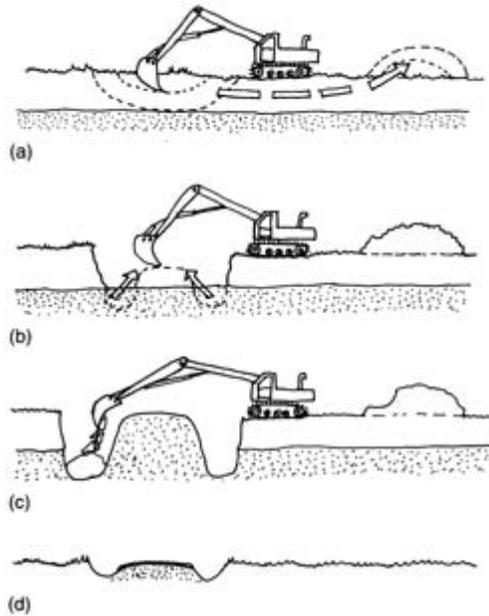
Causeway construction

As a last resort in the worst places, where peat cannot support a raft, causeways can be constructed. If there is a subsoil the peat can be removed down to it and set on one side. Soil is then excavated along both sides of the proposed path route and piled in the middle until it rises to the level of the desired path. It is firmed with the excavator (backhoe) bucket. The excavated peat is put into the holes along both sides and covered in turf. Side drains should be left unturfed. This method produces a very firm path. It may, however, disrupt the hydrology of the peat and so be unacceptable in some places.

Boardwalks

If the ground is boggy with open pools of water, or too fragile to withstand foot pressure or a constructed path like those described above, then a timber boardwalk is a better option. These can be expensive to construct and maintain, but they might be the best option in terms of site protection. They are also exciting to walk along, and they have the added advantage of preventing people from straying from the trail. The following types are found.

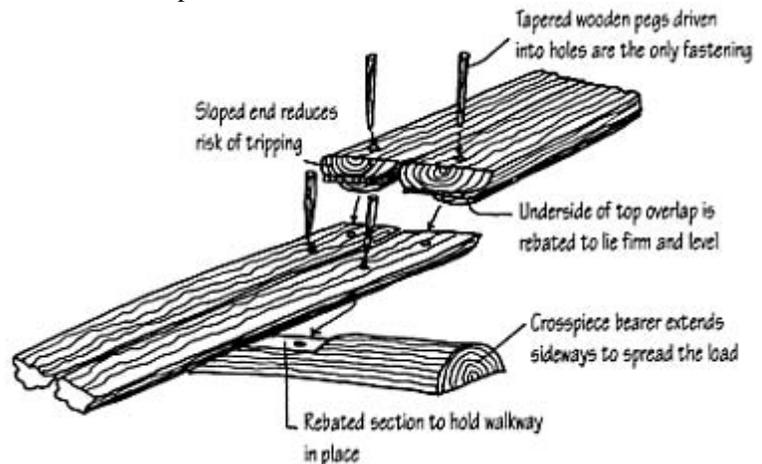
The simplest walks are made from split logs. The two halves are laid flat face upwards, parallel to each other in the direction of the route. The ends and possibly the central point are fixed by nails or pegs to crosspieces, which extend outwards to spread the load and help the walkway to keep afloat. Sections can be joined by overlapping and pegging (see



Causeway construction results in a permanent path, and may be the best solution in the most eroded deep peat areas: (a) The peat is excavated and laid to one side. (b) Hard subsoil from beneath the peat is built up into a causeway to ground level. (c) The excavated peat is returned to the ditches cut by excavation of the subsoil. (d) The causeway is surfaced, and drains are left on either side. The result is a firm path that will not settle, sink or erode.

diagram). These can be made from sections of varying length, which allows the route direction to vary and wind across the area if need be.

Such narrow walkways allow single-file walkers only, and so it is useful if both ends are visible to enable walkers coming in opposite directions to avoid meeting in the middle. Signs might also be needed to advise single-file use, and the need for waterproof footwear where the boardwalk tends to sink into the surface of watery areas. Wider sections for passing can be constructed four planks wide, but these are less easy to keep level because of variable log widths. This method of construction is useful where timber is plentiful because the

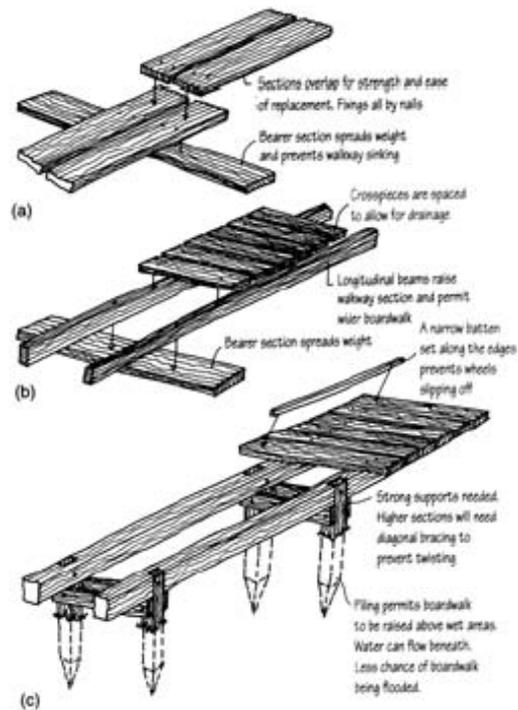


The method of construction of a split log boardwalk.



An excellent example of a floating boardwalk laid across bogland. The construction is of sawn timber resting on horizontal cross-bearers to spread the load. Pacific Rim National Park, British Columbia, Canada.

structures can be made on site from fresh-cut material that is easily replaced. Where rusting metal fixings might be a problem, simple wooden pegs driven through holes will fix the construction satisfactorily. Wider and more sophisticated walkways are needed in other places with more visitors, and particularly for barrier-free access. Parallel beams set 600–900 mm (2–3 ft) apart are bolted to horizontal bearer sections laid on the surface. Planks are nailed to these to provide a walking surface (see diagram). The planks are set wide enough apart for drainage to help keep them dry and free from moss or slime, which might make the surface slippery. Extra grip can be provided by various means such as deck paint, proprietary paints which incorporate a grit, grit stuck to the surface with bitumen, or small-gauge wire netting stapled to the surface. None of these techniques is particularly good either for looks, for convenience or for safety. It is possible to introduce more curves into this type of construction, where the surface pieces overhang the frames and can be cut into sinuous shapes after fabrication.



Three methods of boardwalk construction using sawn timber: (a) Flat planks laid on bearers and fixed by nails. (b) A wider structure made by planking nailed to long beams, which in turn are laid on cross-bearers. (c) A structure built on piling to lift it above the water or to level out undulating or broken ground.

Where a floating construction is not needed and where the ground is firmer deeper down, posts can be driven in to raise the walkway well above the surface. Construction is similar to the example described above but the beams are fixed to crosspieces bolted to the posts. This might be useful where water levels fluctuate seasonally, and to allow water to move more freely below the structure or to obtain a better view out over the landscape. Wider parts or viewing platforms can be added to the basic boardwalk for fishing or wildlife viewing. Smaller, wider areas can also be provided with benches.

Higher-built boardwalks may require handrails for reassurance and to help less able people to use them. This type is easier to build using shallow ramps to allow wheelchairs to use them comfortably. A narrow rail should be set in from and parallel to the outer edges of the boardwalk to prevent wheels from slipping off. The gap between planks may present an obstruction for small, narrow wheels, especially where turns are needed or on sharp corners if the gap is too wide.

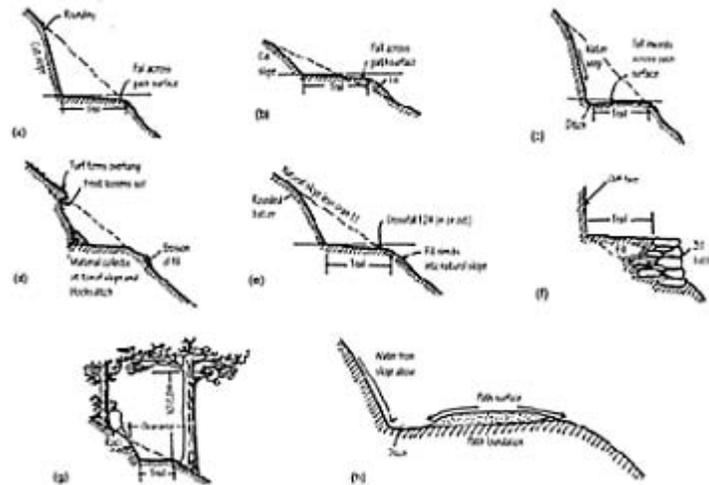
As with all timber used in contact with wet ground, rot will occur unless the timber is naturally durable, such as red cedar, elm or oak, or is treated with preservative. The chemicals used in preservation can be toxic to aquatic life and they should generally be avoided in favour of durable timber. Of the chemicals available, arsenates and creosote should not be used for timber in contact with water; Cuprinol is better, while boron salts are the best, although expensive compared with the others. The subject of preservatives needs more research to look for sustainable solutions. Regular maintenance of timber structures is essential, with prompt repair of broken or weak sections to avoid the risk of injury.

Boardwalks have the added advantage of not disrupting the hydrology of wetland areas in the way that some of the causeway path constructions do.

Sloping ground in mineral soil

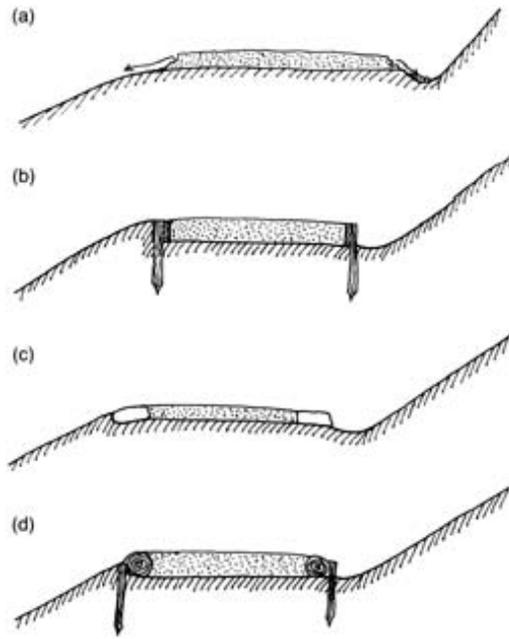
In these circumstances excavation to create the trail is necessary, and gradients need to be controlled. If possible, gradients should be found that preclude the need for steps. After initial clearance and pruning of vegetation, the route is set out with canes and the gradient checked using a simple levelling instrument such as an Abney. Then the path can be cut across the slope. If the width is not too great or the side slope too steep, the excavated material should present few problems for disposal. On steep side slopes it may be preferable to build up the path using rockwork so as to avoid too much cut and fill or problems of disposal of surplus fill.

The slope above the path should generally be cut to the natural angle of repose and shaped to prevent erosion. However, in soft soils it may need some work to prevent it from eroding. Stone revetment can be used for this, as can vertical timber shoring or woven willow branches fastened to the surface until vegetation can become established, either by natural colonization or by seeding, planting or turfing.



Path construction principles for side slopes: (a) On steep slopes the path should be benched out of solid ground and excavated material taken away to be used elsewhere. Here the path is graded so that water is shed from it down the slope. (b) On less steep slopes the cut material is used to make up the path formation on the lower side. This is acceptable where the fill will not erode away. (c) Where heavier rain is common or wetter soils are present the path should be graded so that water runs to the foot of the cut slope, where all the water is collected in a ditch and discharged through culverts at intervals. This avoids the risk of washout and erosion. (d) The top of the cut slope should be rounded off to avoid the erosion problems shown here, and to allow quick colonization of the slope by vegetation. Fill left at too steep an angle also tends to erode, taking parts of the path with it. (e) This diagram recommends the maximum crossfalls and slope grades on which to construct a path using cut and fill. (f) In the steepest slope section the path may have to be built up using stonere retaining structures backfilled with rock and subsoil. An allowance for a safety edge is made. (g) When constructing a trail through a forest the clearance should allow a reasonable space all around the walker to avoid the risk of collision with trees or branches. (h) This diagram shows that the path surfacing should be laid to a crowned shape on a general formation, which drains to a fall. This is especially important if wheelchairs or baby buggies use the path, otherwise they tend to keep pulling down slopes into the ditch.

It may be necessary to retain the sides of the path surfacing to prevent it from slipping into the side drains. Edges can be made from preserved sawn timber rails held by wooden pegs, round logs or local stone. The rails can be curved to some degree, but logs can be used only in straight sections, and this can look awkward. Stone is preferred if it is found on site, but it needs to be flat and capable of staying in place, Larger stones can also be used to vary the width of the path surface and tie it into other aspects of the local landform. Surfacing is normally crushed stone, compacted with fine material or ‘scalpings’ on the surface. Occasionally other materials can be used. Sealed (paved) surfaces such as asphalt or tarmac may have a place in more urban settings or where other materials cannot be relied upon to stay firm and smooth for wheelchairs and buggies, but they should always be top-dressed in local stone.



Path surfaces may need edges to retain them: (a) An unretained edge begins to erode, washing material away. (b) Wooden rails held in place by timber pegs are functional, and have low impact, but cannot be curved very easily. (c) Stone is good, and can be laid to any shape. (d) Logs may be available on site, but the path becomes a series of straight sections, which look stiff and artificial.

Wood chips or bark can sometimes be used to give a softer, quieter surface. This might be useful in a wildlife-viewing area, where the noise from feet crunching gravel might disturb the animals. Soft surfacing can also be a welcome relief to feet fatigued by hard surfaces.

Stone paving is traditional in some areas. Dressed stone or crazy paving should be avoided in the outdoors for its urban or suburban appearance, but well-chosen stone can be laid to produce a hard-wearing surface, although probably not a smooth one. In rocky, mountainous terrain such paths may be easier to construct to permit better access and a more obvious route across boulder and rock-strewn areas where there are risks of damaging ankles. The rock needs only to be laid or rearranged *in situ*. Rock sections may also be useful where the gradient is steep and the surface vulnerable to washout. Stone laid to give an irregular surface gives some grip and erosion protection when combined with a decent cross-fall and good drainage alongside.

Steps, ramps and changes in level

Every effort should be made to achieve reasonable gradients on trails to enable their widespread use by people with a range of abilities. In steeper, more rugged terrain and places where rock outcrops occur, there may be no alternative to the construction of steps or stepped ramps. However, long runs of steps going vertically up a slope are daunting to use and look out of place in the outdoors.

A slope where the gradient demands steps should be subdivided if possible into sections where different numbers of steps are needed, separated by landings and changes of direction to follow landform. In many areas, short sections of steps—perhaps three to five – can be used with ramps in between. This reduces the amount of construction and allows a more leisurely ascent or descent. The use of stepped ramps is another device, but these can be difficult for people with impaired sight to negotiate, and should be rarely used.

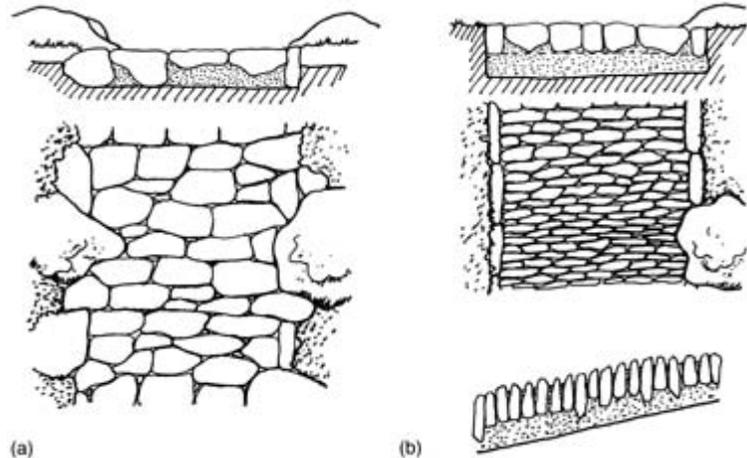
Step dimensions should be generally bigger in scale than normal domestic requirements. The rise can be a little higher but the tread width should be significantly greater. This is because of the tendency to use larger movements out of doors. Also, footwear is normally bigger, takes up more room, and is likely to overhang or catch on smaller steps.

Step construction should be carried out carefully, especially if using dry-laid materials. Loosely compacted material or unstable soil can mean that the impact of descending feet dislodges steps relatively easily. Foundations should be cut back to firm subsoil and drained properly (see above) before steps are laid.

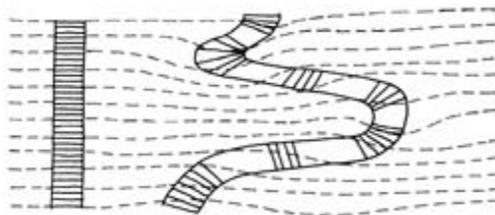
The following forms of construction can be used successfully.

Natural stone

This is the best, most hard-wearing material, which blends into many landscapes. In the most rugged and mountainous terrain, steps can be very irregular in size and shape, so that they



Stone paving: (a) A section and plan of paving using natural stone. A level surface is achieved by laying the irregular stones at various depths. The path is tied into the terrain by using occasional larger rocks along the edges. (b) Narrow stones set on edge provide a surface with plenty of grip on steeper slopes. This traditional method was used in mountainous areas such as the Alps to give grip to sheep or cattle during migrations to mountain pastures.



Step layout: (a) Avoid long runs of steps on a straight slope. These are daunting and tiring to climb. (b) Select a route where the steps can be divided into shorter sections with ramps and landings in between.

resemble slightly easier rocky pitches. In other areas the rocks should be chosen for a relatively even top and face, while the bottom and rear can be rougher, being dug into the foundations or packed level with smaller stones. Round stones are not suitable. Naturally bedded hard rocks, or those that split cleanly, are usually the best to use. Softer rocks may erode beneath heavy foot traffic.

The edges of the steps may need to be retained to prevent sideways movement. Larger stones can be used for this on the down-slope side, and can act as safety barriers or handholds in precipitous terrain. Such stone steps should be checked and repaired regularly, as sudden movement or disintegration of steps can cause ankle injuries. Stone steps can also be cut from the rock itself using a pneumatic drill (jackhammer) or similar tool.

Timber

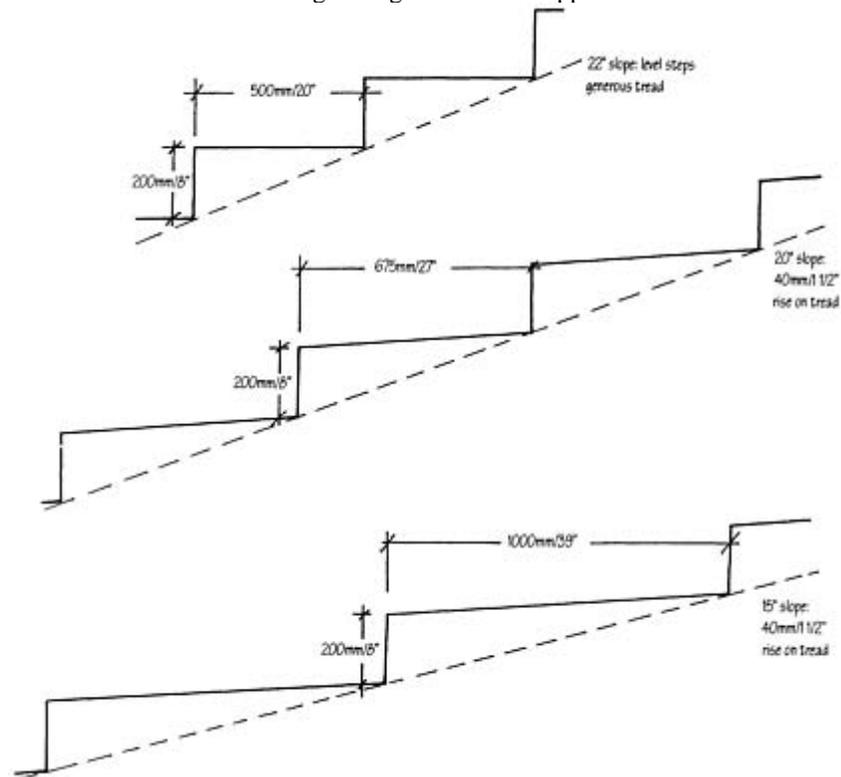
This can be used in a number of ways. One version to be avoided is the use of round or half-round timber as edge retainers. These offer no grip, and under wet conditions they are extremely slippery and dangerous.

Steps have frequently been constructed of stout sawn boards laid on their edges to form a small retaining structure

behind which hardcore or crushed stone is laid. These are dangerous, as the stone is liable to settle, wash out or collect water, causing the edge of the timber to stand proud and trip people, especially on their way down. If the wood is too narrow it can wear down quite quickly. These should not be used.

Solid timber steps work best. These have often been constructed from old railway sleepers (railroad ties), which are of almost perfect dimensions when laid flat and sawn to length. There can be problems of pollution due to the leaching of certain preservatives such as creosote from the sleepers, which precludes their use in some places. Nevertheless, the same dimensions can be sawn from solid wood, but such steps tend to be expensive unless local rough logs can be used. Durable timber for use where preservatives are not possible includes cedar, oak and some eucalypts.

Any form of timber steps can be held in place by stout pegs or short stakes driven into the subsoil. Slots or notches for the pegs can be cut in the front edges of the steps to make a neater finish. If the steps overlap each other, a strip of timber along the underside near the front edge can help to hold them in position (see diagram). These steps are placed on excavated bases, on a layer of crushed stone to aid drainage and give a firmer support.

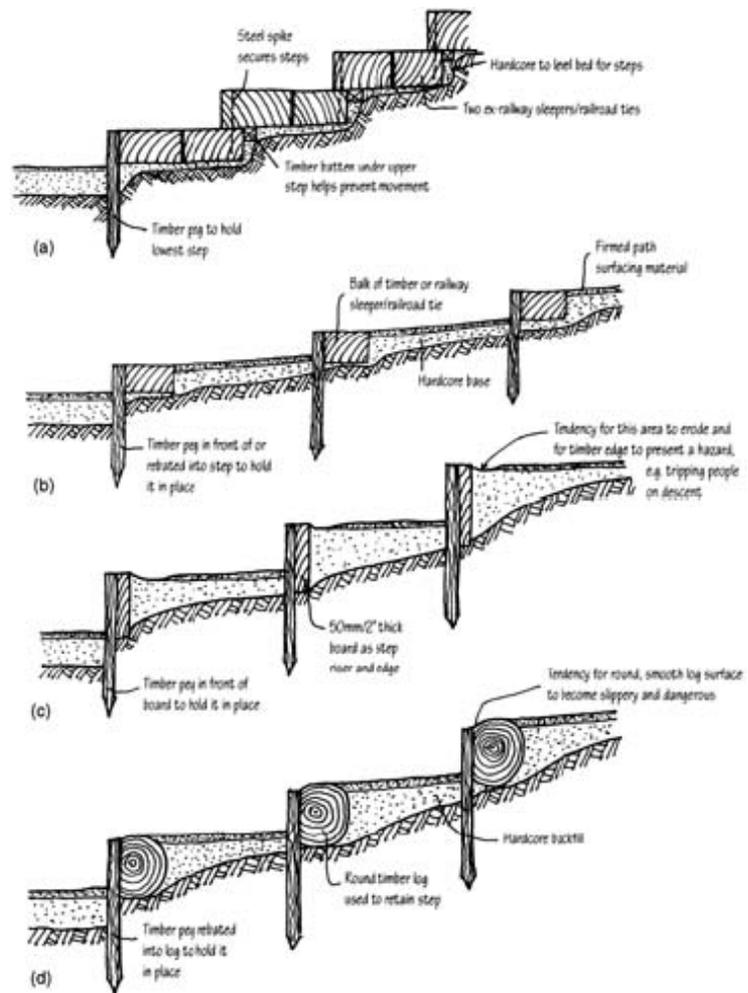


Typical dimensions of steps for the outdoors, where sizes can be more generous than in indoor or urban areas.

Alternatively, timber steps can be built as self-contained step structures similar to open staircases, perhaps placed against a low rock cliff or up a steep bank. Well-constructed, sturdy sections such as this can be anchored down and placed on rock bases to keep them clear of the soil to reduce rot. In the steepest of such steps a handrail up the side is desirable (see 'Handrails' below).

Other forms

Other forms of steps that are found in severe terrain include steel ladders bolted to rock faces, and iron steps set into rock. Such sections are almost always on pitches where rockclimbing skills are needed. They are not for the faint-hearted, but they do give non-climbers a taste for exciting ascents and



Various methods of timber step construction: (a) Solid steps made from sawn timber slabs or old railway sleepers/railroad ties. (b) Steps edged with thick lengths of timber infilled with hardcore with compacted surfacing. (c) Boards set on edge tend to stick up if the infill erodes, and people may trip over them. (d) Round timber edges are likely to become slippery and dangerous, particularly for people with visual impairments.

descents. Holes are drilled, and the iron or steel is held in place by molten lead poured in to fill up the space (traditional), epoxy cement (modern and extremely strong), or expanding bolts. However, such steps are also visually intrusive and dangerous, and so they should be used only if other methods of ascent or descent are impractical.



This set of steel steps is part of a formidable and challenging trail up a precipitous series of rock cliffs and ledges. They present a physical challenge only a little less than that of rock climbing, where ropes are needed. However, they are not particularly attractive. Acadia National Park, Maine, USA.

An ingenious system for climbing up extremely unstable material lying at a steep angle of repose, such as volcanic ash or sand, is to use a series of wooden crosspieces fixed at intervals along lengths of steel cable and laid on the surface. The climbers' feet form temporary steps into the soft material,



A 'sandladder' made from round timber crosspieces fixed to two steel cables. This permits loose, easily eroded material to be climbed safely and with a low risk of surface erosion. Mount St Helens, Washington, USA.

yet they cannot slip because of the timber, nor do they cause erosion. This has been called a 'sandladder'.

Handrails

Handrails serve two functions: as aids to negotiating difficult sections of the trail, such as steep pitches or steps, and as safety barriers to prevent people from falling. Along most paths, handrails should be unnecessary, but they are needed where steps are steep, where boardwalks or bridges are raised more than 500 mm (18 in.) above the surface of the ground, and where the path passes near a dangerous drop or cliff edge and over water. Handrails must be strong enough to support the weight of a person pulling or leaning on them as an aid to climbing, and to withstand the sideways movement of someone leaning or falling against them. Where small children use the trail, lower-level railings or an infill panel are also required to prevent them from slipping beneath the top rail.



The layout of this viewpoint has problems. These girls have found a way to the viewpoint and have ended up outside the safety barrier. They are climbing over it at some risk to themselves. The access to the area and the efficacy of the safety barrier should be reviewed. A rest stop and viewpoint overlooking Valhalla Provincial Park, British Columbia, Canada.

Handrails can be constructed from different materials and in a variety of ways. The simplest are aids to using steep stretches of trails and ledges on the most mountainous paths. These can include knotted ropes anchored to the rock with eyelets, steel cables held similarly, or galvanized steel handrails bolted to the rock. These are positioned on the inside of the and are not intended to prevent people from falling from the trail.

Handrails for support and safety must be sited along the **outside** edge of the path. Sturdy timber railings attached to wooden posts spaced at 1 m (3 ft) intervals are ideal in most circumstances. A substantial top rail looks good outdoors and gives structural strength, but it might also need a smoother, narrower handrail fixed proud on the inside, for people to hold onto. Beneath the top rail narrower railings spaced horizontally prevent children from slipping through. An alternative to wooden lower rails is taut wire cables. These look lighter from a distance, and allow small children and people in wheelchairs to see through the barrier to the views beyond. In more urban settings wooden walls made of vertical boards fixed to rails mounted on posts can be used. These are less easy to climb than barriers made from horizontal rails.

Wire mesh barriers on steel supports might seem stronger, but they look out of place in most wild landscapes. They are cheaper to maintain if galvanized.

Stone walls (cemented for safety) might be appropriate in more developed settings, perhaps at view-points and in mountainous areas where stone is the dominant material. The top of the wall should incorporate features such as pointed capstones to prevent daredevils from climbing on it. Panels of railings or tensioned wires can be inserted into the wall to enable viewing by smaller children or people in wheelchairs, who are unable to see over the top.

Stream crossings

In most circumstances where water has to be crossed special structures should be provided, such as culverts as previously described, some kind of ford, stepping-stones or other informal means, or bridges. In wilder, more rugged terrain, where primitive experiences and a greater expectation of selfreliance on the part of visitors are expected, crossing streams can be an exciting and challenging experience. Unbridged crossings should be the normal practice, but safe crossing points must be selected, and warnings should be posted about the potential dangers of crossing rivers during floods, together with advice on alternative routes. However, where the water level can fluctuate quickly and torrent conditions are likely to persist for some time, crossing structures should be provided.

Fords

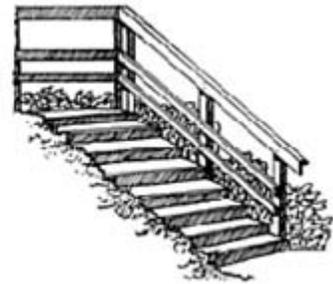
The walker must be able to wade through the water at a place where strong and turbulent currents are unlikely or absent, and where the water is usually fairly shallow. A section of stream where the water flows more slowly and the stream bottom is fairly even and firm should be chosen, and the path should be directed to and from it. If there is some risk from strong



(a)

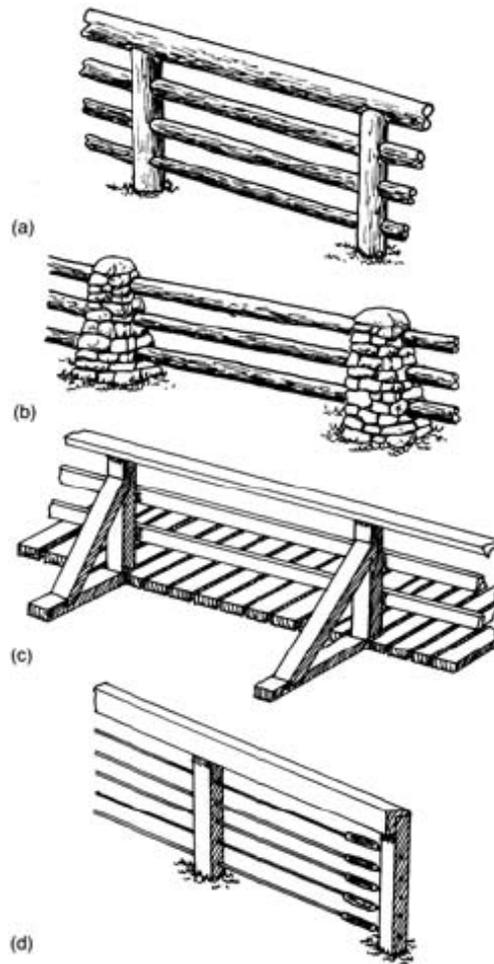


(b)



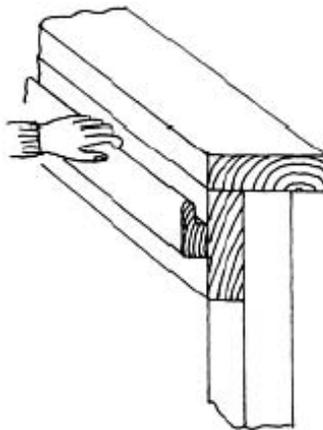
(c)

Climbing aids: (a) This knotted rope strung between two trees makes a useful aid for climbing up a steep rocky stretch on an otherwise easy woodland trail. Mount Orford Provincial Park, Quebec, Canada. (b) A steel cable fastened to eyelets fixed in the rock gives help and security for walkers along a cliff or ledge path in mountainous terrain. Based on examples from the Austrian Alps. (c) A sturdy timber handrail helps people to climb steeper steps, and is especially useful when the path follows a steep slope with a substantial drop to one side.

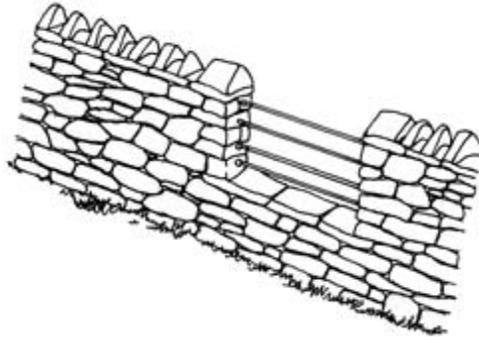


Some varieties of handrail for safety or support:

(a) Round timber used to give a strong rail. The bigger size of timber looks appropriate outdoors. (b) This design of heavy round rails set in uprights made of rock is based on 1930s CCC designs. It is strong, and can be constructed where posts cannot be dug into the ground because of rock. (c) Handrails on boardwalks or decking need to be given strength, to resist horizontal pressure, using outriggers and struts. (d) Tensioned cables used instead of rails can give less impact, and permit views through them by children or people in wheelchairs.

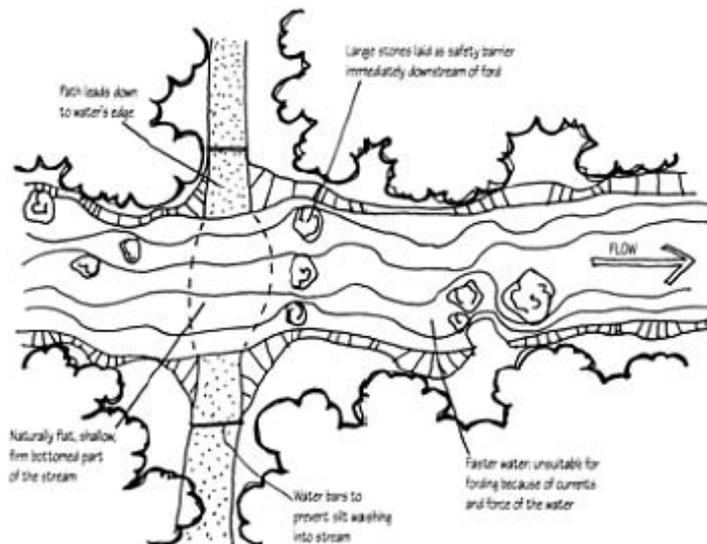


A handrail of an easier size to grip set beneath a heavier, stronger top rail combines visual appearance and function.



A wall used as a safety barrier provided with pointed capstones to deter climbing or sitting on the top. A panel infilled with tensioned cables allows views through the wall by children or people in wheelchairs.

currents, and the ford is wide, large stones should be placed on the immediate downstream side of the crossing place to act as safety barriers. These give walkers something to hold on to if required, and can prevent anyone from being washed away. Although not designed as stepping-stones, they may be used



The design of a ford must combine easy use with safety while ensuring minimal disturbance to the surroundings and preventing silt from washing into the stream from eroded paths.

as such if they stand out of the water, and are spaced reasonably close with flattish surfaces.

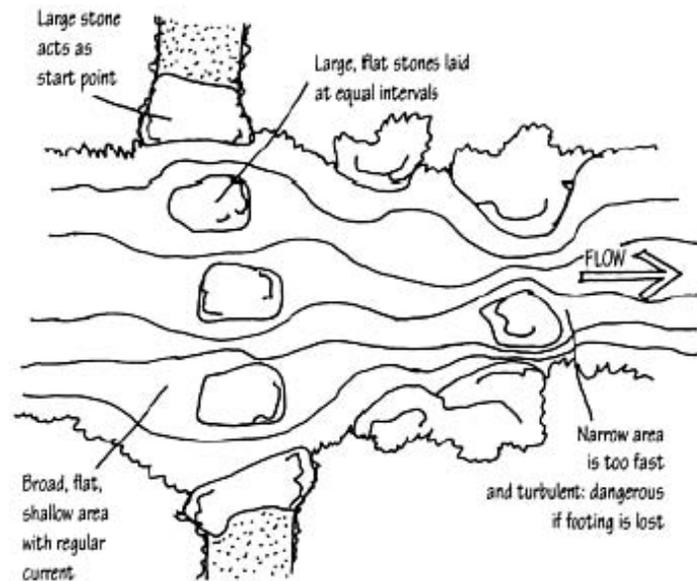
In less wild areas, and for an easier crossing, the ford can be given a better bottom surfacing using large, flat, rough textured stones interlocked together. On popular routes, this may be advisable to prevent degradation of the crossing surface.

Stepping-stones

There may be natural areas of free-standing rocks, which allow nimble walkers to jump or step from one to another, improved if necessary by rocks placed to fill wide gaps. Such areas should be chosen where the rock is rough, and not colonized by slippery algae.

Stepping-stones can also be placed in stream crossings, where large rocks with flat surfaces can be laid to be stable and firm. The interval between them should allow the average person to step easily from one to another, and each stone should be wide enough to allow both feet to be placed on it at once. In an outdoor setting the line of stones

should be sinuous and appear naturalistic rather than formal.



Stepping-stones should be sited in safe places and made of stable rocks with good surfaces to step onto.

Bridges

The main problem with fords and stepping-stones is how to cross the stream during high water. Although advice on alternative routes can be provided, if flooding occurs frequently and the trail is popular it is better to have bridges. Where people with disabilities are encouraged to use the trail, bridges are a necessity.

Apart from the simplest, shortest spans, bridges are complex structures requiring engineering skills for their design, construction and maintenance. In a recreation context, their design also provides opportunities to enhance the enjoyment of visitors. To this end, consideration should be given to using multidisciplinary teams of engineers, architects and landscape laid across the stream. The upper surface is sawn or chopped roughly flat to make a walkway. A handrail can be attached to one or both sides, being bolted directly onto the log. If the timber is durable or the log is very large, this type of bridge will last for a long time provided the supported ends can be kept dry. In such settings the weight of a few single-file walkers will be easily borne, but the bridge's strength (including the handrail) should be checked by a qualified engineer.



*A simple bridge for short spans: a stone slab laid across a narrow stream is ideal.
Dartmoor, England.*

architects as well as artists for the design and siting of bridges.

There are five main types that might be used in the outdoors, some more appropriate in some places than others:

- simple beam bridges, in which single or multiple beams are supported at both sides of the stream to be crossed;
- trussed beams, in which a larger structure is constructed from small sections joined together for strength;
- cantilever beams, in which the beams are supported at one side only, and they rely on their anchoring and inherent stiffness to support the load;
- arch bridges, in which the construction technique forms an inherently strong structure;
- suspension bridges, in which the walking surface is suspended from tensioned cables fixed to supports on both sides of the stream.

Simple beam bridges

These can vary from simple structures, such as a log laid across a stream, to composite steel and timber construction. The form to use will depend on the weight to be carried and the setting in which the bridge is to be erected.

In wild settings, particularly those with forests, adequate and functional footbridges can be fashioned from large logs

Logs used in construction should be straight and as cylindrical as possible; the bark should be removed, and surfaces chamfered to create parallel sides for neatness. Chunky, large logs will always look better, and this will usually help to ensure that they are sufficiently strong.



18 These picnic tables sit on the ground. They can be moved to avoid site damage, but they can also be stolen unless they are anchored. They may also be more difficult to place completely level on uneven ground.



19 This is a well-designed example from Britain's Forest Enterprise. It has the right proportions, and is placed level. The unit has been set into the ground so that there are no obstructions to visitors' legs or feet. An area around the unit has been laid with gravel to prevent wear and tear of the surface. Where there is easy access for people with disabilities the table-top can be extended so that a wheelchair can be set at it. Beechenhurst, Forest of Dean, Gloucestershire, England.



20 This family has taken the opportunity to light a fire and cook some food by the side of a river in northern Sweden. This increases the sense of being away from civilization, and can raise the quality of the experience.



21 This shelter is an enclosed fireplace where cooking can also take place. It is well supplied with firewood. Such a shelter is ideal during the cold, dark winters of northern Sweden, where this example was found.



22 A climbing net provides a good example of motor play, helping the physical development of the bodies of growing children.



23 This example of an imaginative play structure is highly popular with visiting children. Parents are involved too, so that the whole family gains from the experience. Ringwood Forest, Hampshire, England.



24 Part of a play area at Grizedale Forest, Cumbria, England. Here sculptors have created play equipment based on different kinds of wild animal. The pheasant is a slide. Note the extensive use of bark as a safety surface, retained by a log edge. This is an ideal surface to use in outdoor areas.



25 This wide, well-constructed path on a steep incline is well provided with cut-off drains or waterbars made from halfround logs with a channel cut into them. Krimml, Austria.



26 A boardwalk constructed of split logs cut from the nearby forest, borne on wide crosspieces to cross a mire in Finnish Lapland. All pieces are pegged together.



27 A good example of a path cut in a side slope on mineral soil. Re-vegetation of the slope and a good, well-drained surface result in the path's blending into the landscape very well.



28 A well-designed and well-constructed set of stone steps, which are blended into the boulder-strewn landform. Mother Walker Falls State Park, Maine, USA.



29 This bridge between two stretches of boardwalk has made use of a naturally fallen cedar log. The upper surface has been levelled, and a railing has been fixed directly to the log using coach screws. Pacific Rim National Park, British Columbia, Canada.



30 An arched bridge made from small sections of timber formed into a truss of great strength. Developed for Scottish National Heritage. (Courtesy David Downie)



31 This trail is waymarked by a series of square timber posts. Two grooves filled with different-coloured paint around the top of the post show that there are two routes. One branches away from the other further up the trail. The markings are highly visible, although the post is not a prominent colour.



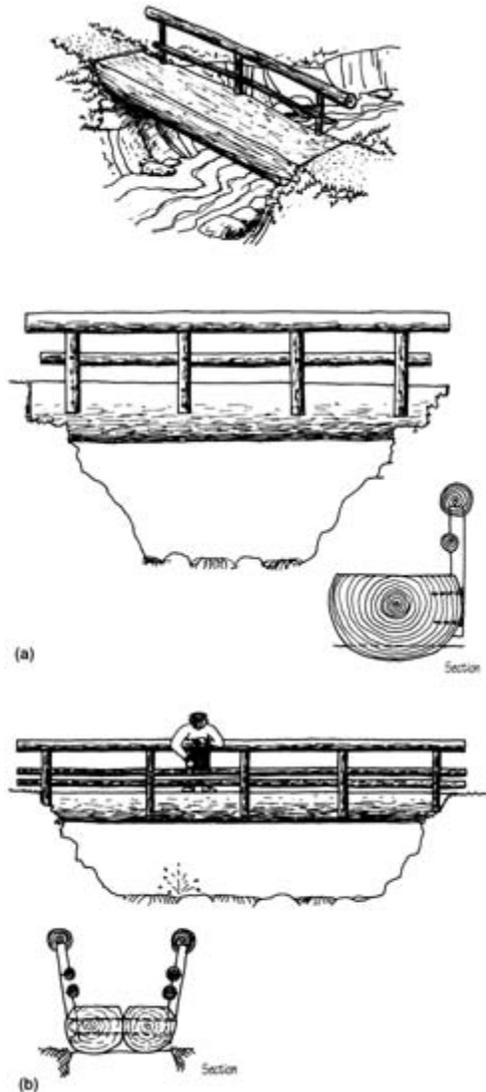
32 This viewpoint provides a spectacular view, but it is marred by the heavy urban design of the railing and the extensive use of concrete as a surfacing. Queen's View, Tay Forest Park, Scotland.



33 All-terrain bikes are increasingly popular, but they can cause erosion, and they do not always mix well with other trail users because of their speed.



34 Cross-country skiers using snowcovered forest roads. The route and experience along it require the same design attention as hiking trails. Glenmore Forest Park, Scotland.



Two construction methods for log bridges: (a) A single log, sawn across to give a flat walking surface with a round timber handrail bolted along one side. (b) Two narrower logs bolted together with a handrail on both sides.

In the absence of a single large log, two or more may be laid side by side, and roughly squared on the top to give a flat surface. To prevent movement the logs should be bolted together at intervals. Handrails may be added (supported by outrigger beams—see diagrams) for lateral strength. Narrow gaps between the logs should be left to allow water to drain away.

If a greater width of bridge is required, a decking may be added of planks sawn or split from logs laid across the log beams with narrow spaces between. The surfaces of the logs need to be level, otherwise the decking will be uneven. Durable or pressure-treated timber should be used for the decking, whose maintenance is a priority.

Sawn timber

This is more appropriate in less wild settings. Two or three beams can be sawn out of solid wood, being proportionately deeper than wide, laid parallel to each other with a decking of sawn boards fixed across them. Some bracing to prevent differential movement between the beams might be needed, with handrails bolted to the outer beams.

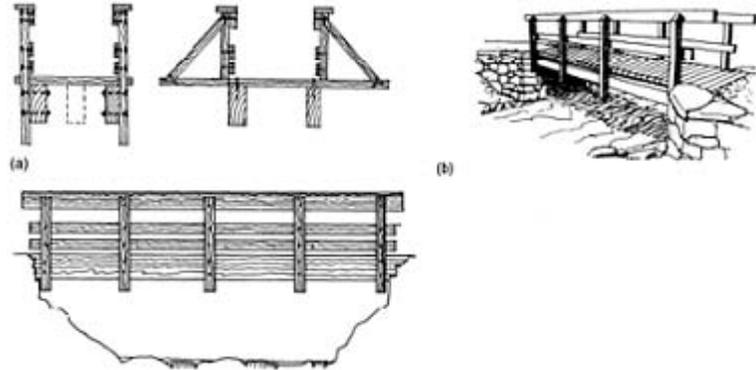
If beams sawn from single timbers are unsuitable, or unavailable for the loading or the span, then laminated beams can be used instead. These are made from narrow strips of timber glued in layers to form a beam. Once again, larger

rather than smaller-scale sections look better in most landscapes.

Steel beams

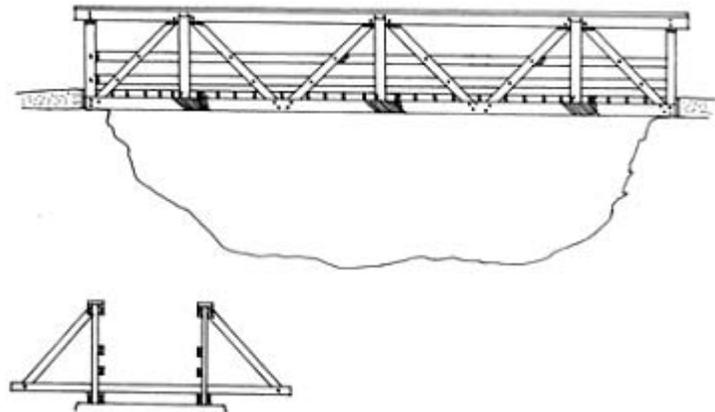
Steel beams might be used where the span is too large to be bridged economically with timber. If these are made of 'Cor-ten' steel or galvanized and left to weather, or painted a dull earth tone, they can be acceptable. Wooden decking and handrails treated with preservative can be provided so that natural materials are more dominant when seen from the trail. Such bridges are very durable and have a long life compared with all-timber structures.

Steel decking and handrails may have a place in certain circumstances, where durability in harsh conditions is needed, or low maintenance is a priority



Designs of sawn timber beam bridges:

(a) Construction methods include handrails either fixed to the supporting beams or strengthened laterally using outrigger and strut. (b) A small beam bridge of good design and construction.



Truss construction is an acceptable form of construction. It uses smaller-dimension timber than the simple beam bridge. The truss also acts as part of the handrail.

and where a lighter all-steel structure might have less impact than a bulky wooden bridge. Sometimes nonnatural materials can help to emphasize the drama of a natural scene. Expanded metal or steel grating can be used for the decking, with steel handrails and uprights infilled with tensioned wire.

Trussed beam construction can also use timber. Made of small wooden sections, bolted together on site, this type of bridge can be erected in areas where access is difficult. The handrail section becomes an integral part of the structure. Maintenance and repair involving replacement of individual sections is also possible without dismantling the whole bridge, as would be the case with a solid beam. A light steel truss bridge is being prototyped by Forest Enterprise in Britain using triangular lattice sections for the beams.



A graceful arched bridge constructed from laminated timber (Glu lam) and with ends finished neatly by stone walling.

Cantilevered beams

In this construction the beam is not a single unit laid on an abutment at each end. Two beams are used, each fixed at one end with the other projecting over the stream that is to be spanned. The two beams meet each other and are bolted together, or for longer spans the central gap can be infilled with a short beam. The cantilever beams have to be made of stiff material and strongly anchored to bear the weight. This essential requirement can make this type of construction awkward to use. However, it has the advantage that two short beams can be used instead of one long beam, which might not be available.

Arches

Arches have been traditionally used in many places. Old stone arch bridges designed for use by packhorses and dating back centuries can be found in many remote areas. They need special skills for construction, and these are unlikely to be found nowadays. However, wooden arch constructions can be used. Similar in many ways to the trussed beam construction described above, an arch of timber latticework can form an inherently strong structure using small-dimension components, and can be erected on site. Laminated timber beams can also be fabricated into curving sections resembling arches.

Suspension bridges

These have been used as footbridges for centuries— for example, the rope structures used by the Incas of South America. There are several varieties of suspension bridge, depending on the setting and the amount of use expected.

The simplest and most challenging type consists of four cables slung across the stream. Boards are lashed across the bottom two to form a footway, while the upper pair, loosely lashed to the bottom ones, form a handrail. These bridges are unstable to use, as they tend to swing from side to side. They make an exciting crossing, but they are not recommended for the faint-hearted. However, for low use by experienced hikers in rugged terrain where materials are difficult to transport, such a bridge can be an option.

The usual kind of suspension bridge is a more sophisticated structure. The main cables are secured to the ground at each side of the crossing, and pass over tall uprights anchored into the stream banks. The footway decking is then suspended from these main cables by a series of ‘droppers’ placed at equal intervals. Beams connect the bottom of each pair of droppers and support the decking. A handrail can also be supported by the droppers. The main cables are tensioned to give the decking its characteristic arched shape, while the cables assume a graceful series of curves.

It is clear that the complexities of design, construction and maintenance of suspension bridges must have an engineer’s input. The size of the cable must be calculated, the anchoring needs to be determined, while the size and strength of the uprights are crucial for safe loadbearing.

Steel cables tensioned by bottle screws will usually be anchored to concrete blocks or ground anchors, depending on the site, the strength of the subsoil, the loading and access for materials. The uprights can be timber frames with special anchor pieces at the top to connect the cables. Smaller steel cables or rods are used for the droppers, and timber can be used for the decking. All the steel should be galvanized, and the timber should be pressure treated with preservative.



An example of a fairly basic suspension bridge over a river in Finnish Lapland. The main cables should be tightened to prevent the sag in the middle and to reduce the swing and bounce experienced when crossing the bridge.

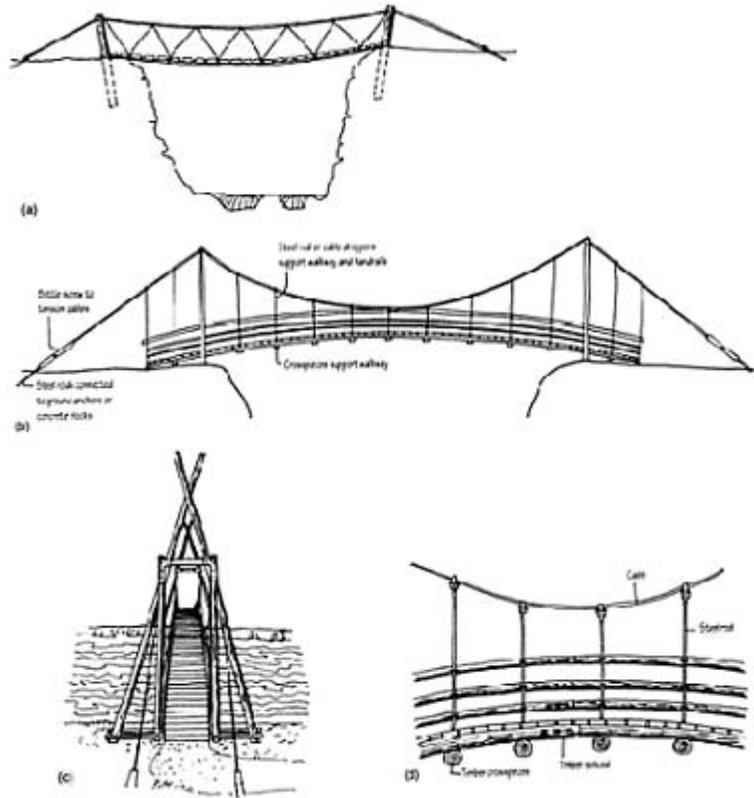
Bridge siting

Bridge decks must be set sufficiently above the water level to allow for high flood levels, and to prevent them from damming the stream with debris and causing damage nearby or the collapse of the structure. Where the stream or river is in a region with extremes of climate, flash floods can cause water levels to rise quickly, and in mountainous areas these floods carry much debris.

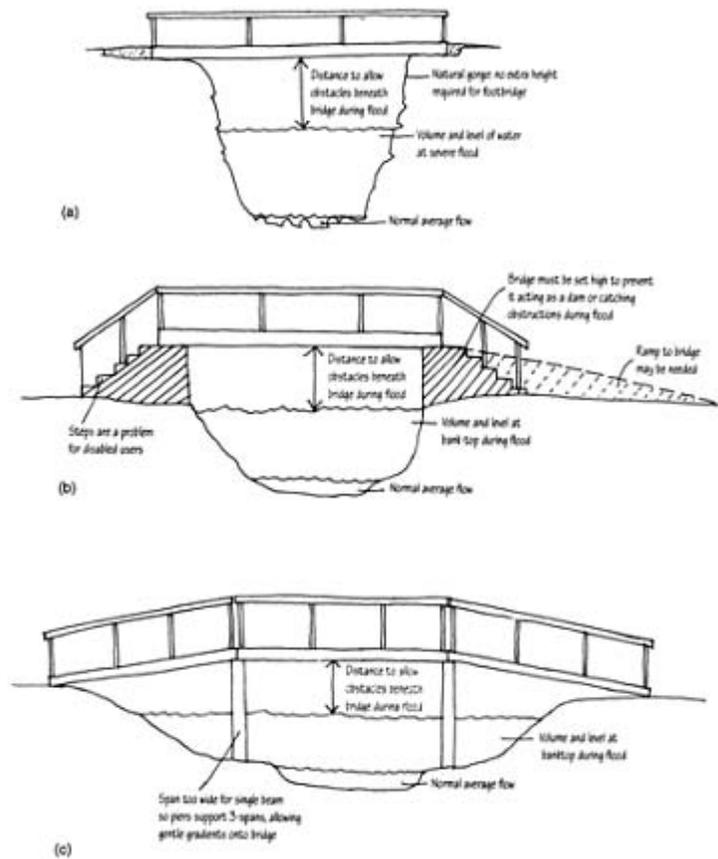
Beam bridges, being horizontal or only slightly arched, usually need abutments to raise them above the flood levels. If the height is more than 1 m (3 ft), ramps or low embankments will be needed to tie the ends of the bridge into the trail surface. Embankments might require culverts to release floodwaters, so they need to be considered carefully. Steps are sometimes used, but these are difficult to negotiate by visitors with disabilities. Other solutions include building the bridge on piers with more spans to enable it to start from higher places on the banks at either side. In other instances, suspension bridges might be sounder alternatives.

Abutments for footbridges are needed to support the structural beams and the deck. They must be constructed to give strength and anchorage. Wing walls may be needed to prevent erosion where the abutment meets the banks, or to contain any infill material used to make up the level. Abutments can be constructed in the following ways.

– **Natural stone.** If this is plentiful and part of the character of the landscape, stone abutments are ideal. Unquarried stones can be laid with concrete backfill or mortar to hold them in place. Recessed joints and grading of stones from large at the base to smaller at the top helps to tie them visually into the setting. There are opportunities for stone sculptors here.



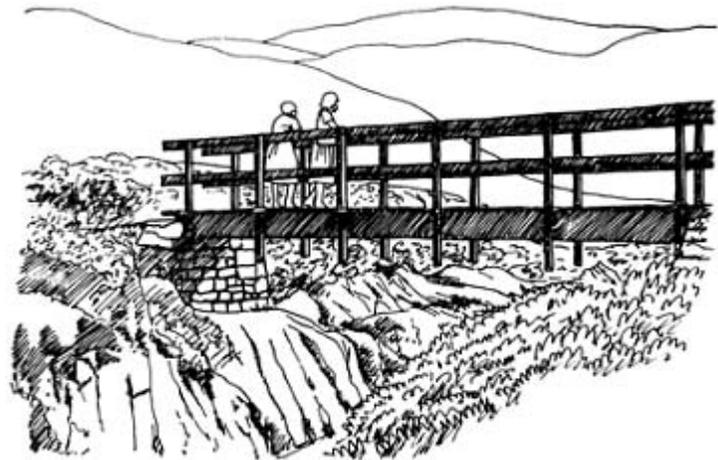
Suspension bridge construction: (a) A simple example, where one set of ropes supports the deck and a second pair provide the handrail. A good solution for wilder places. (b) A more sophisticated bridge with main support cables, droppers to support the deck and handrail and proper tensioning devices and ground anchors. (c) A view of a well-built suspension bridge from Ruunaa National Hiking Area, Finland. (d) A detail of the construction of the deck and handrail from the example at (c).



Bridges and stream-flow characteristics: (a) A bridge can rest at ground level when a deep valley gives adequate clearance. (b) A bridge should be raised above flood level in a shallow stream valley. Steps or ramps link the path to it. (c) Piers support the central span so that the outer spans can slope to meet the natural bank level.

– **Gabions.** Galvanized wire baskets are laid on prepared firm bases dug from the stream bank and filled with local stones, packed tightly and laid carefully against the face of the gabion mesh, ensuring that they will not fit through it. These give heavy weight and good resistance to erosion. The spaces between the baskets and the bank are backfilled with stone.

– **Timber.** Round timber piles, sawn timber planking or crib work (interlocked horizontal timbers) can be used to build up abutments. A piling or planking wall can be kept upright by cables fixed to ground anchors.



This bridge crosses a deep natural ravine. One end of the bridge is raised on a stone abutment in order to level

it because of the uneven shape of the ground. Galloway Forest Park, Scotland.

– **Concrete.** Concrete on its own frequently looks out of place. If needed for structural reasons it can be cast to give it a coarse texture (using roughsawn timber shuttering) or jack-hammered to roughen the surface. If stone construction is not sufficiently strong, shuttering can be lined with stone facing and backfilled with concrete, which gives the main strength to the bridge foundation. Bridge handrails are not always necessary, particularly for short log beam bridges in wild settings. However, for safety and reassurance, a single or double handrail is usually necessary. The same types are appropriate as described in the previous section on boardwalks and along paths against steep drops or cliffs. Others are depicted in the illustrations for the bridges described above. The handrail should extend a little way beyond the end of the bridge to lead the eye onto the structure and tie it into the setting.

but maintains a more natural appearance.

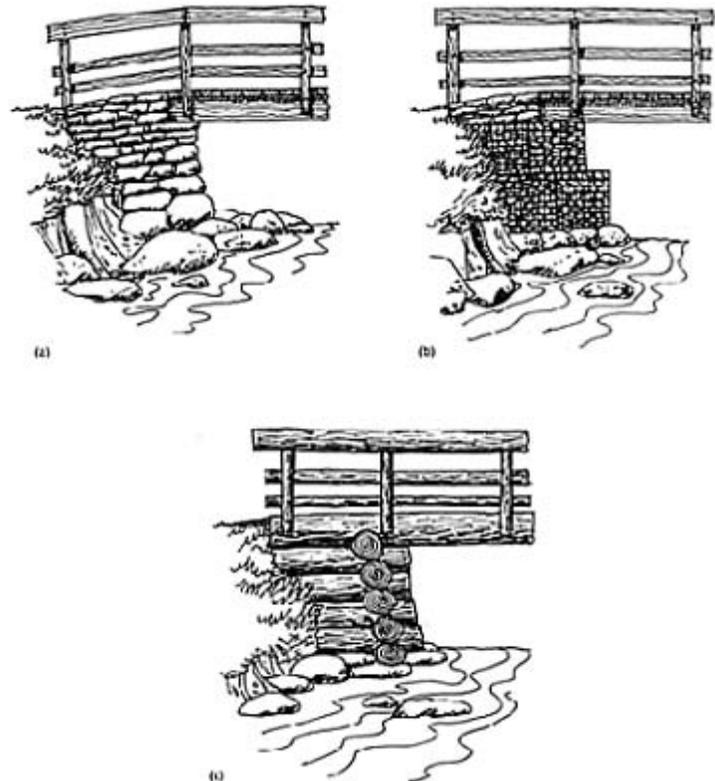
Bridge maintenance is very important. Damage by floods, erosion of the area around abutments, corrosion of steel fixings or posts, damage to decking or handrails should be checked and repaired as soon as it is discovered. Regular inspections by a qualified engineer are essential except for the smallest, simplest bridges.

Waymarking

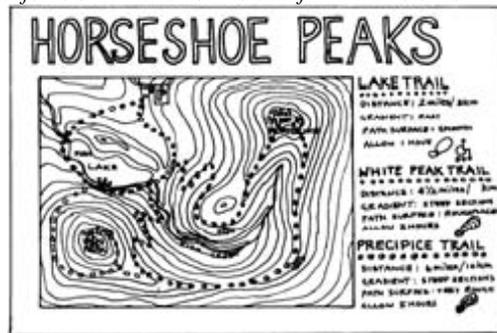
Many visitors to the outdoors are not experienced in the use of map and compass. They are apprehensive about following a trail unless they know where it will lead them, and that they will not get lost. Hence some kind of waymarking is frequently necessary to help visitors enjoy the experience of exploring the outdoors.

If the Recreation Opportunity Spectrum is adopted as a planning tool, or if a trail system graded for a range of ability levels is developed, then the map and compass enthusiast can be catered for by unmarked trails, while the inexperienced visitor can follow marked ones.

Waymarking systems will vary depending on the type of trail development. Often several trails are developed from a particular car-parking area. These might be of different lengths, cater for different degrees of ability or lead to different points of interest. Often they might share sections of the route, with shorter paths diverting from longer ones and perhaps rejoining them closer to the end. Where such



Three types of abutment: (a) Natural stone construction, graded from the largest size at the bottom to the smallest at the top. (b) Gabion baskets made from galvanized weldmesh packed with stone from the site. (c) Log cribwork is a traditional method appropriate for use in forests. The cribwork is backfilled with stones and soil.

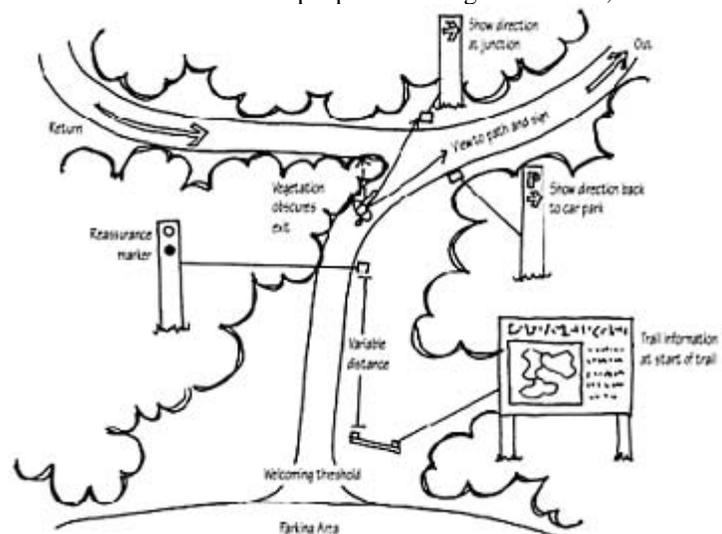


An example of a trail entrance panel showing routes and giving information about the length, average duration and path conditions to be expected of each trail.

path systems exist, the waymarking has to differentiate between each path so that the points where routes diverge are obvious and not missed. One common and well-tried method is to colour-code each trail. A leaflet or board at the entrance to the trail (or trailhead) can be used to show, in map or pictorial form, the trail system, the colour coding, the difficulty, the expected duration and all the points of interest. The colours chosen should avoid those that people with colour blindness cannot identify—for example, certain shades of red and green.

The method of waymarking also depends on whether the trail should be walked in one or either direction. This choice may be important if the gradients vary so that the steepest slopes are ascended rather than descended, or whether particular landmarks or attractive features should be seen in a particular order. Another reason for a one-way circuit is if there is interpretation along the trail that tells a story in a particular sequence (see Chapter 13). Finally, when trails are used heavily a one-way route ensures that walkers are not always meeting people coming towards them so the route might feel emptier than it really is.

The design of the trail entrance is crucial to this: it can be laid out to steer people in the right direction,



A diagrammatic layout of a trail entrance area. The path is designed to encourage walkers to follow the trail in

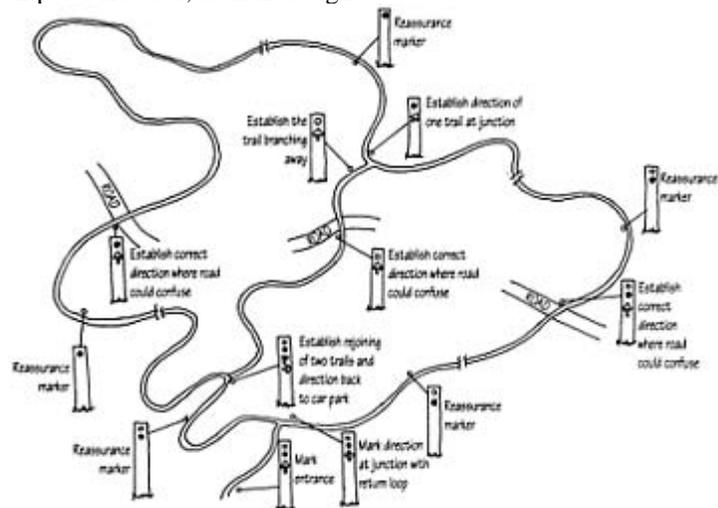
one direction.

and if a one-way route is chosen the waymarking need only be seen from one direction, perhaps reinforced by the use of arrow symbols.

If a two-way route is required then the waymarking must be effective from either direction, and this is crucial at junctions. The position of waymarkers has to be planned from the walkers' point of view by walking the trail, resolving where there might be confusion (for example at junctions), periodic reassurance of the route, and the best locations for signs in terms of visibility. A comprehensive map or schedule should be prepared detailing every marker so that it is known exactly how many are needed, their particular function and their precise location.

Forms of waymarking

There are a number of methods of marking routes. Care is needed to ensure consistency in the form of waymarking used along the routes. This is particularly relevant if posts are used, as their design



An example of a comprehensive waymarking schedule for a path trail layout. A plan like this should ensure that the minimum number of markers has been installed, taking into account the needs of visibility at junctions.

may need to relate visually to other artefacts such as information or interpretation signs. All methods must strike a balance between clear direction and avoidance of intrusion, especially in wilder or sensitive areas. All marking or symbols must be neatly made: for example, circles, ovals and squares with rounded corners relate easiest to natural forms.

Painting rocks

In mountainous areas routes are frequently marked with paint. Bright colours such as red and yellow are often used. When the trail is indeterminate over rocks, the marks should be carefully positioned to catch the walker's eye. In Austria, for example, red and white patches are painted, on which are written trail numbers. In this way the marks are all the same, and they are easily repainted once a year or so. At key points the marks might be supplemented by small cairns that help walkers to locate the direction of the trail, although this practice is not advocated in Scotland.

Painting trees

In forested countries tree-trunks are often painted with markings. Sometimes circles of paint are used; a circular template is placed against the tree, and the marking is applied by spray can or brush. In other places like Sweden smooth rings are shaved in the rough bark of pine trees and a complete ring painted around it. The shaved bark

ensures a more solid colour and reduces the risk of the bark's flaking and losing the mark.

Fastening signs to trees

Wooden or plastic signs can be fastened to trees with wire loops or nails. For example, along the Alexander Mackenzie Heritage Trail in British Columbia special printed plastic signs showing the symbol of the trail have been fastened to trees using nails that are only partly driven in, so allowing for tree growth and easy removal. This may be unacceptable to some people because of damage to the trees, the need to tighten wire loops, or bark expanding to absorb nails and splitting off Plaques.

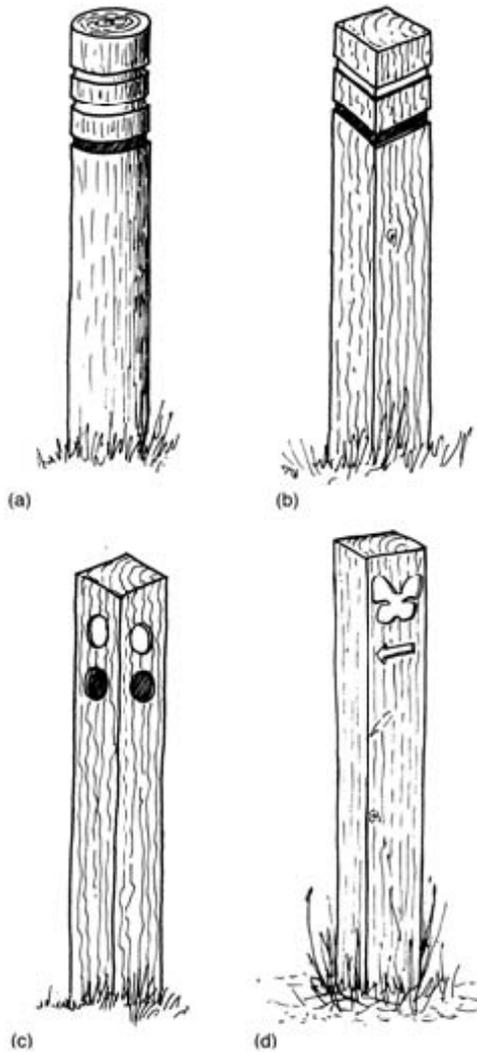
Waymarking posts

Wooden posts or stakes or stone slabs are driven or dug into the ground and markings are made on them. The markings might be in the form of discs painted onto flat sides, routed or sandblasted circles, arrows or symbols infilled with paint, or rings routed/sandblasted around the posts and filled in with paint. Several symbols can be used for stages where a number of trails follow the same route for a time. These posts can be round (peeled) or square sawn.

Markings that encircle the tree-stem or post are the most visible, being seen from every direction. Other types must be carefully orientated so as to avoid being missed by less attentive people. Markers set lower down must be kept free of vegetation, while



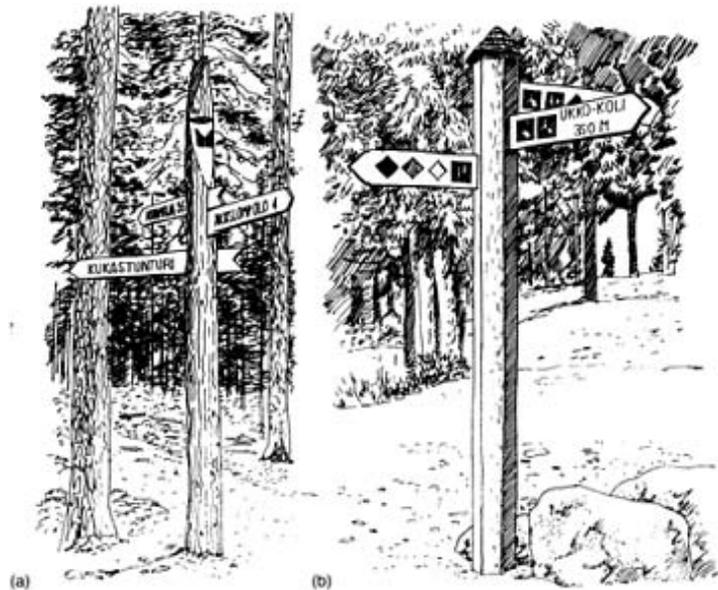
A plastic sign with a special logo has been loosely nailed to a tree. As the tree is slow growing it should be some time before the expanding girth forces the sign off. The damage to the tree may not be acceptable in some places. Alexander Mackenzie Heritage Trail, British Columbia, Canada.



Four examples of routed posts: (a) A round stake with rings routed in it, each painted with the colour code for a trail. (b) The same method used on a square post. (c) circles routed on the surface of a post maybe more obvious but may not always be visible from every direction. (d) A symbol and arrow can be used for themed trails that are best appreciated by following them in one direction.

ones on tree-trunks must not be so high as to be missed, especially if walkers are watching where they are going on rough tracks. In such conditions, rocks painted with markers on the surface of the route can be helpful. Marks set around 1.2m (4ft) above ground are ideal except for trails used in winter (see below).

At junctions where paths diverge, markers must be carefully placed. One at the junction and another a short way along each path, which can be seen readily from the junction, will help to ensure that they are not



In countries which get deep snow, short posts can be buried. Crosscountry skiers need visible signs: (a) Arrow-shaped boards carrying the destination and route direction mounted in an upright post work well, and fit into the forest landscape. Finnish Lapland. (b) A fingerpost using colour coded diamonds, which is prominent in the view, marks the start of a trail system. Koli National Park, Finland.

missed. Another reassurance marker a little further on is advisable, particularly at a large junction. Fingerposts showing directions more strongly and giving distances might be used in larger trail systems. These should be 2.5–3m (8ft 6in-10ft) tall.

Short posts have disadvantages where snow lies thickly. Taller posts should then be used. Fingerposts need to be tall enough that they do not obstruct skiers on deep snow where this occurs. The height should be calculated to account for the snowpack found in an average winter. Taller posts can be unsightly. They work best in forested areas, where they do not stand out as much as in more open landscapes.

Benches

On most trails, especially those used by families with small children, people with disabilities or elderly people, some resting places should be provided at fairly regular intervals. Where possible, benches



A bench invites the walker to sit down, take a rest and admire the view. Koli National Park, Finland.
should be positioned with good views or in attractive places.

As in all aspects of design, benches should reflect the landscape setting in which they are placed. This means that in the wildest areas it may not be appropriate to have benches, and that the materials and styles of benches or perches will vary. In some places, conveniently positioned slabs of rock, logs with sawn-off tops or thick timber planks can be used. The edge of the trail might be excavated to receive one of these so that the bench becomes part of the landscape.

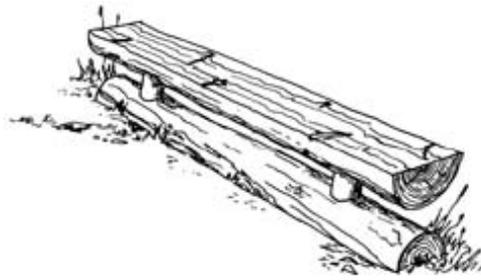
Where elderly people or people with disabilities use the trail, the benches provided should be suitable



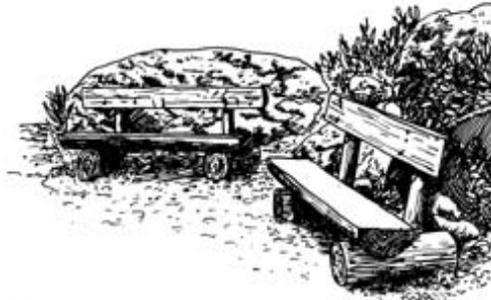
A natural bench made from a slab of rock set in a slope becomes part of the landscape.

for their use. This might include raising the level of the bench, or providing it with arms and a backrest. Such highly finished furniture is best suited to the more developed trails near towns and villages. Even here the urban park bench should be avoided in favour of something more robustly constructed with thicker sections to withstand the rougher conditions. However, finishes should be smooth enough on the sitting or holding surfaces to prevent splinters, but paint and varnish should be avoided in favour of natural-coloured stains or leaving the timber to weather (see 'Picnic furniture' in Chapter 7).

An interesting approach to bench design in some landscapes is to create more sculptural examples. A scheme called Benchmark in Britain uses sculptors who take windblown timber and carve it into



(a)



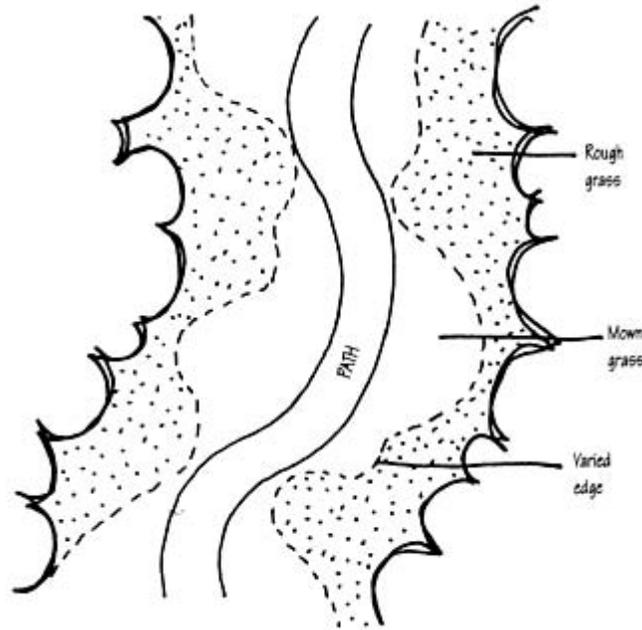
(b)



(c)

A range of designs for timber benches:

(a) This bench from Koli in Finland is made of two halves of a log and two smaller round posts. The bench is simple, stable, and suitable for a forest. (b) Two benches with backrests made from round timber. These work quite well, especially as they are set against some rocks and bushes. Central Germany. (c) A 'perch' makes a handy rest for a short time. Scottish Natural Heritage.



If the sides of a trail are mown the edge should vary to avoid an artificial-looking parallel effect.

interesting and evocative benches, so that using them becomes something more than merely resting and looking at a view.

Trailside design and management

The small-scale landscape created by the vegetation next to the trail should be considered as well as the larger-scale landscape, the sequence of views and features of interest described in the section on trail design.

If the trail is in a forest, the first few metres/yards away from the path into the edge of trees define an enclosed landscape. If the trail route is merely cleared of obstacles and any awkward branches removed this misses opportunities to vary the shape, size and sequence of smaller spaces. A survey along the route should be compiled to record such small detail. There may be special trees, pieces of rock, sunny glades or interesting flora that can be revealed. Thinning the trees or pruning some of them to lighten a dark section can make a dense forest, especially one of plantation origin, less gloomy and oppressive for many people.

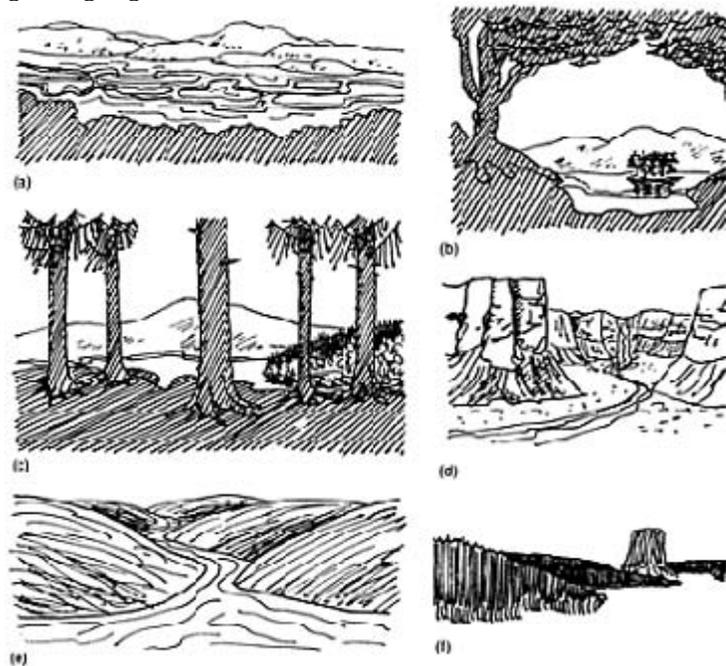
In open landscapes the management of the edges may include some vegetation cutting to prevent too much encroachment on to the path surfacing. If the edges are cut to varying widths along the route, perhaps wider in hollows than on knolls, this looks more natural than a standard width. Sometimes a more structured design involving maintenance of different patches of vegetation at different growth stages can produce valuable wildlife habitat, perhaps for butterflies, as well as a visually more interesting landscape. Each of these patches can be cut in sequence to maintain short grass, herbaceous perennials, low shrubs or tall shrubs (see Chapter 11).

In places, wear and tear of vegetation might occur if the path alignment has caused corner cutting, or sections of path have failed and walkers try to skirt around wet areas. As well as path repair or realignment the vegetation should also be restored. This will be easy in most areas where growth conditions are good, but mountainous, alpine or desert areas take longer to heal and probably need advice from appropriate specialists.

Viewpoints

Viewpoints, sitting places and wildlife-viewing areas should be included from the outset as part of the overall design of the trail system. There are several different kinds of viewpoint, each with its own requirements for design and

maintenance to keep them open by removing overgrowing vegetation.



Different types of view: (a) A panoramic view, where the foreground design is kept simple so as to avoid competing with the wide, distant vista. (b) A canopied view, where the overhead tree branches give an enclosed feeling in contrast to the open view beyond. (c) A filtered view, looking through a partial screen of trees. (d) A framed view, where the massive rocks frame the valley and view of a waterfall. (e) A focal view, where the ridges and lake lead the eye to the head of the valley. (f) A feature view, where a prominent landmark is visible across an open space.

Panoramic views

These are usually obtained at high points such as cliff edges, mountain tops or the edges of steep escarpments. The broad sweep of the view should be unimpeded by foreground trees, bushes or artefacts. The immediate foreground to the view should be as simple as possible to avoid competing with the splendour of the scene. Vegetation management to maintain this is essential, especially where low growth impedes the view obtained by children or wheelchair users. If the view is from a cliff where a barrier is needed for safety purposes, then this should be designed as simply as possible so as not to upstage the landscape.

The approach to a panoramic view should ideally conceal it until the last minute so that its drama or grandeur is emphasized. This can give a memorable first impression.

Canopied views

At the edge of a forest the canopy of tree branches can frame the view between the ground and trees. The foreground trees give a reference point to the scale of the view beyond, and provide a sense of safe enclosure looking out to a more distant landscape. To be effective, canopied views are best developed where mature trees with well-defined horizontal branching are present. Clean tree-boles and an unimpeded forest floor lend weight to the sense of an open volume.

Filtered views

Where trees are widely spaced with clean, straight trunks they can form a partial screen or filter in the foreground. These views also offer safe vantage points, with a greater sense of being hidden from the external landscape. A path passing through dense forest and approaching its edge can exploit this device, contrasting the increasing light

beneath the trees and the tantalizing view out. Filtered views can be used as an appetizer to other kinds of view, raising expectations in the walker's mind.

Framed views

These also use foreground features such as large trees or rocks to compose a view, add depth and give a sense of mystery or drama where parts of the view can be hidden from sight. Such framing can be quite narrow, helping to focus the line of sight.

Focal views

Sometimes landforms and woodlands help to focus views of landscape in particular ways. For successful appreciation, the orientation of the view should be controlled or guided by the direction of the path, the position of a seat or the use of foreground vegetation. As the composition is important, any foreground clutter or features that may distract the viewer should be removed.

Feature views

Where a particular landmark—a peak, a waterfall, a rock pinnacle or historic building, for example—is of special interest, the view should aim towards it. Framing the foreground can help to reinforce this, as can the position of a bench.

Many of these viewpoint devices can be combined. They are well tried, being used as artistic devices by early landscape painters and later converted into real viewpoints by the pioneer landscape gardeners, particularly during the 'picturesque' period.

Viewing towers

In some landscapes the landform and the presence of trees can make obtaining views difficult. Flatter, rolling topography and dense forests are examples of places where viewing towers or platforms can be provided. These are structures that require careful consideration, maintenance and advice from qualified civil engineers before they are built.

Viewing towers usually consist of a sturdy frame of timber or steel, steps (sometimes ramps), and a platform at the top. Climbing them can be quite



*A viewing tower is an exciting feature,
which elevates the viewer
well above the tallest tree
tops. Coaticook Gorge,
Quebec, Canada.*

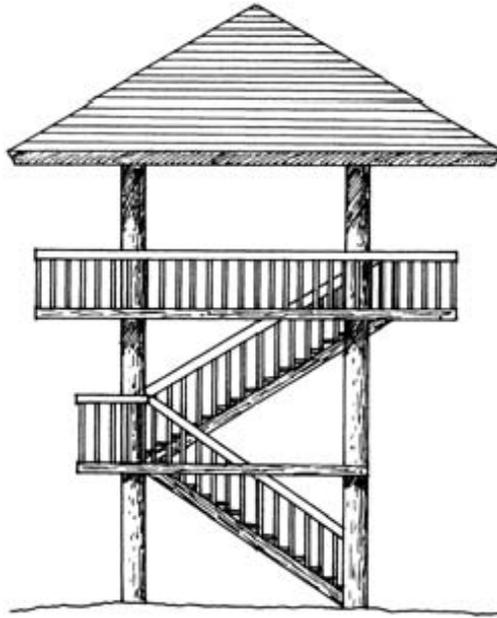
exciting, and the view from the top is usually a 360 degree panorama. In the absence of any other largescale views the openness gained from a tower is often a welcome contrast.

Tower designs should be sturdy and stable, constructed of large-sized materials such as peeled, cylindrical logs or sawn timber bolted together. Cross-bracing using timber bolted across the frame or tension cables will be needed for strength. Solid foundations to prevent overturning in high winds will also be required, and should be designed by an engineer. Steps and handrails are usually within the tower frame, ascending up the centre either as a spiral or winding in a series of right-angled flights. Some examples have the stairs winding around the outside, but these tend to look clumsy. Steps can be made of timber, steel mesh or lattice, which needs less maintenance but which looks more urban. The same considerations apply to the decks, which must have handrails around the edges similar to those for bridges.

Viewing towers are expensive to construct, and need frequent inspection and maintenance. Their height depends on that of the surrounding trees or other features. If the trees are still growing, the tower should be built to anticipate their mature height, so that the views do not become obscured over time.

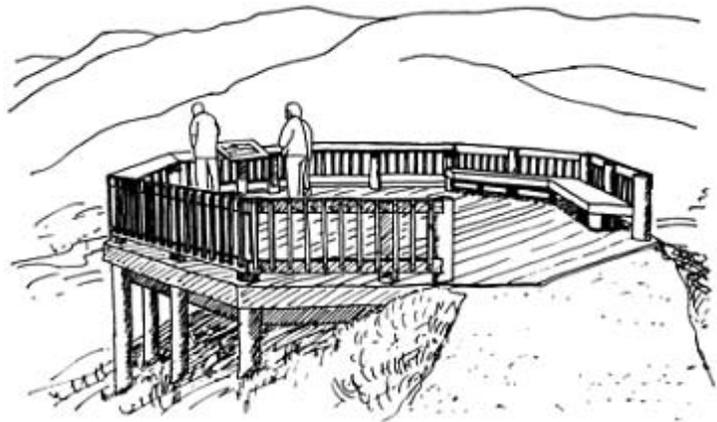
Viewing platforms

A variation on the theme of viewing towers is platforms constructed to jut over a cliff or steep slope in order to provide a better and safer view of an exciting feature by a number of people. Examples include a more dramatic view of a waterfall or a downward view into a canyon or river.



A roofed observation tower constructed around four large tree trunks, which are mounted on concrete bases. The roof shades viewers in summer and helps to protect the timber structure from decay.

Viewing platforms can be cantilever structures jutting out from solid ground, often with struts underneath to give additional support. Their construction should be similar to that of bridges, viewing towers and railings, and involve structural engineers in their design, construction, inspection and maintenance. Platforms have the advantage of being readily accessible from trails by people with disabilities and generally of being more stable and easier to construct than towers.



A platform jutting out from a steep slope helps to give an elevated view, and is specially designed to be wheelchair accessible. However, the view from a wheelchair may be obscured by the railing in this example from Mount St Helens, Washington, USA.

Trailside shelters

Along the length of the trail it might be helpful to hikers for shelters to be located at appropriate locations to provide shelter from inclement weather, shade in hot conditions, or camping opportunities. They can vary from simple roofs to give rain and sun



An interesting small shelter along a trail, made in four prefabricated sections, which are fitted together on site. This offers shelter or shade depending on the weather.

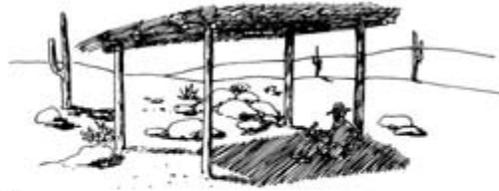
protection, to simple walls to give shelter from winds, or to completely enclosed structures to give refuge from the worst conditions, or camping places or safety retreats.

The simple roofed shelters might be similar to the picnic shelters described in Chapter 7, except that in remoter places they should be less finished in construction. A flat thatched roof of poles lashed together and covered in locally cut materials such as grass or twigs could provide shade in a desert climate. A monopitch frame of round timber notched together and roofed in shingles, split logs or planks will provide some shelter from rain and perhaps wind. The Lapp tent or other teepees, wigwams or wickiups modelled on indigenous or vernacular structures would work in appropriate places where more shelter is required.

In very exposed places such as mountain tops, where the wind is severe, hikers are at some risk of exposure when cooling off after the exertion of the climb. The windchill factor can be greatly reduced by erecting stone-walled shelters that enable climbers and hikers to sit in the lee of the wind to rest. Such shelters can be circular, creating a totally enclosed space out of any wind, or cross-shaped so that at any one time one quadrant will be entirely sheltered. Either of these types will work, but some skill is needed to build them well and tidily.

In severely exposed conditions, or in places where the weather can change suddenly with low temperatures, refuge shelters could be provided for climbers and hikers caught unawares in a storm or blizzard. If the trail is above the tree-line in the open, buildings can be difficult to erect and keep weatherproof, as well as being intrusive in these sensitive places. One option is to find a hollow or low cliff beneath which a lean-to shelter can be erected, built from stone with a roof and door made from stout timber. The location must be in a place that can be found easily, marked on maps and on site and signed from the trail so that it cannot be missed.

A second option is to use a prefabricated structure designed to be weatherproof, which is taken up to the site and anchored in place with cables or Rawlbolts of the type used to anchor climbing cables. Timber shelters of a 'beehive' shape have been developed for this purpose in Scotland, notorious for its changing weather and rapidly descending cloud, which reduces visibility extremely quickly. These shelters can accommodate several people, who can stay overnight if need be using the floor and benches provided to



(a)



(b)



(c)

Some shelter ideas that look right for their respective landscapes:

(a) A simple overhead shelter of poles and twigs gives overhead shade in a hot desert climate such as Arizona or New Mexico, USA. (b) A shelter like a giant umbrella based on a 1930s CCC design. It is an all-wood construction set in a stonework base, which acts as a bench. (c) A shelter providing overnight accommodation in Kokanee Glacier Provincial Park, British Columbia, Canada.



(a)



(b)

Two designs for stone-built mountain summit shelters, which act as windbreaks whatever the weather.



A specially designed beehive-shaped mountain shelter made of a curved timber pole framework covered and floored with sawn timber. Designed and built by Charles Gulland for Scottish Natural Heritage.

sleep on.

Where the trail is in the tree-line of a mountain forest, a log cabin style of building can be constructed on site and provided with a fireplace, as there is fuel nearby. The cabin should be primitive, to maintain the wilderness qualities while providing refuge for hikers.

Any overnight shelter can become a squalid place if not looked after by the users or by ranger staff. If it is in a remote location it is unlikely that rangers will be able to visit it very frequently. It is helpful if all users follow a code of conduct for such places, cleaning out food remains, litter and ashes, refilling wood stores and being hygienic when attending to personal needs. The provision of a visitors' book can help record incidents, weather conditions and observations about the state of the hut and the people using it.

Stiles and gates

At certain points along many trails there may be fences, walls or other barriers to be negotiated. Such fences may be needed to control livestock, to keep deer out of forests, or to prevent access by horses, motor cycles or all-terrain vehicles. Unfortunately, they can also be barriers to trail users, in particular people with disabilities or others unable to climb over them. Ideally all trails should be barrier free, but this is not always possible.

Barriers such as fences or walls can be passed either by climbing over or through them using some sort of stile, steps or ladder, or by a gate. Gates have the advantage of permitting wheelchairs, buggies or elderly people to go through, but they can be left open and allow stock to stray. Stiles are safer in this respect, but mostly they cannot be used by people with disabilities or the elderly. Which method to use depends on the type of users expected and the importance of the barrier's remaining unbreached at all seasons.

Stiles

There are several varieties of stile used: many form part of the vernacular construction used in different areas.

– **Slit stiles.** These consist of a narrow opening, tapering inwards towards the bottom, which allows a person to squeeze through while preventing stock from doing so. Made of wooden or stone posts, they are found in post and rail fences, hedges and stone walls. Modern variants also

include metal self-closing stiles, which can be opened wide and are automatically closed behind by gravity.

- **Turnstiles.** These consist of crosspieces fixed horizontally over a pole that rotates, thus allowing a person to slip through. They need to be strong and yet easy to rotate. A sturdy turning device can be made from galvanized steel.

- **Step stiles.** Wooden steps, either parallel or crossed at right angles, are built, which pass through the fence. They are used in wooden post and rail fences, hedges and wire fences. Any barbed wire should be covered by a wooden rail or plastic tube, or should be de-barbed. If one post is made taller than the others and smoothed, it can provide a useful handhold. Steps can be constructed as integral parts of stone walls, either using flat stones placed through the wall or built into the structure at wider sections.

- **Ladder stiles.** These are found in places where walls or fences (such as deer fences in the Scottish highlands) are too high for the step or slit types. Stepladders made from sturdy round or rough sawn timber are placed in an A frame over the fence or wall, with extension pieces at the top for use as handholds.

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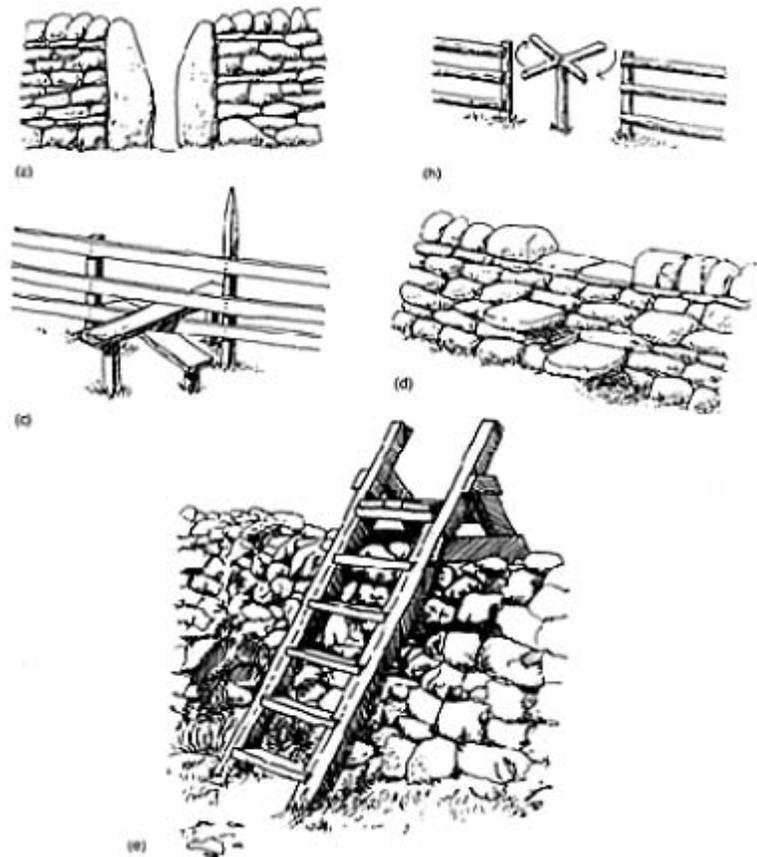
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wide

Gates

There are many designs of gates suitable for use in most places, made of sawn timber with galvanized steel hinges and fasteners. If there is a risk of people leaving gates open, self-closing devices can be used, such as rising hinges, weights and automatic latches. Special leaning gates can be used in deer fences, but these can be heavy to lift, and there is a risk of their falling back on to people. One of the more reliable types is the kissing gate, which swings freely within a railed enclosure. The user walks in, swings the gate past and walks out. It can be built to allow access by wheelchairs and prams without allowing motorcycles or horses to pass. It should be the standard form of gate for trails that are likely to be used by people with disabilities and others who may experience similar difficulties.



Stile designs: (a) A slit stile in a wall made from stone uprights, which taper to a narrower gap towards the bottom to prevent livestock from passing through it. (b) A turnstile constructed of timber with a galvanized steel spindle. (c) A traditional step stile in a timber rail fence. The extended post makes a good handhold when climbing over it. (d) Stone steps set into the structure of a drystone wall is another traditional type of stile. (e) A ladder stile can be used to climb over high walls or deer fences. This one is in Ennerdale Forest in the English Lake District.



A kissing gate made so that wheelchairs or baby buggies can negotiate it. New forest, Hampshire, England.



An area set out with various types of trim or fitness equipment. It is all made from wood to simple designs, and it fits in well into this scene. Helsinki Central Park, Finland.

Fitness or trim trails

A special variety of trail much favoured in recreation areas closer to urban centres is the fitness or trim trail. This usually comprises a circular loop trail along which are positioned items of equipment used to exercise, tone and strengthen different sets of muscles. The equipment may be spaced around the trail or clustered at certain points. The jog around the trail, between the different pieces of equipment, warms the person using it, as does the order in which the exercise equipment is used.

Construction of the exercise equipment in the outdoors looks best in wood—sawn or peeled and rounded. Metal tubing may be used for some pieces. Depending on the type of equipment it should be set in an area of hard surfacing to prevent wear and tear on the ground, or the surface should be covered in bark or wood chippings where falling from a height is possible.

Equipment should normally be set to one side of the trail so that it does not obstruct walkers who are not using it for fitness purposes. The equipment should be well spaced, numbered and provided with signs illustrating the way it should be used. Often each piece of equipment allows different degrees of fitness to be exercised, or is suited to different heights and ages of people. For example, lifting logs to make use of upper chest and arm muscles can range from light to heavy, or hurdles for jumping over can range from low to high.

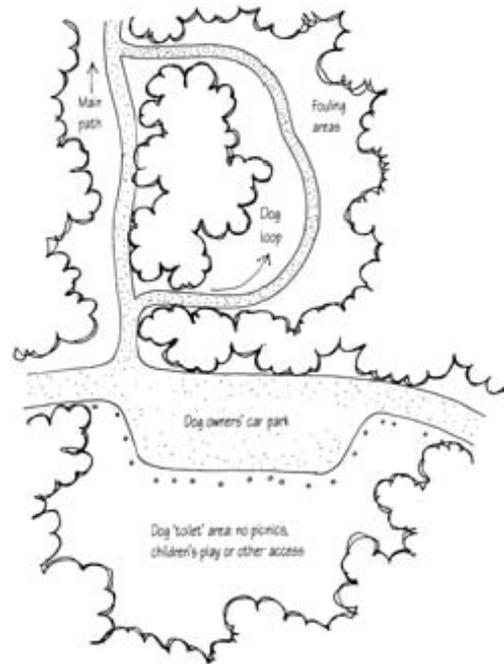
Trails and dogs

Many people, particularly in densely populated areas, walk on a daily basis to exercise their dogs. This means that paths can be fouled by dog mess, presenting a hazard underfoot and a risk to health, particularly for children. Hence it is important to plan for dog walking from the outset, or redesign the trail system if it is currently a problem.

One method of coping with dogs is to devise special loops along which people can be encouraged to take their dogs when they first enter the recreation area. This enables dogs to do their business before a longer walk along the main paths commences.

The second method, more appropriate at car parks, is to set aside an area for dogs to use—a 'dogs' toilet'. It should be clearly marked in order to let dog owners know that it is for their dogs to use, and to prevent other people from inadvertently walking over it. The area needs to be large enough so that dog mess decays before too much build-up occurs.

The other device is to insist that dog owners collect and dispose of their dogs' mess. This is more common and easier to implement in urban parks than in remoter locations.



This diagram shows a couple of ways in which the problem of dog fouling can be reduced at a car park and trail area.

Dogs can also cause a nuisance by disturbing livestock, wildlife or other dog owners. Management strategies may range from insisting that all dogs are under control at all times (preferably on a leash) to banning dogs in some areas at particular times of year, such as lambing or nesting seasons.

Horse trails

In many areas people enjoy exploring the outdoors on horseback. For some this will consist of riding from home, a livery stable or paddock into a woodland, across a common or along a bridleway. Some might take their horse to a particular destination by car and trailer, ride some trails and return home in a day. Others might go on a guided pony trek as part of a residential holiday or from a dude ranch. Finally, some will plan to ride a trail over several days, camping at places along the route where fodder and corral facilities are located. Whatever the way a trail is ridden, the route, the surface and the facilities such as loading areas, hitching rails or corrals need to be carefully considered in their planning and design.

The trail may be an established route such as a British bridleway, where landowners are legally obliged to maintain the route in an open condition. It may be used by hikers as well as horses, which may pose problems when the way is narrow and heavily used. It is always preferable in busy areas to segregate trails, with special ones established for horses only, while keeping hiking routes horse free.

Rough and steep horse trails are acceptable in places if it is expected that experienced riders will use them. Pony trekking or dude ranch operators may expect inexperienced or novice riders, and so they will want a range of trails from easy ones to those of a rougher nature. Riding for the disabled is a popular activity and requires extremely gentle routes.

The trail route should be laid out in a similar way as for hiking, when viewing the scenery is one of the purposes as well as exercise. The distances can be longer, as the horse is usually a quicker means of transport and the views gained from the higher position on the back of a horse are slightly more extensive than those on foot.

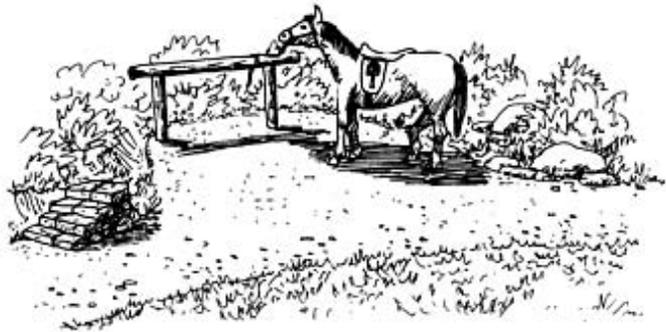
In areas of firm, freely drained mineral soils with rock, sand or gravel, the surfacing of the trail may need little or no attention. Sandy soils make excellent surfaces with a low risk of injury, so that stretches for a canter or gallop can be provided. However, poorly draining clay soils can churn up, and when hoof prints are deep they can fill with water, become frozen and the surface turn into a quagmire. In such circumstances it may be necessary to close the trail during very wet weather, restrict the overall amount of use, have alternative routes so that damaged ones can be

repaired or given time to recover, or surface the trail with stronger materials to prevent damage.

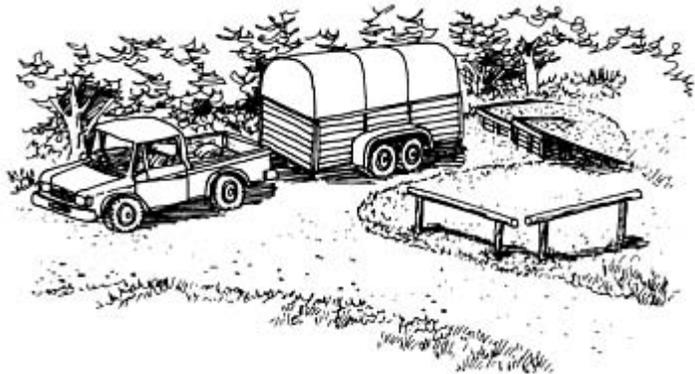
If surfacing is used, the trail should be constructed in a similar manner to a footpath. The width should allow two horses to pass with ease. Trees should be kept back from edges so that riders' legs are at less risk of being injured as they pass. Low branches should be removed along the route. Additional surfacing can also be provided for a softer ride, to reduce the wear and tear on horses' shoes and to deaden the noise. Shredded bark or wood chips are excellent for this. Sand can also be used but is more likely to be washed off during rain on steeper stretches.

Water crossings can be forded in more circumstances than for hikers, thus reducing the need for bridges. Where bridges are needed, wider decking, solid planking with narrower gaps and possibly bark surfacing should be used. The handrails should be higher to prevent riders from falling over. Some horses do not like crossing bridges, so softer surfaces may help by reducing the noise and the risk of possible injury if a horse shies. However, it is often prudent to lead a horse across a bridge.

At points where the rider may wish to stop to look at views, eat lunch or observe wildlife, hitching posts or rails are needed. A sturdy timber structure will suffice, but it must be securely fastened to withstand jerking movements by the tethered horse. A lay-by or flat open area away from the trail should be found so that the hitched horse cannot interfere with other riders passing by. If a group are out riding then more rails will be needed. Steps for remounting horses might also be provided for the convenience of some riders. Such steps should use the type of construction



A trail for horses is provided with a hitching rail of simple but appropriate design and a set of mounting steps at places where riders may want to dismount to look at a view or have a picnic.



An unloading ramp of two different heights allows for different trailers or vans to back up to it. Hitching rails are provided to tether the unloaded horses. Timber construction is used, with earth and hardcore infill behind the ramp retaining wall. Based on an example from the Alberta Forest Service.

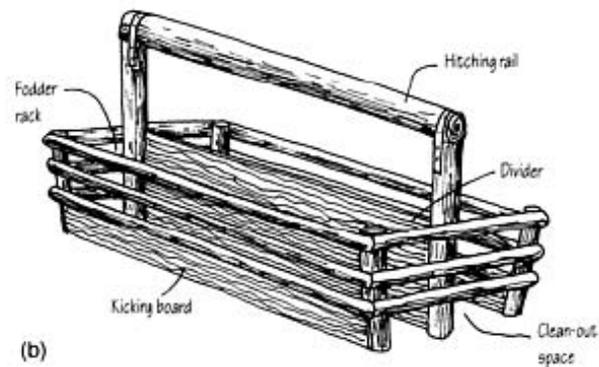
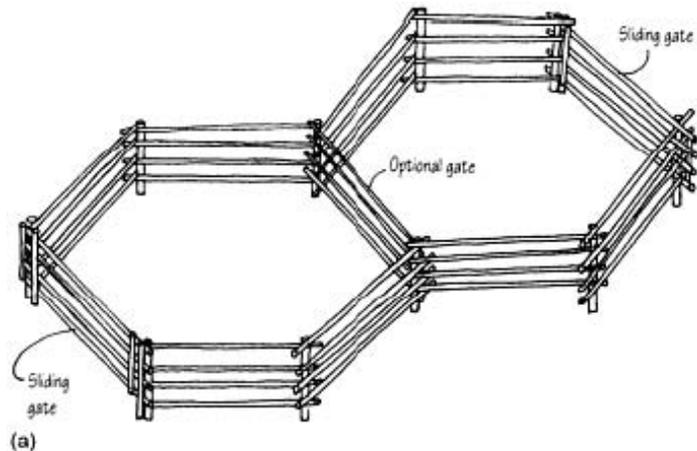
suggested earlier in this section.

Where horses are brought to the area in a horsebox or trailer, special parking and unloading places should be provided so that the horses are kept out of the way of other cars and pedestrians. Hitching areas or a corral will reduce the risk of horses getting loose and causing problems elsewhere.

If camping takes place along a long-distance horse trail, overnight accommodation will be needed for the horse as well as for the rider. If a field, stable or paddock is not available, a corral is usually suitable and can be of post and rail or pole construction in a typical farm or ranch style. Corrals can be built for several horses or for single animals.

Horse stalls can also be used instead of corrals. These are like openair stables, where the horse is tied in and provided with a manger. Water can be supplied from a spring for tap and fed into a trough made from galvanized steel. Fodder can be carried in a nosebag (oats or nuts), foraged around the area or provided at the campground as hay, nuts or oats. Hence storage and fodder supply has also to be provided, along with hay racks, mangers and water troughs. All structures can be made out of rough sawn or round timber, which should be untreated to avoid poisoning the horses if they lick or chew it. All bolts or nails must be recessed, cut off or otherwise hidden. Sharp corners or angles should be removed from post ends and sawn planks to prevent injury to the horses. Horses can be hobbled or tied to a long rope secured to a post, but this can be risky.

The location of horse facilities should be downwind of the camping area to reduce smells, but should be sufficiently distant so that smoke from campfires does not affect the horses. The facilities should also be placed away from any streams to minimize the risk of pollution from horse droppings and urine. The soil on which they are constructed should be suitable for horse use, as described earlier.

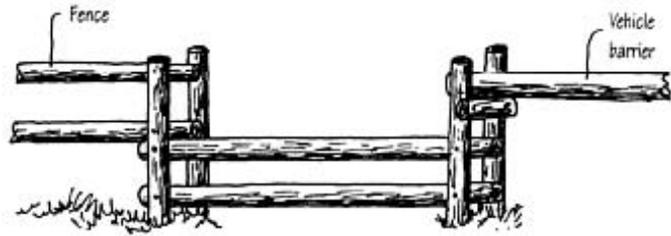


(a) This design for a horse corral is in a traditional style with all pole ends outside the fence and an absence of narrow corners to reduce the risk of injury to the horses. Several corrals can be linked together to increase capacity in busy areas. Based on an example from the US Forest Service. (b) A feed rack to be built where horses stay overnight. The hitching rail is incorporated into it.

Horse trails, like other trails, may have to pass through fences or other barriers. Traditionally, gates have been provided that can be opened from horseback by hand or by using a whip or crop handle. Selfclosing devices such as rising hinges and springloaded catches are fitted, as it is easier to lean forward from a horse to open a gate than it is to lean back and close it. If the main purpose of the barrier is to keep motorcycles out, a gate is inadequate. Instead, spaced horizontal logs set on posts about 1m (3ft) above ground level allow horses to step over them, but are too high for motorcycles to be lifted or wheeled over.

All-terrain cycle trails

One of the growth areas of outdoors recreation is that of all-terrain cycles or mountain bikes. These can go almost anywhere, can attain quite high speeds on downhill stretches, and can cause severe wear and tear, especially on soft ground. In general, where the trail system is well used by walkers, mountain bikes should be kept separate in order to avoid accidents. Codes of conduct for cyclists should be encouraged. As for hiking and horseriding, the cycle route should be chosen with the overall experience in mind, including physically challenging sections, interesting features and views.



This barrier allows walkers and horses over it but prevents motor bikes from getting through.

Routes should be chosen to avoid soils that are easily eroded, and should be aligned where possible to prevent washout during rainy periods. Some surfacing may be needed in soft or wet places, where these cannot be avoided. Cyclists might also be encouraged to use forest or park roads for some stretches. This will reduce wear and tear elsewhere.

Routes should be waymarked where there may be doubt about the direction, so that cyclists do not stray into more sensitive areas. However, in many places, especially if the use is light and the terrain robust, unrestricted access to roam around might be permitted.



Waymarking should be provided to ensure that bikes follow any special trails.

In cases where the trail surfacing has collapsed, remedial action should be taken as quickly as possible. Routes may have to be diverted, the surface reinforced and drainage laid.

Cyclists can usually use the same water crossings as walkers, carrying their cycles if need be. This reduces the number of bridges and fords that are needed. If cyclists and hikers or horses have to cross or share a section of route, the layout should allow plenty of passing room, and the code of conduct should explain who gives way to whom.

Signs should give warning of the section, especially crossing of one path by another, and the trail layout should ensure good visibility, a crunchy surface to warn of cyclists' approach, and possibly barriers to keep users separate in unavoidably narrow sections.

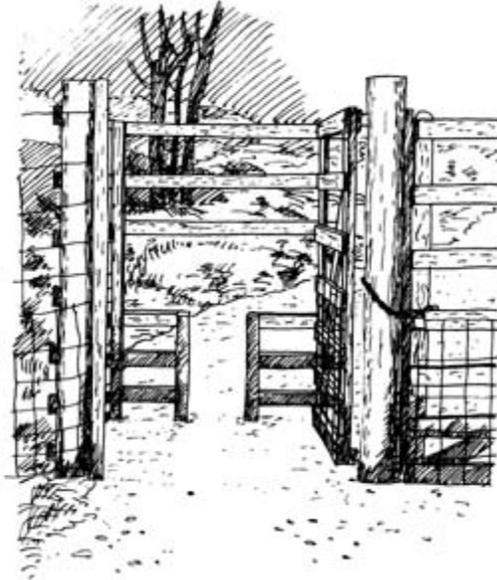
Bikes can also be carried over stiles in most instances. Where there are kissing gates it is possible to insert a special slot in the enclosing fence that will allow a cycle to be passed through but not an animal or motorcycle (see diagram).

As cycles are valuable and easily stolen, racks that can be locked should be provided for them at car parks or other risky places. A design suitable for the outdoors consists of a log with slots cut out of it. Each slot has a strong eyelet screwed in next to it. The cycle wheel or frame is placed in the slot, and the cyclist can lock it to the eyelet using their own lock.

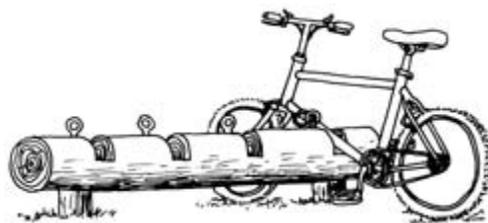
Cross-country ski trails

Another growth area of trail use is cross-country or nordic skiing, used to follow trails during the winter season. The same principles of trail route design should be followed as have already been described, as one of the enjoyable aspects of such skiing is the chance to see wildlife, frozen waterfalls and lakes and splendid snowy scenery. Routes through forests are frequently preferred, as the trees catch the snow, and the day-long shade in the winter reduces the thawing. There is also less chance of the snow being blown off the trail.

In many urban fringe and accessible forests in Scandinavia or parts of North America, extensive systems of specially prepared trails are provided. These are of different lengths and for different levels of proficiency. Usually the prepared trails are wide enough—up to 3m (10ft)—to permit one or two sets of parallel tracks for the traditional method of skiing side by side with room for speed skiers using the skating technique. Lighting might also be provided in northern latitudes where daylight is short or nonexistent in winter months. These routes should be



A modified kissing gate in a deer fence will allow all-terrain bikes to pass through but not motorbikes. Glen Affric, Scotland.



A bicycle lock made from a large log with slots cut from it and large eyelets to lock the bikes to.

waymarked like hiking trails, with information provided at the start on length, difficulty, expected duration and any special features to be encountered.

In wilder places the chance to ski on new, unprepared snow and experience the stillness of the winter forest provides a marvellous experience.

Forest roads covered in snow have far less visual impact than at other times of year, and make excellent routes from which other trails can be chosen. Hiking trails may also be used if the gradients are not too steep or dangerous.

Along the route it may be appropriate to locate benches and shelters such as those described for hiking trails and picnicking. In remoter areas many people enjoy skiing to a cabin, cooking food and camping before skiing back the next day. Shelters with fireplaces and fuel are provided along such networks in Finnish Lapland, for example, where sausage roasting over a fire is a traditional experience after a day's skiing.

Other artefacts that are needed are racks where skis can be stacked when taken off and for leaning them against to apply resin coatings. In busier places toilets might be needed (see Chapter 7).

Chapter Ten

Water-based recreation

Water in almost any form is an attractive feature in the landscape. As well as its aesthetic qualities it is highly valued as a recreation resource for fishing, bathing and boating.

Planning for water-based recreation to cater for the often conflicting demands of various activities is essential. This is a large subject, and this chapter is not intended to explore it in any detail. Its purpose is to consider the design of facilities needed by the main forms of water-based recreation, and measures needed to prevent site damage at the vulnerable landwater interface. Site layout should consider the segregation of different uses, such as boat launches and jetties, fishing from the shore, sunbathing and swimming, together with the protection of sensitive shoreline habitats. Zoning of a lake or river for these uses is frequently the main result of water recreation planning, which in turn determines the general layout and site design criteria for the area. The requirements for structures and artefacts to enable visitors to enjoy their activity to the best of their ability and in safety will be determined by this series of considerations.

Fishing

Fishing is a very popular pastime, enabling many people to enjoy an absorbing activity in the outdoors, as well as an appreciation of nature.

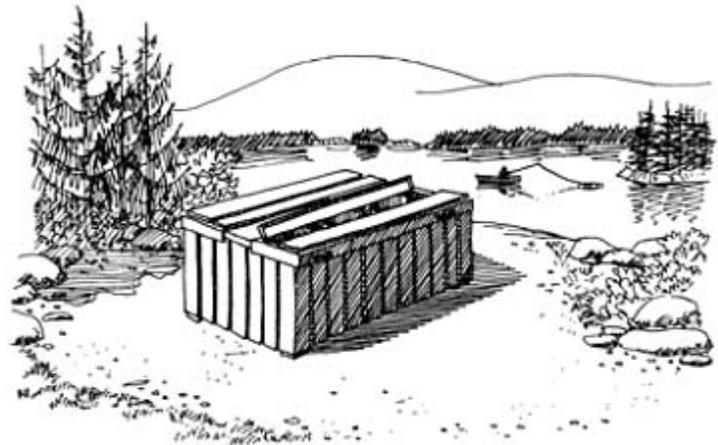
In general, the facilities described in this section are extra to the basic requirements already covered in previous chapters, such as car parking, picnic areas, paths, toilets and shelters. In many areas there is no design for fishing facilities: they look scruffy and badly constructed. Nor is there much attention to the site, so that common problems are bank and access route erosion, damage to sensitive habitats, litter, human hygiene and the danger of fire. There are different requirements for game (trout, sea trout and salmon) and coarse fishing, and differences between riverbank or lakeshore fishing and fishing from a boat.



Fishermen can cause a lot of wear and tear to the ground, so they often need paths, platforms and other features along the edge of the river, lake or pond.

Fishing from a riverbank or lakeshore

Game fishing involves access to the bank or shore and wading into rivers. Access routes and paths need to be planned and designed unless the use is low enough to involve little wear and tear. The wilder character of many rivers and lakes may suggest as little path construction as possible. The next requirement is for vegetation management to maintain space for casting flies. This may involve removal of trees or trimming of branches, which should be carried out so as to prevent unsightly disfigurement to trees or bushes. If boats are used, launch areas and jetties are required (see below for details).



A fish-cleaning station with cutting surfaces and vermin-proof lids over plastic buckets, which can be used to collect and dispose of fish guts. Derived from a design by the Alberta Forest Service, Canada.

People who go coarse fishing (that is, for fish other than trout, sea trout or salmon) normally sit on the bank of a lake or stream, or use a boat. Small platforms are needed if the soil is wet, soft and sticky. Timber planks nailed to a frame will spread the weight of a person and enable stools, umbrellas and tackle to be organized more easily clear of mud and weeds. A boardwalk or strengthened path may be needed to provide a better route to the fishing areas (see Chapter 9).

A jetty over the water will give access for visitors with disabilities. Railing may be necessary if the water is deep, or for other safety reasons, but raised edges to prevent wheels from slipping off may be all that is required. The jetty can be cantilevered from the bank, built on piles, or floated on the water.

Where visitors are permitted to venture close to water, however deep, especially when paths lead them there,

safety must be considered. Life rings should be provided, located close to the water's edge in visible places that are easily accessible. Spacing between life ring stations should be close enough to require only a short dash to one once a person is spotted in difficulties. The usual plastic floating rings are adequate, with a length of line attached by which to pull the rescued person back to the shore. The line should be rot-proof (polypropylene), and long enough to reach beyond the distance out from the shore that people are likely to fall in. Regular and frequent checks of safety equipment are necessary to ensure that it is in good condition. The life ring stand should relate visually to other artefacts and be of simple design. A vertical post of large dimensions can be used in many situations.

It is enjoyable to eat freshly caught fish, so picnic areas with fireplaces should be provided nearby if appropriate to the character of the landscape, or where fire risks from uncontrolled fires are too great (see 'Fireplaces' in Chapter 7).

Fish for cooking have to be cleaned. The odd remains of cleaning one or two fish for cooking in a remoter place can be disposed of by packing it out, burning it on the fire or burying it so as not to attract wildlife. However, in well-used places, in hot weather and by lakes used for other activities, fish residue should not be left lying around. They smell, attract flies and other wildlife, such as bears in much of wilder North America. Therefore cleaning stands should be provided. These can be made to workbench height with surfaces equipped with cutting boards that can be scraped off into plastic buckets or bins with lids to prevent seagulls, flies and, if need be, bears from getting in. Hard ground surfacing all around and water available for regular hosing will keep the stands clean. The buckets or bins should be regularly removed along with litter and garbage from elsewhere on the site. Such cleaning stands are especially needed when people land numbers of fish from boats and clean them before taking them home. As with all artefacts, they should be simple structures designed to fit in with others on the site, and positioned to be screened from attractive views, perhaps in spaces at one side of the main access routes from the shore or boat landings.

Freshwater bathing areas

In the summer months, especially during long periods of hot weather, lakes become warm and rivers and streams present tempting opportunities for cooling off. In the wilder places people may wish to swim in a lake or stream and delight in the remote, solitary nature of the place. Other more gregariously used places may become busy and subject to potential problems of hygiene, litter, safety and site damage, which reduces the pleasure and spoils the setting.

Hygiene requirements may include toilet blocks, showers, changing cubicles, drinking water supplies, litter management and restrictions on taking pets in or near the water. Ideally, bathing facilities should be grouped within a single building to reduce the impact of several structures in the landscape. Toilet blocks have been dealt with in detail earlier, and can include showers and changing cubicles.

Where separate buildings are needed to house changing cubicles, these should be designed to match the toilet blocks and picnic shelters used elsewhere; they can also include showers. Basic shelter structures can be modified easily with partitions, screens and benches. Their design should include non-slip floors, which are sloped for ease of washing down and draining. Partitions must be high enough to ensure privacy, with sightlines into entrances screened off. Materials should not splinter or be of an abrasive nature. Pegs or hooks should be provided for hanging clothes. Lockers are occasionally provided at the larger sites but not at smaller ones, where cars or family picnic spots are within easy reach. Changing cubicles can be individual, unisex arrangements or communal separate-sex areas with appropriate signage. If demand increases at the site it may be necessary to increase the number of changing units, so designing a building that can be extended easily or internally remodelled is an advantage.

The site layout should also include signs to orientate visitors to the changing facilities and toilets, and to guide their behaviour: for example, reminding them that glass bottles should not be used anywhere on the site.

Lakeshore protection

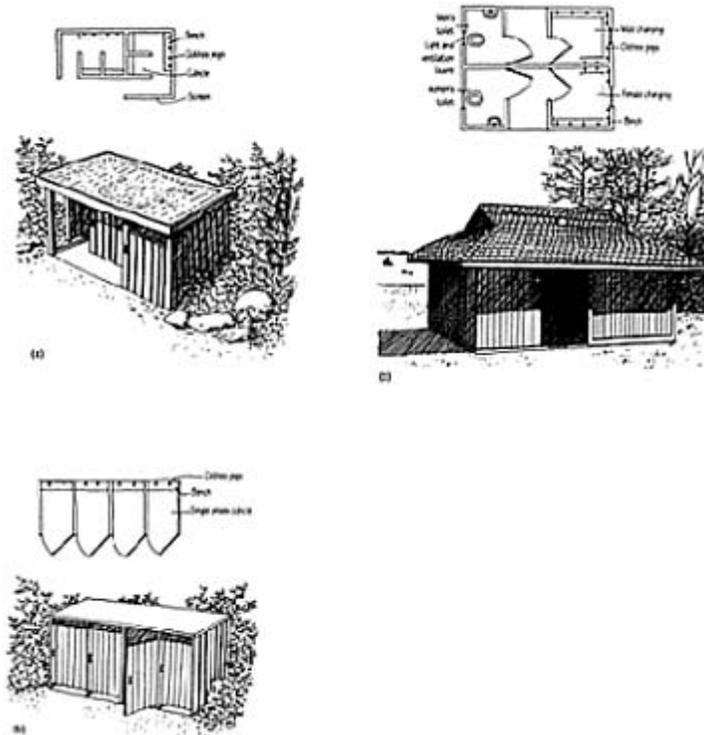
Constant wear and tear along the landward edge of a beach should be prevented. This can be achieved by access control in the most vulnerable places such as wetlands, stream mouths and steeper banks, and by edge reinforcement where access is permitted. Low, rockwork walls or timber edges help to define the edge and stabilize it.

Rockwork walls can vary from the use of locally obtained natural boulders laid fairly roughly to maintain a natural character, to well-laid drystone or mortared construction in keeping with a more rural or urban character, and where use is heavy. Ramps and steps should be provided along obvious access lines from parking areas to the water's edge. The rockwork can act as seating, places to dry towels and bathing costumes, can give some shelter from wind, and can provide warm areas for sunbathing.

Edges might also consist of stout baulks of timber laid end to end, possibly built up in horizontal layers to form low walls. Higher walls can be made by vertical round timber driven in side by side and topped with horizontal sawn planks. If the wall is taller than 1m (3ft), protective handrails are probably needed (see Chapter 9).

Lake bathing areas

That part of a lake set aside for swimming should be planned and laid out for safety and to give people an enjoyable experience. The choice of swimming area should take into account several factors. The suitability of the water is important, particularly its cleanness and temperature. The shelter or exposure of the area and the likelihood of insects if it is too sheltered should be considered. The character of the lake bottom is also important. Firm sandy or gravelly conditions, gently sloping with no sudden drops, are essential so that inexperienced swimmers do not suddenly find themselves out of their depth. Sand or gravel beaches are more likely to be backed by grass or forest vegetation instead of cliffs, sand-dunes and



Changing-room designs: (a) A monopitch building with high-level windows provides facilities for segregated male or female changing. (b) Individual units to be used by anyone. Light can get in above and below the doors. (c) Combined changingrooms and toilets in one building. The rooms are ventilated by louvres, but they do not receive sufficient natural light. Williamson Lake Provincial Park, Alberta, Canada.

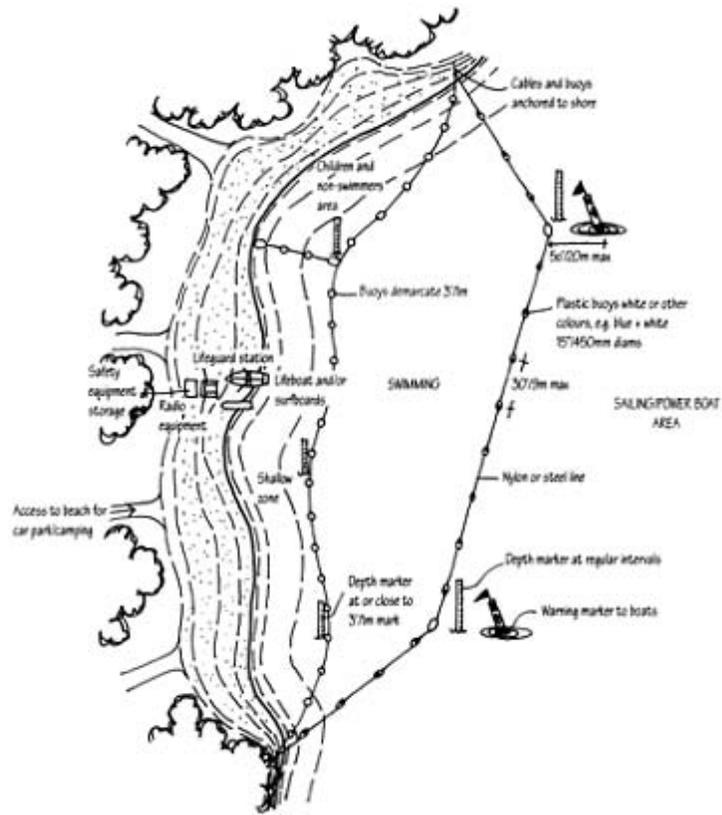


*A lake beach where a low retaining wall has been laid in order to reduce the wear and tear of the grass edge along the beach.
Whistler, British Columbia, Canada.*



Two methods of protecting lake shores:

(a) Timber piling trimmed off to follow the profile of the land. (b) Rockwork, with large rocks lower down, grading to smaller ones at the top. Both methods allow for the inclusion of access ramps.



A diagram showing all the requirements for a lake bathing beach to be used by many people. Derived from the US Forest Service.

other coastal features. This means that they can be less vulnerable to damage than sand-dune areas are, but they can also be more muddy when worn.

If sailing and powerboats also use the lake they must be separated from general bathing in order to avoid serious accidents. This can be achieved by a line of buoys demarcating the outer zone at around the 1.8m (6ft) depth. These buoys are spread along a rope or cable anchored in place at intervals, with a depth marker at each corner or change of direction. The ends of the cable are attached to adjustable fixings on the shore, such as posts or anchors.

Within the demarcated swimming area a second area should be divided by another line of buoys along the 1m (3ft) depth line. Again, this should be provided with depth markers. This inner shallow area can be further divided into a safe area for children and non-swimmers to use.

Depending on the degree of use, and on any national, state or provincial regulations, safety equipment and personnel should be stationed at regular intervals along the beach. A lifeguard station may be present, and equipment such as a small boat, surfboard, radios, life rings and first-aid kit should be kept there. A secure shed for the equipment other than the boat and a high seat for the lifeguard should be constructed in the same design character used elsewhere on the site.

River bathing areas

If rivers are to be used for bathing, planning must address issues of zoning for different users along different stretches, such as boats fishing and swimming, which may conflict with each other or require particular qualities of river water depth, speed or riparian vegetation.

Rivers may provide good swimming opportunities, although the water is usually colder, which, together with currents, may make them less safe for children or inexperienced swimmers in an unsupervised location. Shallow pools with gravelly bottoms and stretches of potholes, natural chutes or slides and ledges are very attractive, allowing safe and exciting activities. Some of the best swimming is to be found in places where glacial meltwater torrents have eroded solid rocks into dramatic forms, but where the river is now much smaller than it once was.

As with lakes, riverbanks can be easily eroded by overuse, so that retaining and reinforcing structures of a similar nature might be needed. As erosion is also a natural process, it is worth looking at the pattern of currents, so that access and use are not concentrated on the most vulnerable areas. This depends on the rock type and the character of river. A faster mountain stream is more erosive than a sluggish one meandering across a flatter area. Erosion is mostly concentrated on the outsides of bends, while shingle banks occur on the inside. Hence creating access to the inside areas is less likely to cause damage.

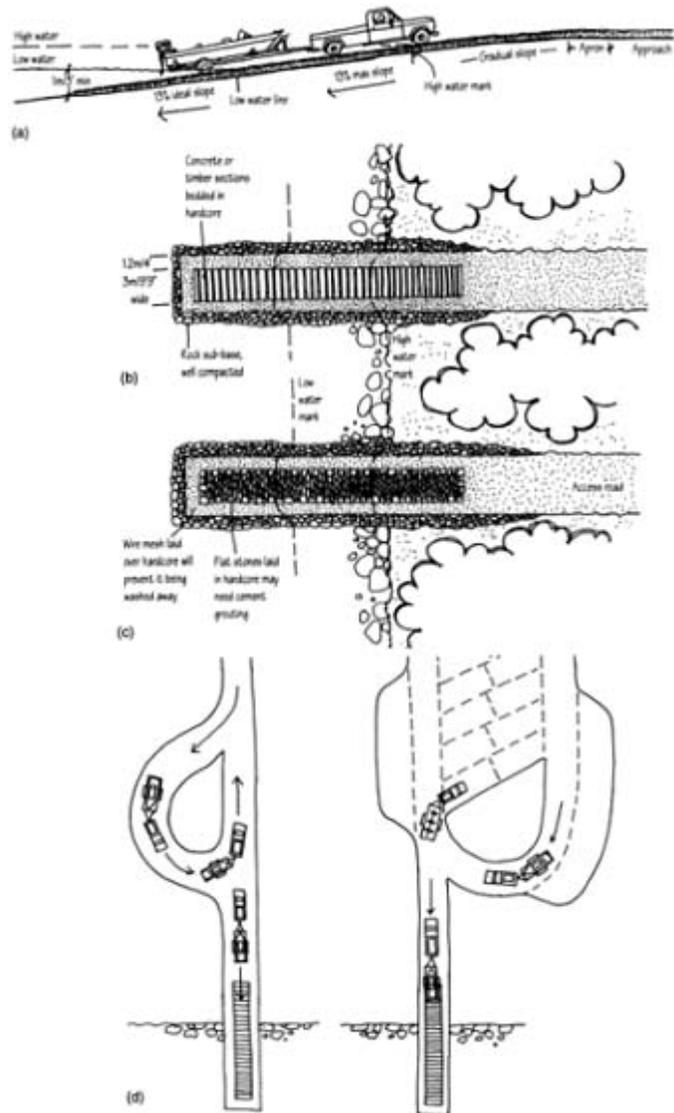


*A simple, small boat-launching ramp,
which uses rollers on a
timber frame to ease the task
of hauling a dinghy from the
lake. Baxter State Park,
Maine, USA.*

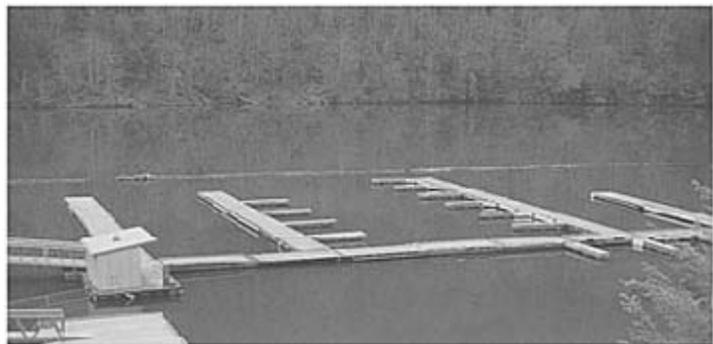
As with lakes, safety features such as depth markers, life ring stations, ropes across the stream to delineate deeper areas and to hold on to, or rocks placed across faster areas for the same reason, should be provided. Warnings about places where it is difficult for children or less fit people to get out of the water should also be considered.

Boat facilities

At many sites with water access, people want to be able to launch boats. These may range from small kayaks and canoes that can be easily carried from a car roof rack to the water, to larger sailing or motorboats, which need ramps into the water to launch them. In remoter locations it might be appropriate to allow only those craft that can be manhandled, while in the busier areas nearer cities boat launch areas, mooring jetties or even fully fledged marina facilities with refuelling places might be provided. This is partly to reduce the degree of development, the number of artefacts and the use of motorboats in wilder places. The use of materials



Boat launching-ramp designs: (a) The basic requirements of gradients and water depths for a functional and safe boat-launching ramp. (b) A ramp layout using prefabricated concrete or timber slabs bedded into hardcore laid on a compacted rock sub-base. (c) A ramp constructed from flat stones laid in hardcore retained by an edge of larger stones, which are embedded in the base. (d) The layout of the road to and from the ramp allows the towing vehicle to turn to reverse down it and then to park, after launching the boat, in a pull-through parking area nearby.



A small marina made from floating prefabricated sections, which are linked together and connected by a hinged ramp to a floating fuel store and then to the shore. The whole system is flexible, and allows for changes in water level and swell on the water surface. A reservoir near Portland, Oregon, USA.

should also reflect the environment. However, good, simple, well-constructed facilities are needed for durability, appearance and safety. When planning for boat use, the launching ramp or jetty should be chosen for the landscape setting as well as the type of boats, site requirements and safety.

Boat launches

One of the simplest and most effective forms of boat launch is a sloped ramp descending at a shallow angle into the water. Boat trailers are reversed down this, and the boat is slid by hand or let down by cable under its own weight into the water. It can then be moved to a jetty nearby, where passengers can board and supplies are loaded. The trailer and the towing vehicle are then moved to nearby parking, which does not intrude upon the water setting.

Launch ramps can be constructed from:

.– **poured concrete**, which is prone to cracking, especially in areas where severe winter temperatures are likely. If damaged it is difficult to repair. It can also look most urban and too finished for wilder locations. Exposed aggregate varieties of concrete that use local types of stone will blend in better.

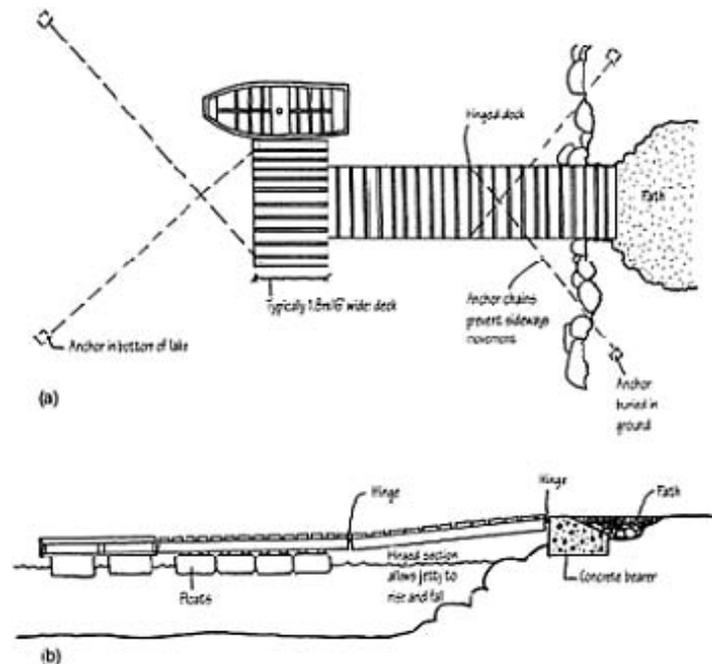
.– **reinforced concrete** slabs laid side by side and linked with steel couplings. A small space is left between them and filled with gravel. These are flexible to lay, easy to replace, and can be precast off site. The gaps between them give good grip for shoes and vehicles in wet conditions. The coarser texture and gravel infill helps this type to blend into the landscape. Exposed aggregate concrete looks better and helps give a good grip.

.– **timber slabs**, laid similarly to the concrete slabs. These do not last as long, but they are easy to lay and replace, and they do less damage to the bottoms of boats when they are hauled out of the water. Preservatives cannot be used on the timber because of the risk of the chemicals leaching into the water. The timber may become slippery where it is most frequently in contact with water.

.– **flat rocks**, which can be laid *in situ* on a firmed base infilled with gravel. These may depress under the wheels of heavily laden trailers but they tend to blend with the landscape better than the other varieties, and are easier to fit and re-lay.

jetties

Jetties are needed for mooring boats and float planes that land on lakes in the remotest locations. Jetties should be located in sheltered places out of the way of currents and in places where the water is naturally deep enough for the types of boat or float plane intended to use them. The design of jetties must reflect the qualities of the landscape while being designed to be fully practical.



Jetty designs: (a) A plan showing the layout and general dimensions of a simple timber jetty and the way it is stabilized using anchor chains. Based on Alberta Forest Service designs. (b) A section through the jetty shows the general method of construction, connection to the shore and the floats fixed beneath it.

In shallow water where levels do not fluctuate a jetty can be constructed on piles made of durable timber connected by a framework with a surface deck. Rocks can be used to infill between the piles and give some shelter and breakwater to the mooring area.

In deeper water, floating jetties may be better, particularly where water levels vary significantly. Floats can be made from well-cleaned petroleum drums (metal or plastic), blocks of polypropylene, or special proprietary floats made from plastic with flanges to fix them to frames.

The deck of the jetty can be constructed from sawn timber frames surfaced with planks. If preservatives are used, care must be taken to ensure that it is not toxic to fish or other aquatic life (see section on boardwalks in Chapter 9). Any metal fixings should be of galvanized steel. Small jetties can be taken out of the water and stored on shore over winter for repair and maintenance. Jetties can also be prefabricated, which is an advantage when they are to be transported to remote locations.

The jetty must be anchored to a fixed base on dry land, usually a concrete block, by hinges or short chains, which allow it to rise or fall with the variations in water level. The jetty consists of an access ramp or gangplank section, whose angle varies with the water level, to walk along; this joins by another set of hinges onto a floating section used to moor boats. To prevent sideways movements and twisting or buckling in waves and winds the ends of the gangplank and the offshore end of the floating jetty section should be anchored with diagonally arranged cables or struts.

Steel and timber can also be used. This is more durable and stronger, which may be required in busier locations and for less experienced boat users where buffeting is more likely. Galvanized steel frames can be prefabricated; floats can be made of metal tubes with timber decking bolted on. In places where less experienced sailors, passengers and swimmers are expected to use the facility, or where the gangplank can be steep due to low water levels, handrails should be fixed to it. This variety is a lowmaintenance one, but it can also be hauled out of the water if need be. It must also be anchored to the shore as described above using cables or steel struts, which give added stiffness as well as securing the ends to prevent sideways movement. The metal frame construction is a more highly finished design appropriate to busy sites. Its more urban appearance is out of place in wilder, more remote locations.

All-metal jetties of pontoon construction are also used in marinas. Hollow metal watertight boxes are the basic unit, with or without timber decking, and bolted together in various combinations, which can be expanded as demand increases if the lake can support the number of boats. This type of design is at the most urban range of the spectrum from the simple wooden structures described above, and is appropriate for the most gregarious locations.

Chapter Eleven

Wildlife viewing

One of the most exciting aspects of visiting the outdoors for many people is seeing wildlife, especially unusual or large mammals and birds. Sometimes driving along roads provides opportunities, as some animals use the verges to graze, or they cross roads *en route* from one place to another, and do not seem to be disturbed by the presence of vehicles. Birds of prey can be observed hunting along road edges for small mammals, taking carrion in the form of road kills and using utility poles and wires as perches.

Often road traffic hits and kills wildlife while large animals such as deer can inflict damage to vehicles and injury to passengers. Where scenic or tourist routes encourage wildlife viewing they should be protected from injury by traffic by a range of measures, such as wildlife warning signs for motorists, passages beneath the road to allow wildlife to cross the route in safety, fences and small roadside mirrors to reflect headlight beams off the road to warn wildlife at night.

Some drivers will stop and leave the vehicle to take photos of wildlife, which may not be so oblivious to the presence of a human as they might be of a car. Hence an attractive alternative is to view wildlife in more natural settings, in circumstances where there is no risk to the animals and birds or to the people who have come to look at them. Moreover, the hint of mystery and element of surprise on arriving at a place from which a herd of deer or bison or flocks of birds can be seen adds greatly to the experience of the visit.

Hide layout and design

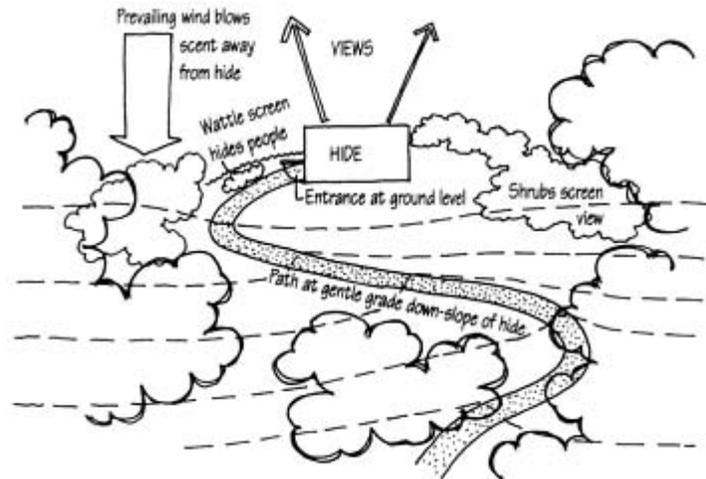
One of the best ways to identify and observe wildlife is from a hide where the approach is camouflaged and from which a good, clear view can be obtained. Benches to sit on, an aperture to look through, and the knowledge that the animals or birds are undisturbed by the human presence—all add to the enjoyment.

Many organizations have developed facilities to enable visitors to observe wildlife in this way. Occasionally the observation is also used to protect rare species, especially birds, during the nesting season. Thus visitors appreciate the sight of birds feeding their young and understand something of the need to protect them from egg thieves or unscrupulous hunters.

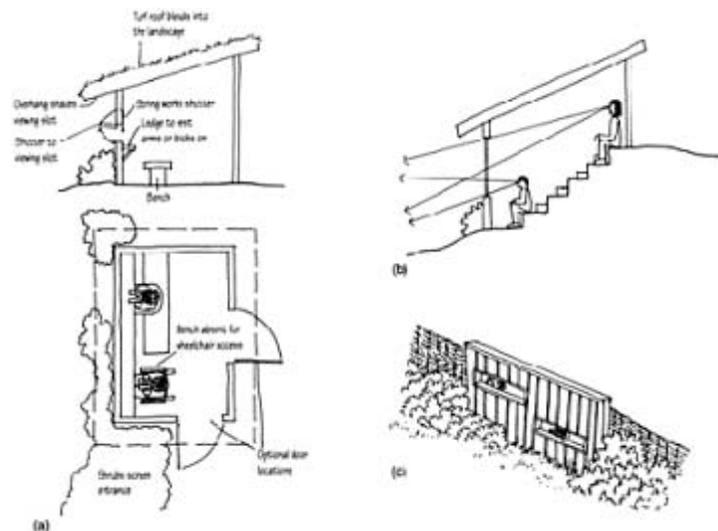
As with any facility, places for wildlife observation will need some design consideration and input. If the site is particularly attractive, large numbers of visitors might arrive to see breeding, migrating or overwintering birds or animals. Hence there might be a need for large-capacity hides, good paths, proper car parking and toilet facilities. All of these, except the hide, have been dealt with already. The design of the hide or observation point is the next thing to consider.

The approach to the observation point should be designed so that the visitor is downwind and out of sight. Landform can be used to ensure that the trail is below a ridge or behind a slope. Thick vegetation can also be used to screen the access, and is ideal in most cases. Screen fencing, preferably as a temporary measure, can be used to fill any gaps or to cover the last stretch before the hide itself. Woven hazel fencing or any visually opaque material taller than head height is satisfactory. If people with disabilities are to look at the wildlife, the approach path will have to take account of the gradient and the surface needed by them as well as the hidden approach.

In a simple form the hide can consist of a section of fence with viewing slots or holes through which people can look. The slots can be at different levels to permit use by smaller people, children or wheelchair users. If the hide can be orientated so that the sun is usually behind it, the wildlife will be front lit and easier to see and better to photograph. Lenses of binoculars or cameras will not catch the light and



A layout of a wildlife observation hide area, showing the factors that should be accounted for in the design.



Some considerations in wildlife observation hide design: (a) The layout of a simple hide with access for wheelchairs.

(b) A larger-capacity hide with tiered seats to accommodate bigger groups of people

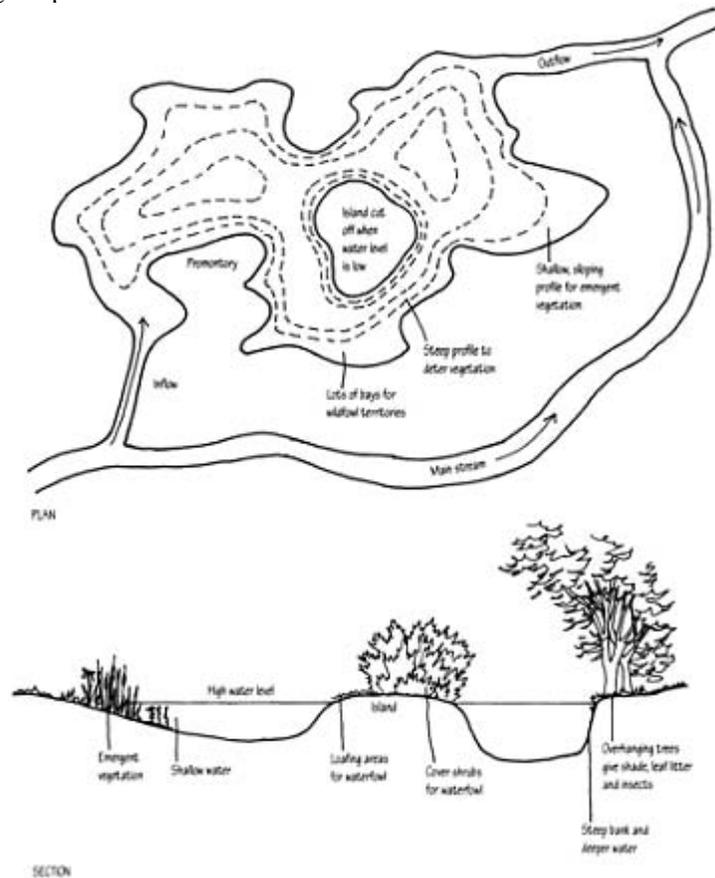
such as a school party or bus trip. (c) A simple hide made from a timber screen wall with viewing slots is cheap but effective.

alarm the wildlife, and the shady, back-lit face of the hide will be less obvious.

In order to be used all year and in all weathers an enclosed building should be constructed. A neutral, simple form that merges into the background will cause least intrusion. Often a wooden structure will suffice, either square, rectangular or polygonal in shape with a monopitch roof, perhaps covered in turf, thatch or branches, accessed from the rear either at ground level or from a gently graded ramp. Its capacity and sophistication should reflect the degree of use expected. If coachloads of ornithologists or school-children are regular visitors then a large building may be needed containing raked seating and a large window through which to see the wildlife. A big window means that the interior of the hide should be kept dark to avoid the sight of moving people. A screen or shutter can cover the window while people go in and out with a light on and then be opened to reveal the wildlife. An overhanging roof will ensure that shadow is cast over the window to keep it darker still. For winter observation in cold climates,

double glazing, insulation and heating may also be required. Benches and ledges to rest binoculars or cameras on will assist people staying to see more elusive wildlife. Posters showing the characteristics of the different wildlife can be put on the walls.

Aquatic wildlife such as fish can be viewed in several ways—from below or from above. There are examples of submerged structures equipped with windows of strong, thick glass through which views into the river or lake can be obtained. These are expensive to construct but they give an unusual and exciting view of fish from within their habitat. A boat with a clear plastic or toughened glass panel in the bottom of the hull is another method.

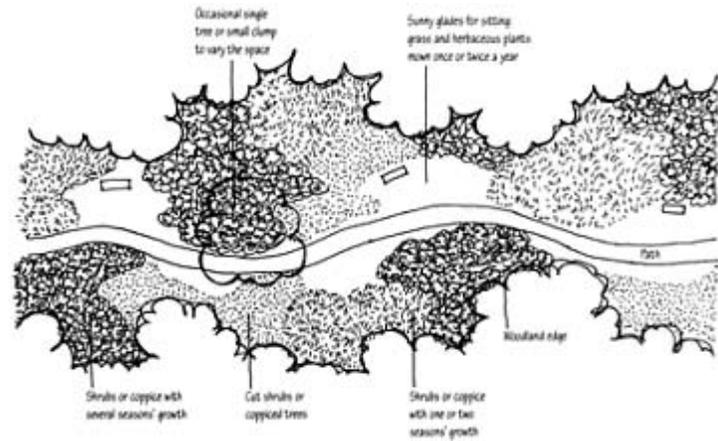


Considerations in the design of a pond to attract wildlife to an area. Variations in depth and edge shape are important in order to give a range of pond habitats.

Viewing platforms can also be constructed that jut out over a river or lake. In places where migratory fish come up to spawn the sight of thousands of salmon or sea trout can be awesome, especially as they try to jump up rapids, and such platforms give more people a better view. The kind described in Chapter 9 can be used for this purpose.

Design of wildlife areas

As well as bringing people to the wildlife it is possible to bring wildlife to the people. Areas can be developed into open glades, wetlands or ponds that attract deer, birds, butterflies and other wildlife. Such areas should be designed not just to provide good habitat but also to look as natural as possible.



A glade area with a path through it and a varied edge habitat developed to attract wildlife, particularly birds and butterflies.

Open glades in a forest, where sunny edge habitat, good quality forage, water and mineral licks are provided, can attract shy creatures such as deer regularly enough so that visitors have a high probability of seeing them. The edge design of such glades, their shape, size and the impact of management activities should be carefully considered. Irregularly shaped areas where the open space tends to be in the hollows among landform will often look more natural. For similar effects, groups of shrubs planted for browsing should be placed at irregular intervals and be of varied sizes, while trees pruned to let more light into the edge or to open up the edge for a view should have the height of the pruning level varied.

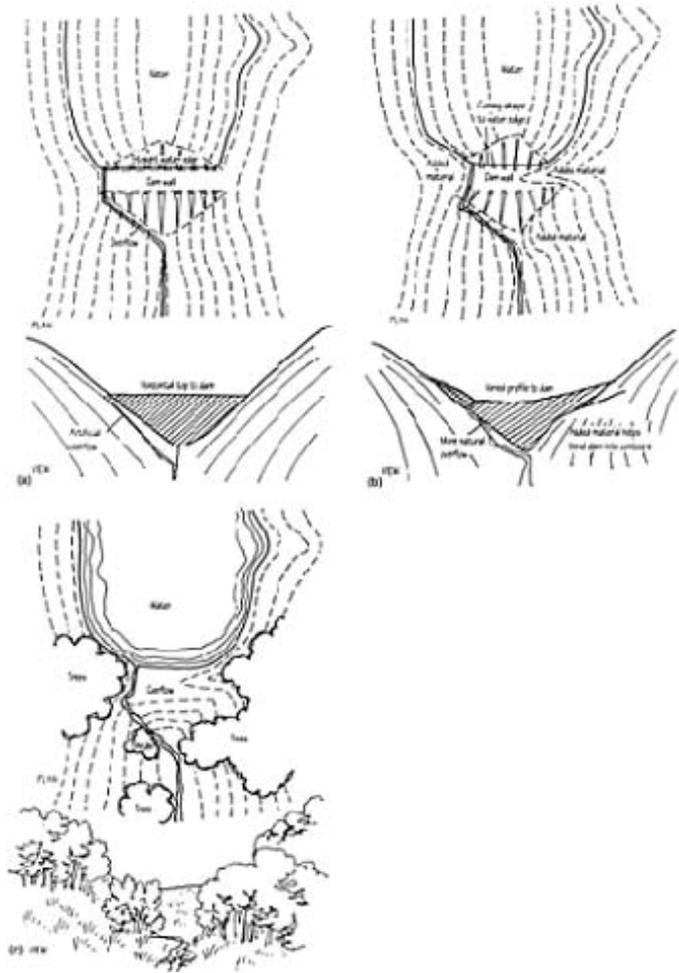
Glades in woodland can also be developed for butterflies and insects, which do not usually move away from humans like animals or birds do. Vegetation management is the key here. Edges of trees, patches of shrubs of different varieties and heights, herbaceous vegetation and grassy areas maintained on a cycle of cutting and mowing will provide the food plants of indigenous species for butterfly larvae and the nectar-giving flowers for the adults to feed on. The design of these glades can be developed by varying their width, the shape of the space and their direction to create wonderful linear habitats as part of a trail through the landscape.

Wetlands and ponds should be made to look natural with varying water levels, curvilinear shapes and graded edges to allow different vegetation types to be developed in different places. Irregularly shaped islands placed off centre in ponds will help to protect waterfowl from vermin. Bays and promontories will increase the territories available for different birds and add to the natural effect.

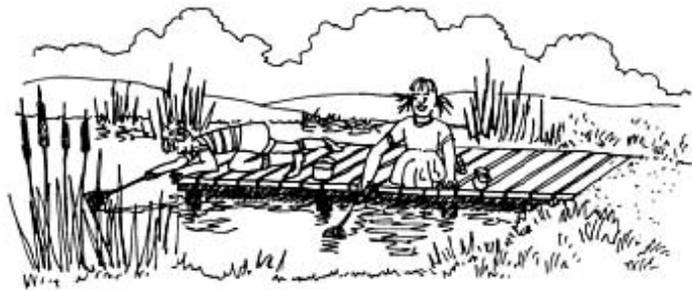
If dams are constructed to convert a stream into a wildlife pond these should be designed to blend into the surrounding landform as well as possible. Engineered, trapezoidal retaining walls stand out artificially in the scene, and should be modified with naturally shaped earth mounds and plenty of shrubs and trees.

Old gravel workings often make excellent habitats for a wide range of wildlife in areas close to cities, where excavation can leave well shaped areas that colonize quickly. Wildlife observation can go hand in hand with environmental education in these circumstances, particularly when schools are close by.

As well as the more obvious larger animals, birds and fish, viewing opportunities are possible for other wildlife. In wet areas small jetties can be erected from which pond dipping can take place. This allows children as part of education or play (see Chapter 8)



The design of dam walls for wildlife ponds needs care: (a) A basic dam wall with a symmetrical profile and flat top. (b) Earth has been added to the dam to vary its profile and to blend it into the nearby contours. (c) Vegetation on the parts with extra soil helps to blend it further into the surroundings, so long as the roots are prevented from damaging the clay core of the dam.



Small jetties can be extended over a pond to allow activities such as pond dipping to take place.

to see frogs, snails, newts, water beetles and small fish, which are just as useful and fascinating to study. Shallow places can be used for wading with nets for the same purposes.

Chapter Twelve

Design for overnight visitors

Previous chapters have concentrated on designing for visitors who go to an area primarily for a day trip and leave before the evening.

However, the outdoors can be particularly attractive at other times of day, especially at dawn and dusk. There is also something special about staying longer at a place, when there is time to know it better, to explore remote places and absorb the atmosphere. Nights spent in wild places, whether unrolling a sleeping bag beneath the stars, camping in a tent, a trailer caravan, a motor home or staying in a cabin can complete the sense of closeness to nature, extend the period of unwinding and relaxation, and permit more extended routes on foot, horseback, allterrain cycle, skis, boat or kayak to be explored. Some of the facilities needed for overnight stops— fireplaces, toilet blocks, horse corrals and shelters— were to some extent covered in the previous chapters. In this chapter the specific requirements of a night's stay in the outdoors will be discussed. Tents, touring caravans or camper vans/recreational vehicles and cabins will be covered. Static caravans could also be considered in a similar way to cabins in terms of the design considerations for their layout.

Desirable qualities for an overnight visit

Staying overnight in a wild, remote and scenic place offers a rather different experience from staying in a motel, hotel or bed and breakfast. Sometimes the discomforts associated with some forms of camping can be so acute— burnt and smoky food, biting insects, inadequate washing facilities, uncomfortable sleeping arrangements—that the experience of the outdoors must far outweigh these and the perception of home comforts available in more usual overnight accommodation.

Hence there are two key elements to the overnight experience. One is the level of home comforts to be provided, and the other is the quality of the setting and the atmosphere and its enjoyment.

Home comforts can increase with the type of accommodation available, but there can be a consequent reduction in the quality of setting, the atmosphere and its enjoyment. The Recreation Opportunity Spectrum tends to favour backpacking with a bedroll or small tent in the wildest areas to fit in with the setting of remoteness and lack of human presence, whereas trailer caravans and motor homes set in developed areas supplied with electrical hookups and on-board bathrooms would be more typical of less remote, more gregarious settings. At one end of the scale there is the added thrill or tension of being amongst wild animals, some dangerous to humans, while at the other the risk of attack is minimal.

Nevertheless there can be a wide range of experiences. Dispersed camping sites can mean that it is possible to be alone in a motor home and feel away from others, while at some busy backpacking sites campers can feel very crowded. Therefore it is important to design to sustain the qualities of being close to nature but not too close to other people.

The market demand should be assessed before deciding what to provide. It might be segmented, allowing different sites or different parts of the same site to be developed for different categories of user in varied ways. For example, backpack hikers are likely to seek a remote, wild experience where there is some element of self-reliance needed. Alternatively, they might have a low budget for their trip and wish to camp cheaply in a field by a farm that may be near to a pub or bar to visit for a refreshment. Remote long-distance trails in the Rockies of North America will suggest the former, the West Highland Way in Scotland the latter. There is nothing wrong with either, except that both markets should be catered for if possible.

Family groups may camp because they also seek a wilder experience, except that issues of vehicular access, safety and entertaining young children have to be accommodated. Camping has also traditionally been a cheap way for less well-off families to have a holiday or vacation, so that wildness may not necessarily be what they want. Families often prefer or will tolerate busier campsites, where they can mix with like-minded people and where the children can play easily and safely together while the adults socialize.

Trailer caravans may also attract a particular user group. In some places the users may return regularly to the same site and even the same pitch, spending several weeks there and meeting old friends from past years. This social side becomes difficult if the units are widely dispersed around a large area. There may also be another category of people who tour from place to place, staying one night at a site and then moving on. For them the social contacts outside the family or couple may well be secondary to the solitude and the variety of settings experienced.

Motor homes, because of their mobility, are most likely to be used by people who like to spend a fairly short time at one place. In the USA and Canada the biggest of these RVs (recreation vehicles) may be seen towing a car with a boat loaded on a roof rack. They stop at sites, and use the car for local expeditions and the boat to fish or sail on a nearby lake. Such a versatile vehicle requires plenty of space, and needs good roads.

Cabins, in contrast, can be owned by a family who use it for their vacations; or sites with a number of cabins may be built to be let or co-owned. In many places with lakes such as the Okanagan region of British Columbia almost every lake is ringed by cabin sites set down near the shore and tucked in amongst the trees. In Finland the recreational use of lakeside cabins is part of the national culture. Cabins for rent are increasingly popular. The quality of accommodation can be high, while the self-catering aspect attracts people, especially families, for whom eating in restaurants is too expensive or detracts from the experience. Cabins can be used all year round, and in some places such as ski resorts the high season is the winter; they provide the security of home comforts within an outdoor or wilder context.

A further user of camping facilities is the organized group such as the Scouts, Girl Scouts/Guides or other youth organizations. These offer youngsters the well-tried formula of fresh air, exercise, an introduction to nature, team building and pioneer skills such as open-air cooking, building things from materials found on the site, and exploring. As well as the supervision of large numbers of one age group there are requirements for segregating the sexes, formal activities such as parades, open-air services and separate areas for patrols or subgroups within the main camp area.

Camp layout and planning: general considerations

Observation of established campgrounds in various countries and locations suggests that there are different varieties of layout to suit different user groups. Sites can be designed to cater for one group or be varied so as to offer different settings to suit different preferences.

Open sites with free or flexible access

In much of Europe, especially Britain, the Netherlands, Denmark and Germany, more open campgrounds often seem to be preferred. The populations of these countries are high, space is at a premium, distances to sites are not great, wild or remote places are relatively rare, and more gregarious layouts seem to be acceptable. In Britain and the Netherlands, where woodland cover is quite low, open sites frequently cannot be avoided.

It is typical for a site to be laid out with an entrance road leading to a loop or series of loops from which access is freely available to pitch a tent or park a vehicle and caravan on a grassy surface. At peak times such sites can be very densely arranged. Open campfires are not usually found, and so most people bring gas stoves or charcoal barbecues for cooking. In partially wooded sites, such as the New Forest in the south of England, the trees help to disperse camping or caravan units and reduce the impact of a large site.

One advantage of open sites is the flexibility to increase densities at peak times if the users are tolerant of such close proximity. If use is dispersed at other times, parts of the site can be closed off to allow vegetation to recover or to reduce the area of the site to be maintained and supervised.

Open sites can be windy and exposed to external views, whence they may appear very unattractive. Planting of small trees or shrubs and the use of landform can lessen the wind and help to screen the impact of the site, as can the use of landform. Using the same techniques, the site can be broken down into smaller and pleasanter spaces with some increase in privacy. On the other hand, windy or at least breezy sites can be advantageous in insect-ridden places. Midges and other pests cannot fly in a stiff breeze, and the speedier drying of open sites after rain can further reduce their incidence as well as making the site drier underfoot.

As well as the tents, caravans or mobile homes, there will be other structures needed around the site, such as fire hydrants, extinguishers or sand buckets, taps or stand pipes, rubbish bins, grey water or chemical toilet disposal points, electrical hook-ups, information signs and ablution buildings. These will be more visible and potentially have greater visual impact on open sites. Enclosures or clusters of these facilities should be considered, and a comprehensive approach to their design should help lessen the impact and visually unify the site.

Spur sites with controlled vehicle access

In North America it is more common to disperse the camping around a site into individual or sometimes dual or family units well separated from their neighbours. A short spur is made off the loop access road, into which the trailer, motor home or car can be reversed. An area next to this is laid out as an open area equipped with a fireplace and table.

The setting for many but not all of these sites is forest or woodland, providing a strong sense of enclosure, screening from neighbours, increased privacy and reduced fire risk. Some sites are zoned into tent or trailer/RV areas. In the tent zones there are car spurs next to a prepared area that is level, well drained and smooth on which to pitch a tent. In the trailer caravan/RV zone the surfaced spur usually needs to be larger, and the open space does not need to be so level.

In Britain and Europe there are examples of woodland sites of a similar nature, but they do not seem to be as popular. This may be partly because people are not used to enclosed forests and so tend to favour more open landscapes. They might also be more worried about trees falling on their tent or vehicle.

Wooded sites offer shelter and shade, but they may also be more prone to biting insects, especially in damp, shady conditions during the summer months. The choice of site should try to avoid places where insects are a problem, such as low areas next to boggy or marshy ground.

Walk-in, boat-in or fly-in sites

Some campgrounds for tents only can be laid out so that there is no direct vehicle access to the pitches. A central car park is provided next to an open area or with walk-in loop trails leading to small clearings in which to pitch a tent. These give a slightly wilder feel than those where the tent is next to the car, but they do require all the equipment to be carried in. This type of site might be more attractive to people who travel light and prefer a more 'backwoodsy' atmosphere.

As well as campsites where vehicles are used for access, there are those on lakesides, where a number of campers arrive by boat or float plane. Although these are located in some of the remotest settings, the number of people attracted to the area justifies laying out a campground in order to reduce impact or pollution risks.

Pedestrian circulation

Pedestrian circulation around the site must be considered in the layout from the outset. Routes to toilet blocks, rubbish disposal points, to shorelines, trails, boat launch places or moorings and so on need reasonably direct access from various parts of the site without people interfering with the privacy of other pitches. The concept layout can be tested for possible route lines, and where possible conflicts occur the design can be adjusted.

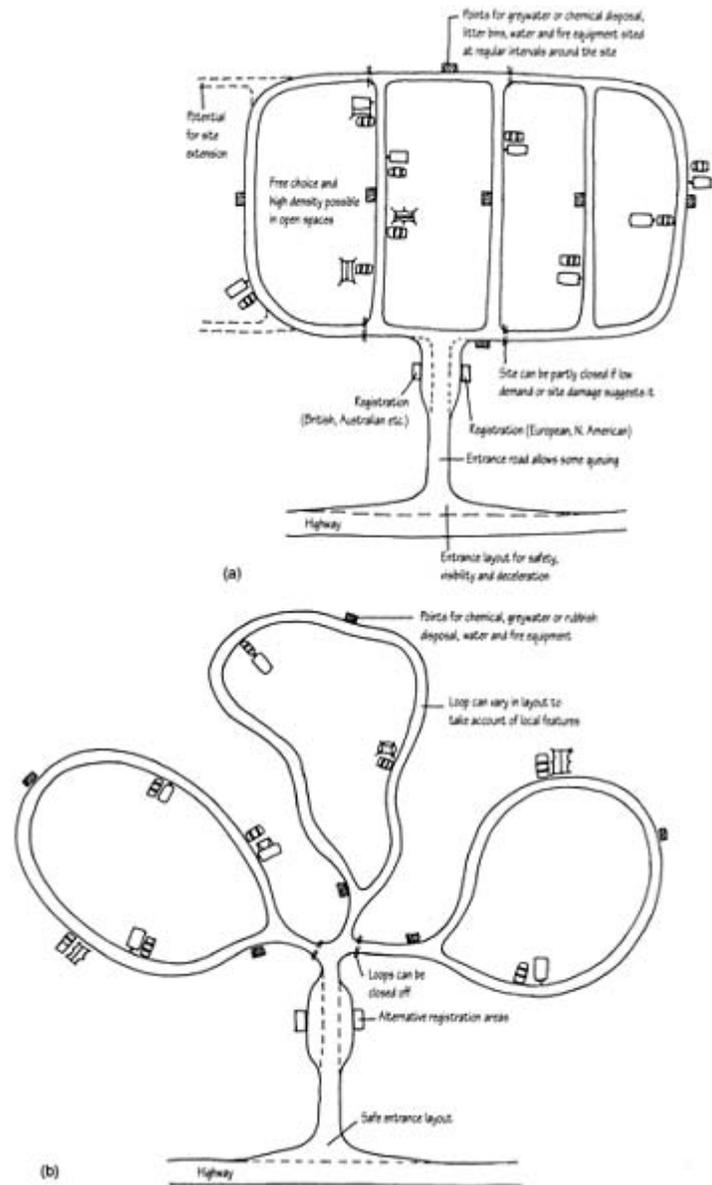
Vegetation, landform and water or wet areas can be used to help guide pedestrian use. Based on an agreed design, paths can be constructed and signs and information panels erected to help new arrivals to find their way around, particularly when the site is widely dispersed and views around it are curtailed by shrubs and trees.

Provision of facilities

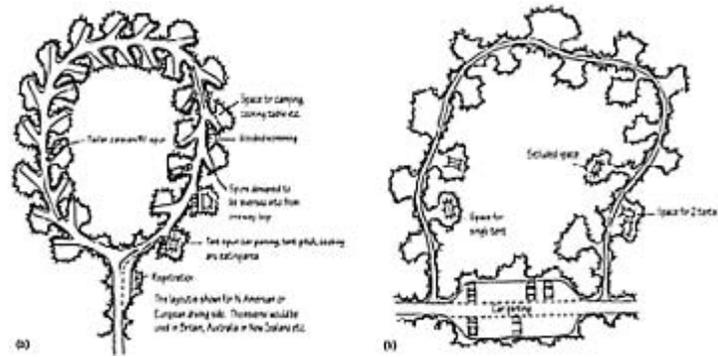
It may be necessary to provide a range of facilities at campsites. The level and type of provision will depend on the character of the campsite, the type of users it is aimed at, and its robustness. This may be related to the ROS, to national, state, provincial or local regulations concerning public health and fire safety, and the demand for various activities by the users.

Toilets

Most campsites for tents should be provided with toilet facilities. The type and the amount of provision should follow the same concepts and specifications as those described for toilet provision at day-use sites in Chapter 6. Any of the types described will suffice, depending on the size of the site. To minimize the distance that people have to walk to the toilets it may be better to erect several small blocks in key locations around a dispersed site instead of a large and more economical central block. There may also



(a) This typical layout used in many places, particularly by commercial operators, is efficient in using the ground. The vehicle circulation can be confusing, leading to some areas being over-filled and others left relatively empty, depending on whether spaces are allocated at registration or are freely chosen. (b) The same area can be laid out better as a series of self-contained loops leading from the main entrance. This layout also helps pedestrian circulation and the siting of toilets and ancillary fixtures.



Good examples of spur campsite layouts: (a) A one-way vehicle loop with spur areas set off at intervals. (b) A walk-in tent loop where parking is restricted to one area and tent spaces are spread out along a loop trail.

be regulations determining the maximum number of pitches per toilet block that can be provided.

Showers and laundry facilities

Buildings with toilets and showers in single-sex sections with a laundry room attached may also be provided. The design and layout can be based on some of the toilet designs, modified as necessary. Laundry facilities may be restricted to hand washing, or may include coin-operated washing machines. The latter may be appropriate if people are staying for any length of time and there are no alternative facilities within easy travelling distance of the site.

Community buildings

In many places where the weather can be unpredictable, a hall or community building can be provided to give campers a chance to keep warm and dry, to cook under a shelter or to meet other people. This can be a simple affair such as a shelter with a fireplace and some benches or a more sophisticated enclosed building with several rooms.

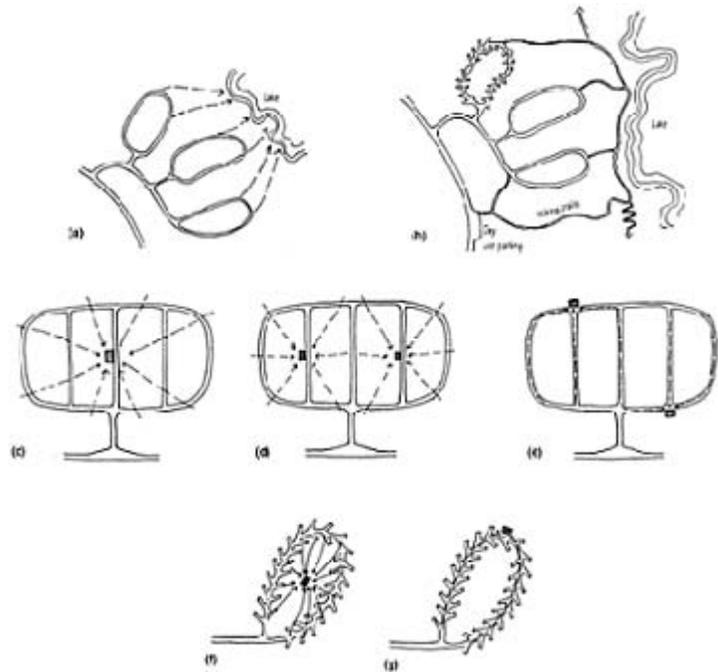
Any of these buildings, if provided, should be carefully sited and the camping loops/spurs so arranged to give the shortest route to the toilet blocks for pedestrians.

Other facilities

The same criteria of siting apply to water supply, litter bins, fire extinguishers and other safety equipment. If possible, the toilet block should act as the focus for positioning all these facilities so that drainage, litter collection, sewage pumping and other servicing needs can be achieved at one place with minimal travelling by service workers around the site. Furthermore, there may be office/shop buildings and storage to be considered at the entrance area to large, more commercially operated sites.

Campground layout design

Given the range of considerations described above, together with the requirements for daily activities at or near campgrounds, their design is a complex task. The layout should try to fit the desired number of camping or caravan pitches and the best vehicular and pedestrian circulation (separated if possible) into the landscape while accommodating the wide range of additional structures needed. Different landscapes will offer different possibilities, so a thorough survey is needed to establish the main features and limiting factors before design is undertaken:



Considerations for pedestrian circulation at campgrounds:

(a) Loops arranged at rightangles to an attraction such as a lake enable people to use the roads without crossing through campsites. However, this can put pressure on the nearest part of the lake shore.

(b) Separated day use with controlled circulation to provide access and site dispersion should be considered. (c) Circulation within an open site can cause problems where there is, for example, a central shower and toilet block. People will tend to take the shortest route, reducing privacy and security and possibly causing disturbance. (d) Two shower/toilet blocks reduce

the overall traffic but at possibly greater expense. However, the siting still causes similar problems to (c) even though all campers are equidistant from them. (e) In this layout the toilet/shower blocks are placed so that the roads are naturally the easier routes to follow. (f) Circulation problems can occur with spur layouts. Centrally located toilets or showers should be avoided for this reason. (g) Placing toilet/shower blocks at the end of the loop makes it easier to follow the road to them, and reduces impact elsewhere.



A campground community building based on a 1930s CCC design. It contains a large room with a generous fireplace. The log and rough stone construction is visually attractive and of extremely good workmanship.

– Slope and landform. Tents and caravan trailers need to be on a level surface wherever possible. Naturally level areas such as hollows or spurs in hilly places should be identified so that the pitches can take the fullest advantage of

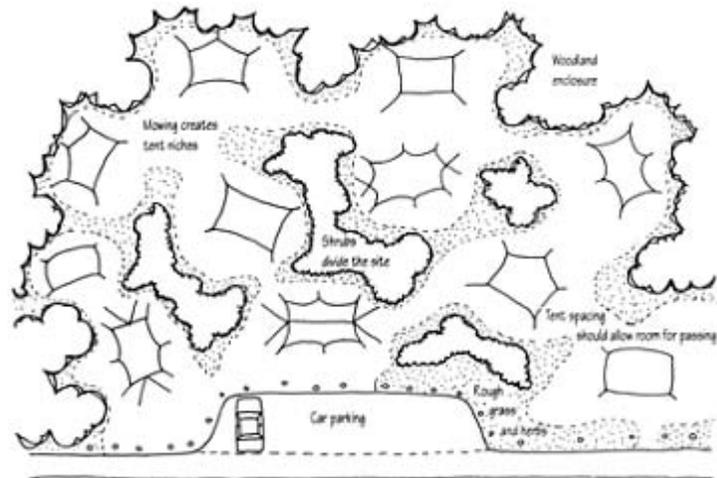
natural places and minimize excavation or filling of side slopes.

– **Drainage.** Wet areas breed insects and are unsuitable for tent camping, so the provision of some drainage might be desirable, especially if natural drainage has been disrupted by excavations for the roads, paths and pitches. Water may flow onto a pitch site unless cut-off drains are laid. Run-off from surfaced or cut areas collected in drains may carry silt into water-courses or lakes unless silt traps or soakaways are provided.

– **Trees and vegetation.** In more open sites, the existing surface vegetation such as grass may not be robust enough for heavy use, so that consideration should be given to alternative surfaces or vehicle control. Shrubs and trees with extra planting as required may offer ideal opportunities for screening to reduce the impact of the mass of tents or vehicles, separate pitches, create shelter or shade and guide circulation. The design concept for the site may be based around the opportunities provided by different vegetation types and the amount of enclosure they provide.

– **Linkages.** The various linkages into other parts of the campsite and its surroundings have to be established. If the site is near a feature such as a lake where there is significant day use it is often preferable to separate the two types of facility for access and parking. However, links from overnight and day use into a trail network could be worthwhile so long as day visitors do not become enmeshed in campground circulation and activities.

The whole site can be split into areas for different kinds of camping as described above, and can also take account of different landscape types within the overall site: flat versus hilly, open versus wooded, near attractions versus remote and so on. It is also



A layout for a tent area in an open site. Car parking is restricted to a central area. The site is divided into pitches separated by shrubs and rougher grass. This helps to give campers their own spaces. No fires are accommodated here, although it would be possible in a roomier layout.

possible to vary the character in terms of the degree of finish to the camping area to reflect the ROS ranges. This is also relevant in Britain and Europe, where different sites and diverse camping environments are difficult to obtain.

The detail of some layout designs for different environments and categories of users is now considered.

Open sites for tents

The ground needs to be level, reasonably smooth and with a good dense grassy sward. The soil should be freely draining, relatively easy to drive tent pegs into, and unlikely to stay wet or become muddy. Noise insulation is non-existent in tents, so some physical separation between pitches is desirable. Unless tent pitches are marked in some way, such as by a numbered post, or each place has its own fireplace or hearth, a practical way is to let people choose their own site. They will probably tend to select the widely spaced locations first and fill in until the space seems as full as it can be given the need for private space. Dividing the space up with irregularly shaped shrubs or trees will create more private feeling pitches for a given area.

Fireplaces of the circular 'campfire' variety can be provided for some or all of the pitches (see Chapter 7). Strict regulations about distances between pitch and campfire need to be indicated and implemented to avoid fire risks, as most tent materials are highly flammable.

The grass should be mown fairly regularly. This can also be used to demarcate pitch layouts, by mowing some

areas and leaving others to grow tall and thus deter camping.

The car parking design has two main options. Either cars drive to the pitches, so that tents can be pitched next to them, or else cars are parked at a central parking area around which the camping sites are arranged, and campers carry their equipment to their pitches. The latter option has several advantages: cars are confined and cannot spoil the surface in damp or wet weather; it is much quieter, as some campers can use their cars without disturbing nearby pitches.

Open sites for trailer caravans/tent-trailer s/R Vs

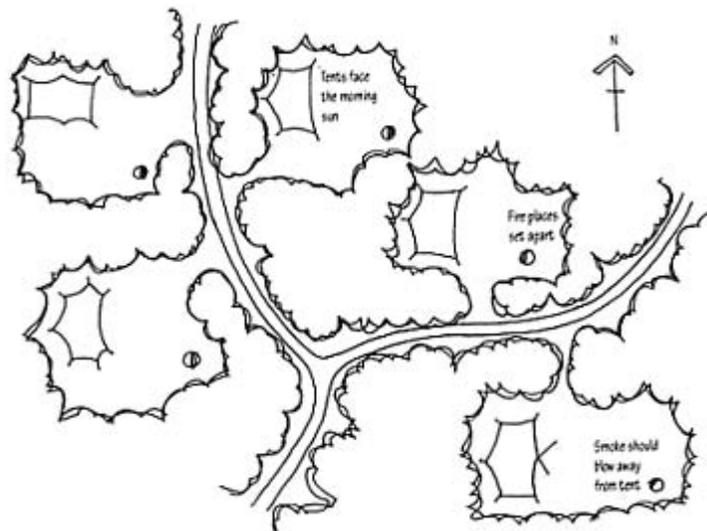
The sites should be laid out so that access roads in the form of loops have pitches set alongside them numbered with marker posts. The trailers or RVs are then reversed onto the grass at right angles or obliquely to the road at set distances. Where required, the area can be subdivided by trees and shrubs to create smaller spaces and to allow some small clusters of family groups to establish themselves.

One advantage of an open layout in Europe and Britain is that it can more easily cater for cars and trailer caravans, whose doors open on different sides depending on whether the vehicle is driven on the right or left-hand side of the road. Thus the layouts must be flexible in terms of space and orientation, for camping extensions to trailer caravans and the location of picnic tables or fireplaces.

Where electrical hook-ups are supplied, their number and position set the limit for the capacity of the area and the spacing for the pitches.

Spur sites for tents

In this layout there are three further options.



Thought should be given to the layout of tent sites within a loop. Here the pitches can face the morning sun; fireplaces are set apart to reduce fire risks to tents or vegetation, and to reduce the drift of smoke.

Loop road

The tent area is accessed by car from a loop road. Each pitch is provided with a parking spur. Next to this is a tent area, a picnic table and a fireplace. In the most primitive type the pitch can be an open space, a little distance from the car, cleared of stumps and stones, and with a grassy surface. Logs can be provided as simple benches, and a circle of boulders for a hearth. A slightly more improved variety can be given a better surface, nearer to the car, with a hearth equipped with a grill or kettle hook and a sturdy bench. A further upgrade could have special pitches of level, smooth surface provided with a steel hoop fireplace or a steel altar fire and a picnic table. Toilets, showers, water and rubbish disposal will be concentrated at a focal point of one or more loops.

Central parking

Cars are left at a central parking area and campers walk into the camping area carrying their kit. The pitches are sparsely equipped ones, as described in the first option above. Small paths lead from the main trail into secluded spaces where trees and shrubs come close to the tent, providing effective separation between units in terms of sight and sound. Rubbish is either taken out completely or left at a receptacle by the car park, where a standpipe and vault toilet will also be provided.

This layout is also suitable for those remote camping areas where access is by boat or float plane. Instead of the car parking area there is a jetty, or else use is made of a gently shelving beach.

This option is likely to be more suited for those people seeking a quieter, more solitary, wilder experience, and who do not require so much equipment.

Camping shelters

Instead of tents, wooded sites can be equipped with open-fronted camping shelters. These are constructed from timber with asymmetrically pitched roofs. They have a wooden floor, and are raised off the ground. In front of the open side is placed the campfire. In the USA these are often called 'Adirondack' shelters after their origins in the Adirondack Mountains of New York State.

Spur sites for trailer caravans/camper vans/RVs

This layout is similar to that for tent spurs accessed by car, except that the spur has to be longer to accommodate the larger vehicle combinations, but adjoining space does not have to be so large or so flat. Spurs must have gentler gradients, and should be set out to be reversed into at an oblique angle to a one-way loop, or be arranged parallel to the road to allow vehicles to pull through them to leave. Because of the increased length, extra cut and fill may be necessary on steeper or more variable terrain, and so careful surveying of sites is prudent.

In North America all camping spurs of this kind can be arranged so that the caravan/trailer/RV doors open onto the picnic and fireplace clearing or access to it. In Britain and Europe, because of the variations in position of doors on vehicles, spurs should have sufficient width for the vehicle to be parked more to one side than another for convenient access to surrounding and larger open spaces.

Each spur can be fitted with an electrical hook-up. The loop arrangements make cable routing much easier than with more randomly spread trailer caravan sites. Grey water and chemical toilet disposal points can be located at the entrance to the trailer loop, where access is easier both for campers to pump out their units and for maintenance staff to pump out the collecting cisterns. The same criteria apply for rubbish disposal and collection.

Spur sites of all types are particularly well suited to wooded landscapes, where they gain most visual separation from one another, and where the forest floor is unsuited to free access by vehicle. The quantity of surfacing can look very intrusive in open sites, although this might be necessary to prevent too much site wear and tear.

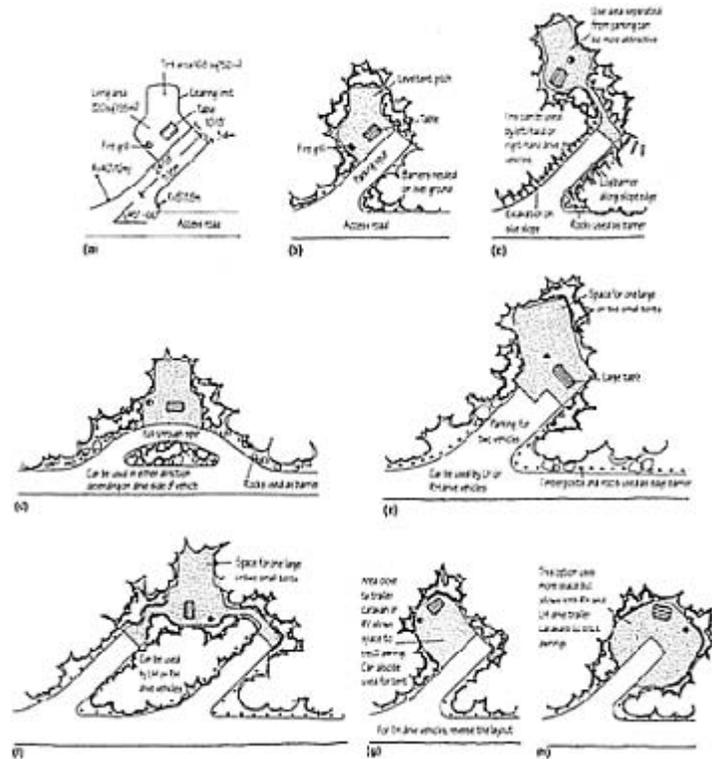
Youth camping sites

These generally need more open space. If they are not of the primitive variety where the group rents a field from a farmer, digs its own latrines and so on, then a central parking and administrative area with toilets and showers or several small units of these are provided. Larger spaces near these and separated from one another permit each patrol or other subgroup to pitch their tents in a cluster. A central larger area is needed for group activities. This should be arranged for easy access from tents, vehicular access and parking. With children participating in active games, good access for emergency purposes is essential. Spaces must have good separation between cooking fires and tents, which also allow the formation of large campfire circles for the evening storytelling and singing that is a tradition.

As large, relatively level open areas may be difficult to find in some places, it may be advantageous to develop and maintain permanent youth campsites in suitable locations.

Design of campsite utilities

Fire equipment, disposal points for water, chemicals and rubbish, maps of spur and numbering layout, phones, bulletin boards and other signs and artefacts are usually needed. All of this can be unsightly if not designed to look simple, unified and in keeping with the setting. The sites for such artefacts should be chosen where they can be tied into the landscape. A clump of trees, a wall, a dense area of shrubs or a rocky bank can all provide suitable backgrounds. A fence or enclosing structure can help to integrate and screen many of the more unsightly facilities, while access to them is maintained.



A series of camping spur layout designs: (a) General dimensions and road geometry for parking at a camping spur (left-hand drive vehicles.) (b) A design for level ground. (c) On side slopes some excavation may be needed. The camping/picnic area has been placed a little distance away from parking to take advantage of the setting. (d) A pull-through spur parallel to the access road may be better on steeper side slopes, to reduce excavation. (e) Two vehicles and two tents are accommodated for a larger family in this design. (f)

Another design for two cars and one large or two small tents. This layout can be used for righthand or left-hand drive vehicles. (g) In this layout the table and fire are set away so that an awning can be erected for a trailer caravan or RV. (h) This design allows caravans or RVs of left-hand or right-hand drive to be accommodated, together with awnings or extensions.



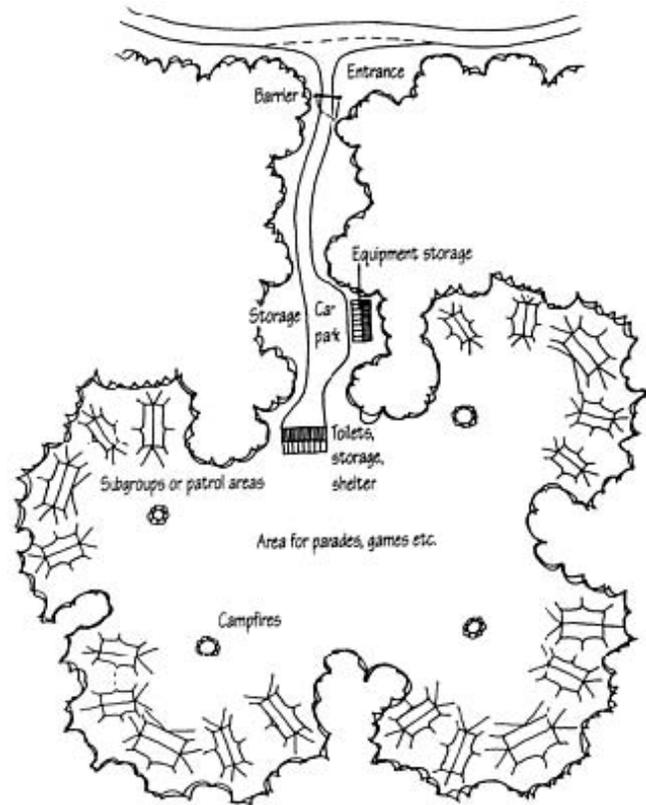
This design for a large layout shows how terrain and vegetation can be used to provide a range of open and wooded sites for caravans/RVs or tents, together with a day-use area. Sensitive or difficult areas have been avoided, and circulation for pedestrians and vehicles has been organized.

Access for people with disabilities

Like other forms of recreation, as many camping areas as possible should be designed to be barrier free and offer universal access. This is easy on flatter sites, where tent pitches or trailer-parking areas can be on the same level as the paths, picnic tables, fires and other facilities. On more sloping sites a proportion of pitches should be levelled and have access paths that conform to the gradient requirement described in Chapter 9. A choice of experience should be offered, from the wildest to the most well equipped, just like any other site. Parking spurs usually need more space around them to facilitate the manoeuvring of special equipment.

Other buildings

As well as the requirements for services described above there may be other buildings needed on the campsite, such as entrance station and office buildings for administration, maintenance and fee collection. Occasionally shops are provided (often let to concessionaires). In all cases the layout of the site entrance should allow for new arrivals to pull over to register, pay fees and collect information while permitting other campers to drive in and out. If there is more than one building they should be grouped and built to similar styles appropriate to the setting. If toilet, shower and laundry blocks are also provided, all of the buildings on the site should be designed as part of a family, using the same kinds of forms, materials and colours to ensure that unity is maintained. Trees, shrubs and other vegetation can be used to tie buildings further into the landscape.



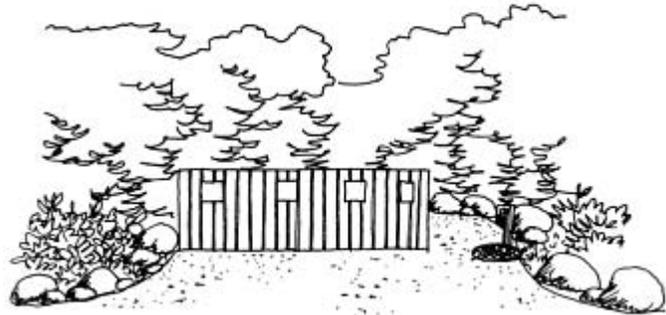
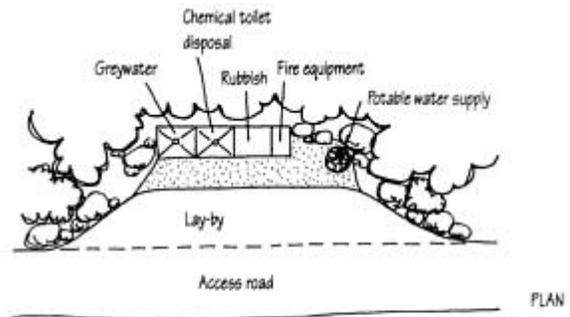
*A layout for a youth camping area
(suitable for scouts, church
groups etc.).*

Case study: Lost Lake Campground,

Mount Hood National Forest, Oregon

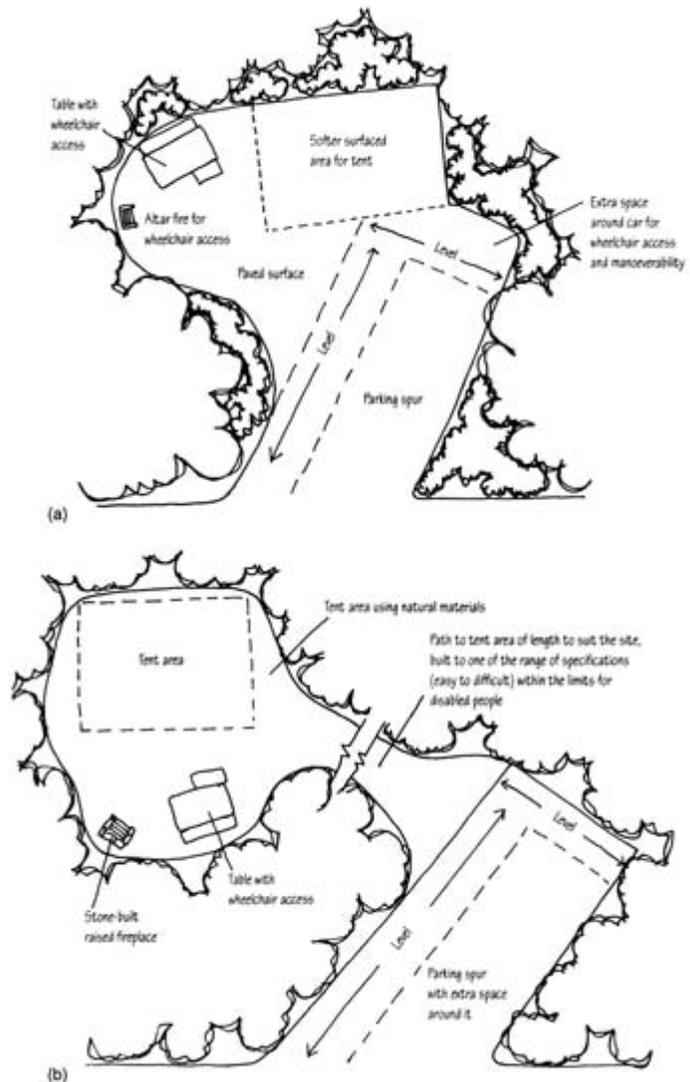
In order to demonstrate some of the design concepts and principles described above it is useful to look at a recent example. Like so much recreation design in recent times it involves major refurbishment and reconstruction rather than a completely new development.

Lost Lake Campground started life a long time ago in 1916. Prior to road access in the early 1920s, people took a train to the village of Dee, and then hiked 13 miles (21km) into Lost Lake. In those days



A design for campsite utilities such as fire equipment, water, litter, grey water and chemical toilet disposal arranged into a neat enclosure provided with a lay-by and surfaced access. Trees and shrubs help to screen it, although the tidy design would also work in open sites.

people sometimes drove cars, but more often they rode horses into the forest. As the location was relatively near the city of Portland with a growing urban population, and as road access improved, popular access to the recently established National Forest was in quite high demand. The campground originally comprised an access road with some fairly primitive sites for backwoods-type camping. Fishing and boating on the lake provided the main attraction to both day visitors and campers.



Some spur layouts to permit camping by people with disabilities:

(a) A design for a campsite in a highly developed area. (b) A design for a wilder, remoter area with vehicle access.

As time went on use gradually expanded. Trailer caravans and RVs were introduced in the 1960s, and the number of pitches gradually grew. Nothing was consciously designed. Available areas away from the roads were developed into parking spurs with little thought for site degradation. The east lakeshore became overdeveloped and worn out by the early 1980s, with camping extending all along it. There were 87 pitches with still rising demand, while the concessionary site operator wanted more capacity to give better viability. As well as the camper use there was increasing day visitor demand, which was mixed into the site and which needed some management. The US Forest Service realized that a major refurbishment was overdue, and a team of landscape architects and other Forest Service staff were appointed to the task.

The extent of the campground is limited. It is a generally forested area occupying a bench between Lost Lake and a volcanic cone (Lost Lake Butte). With variable terrain but a general 13% side slope the linear nature of the site parallel to the lakeshore provided challenges to the designers. The only really flat area is heavily forested with old growth cedar and fir, wet and unsuitable for development. Much of the area, particularly at lower levels, is fragile and easily eroded.

A survey of the site and an analysis of constraints and opportunities led to the crucial design decision to separate day use, concentrated on the lakeshore, from the camping by moving much of the latter up the slope away from the most fragile areas, which would be subsequently restored with native vegetation. The survey identified a paved, under-utilized logging road running along the slope some way above the original campground. This offered an

opportunity to become the new main access road from which other loops for camping could be developed where the terrain and drainage permitted.

The design concept separated car-accessed tent camping from trailers and RVs, and these from walk-in or cycle-in camping. Loops were then designed for the different requirements and camping spurs fitted along each of them. The remoter area chosen to be developed was naturally more resilient than the original area but nevertheless drainage had to be carefully developed. To avoid disrupting the natural drainage pattern some of the roads were constructed on a permeable base on top of which was placed a filter fabric overlaid with gravel and asphalt. Thus the water is able to percolate beneath the roads without having to be collected in ditches and culverted under them. This allows downslope trees to receive the same water as before construction.

A new water supply also had to be provided. The pipe layout generally follows the road system. Water is pumped from the lake, filtered and stored in a tank above the campground. Sewage disposal utilizes state-of-the-art SST facilities (sweet smelling toilets). These are simple vault toilets in which waste is collected in a holding tank, later being pumped into a 'honey' lorry for transport to the municipal treatment plant 24 miles (38km) away.

As the access loops had to run parallel with the contours as far as possible, most of the camping spurs had to be built by cutting into or filling out the side slopes. Once the road alignments were marked out on the ground the designers identified each spur on the ground so that the best fit into the landscape could be achieved. If the slope was too steep for a reverse-in spur a pull-through one parallel to the road was used. Terracing retained with local rock and horizontal logs was used to reduce cut or fill for the tent bases and fireplace areas. For barrier-free spurs the flattest sites were chosen with the easiest grades. The goal was to have 25% of campsites meeting barrier-free standards. Each spur site was carefully designed with details of retaining rockwork, paths and steps, trees and existing logs to be retained and fireplaces agreed before construction took place. Use areas were surfaced with compacted, fine gravel to prevent soil erosion.

Once the design for the layout was finalized the toilets were located, a path network for campers to the lake was fitted in, and a vehicle and pedestrian sign layout was executed to ensure that the minimum number of signs was used for the needs of the site. Signs were professionally designed, and constructed as routed letters in solid redwood panels, selected for their visual qualities and long life.

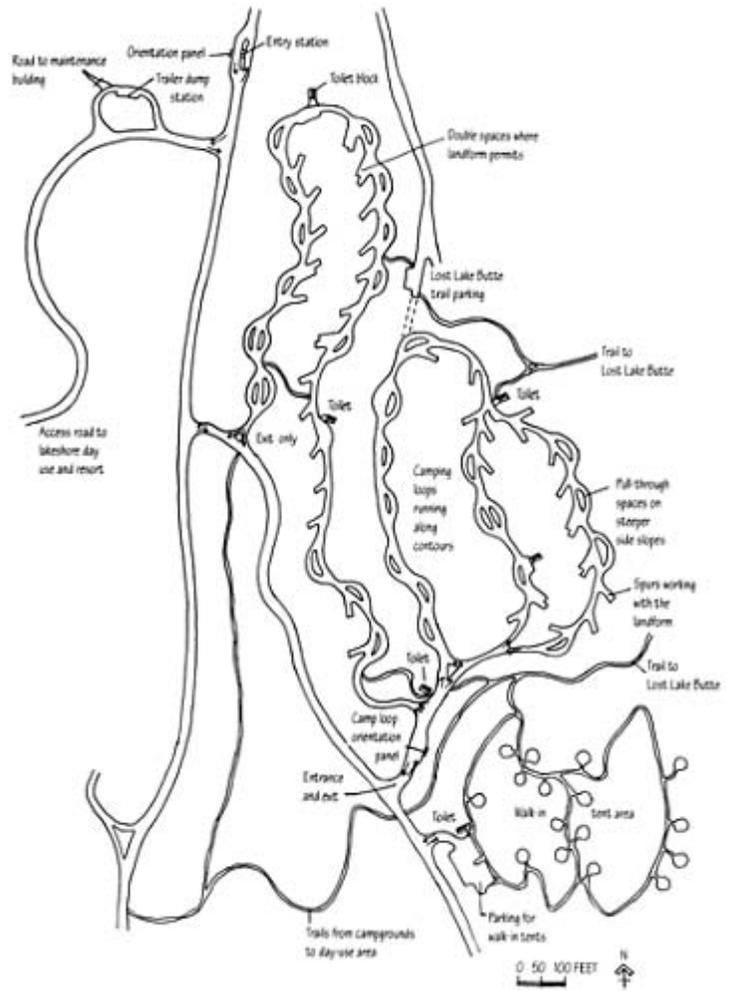
As well as the camp area construction the abandoned spurs and access roads were restored and re-vegetated using plants native to the site. Plants were salvaged from areas to be developed and stored on site in special 'capillary' beds. Other plants were propagated from cuttings or seed. On the day-use area the eroding lakeshore was stabilized, along with other improvement measures. The design was constructed over several phases as new areas were opened and old ones were removed and re-vegetated. In 1994 the site was commended by the American Society of Landscape Architects.

Cabin sites

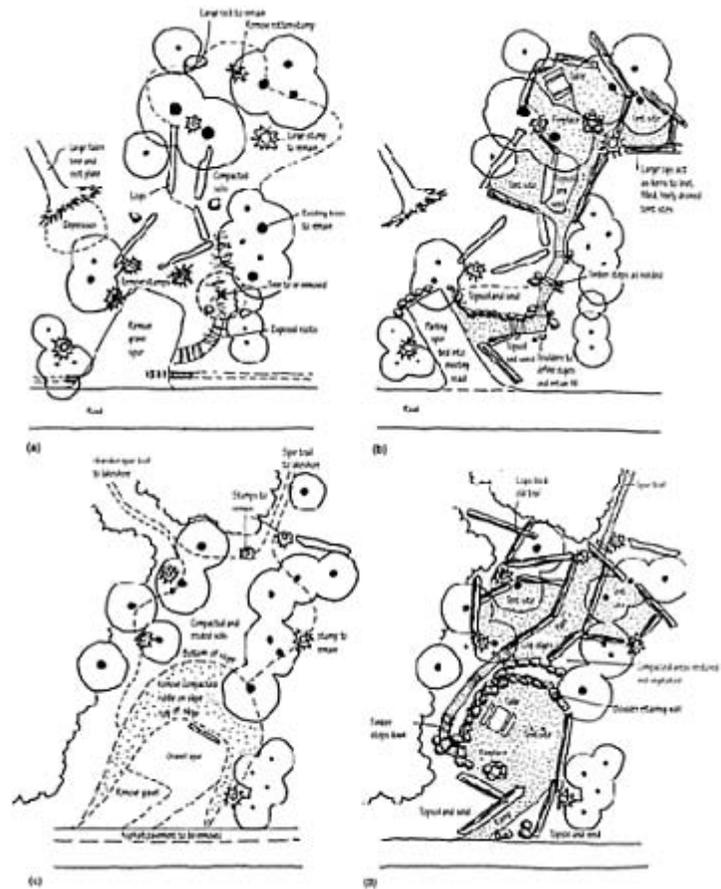
The next type of overnight accommodation to be considered is the cabin or chalet. Their layout and design should combine some of the elements of the various buildings so far discussed in this book together with many aspects related to campground design. This section will concentrate on the position and layout of a site, and the external form and design of cabins, rather than the internal design and detailed architectural aspects of construction.

Position

Whether one cabin or a series of cabins is built their position in the landscape is of prime importance. occupier of a cabin is likely to expect a view out to the landscape. The wild and scenic qualities of the site may depend on the perceived lack of human intrusion, which the sight of groups of buildings might compromise. Service provision may be needed, which introduces other elements depending on the location.



The new layout at Lost Lake Campground showing the various camping loops, linkages with the lake and trails, and the strategic siting of toilet provision.



Spur designs at Lost Lake Campground: (a) A typical spur before redesign, badly worn and ill defined. (b) The new spur above the road with the tent sites set above, surfacing bounded by logs and accessed by a short trail. Some areas have been restored to native vegetation.

(c) A downhill spur before redesign, dominated by the compacted rubble used to build up the parking. (d) The new design removes the parking in favour of a walk in spur, and provides several tent sites suitable for group use dispersed on two levels. Rocks are used to retain the slope, and logs provide edgings.

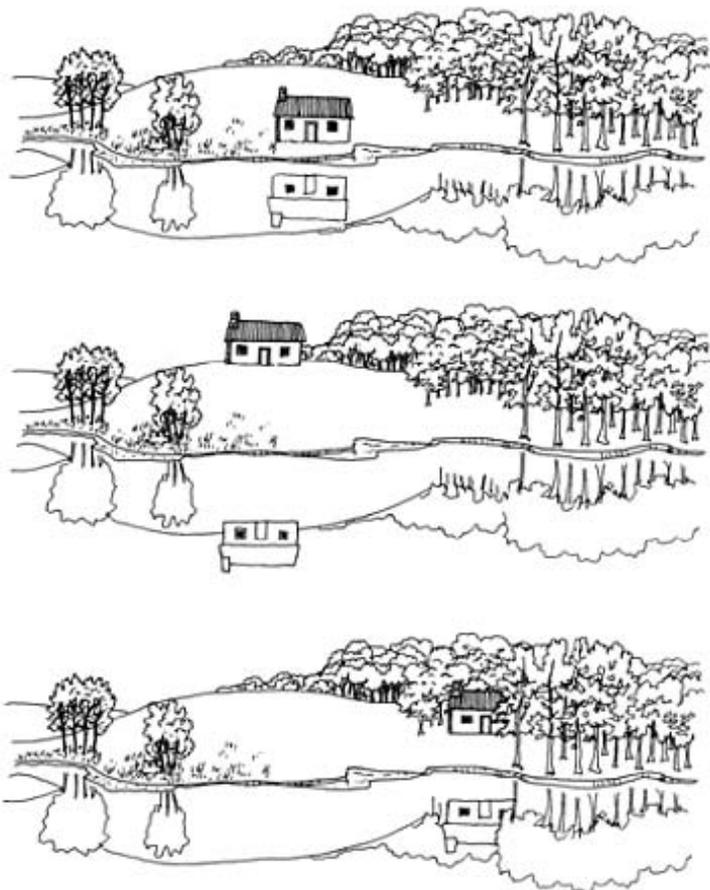


One of the redesigned sites at Lost Lake Campground, showing how the detailed aspects fit the site well. (Courtesy Dean Apostol)



A site containing several small timber cabins set around an open area. This is a high-density layout, which some people find acceptable. Amsterdamse Bos, Holland.

If a single cabin is considered then the task is easier, The more primitive cabins with no electricity, with a composting toilet and water



Siting of a single cabin: (a) Shows the cabin near the water's edge, where it dominates the open space. (b) Shows how siting on the skyline creates a very focal view. (c) Shows an example set into the edge of trees so that it is much less intrusive, and does not dominate the landscape.

obtained from a well, spring, river or lake can offer a very significant contrast with the modern world. The location may depend on foot or boat access, and so a position should be chosen that makes use of the local terrain for shelter, sunshine, nearness to water and the access point while avoiding sensitive vegetation, or site excavation. This may entail a detailed search within the possible area. Local materials together with some that are brought in can be used to construct a cabin that should appear to be part of the landscape.

Many people's weekend cabins are likely to be more sophisticated. Running water is probably needed. Vehicle access will be desirable for the delivery of equipment and stores as well as for emergency access if the location is an

area of fire risk in dry conditions. All this implies a more developed site. Extensive use should be made of natural terrain



A site where felt-roofed log cabins are arranged loosely in a predominantly open landscape. This is not so densely arranged as the Dutch example, but there is a lot of intervisibility between the cabins, which is only partly broken up by the trees on the site. Strathyre Forest, Scotland.

and vegetation to screen and blend the cabin into the landscape. In most cases, a cabin position either parallel or at right angles to the contour or landform will provide a satisfactory visual relationship. In damper climates the cabin can be set amongst trees that are thinned to let light in but are kept close to the walls. In drier climates a more open area is desirable to reduce the risk of fire.

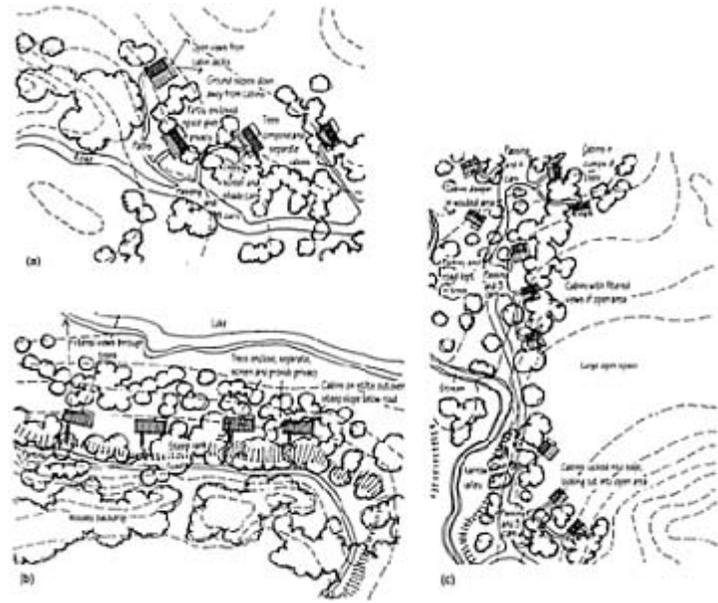
If flush toilets are required the location of sites for septic tanks needs to be identified (see Chapter 6) This may limit the choice of sites within the area.

Frequently people want to build their cabin close to a lake or the sea shore. Shoreline vegetation, especially on sand-dunes, tends to be extremely fragile, so that cabin construction, access tracks and disturbance of slow-colonizing plants can have a serious impact on the whole area. Sites should be chosen where the surrounding vegetation is robust and where the ground conditions are less likely to erode.

Site layout

Where several cabins are to be built as part of a commercial venture, where they are rented to people on holiday or vacation, their siting becomes more complex. A comprehensive site layout plan is needed. As with campgrounds, the cabins should normally be dispersed around the site and accessed from one or more loop roads. Short spurs can be made to a parking area next to the cabin, or small parking clusters can be provided from which paths lead to several cabins. This is convenient for services to minimize pipe runs for water, sewage and the number of septic tanks required. Electricity transmission lines should be underground wherever feasible.

In more open sites scattered cabins can look chaotic, so a layout clustering them can resolve this problem. In addition, the position of the cabins relative to landform and to each other requires more use of architectural relationships in the grouping,



Three examples of cabin layouts taken from a design at Loch Awe side, Scotland, built by the Forestry Commission: (a) A cluster of cabins (three of one style and one of another) arranged asymmetrically amongst trees on a gentle slope. The parking and access is behind the cabins, and each cabin has an attractive view and a degree of privacy created by the orientation of the cabins and the use of trees. (b) A linear arrangement along a steep slope overlooking the loch (lake). The fronts of cabins are supported by stilts, giving them a dramatic location and spectacular views filtered through gaps in the trees. (c) Cabins arranged in loose clusters in or on the edge of woodland and a large open space. Some are right on the edge, some in the edge with filtered views, others more privately fitted in amongst the trees.

angles, enclosure and regularity of the cabins, especially to improve views into the site from outside. To some extent this may compromise privacy or a sense of wilderness.

Once the main functional and practical issues have been analysed the site should be examined for the qualities that different spaces have to offer. Woodland or forest edge sites opening on to sunny



This cabin site layout demonstrates the design and management requirements to minimize fire risk and to allow for fighting any fires that do occur.

areas may be popular. The woodland gives privacy and screening while the views out are open and the space offers

opportunities to watch wildlife or for children to play. Places overlooking water are always attractive, so sites permitting views while also protecting the area (see above) should be chosen. Deeper woodland or forest might be the preferred choice of other people seeking more solitude, so that the layout design should take the opportunity to provide as wide a range of locational experiences as possible.

The layout should be planned in such a way that vehicular access, parking and service requirements such as rubbish bins are behind each cabin and partly screened. This will ensure that views out are not impeded and that views into the site will not be spoiled by the clutter of cars or bins.

In dry forests or other places where fires are a hazard the whole site should incorporate a range of fire prevention measures. These include the following.

- Access to a lake, stream or other water source should be provided for fire engines or tankers. This should be kept clear and not used as a boat launch or for car parking.



A well-designed traditional squared log cabin built to modern insulation standards. It is equipped for use by people with disabilities, and has an access ladder to the roof in case of fire. It is set amongst a pine forest of open character and stained a dull colour in order to fit in visually. Ruunaa National Hiking Area, Finland.

- Nearby day-use areas and outdoor fireplaces at the cabins should be laid out so as to avoid the spread of fire. A buffer zone free of flammable materials should be maintained around each cabin.
- There should be more than one access in and out of the site; or loop and roads and bridges should be designed to take the weight of fire trucks.
- A fire break around the perimeter of the cabin site area will help to reduce the risk of fires spreading in from outside. This should be a linear zone, which is shaded and kept clear of dead vegetation. Naturally non-flammable areas such as bare rock and water should be incorporated where possible.
- The cabins should incorporate non-flammable materials and be designed to limit the places where flammable debris can collect. Wood can be treated with fire retardant, although large-dimension timbers do not burn very quickly. Access onto the roof should be provided so that it can be swept and inspected, while chimneys should be fitted with caps and screens to prevent sparks escaping or birds from building nests in them. A large barrel of water and a bucket should be provided where no pressurized water is available as a useful emergency supply.

Cabin design

Although detailed architectural issues are not being considered, the external appearance, style of building and use of materials is of interest in terms of the ambience created and the impact on the landscape. Most cabins will be made of natural materials, predominantly wood, perhaps with stone in places and other materials as appropriate.

There are two main varieties: log construction or frame construction.

Log construction

This type can range from the primitive pioneer-type cabin made of rough logs to more sophisticated versions where the logs are machined to fit together snugly and present a more finished and weatherproofed result. The rustic, primitive varieties will fit better into more remote, forested locations.

Logs can also be laid horizontally on top of one another, overlapping the ends of logs for stability, and intersected at the corners. This type of construction leads to a particular kind of structure with a horizontal emphasis, coarse texture and prominent corners formed by the intersections. They tend to have low-pitched roofs with wide overhangs, which cast deep shadows and help the cabin to hug the ground.

Because of its prominence the roof finish is often the most critical part of the design. Traditionally wooden shingles (shakes) or overlapping boards are used, and if treated with preservative these last a reasonable time. Asphalt sheeting or tiles have a very smooth texture and can look too finished for the wilder locations, but profiled steel sheet with a dark colour is acceptable (see Chapter 6). Sometimes turf can be used, which gives a very

interesting texture and colour.

Logs should be peeled, large in dimensions to reflect the scale of the landscape, and either allowed to weather to silvery grey or stained an appropriate colour. In Finland, logs from trees that have died, the bark flaked off and the wood weathered silver, are highly sought after for cabin construction. Their texture and colour, as well as their stable, naturally dry condition, make them ideal for cabin construction.

The machined logs are modern versions of the traditional hand-squared logs used in many places. They give more regular dimensions, so that each cabin can be built easily and more cheaply—an important consideration at a commercial site. The timber can be treated against rot and fire, and even the jointing between logs gives a more weatherproof seal. The pattern created by the jointing of overlapping logs should have some regularity, as complete randomness can cause visual confusion. The jointing patterns used in masonry, such as stretcher bond, can also be applied to log or sawn board walls. These designs are more appropriate in a less wild or rural area.

If the cabin is built on irregular ground a level base will be needed. Natural stone should normally be used to make this, rather than exposed concrete or brick. Alternatively a timber frame can be built on steeper ground to avoid cut or fill altogether and provide a more elevated view from the windows or balcony.

Frame construction

Frame construction using sawn timber clad onto a timber frame looks more finished than the machined logs and may fit some landscapes, such as in Britain, where log construction is not traditional. The design of the cabin need not follow a traditional or domestic form, and can be of more neutral, asymmetric forms such as intersecting monopitches. A-frames can also be interesting and contrast with everyday residential landscapes. Trees, landforms or other natural features can be the source of inspiration for their design. Overhanging roofs, balconies or decks, cabins on stilts jutting out over steep slopes or water are all features that can be accommodated in appropriate places.

The external finish of the cabin should, as above, reflect the textures and colours of the landscape so that their impact is lessened. Vertical board-on-board cladding of rough sawn, left-to-weather timber looks excellent. Clapboard is more traditional in some places but is normally painted or stained, not left to weather. Shingle or profile steel roofs also give texture.

Shadows cast by deep bargeboards and a dark stain for the roof help to give the cabin visual weight and reduce its apparent size and reflectivity, thus reducing its impact both on the site and in the wider landscape. Window frames and doors can be given a brighter colour to provide an accent.

Frame cabins are an easier form of construction if large expanses of glass are wanted to let more light in, to give wider views out and to merge the inside with the outside. Fine mesh screens to all windows, doors and ventilation apertures should be fitted to prevent biting insects from getting into the cabin.

Decks, porches, balconies or other sitting out or eating areas can greatly increase the opportunities for inside/outside living, perhaps in conjunction with french windows as suggested above. Given that many cabin sites are on uneven ground, the most of this can be made for decks protruding out over sloping ground. The landform and site can also be used to take advantage of breezes to help keep biting insects away, although in extreme conditions fans may be required to create a sufficient breeze.

Decking and handrails (if the slope is steep) should reflect the design of the rest of the cabin and take account of the safety issues described in Chapter 9. Access to the cabin and its deck by people with disabilities should also be a standard consideration. Access from behind the cabin should ensure a fairly level approach so that any landform falling away is taken up by the deck. Thus taking advantage of scenery also provides a good barrier-free approach. Elsewhere, ramps may be needed if the cabin is raised on a stone under-building.

External finishes should avoid urban materials. Natural stone surfacing or timber decking should generally be used for paths to the access road, which should follow all the recommendations for car parking described in Chapter 5. Attention to detail in the finish of the areas immediately around the cabin is important, because much can be disturbed or lost during construction.

It may be appropriate or necessary to provide some lighting for access to cabins at night. Rather than use urban types of lighting on high poles, it is much better to choose low-level lights set at waist height, which illuminate the path only. This reduces the overall effect of lighting and helps to maintain the atmosphere of remoteness so important for the quality of experience.

Sites for barbecues can be laid out near the cabin in an open area, safe from the spread of fire, together with picnic tables. Sometimes these are shared by several cabins in a large development and are placed a little way off so as not

to be overlooked or invade the privacy of the cabins.

Signs, enclosures for rubbish bins, car park barriers, picnic tables, bridges, steps, gates and all the other artefacts that might be needed as part of the cabin development should all be designed to reflect the idiom used in the cabins. If possible, litter bins should be incorporated into the exterior structure of the cabins.

A reception building, perhaps including public phones, television, a shop, indoor games, refreshments and laundry facilities, may be needed at larger sites. The design should also reflect the architectural style and construction of the cabins.

Condominiums

As well as single cabins to be occupied by one family it is not infrequent for a single building to contain two or more units, or for cabins to be arranged in multiples. In North America these are referred to as condominiums or 'condos' for short. The same design and layout criteria apply, except that because of the multiple occupancy there is a greater density of facilities required, such as more car parking and services per unit. In some areas the denser clustering and greater density can solve problems by concentrating use into a smaller and less fragile area, or constructing fewer actual buildings. Nonetheless, there can be difficulties related to the privacy of shared decks or balconies. In other places the density can cause problems if the landscape is sensitive, such as greater visual impact, greater site disturbance and adverse effects on natural drainage. This means taking more care in site choice, layout and design as well as the design of buildings.

Chapter Thirteen

Interpretation

So far, this book has covered the practical needs of visitors to the outdoors so that they can enjoy fully the experience of scenery, wildlife and physical activity. It is vital to ensure that the special qualities and the spirit of the place are not overwhelmed by the facilities and artefacts provided for visitors, as well as by the people themselves. Some basic information and orientation will also have been provided to help them find their way around safely and with due respect for the environment. If visitors are to gain a greater understanding about the wildlife, landscape and its heritage that they are visiting, this can be provided through interpretation, which is the subject of this chapter.

What is interpretation?

Interpretation has a recognizable history going back to the eighteenth century, when particular people, mainly in Europe, guided visitors to places of natural wonder or ancient history and told them facts and fantasy about those places. The subject was put on a professional footing in the 1950s and 1960s by the US National Park Service, and it has continued to develop since that time.

Interpretation was defined by Freeman Tilden in 1957 for the US National Park Service as the work of revealing, to such visitors as desire the service, something of the beauty and wonder, the inspiration and spiritual meaning that lie behind what the visitor can with his senses perceive.

These concepts are embedded in the well-known series of booklets to be found at US national parks: *The Story Behind the Scenery*.

In Britain, the Centre for Environmental Interpretation offers a fuller explanation:

Interpretation is the art of explaining the meaning

and significance of sites visited by the public. There are three key elements:

1. A specific site of natural, historical or cultural value is involved and is being, or will be, experienced at first hand by the visitor.
2. The visiting public, whether tourists, day visitors or local residents, are making a recreational visit.
3. The organization or individual interpreting the site aims to generate a concern for its conservation and/or to encourage an understanding of the processes and activities taking place.

In several countries the subject has now gained its own profession of standing, such as the National Association of Interpreters, USA, who define the subject as

A communication process designed to reveal meanings and relationships of our cultural and national heritage through first-hand involvement with objects, artefacts, landscapes and sites.

Therefore it is clear that interpretation is a different process from that of supplying information and orientation, environmental education or propaganda. This is frequently misunderstood, to the detriment of the organization, the visitor and ultimately the site, as raising understanding about wildlife and landscape often provides the stimulus for conservation.

Supplying information and orientation is simply providing facts to assist visitors (covered in Chapter 4). It helps them to find their way around the site and avoid getting lost, and it advises them what they can or cannot do in safety.

Environmental education is similar to interpretation except that it deals with a much wider spectrum of the environment and its relationships with people of all ages and background—at work, in the home, at school and during leisure. That is not to say that interpretation has no educational content, nor that interpretation media cannot be used as part of an educational programme. However, interpretation tends to be more concerned with innovative and stimulating ways of explaining the key aspects of a particular site or issue.

Propaganda is the promotion of a particular point

A communication process designed to
our cultural

that of supplying

Environmental education is similar

programme. However,

Why interpret the environment to visitors?

usually have several

of view through the selective use of material that seems to be factual and which is presented in an enjoyable way. For example, visitor centres operated by organizations whose primary purpose is to exploit natural resources may aim to convey a message justifying those activities, even though they may be harmful to the environment.

Why interpret the environment to visitors?

Organizations usually have several reasons for engaging in interpretation:

- to increase the enjoyment that visitors gain from their experience, in the belief that an understanding of the landscape and aspects of natural and cultural heritage leads to greater pleasure;
- to increase understanding and appreciation of the area visited and of the great outdoors in general, to lead to a greater respect for it and recognition of the importance of conservation, protection and management (this arises from the first reason);
- to help managers at a particular place by influencing the patterns and habits of the visitors who use it;
- to convey a particular message relating to an organization or its activities in ways that leave a good impression in the minds of visitors;
- to increase sales of souvenirs, literature or other merchandise or to recruit members to an organization.

Some of these reasons tend towards propaganda, but they are not inappropriate so long as they are secondary to the purpose of increasing enjoyment through understanding.

There is no doubt that large numbers of visitors to all kinds of natural, cultural or historical sites enjoy guided walks, visitor centre exhibitions, nature trails and enactments of historical events. Major centres can attract many thousands of visitors, and they can sometimes become visitor destinations in their own right. However, there are some central common

elements to all of these places, as follows.

- The place is special, for a reason that draws people to it. This might be a famous and important historical event, a natural wonder or a unique cultural site. These raise people's curiosity and thus their appetite for finding out more about it.
- The people who go there tend to be interested in the subject, which is the prime reason for its attraction.
- The people who tend to gain most from their visit are those who are curious by nature and keen on finding out about the world around them at every opportunity.
- A greater understanding of the special qualities of the place may occur if there is engagement with it mentally as well as physically.
- Visitors making a special trip to the place, especially a first or infrequent one, are more likely to want some interpretation than regular, frequent visitors, who are more likely to have their own knowledge and different reasons for visiting.

In order to make the correct assessment of the interpretative content for an area, an overall strategy should be adopted. For example, Scottish Natural Heritage in Britain have produced one covering the sites they manage, National Nature Reserves in Scotland, and for general advice to other landowners.

What to interpret

As a broad guideline, it is likely to be appropriate to develop interpretation programmes at sites if three basic conditions can be fulfilled:

- The site or location has something special, which is outside the general experience of most people.
- There are substantial numbers of potential or actual visitors who wish to learn something about the area.
- The site can accommodate the interpretative media to be used and possible visitor pressure.

The sort of place with potential for interpretation is one with unique physical, cultural, ecological or

historical features, processes or associations that are sufficiently special to attract quantities of visitors to go there as a day out, as part of a tour or as a school trip. Examples include:

- **historic sites** such as Stonehenge in Wiltshire, England, Culloden Battlefield in Scotland, Colonial Williamsburg in Virginia, USA, Gettysburg Battlefield in Pennsylvania, USA or birthplaces of the famous;
- **wonders of nature**, such as the geysers and mud pools at Yellowstone National Park, Wyoming, USA and Rotorua, New Zealand; rock formations such as Bryce Canyon, Arches National Park, Utah, USA or Uluru (Ayers Rock), Australia; waterfalls of great splendour; groves of trees, such as the giant sequoias in California, USA, Cathedral Grove in British Columbia, Canada, or the Major Oak in Sherwood Forest, England; habitats of rare or impressive animals;
- **places of great scenic beauty** connected with famous people, such as Wordsworth and the English Lakes, John Muir and Yosemite in California, Alexander Mackenzie's trail across Canada, and Lewis and Clark's expedition across the USA to Oregon. Small-scale interpretation may be appropriate at lesser, more localized examples than those cited above.

The degree of interpretation should match the status of the site, the numbers of visitors expected to use it, and the ability of the site to cope with the proposed level of activity. Large investments can be justified only for the most important and highly visited sites. Smaller places would be overwhelmed by sophisticated and large-scale facilities. It is most important that the interpretative media, especially visitor centres, do not become surrogates for the real experience gained from the landscape itself.

What to interpret, in terms of the choice of different themes or subjects, will depend on the characteristics of the visitors, such as their age range, socio-economic grouping, expected educational background and range of interests. It might be impossible to determine some of this for many sites,

The degree of interpretation should match

What to interpret, in terms of the grouping, expected

so that a variety of topics might be chosen and presented in different ways.



These giant sequoia trees are good examples of wonders of nature worthy of interpretation: for example, aspects of their age, their natural history and the fragility of their habitat. Mariposa Grove, Yosemite National Park, California, USA.

Interpretative strategies

Before developing interpretative plans for individual sites it is important to consider the overall strategy for the whole area under management. Such a strategy can ensure that interpretation at one site complements rather than duplicates that at another,

and that opportunities for good stories are not missed. Such strategies can be developed by individual owners or agencies, or by consortia covering a much wider area.

A simple but clear example of a strategy is provided by the US Park Service at Craters of the Moon National Monument in Idaho. This area has a strong character because of its recent volcanic history. A drive takes visitors through it after an introduction to the subject at a small visitor centre. Along the drive are sites with walks of various length, which are interpreted in different but complementary ways. Some deal with different aspects of volcanoes, such as cinder cones, lava tubes or different kinds of lava, while others look at the ecology and wildlife living in such an inhospitable landscape.

Interpretation planning

Having got a general idea of the potential of a place for interpretation, some planning will be necessary. This will ensure that the interests of the organization and of the visitor will be harmonized, and that the best methods are employed for the situation.

As in any plan there must be some management objectives, expressed in terms of outcomes from the interpretation programme for the organization and for the visitor. These can be described in the following ways.

- **Behavioural:** what it is hoped the visitor will do as a result of participating in the programme. This might be to visit particular places, to show more care for fragile areas, to purchase a souvenir, or make a donation.
- **Learning:** what the visitor is expected to take away from the visit. This might be some salient facts about the place and its evolution or development, or events and personalities connected with it.
- **Emotional:** what it is hoped the visitor will feel as a result of their visit. This might be a belief that the place and associated features or wildlife should

be protected, that management of special sites is a good thing, and that the organization is doing a good job.

Once the objectives have been established, the messages or stories that the interpretation should convey can be developed. There might be one message for a small site or several for a larger one. There is a risk that too many messages can cause confusion, so a single strong theme with a few variations is likely to be the most effective. This theme can be presented in different ways for different people, such as adults or children.

The message should be organized in a hierarchical way, with a main title or slogan that encapsulates the key elements of an issue or the character of the landscape. The main theme can be divided into subsidiary themes with appropriate titles and contents lists, each containing a summary part and a detailed part. In this way, whatever the medium employed to convey the message, its coherence will be maintained, and every visitor should be able to obtain as much or as little of the message as is desired, depending on the circumstances prevailing for a particular visit.

The objectives, message structure and content should be kept under review. Perceptions may change, knowledge may become out of date, and visitor characteristics may shift over time. It is important that the interpretation should meet its objectives and maintain its learning quality at all times.

The theme and the story-lines should be worked up into a script, much like an advertising campaign. Different media may be required for different sections of the script depending on the most effective way of conveying a particular part of the message to particular audiences.

It is often helpful to plot the interpretative plan on a map, indicating the location for different stories with their associated media: in this way the interactions of the interpretation can be monitored by the site managers.

There may be several stages in delivering the message, depending on how the site is expected to be visited. For example, at the entrance pay stations of

have been established, the can be developed. There might be one

so a single strong theme with a few

The message should be organized in a hierarchical main theme can be divided into

The objectives, message structure and content

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a particular part of the message to It is often helpful to plot the interpretative plan on a

be monitored by the site There may be several stages in delivering the
US National Parks the visitor is handed a brochure. This introduces the park and provides some orientation. It also contains the basic story-line of what is special about the place, its history and the main interpretative themes.

Often one of the first places to visit is a visitor centre, normally containing an exhibition devoted to the natural and cultural history of the site and its development, using well-designed display panels, models, artefacts and interactive displays with computer software or simple 'feely-touchy' samples. In addition there will usually be one or more audiovisual shows, which provide a general introduction to the area using film, video or tape/slide. Breathtaking photos of the landscape over four seasons, the wildlife and human interaction and activities reinforce the quality, fragility and value of the landscape. Visitors are invited to explore it for themselves. A shop area full of books, pamphlets and souvenirs gives people a chance to purchase mementoes or useful articles such as maps, and finally some refreshments may be provided.

Once the visitor centre has been experienced (some parks have more than one, each dealing with a different part of the interpreted message), the visitors may follow the park road, stopping to look at the view (where interpretative panels explain what can be seen), to hike a loop trail (accompanied by a trail leaflet or stopping to look at signs by the route explaining the features of interest) or to picnic, swim, back-country hike or ride, camp or otherwise stay there. There could also be a programme of guided walks, where rangers will take people on varying lengths of hike on easy or difficult trails to see and learn about different aspects in detail.

Children will be provided with their own version of this menu at various points: parts of the exhibition, explanatory talks, a film or slide show appealing to them as well as adults, and the souvenir shop selling items attractive by design and price to different age groups.

People with disabilities will also be catered for, perhaps by barrier-free trails, interpretative signs in Braille, or with audio facilities.

Such an extensive menu of interpretation at a large site of national or international importance has more material than can be consumed during a single visit. Thus repeat visits are encouraged to find something new, especially if temporary exhibits further expand the variety from time to time.

The menu described above introduces the main forms of interpretative media available to interpreters and graphic designers. It is important that the right media are chosen, and that simpler rather than complex solutions are chosen. Not every site requires every medium to be used.

Interpretative media

The media available for conveying interpretation are:

- people telling the story;
- leaflets;
- portable tape recorders;
- on-site panels (including listening posts);
- exhibition areas;
- visitor centres.



A person—a ranger, interpreter or expert—leading a walk can be one of the best ways of interpreting the environment to visitors, who can ask

questions, discuss issues and

perhaps be more convinced of the need to protect areas.

People telling the story

For many sites, especially those with complex and detailed stories and where the audience is likely to be a curious one, people who can explain and answer questions are very effective, although costly. There is the added advantage that the landscape is not littered with interpretative panels or signs detracting from the enjoyment of those people who may find such devices intrusive.



A range of examples of interpretative leaflets from various places and produced by different organizations.

Listening to an enthusiastic and knowledgeable guide can be very rewarding, and there is the added feeling of reassurance for those who are afraid of getting lost or misjudging how long it takes to follow a trail. The rangers who lead the walks can also monitor visitor activity, especially on the more popular parts of the area, and supervise behaviour when necessary.

Ideally the ranger, interpreter and designer should collaborate in planning and designing the trails that lead to particular places of interpretative value for storytelling. This might include providing areas with benches where a larger group can be seated while the ranger tells the story. The surfacing, gradients, length of trail and the presentation of its features should be designed for the selected audience (see Chapter 9).

At some visitor centres or at campgrounds in national parks and national forests there might be a demand for outdoor lecture theatres. These involve tiers of seats set in an open natural hollow or amphitheatre with good natural acoustics, electrical provision for audiovisual projection and a screen, a campfire ring and perhaps a low stage or dais. The campers can sit around the fire to hear stories, sing songs or look at films or slide shows. Thus they can be entertained and informed at the same time.

The design of these amphitheatres should take into account the capacity of the campground and therefore the potential audience size, the type of weather (in rainy places the stage and screen might need shelter), and the type of design character that is appropriate. In some places (the more rural or urban ROS characters) more formal benches and harder surfacing might be appropriate, whereas in wilder areas logs or stone seating might suffice, or even a mown grassy bank for informal sitting on rugs or groundsheets.

A wooden stand with weather protection (glass-fronted box) for a projector together with an extending screen kept in another structure forming part of the stage or dais backdrop will be needed for regular slide shows. White screen surfacing must be maintained, and should not be kept out in the open air to become dirty, mouldy or sooty.

Leaflets

These are one of the most common and popular ways of interpreting the environment. They can relate to the whole area or to a part of it, perhaps to a single trail designed to follow a particular theme. Leaflets also provide a form of souvenir and something to refer to later.

The text of the leaflet can be related to points on the ground, such as plants, views or cultural artefacts, by means of photos or drawings that identify them, by points on a map of the route, or by numbered posts along the trail. The posts will have no meaning to visitors without the leaflet, and spotting the next post and interpreting what it relates to can become an exciting game for children.

The design of an effective leaflet is a specialist task, and it should be undertaken by a skilled graphic designer once the trail alignment, interpretative script and marker post locations have been decided. Special photographs, illustrations and maps might be needed for the leaflet. Some organizations maintain their own design teams, who can produce leaflets to a general house style but with localized characteristics. If external consultants are used they need to be given a good brief on the interpretative design and requirements of the leaflet.

Leaflets must be kept up to date, especially if the landscape changes suddenly, as happened after the forest fires at Yellowstone some years ago. The number of leaflets to be produced needs careful assessment; it is likely to be affected by several factors, such as the likely demand, the audience, the quality of the production, the shelf life and the budget available. Large print runs reduce unit costs but maximize overall costs. Therefore, for sites or trails with a low turnover, cheaper leaflets with a short shelf-life that can be easily revised and reprinted should be used, while glossier leaflets are likely to be confined to places with a high turnover.

Portable tape recorders

Another means of giving an interpretative message that can be up to date, and also reducing the number of artefacts on the area or the number of leaflets that have to be updated, is a portable tape recorder of the Walkman variety. These might be available to rent from an information centre, and prompt the visitor to listen to sections in accordance with marked posts set along the trail. In places where foreign visitors are common, versions can be produced in different languages. The recorders do not interfere with other people walking the trail, and are useful for blind or partially sighted people.

On-site panels

In many areas, trails can have small signs or interpretation panels carrying short messages and pictures relating to features on the site.

There are many types of structure, as follows.

– **Simple wooden posts** of substantial dimensions can be angled off at a convenient height to provide a surface on which to glue or screw small plaques with an interpretative message. The message can be engraved into material such as plastic or metal, or printed on materials encapsulated in plastic or resin. The posts should be placed so that they are orientated towards the point of interest. The plaques can be damaged accidentally or deliberately, so some maintenance and replacement will be required.

.– **Sawn slabs of wood** in single or multiple units can be used for larger panels. The artwork can be printed in the same way as for the smaller posts, but it can contain more information, pictures or even photographs. The materials and techniques described in Chapter 4 for information signs can also be applied to interpretative signs. A useful design is one in which a recessed section is routed out of the face of a timber slab. The upper and lower edges of the recess should be angled to create a dovetail joint. A separate panel is slid into this and secured by a side piece fixed by recessed screws. The interpretative panel can be removed easily over the winter, or for repair or updating (see diagram).

.– **Metal-framed structures** can be used to carry plaques in places where vandalism is a problem. They can be galvanized, plastic coated, enamelled or made of Corten steel. They also fit into places with more buildings, where a more finished appearance is appropriate. The plaques can use the same materials as described above.

.– **Small panels** in circular or oval shapes can be fixed to rocks, either where they occur naturally or placed there for the correct orientation. Where feasible, engraving using a sandblasting technique is the most effective method to give a legible message that blends with an irregular surface.

.– **Larger on-site panels** can also be used. These might be needed at a major viewpoint along a trail, at a wildlife observation area, or at an important

cultural, historical or archaeological site.

The structures described for information panels could also be used in these circumstances, although the layout of text and graphics will be different.

- **Listening posts** are devices that contain a cassette tape player, from which a loop tape plays a message. They can be powered by energy from solar panels. They are useful where blind or partially sighted people use the trail, or where the sounds of animals help to evoke the right atmosphere. The posts can be free standing or incorporated into an interpretative panel containing written and pictorial material.

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As in all types of structures used outdoors, panels should be subservient to the landscape, and should be chosen for form, size, colour and materials that will fit the local surroundings. Graphic techniques have to present a memorable message without this becoming intrusive. Bright colours and shiny finishes tend to look out of place, as do over-elaborate graphics. All structures must be carefully maintained and cleaned at least once a year before the visitor season.

Exhibition areas

A more developed stage than leaflets or onsite panels is an outdoor exhibition area. A number of panels—which might include text, illustrations, photographs, interactive devices and ‘touchy-feely’ exhibits (treecones, fur, antlers, stone etc.)—are arranged in a sequence, perhaps near where trails start. The design of the panels can be an extension in structure and materials of the information panels (see Chapter 4), taking the information a stage further into interpretation. An enclosure formed from the panels and open to the air and natural light can also work quite well.

Alternatively, a shelter of the type described for picnic areas or an overlook platform can be used to house the exhibition area, giving some weather protection and a vantage point to help relate the interpretative story to the landscape. Otherwise an enclosure formed from the panels and open to the air and natural light can also work quite well.

Visitor centres

The biggest and most comprehensive way of presenting interpretation is at a special centre. During the 1930s, before the term ‘interpretation’ was coined, the US National Park Service built what it called ‘museums’. Some of the buildings were of outstanding design, and they serve as models of the attention to detail for functional requirements and the harmonious visual relationships between the building and the surrounding landscape. However, a visitor centre building can be very expensive, and a fundamental first question is whether or not it is essential for the delivery of the interpretative objectives of the site: hence a careful economic appraisal of all the options should be undertaken to determine the most appropriate range of facilities to be provided, and the size of building in relation to the expected number of visitors.

Visitor centres usually combine some or all of the following:

– **A reception area and information counter** manned by staff, at least in the main busy periods. The staff answer questions and manage the building.

– **An exhibition area** consisting of static displays, interactive or hands-on gadgets, dioramas, artefacts and things to handle ('touchy-feely'). This may be similar to the outdoor display brought indoors, or may be more sophisticated, as the

controlled environment and availability of power make it possible to use computers, action models and so on.

– **An audiovisual area.** This might be a theatre where tiered seating creates the best views for a cinematic film, video or tape/slide, or a smaller, more informal area with fewer seats for a television, video or a tape/slide.

– **A souvenir and book sales area** where revenue can be made. Books on natural history, the history of the area, guides and maps, stories and other appropriate material such as posters or art prints are well-tried merchandise. Other items might include pens, pencils, badges (buttons), mugs, toys, games and crafts made from, labelled or otherwise identified with the area and its attractions.

– **A classroom or study area** for environmental education of both children and adults.

-- Some **comforts** for the visitor, including toilets/restrooms, perhaps a cafe or restaurant, and spaces for lectures or talks (possibly the same area as for the audiovisual display).

– **Staff facilities**, including office space, toilets, storage and workshop areas.

power make it possible to use computers, action models and so on.

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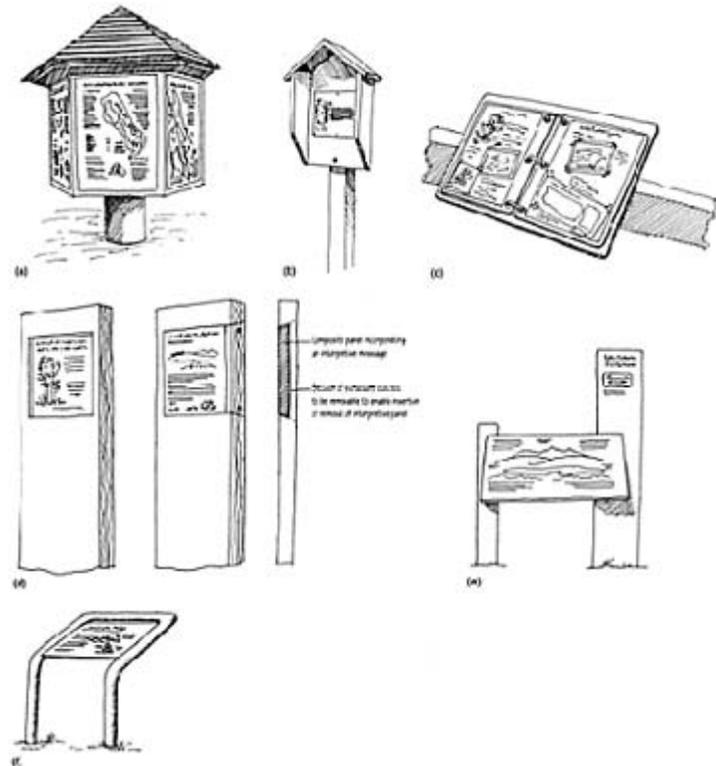
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The size of the various spaces required needs to be carefully assessed relative to the expected numbers of visitors at different times. The result can be a substantial building with the potential to make a significant impact on the landscape, and with high capital and running costs. The design of such a building should be carried out by an architect. Different approaches can be taken to fit it into the landscape, which have been successful in various settings.



A range of both good and bad designs of interpretative signs used on along trails: (a) A fairly large multi-sided structure with roof provides information and interpretation. Quite a lot of material can be presented, and several people can look at it at one time. This is more appropriate for the entrance to the trail. The roof is a fussy aspect of the design. Koli National Park, Finland. (b) A small panel screenprinted on aluminium and housed in this little shelter is an overdone structure for a small amount of material. A fussy solution like this is also quite expensive to make. Dolly Sods Wilderness Area, West Virginia, USA. (c) An interesting and effective exhibit made of laminated sheets, which open like a book. The graphics are photographs of pages of a ranger's notebook, recording daily sightings of wildlife and descriptions of seasonal changes. Well presented and generally sturdy, although it can be damaged. Skunk Cabbage Trail, Glacier National Park, British Columbia, Canada. (d) Interpretative structures made from large slabs of timber. Laminated panels can be clipped into recessed sections, or a side-piece can be unfastened to allow a graphic panel to be slid in or out. Forest Enterprise, Britain. (e) A structure using a tall post carrying site and organizational information acts as part of a frame to an angled interpretative panel using laminated material. Scottish National Heritage. (f) For a vandalprone area, tubular steel, either zinc coated or Cor-ten rust patina steel, can be used to make a strong structure to hold a laminated panel fixed to flanges or crosspieces.



This structure provides a more ambitious yet still outdoor exhibition structure. It gives limited cover and protection against the weather. The neutral, almost sculptural form and natural finish work very well. Deschutes River, Oregon, USA.

Traditional or vernacular

There may be strong reasons for using traditional or vernacular forms, materials and construction in an area. There may be other buildings nearby, and too much contrast could look out of place. In many wilder places, pioneer or homestead style using local materials without a high level of finish can be entirely appropriate.

Neutral or non-domestic style

Here the building forms are derived from the shapes and character found in the landscape, such as rocks, landform and trees. Vertical emphasis can be given to the building in a forest or where there are steep mountains, while a horizontal emphasis is more suitable to flatter land, or near a lake or the sea. In this way the sculptural qualities of the building can reflect and interpret those found in the surrounding landscape.

The building should be set into the landscape so that its size does not dominate. This is difficult to achieve in smaller-scale landscapes, so external treatments such as earth mounds and tree-planting might be needed to reduce the apparent size and proportions of the structure. Heavy roofs that overhang, subdued neutral or earth colours and coarse textures all help to tie the building down into the landscape (see discussions of toilet block and shelter design in Chapters 6, 7 and 9). Continuing the pathsurfacing materials in to the building also creates a sense of continuity with the rest of the site.

Every care should be taken to ensure that the visitor centre is not a surrogate for the real landscape, so the interpretation plan should stimulate the visitors' appetite to explore and spend time in the outdoors while respecting it.

Art as interpretation

If one of the aims of interpretation as described above is to help visitors understand something of the spiritual meaning of the place, then all the earnest facts and explanation may not achieve this. However, there are ways in which it might be conveyed through poetry, prose and painting about the area, and the use of these elements in the displays. Another way is to use sculpture out in the landscape. If visitors come across sculpture along a trail it can evoke all sorts of questions and responses, and can often prompt an understanding of the spirit of a place. The use of sculpture in forests has been pioneered by the Forestry Commission in Britain for over 20 years.

At Grizedale Forest in Cumbria a partnership project was undertaken between the forest managers and Northern

Arts, a government-funded arts promotion body. Together they were able to fund a series of residencies over the years for talented sculptors, who were able to explore the landscape through art and the use of local materials. Some of the sculptures are highly abstract evocations of the land, of water, of growth and decay, while others are more figurative. The use of sculpture in this way has been taken up elsewhere in Britain with some interesting results.

However, there is a danger of overloading the landscape with sculpture, and it is important to view the sculpture as a means to an end and not as an end in itself. Ideally, the sculpture should emerge from and be part of the landscape to which it ultimately returns, thus demonstrating something of the cycle of creation, change and decay. In this scheme the landscape is not a setting for a studio piece.



35 A fishing jetty where anyone, including people with disabilities in wheelchairs, can gain access to the water for coarse fishing. Finnish Lapland.



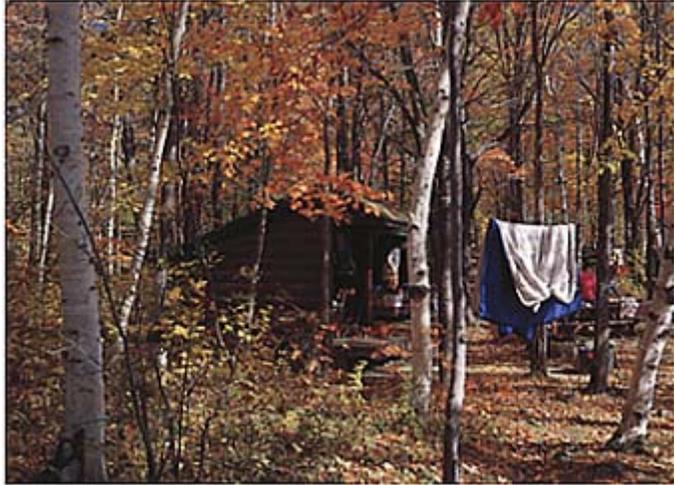
36 A hide with a hidden approach path using screens made from hazel wattle fencing. Unfortunately, the hide is reached by a staircase, which prevents access by people with disabilities.



37 An example of an open camping/trailer caravan area where the backdrop of trees and some patches of shrubs give some structure and enclosure to the site. New Forest, Hampshire, England.



38 An ideal woodland tent camping area provided with a parking place, flat tent base, picnic table and fireplace. The trees screen sites from one another, giving privacy and security. Baxter State Park, Maine, USA.



39 A camping shelter, known in the USA as the 'Adirondack Shelter'. The fire in front of the open shelter gives warmth. Baxter State Park, Maine USA.



40 The entrance and arrival area to a campsite in an open setting. The reception building also contains a small shop. An information sign shows the site layout and details of the surrounding area. The general appearance is tidy, simple and well maintained, although there is a rather large expanse of gravel, which need not be so great.



41 An attractive A-frame construction with large windows and a deck to give good light and a view over a lake. This example is supported on stilts to take advantage of a slope. Loch Awe side, Argyll, Scotland.



42 These brochures are a standard series, designed to a family 'style' and given to every visitor at the entrance to US National Parks. They are well designed and produced, and make an excellent collection.



43 A concentration of interpretative panels makes this almost an outdoor exhibition area. Two types of structure are used: the larger one is described in Chapter 4, and the smaller is the slab of wood described above. The panels are arranged at the entrance to a series of trails. Queen Elizabeth Forest Park, Scotland.



44 This building, modelled closely on traditional vernacular architecture, houses an information and exhibition centre. It is not pretentious, and is well built with no fuss in its setting or surroundings. Ruunaa National Hiking Area, Finland.



45 This intriguing scene includes two sculptures of wild boar made from resin-bonded natural materials. It is evocative in its own right, yet subtly interprets part of the landscape. In Britain wild boar do not exist in the wild any more, yet here at Grizedale Forest they are symbolic. The name Grizedale is derived from Old Norse for 'The Valley of the Pigs'.

Chapter Fourteen

Comprehensive site design

We have now described the sequence of events, decisions, activities and facilities that make up a visit to the outdoors. It is essential that each component is fitted together properly through the design process. While thinking this process through from the perspective of the visitor it is still necessary to take a wider view of the recreation area from the point of view of the manager and designer. It is not possible to design a visit step by step unless a broad view of the area is gained, providing a context and purpose into which the chosen facilities are inserted.

The brief

Site design needs to start with a brief. This contains a set of objectives, which should have emerged from the

planning stage. It will identify who the expected visitors are likely to be, how many, over what time, and for what activities. It will also identify site opportunities or constraints that need to be overcome through zoning, by design, or by management.

The brief should also contain timescales, funding, financial performance targets, and the various approvals to be obtained before implementation can begin. A team of people bringing together the necessary skills should be assembled, including those who will be responsible for the management.

If the site is sensitive ecologically, politically or in other ways, a wider group of people may need to be consulted about the development of the design. These might include local residents, representatives of key user groups, local politicians, and agencies responsible for particular aspects of the resource, such as forest and wildlife services, highway authorities and water agencies.

The design team may consist of recreation planning specialists, landscape architects, engineers, architects and building surveyors, artists, ecologists and wildlife biologists, as well as accountants and economists. Each member should avoid taking up a narrow position with respect to their specific discipline and instead provide factual information at the survey or inventory stage, co-operating at the analysis phase, and remaining open-minded in order to contribute integrated and constructive ideas at the design phase.

Stages of design

Once the brief is agreed with the client or client body, the typical stages of design are as follows.

Survey/inventory key

First, information is collected on:

- .– **physical aspects of the site**, such as landform, geology and soils; water movement; terrain slopes and stability;
- .– **ecological aspects**, such as plant communities; wildlife use; sensitive sites; habitat dynamics, such as fire or insect attacks; pollution risks.
- .– **cultural aspects**, including traditional recreational uses and history; heritage and archaeological remains; previous land use; aesthetic/landscape qualities;
- .– **recreational aspects**, such as the potential of the area; limitations on carrying capacity; safety issues; environmental education potential, including interpretation.

Analysis phase

Here the implications of the information are tested. This can be categorized into:

- landscape character, aesthetic qualities, views and eyesores;
- constraints and opportunities for development of the site for recreation and environmental education including locational conflicts, site constraints;
- ecological analysis of the likely changes to plant communities and wildlife uses by various activities which might be developed, their location, places to avoided and management options to maintain biodiversity requirements.

Design phase

This is the creative phase, where the objectives and outcomes of the analysis interact. It requires imaginative, creative thinking to achieve an integrated and successful resolution of all the issues. The design team should consider a wide range of ideas in seeking both well-tried and original ways of solving problems and maximizing opportunities. Concepts are gradually refined into initial design options. The landscape architect may work up the concepts into feasible and costed layouts.

Once the initial design phase has been reached, it is important to test how it is likely to work for the prospective visitor. This can be done by the group's using a checklist based on each stage of a visit, or by asking people less familiar with the design to imagine a visit, using the same checklist. In this way an indicative quality of the visit, which is the main determinant of the success of the design, can be assessed, and the layout and design can be refined as required. Questions of safety, barrier-free access, vehicular and pedestrian circulation and information provision can be answered in a similar fashion.

Once the design has reached this stage, it must be offered to the client and any consultees for their assessment and approval. It may also be helpful if they use a checklist similar to that derived from the stages of the visit. This enables the client to ensure that the overall objectives have been met. Consultees with disparate interests can more easily offer comments or require changes to particular aspects without compromising the whole design. The process of consultation and approval is likely to require several iterations of refinements to be incorporated into the overall design and objectives, and this has to be built into the project lead-time.

The needs of the prospective manager are important when testing the initial design, and it should be fully tested by simulating the various maintenance and management tasks at specified intervals: for example, daily, weekly, monthly or annually. It is useful to prepare an outline maintenance and management plan at the initial design stage so that the client is clear about the obligations and resources that are likely to be needed.

Finally, an important aspect of the design phase is to communicate with the local community about the project. They might be sensitive about changes to their environment, particularly if they are established users of an area that is about to be changed. Consultation should start at an early stage and continue up to and including the construction phase.

Construction phase

Once approval for the project has been received it moves into the construction phase. Specifications and detailed drawings are prepared to enable contractors to estimate prices, and for construction to take place. In the outdoors, especially in wilder places, the site survey information collected at the survey/inventory phase may lack precise detail. Hence there may be a need for some flexibility in the construction layout when compared with the design. For this reason, all setting out of the design on the site should be closely supervised by a member of the design team, and only approved when the desired quality is achieved.

Site protection measures, especially when working in sensitive areas, must be adhered to. These should be clearly stated in the project specifications and closely monitored.

In some circumstances, construction may be carried out by volunteers or other less skilled people. This is common in smallscale projects on sites managed by the voluntary sector, such as local nature reserves, parks and trails. Quality of construction can be more difficult to achieve. The simplest designs and construction techniques should be used, and all workers should be supervised by someone with construction expertise, good knowledge of the site and an ability to read drawings and plans.

In order to demonstrate the application of the design process it is useful to look at a case study. It is not possible to find an example that has every concern or resource issue present. However, the following example has some exacting requirements.

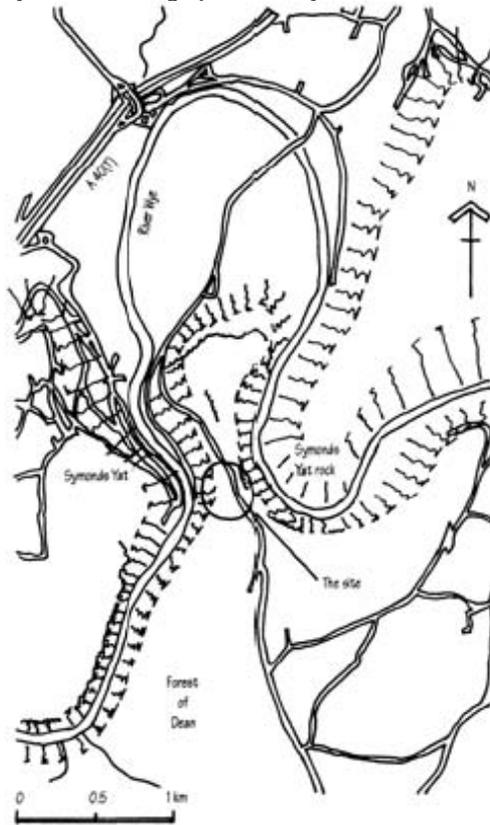
Design case study: Symonds Yat

Location and history

Symonds Yat is a site in the former Royal Forest of Dean in Gloucestershire, England. It is managed by Forest Enterprise, the national forestry management agency in Britain, and is one of a number of recreation sites offering recreation in an ancient forest setting. It is probably the most heavily visited site in a British forest, and yet it is quite small in area. The main purpose of visiting Symonds Yat is to look at a dramatic view over the River Wye gorge. In addition, rock climbing, wildlife watching, picnicking and walking trails are other possible activities.

Symonds Yat rock has been an established tourist attraction since the eighteenth century. It was promoted by

William Gilpin in 1782 and later espoused by William Wordsworth and the romantic poets. Before road access was possible, visitors arrived by boat along the River Wye, and later Victorians and Edwardians came by train and charabanc (early minibuses). During the late 1950s and 1960s car ownership expanded, and visitor numbers dramatically increased. At first the provision for car parking was *ad hoc*, little design being undertaken. Managers tried merely to keep the site reasonably undamaged. Access from the narrow and steep public road was always difficult. There were concerns over safety because of the high cliffs surrounding the site, and risks of damage to the ramparts, which are part of its history as an Iron Age promontory fort.



The general location of Symonds Yat, above the deep gorge of the River Wye.

Wear and tear of the site was severe, the ground surface at the main viewpoint being eroded down to bare rock by the impact of thousands of human feet. Access for people with disabilities was difficult, and the toilet capacity was seriously inadequate. There were reports of queues at the ladies' toilets regularly being 15 or more at peak times.

By the late 1980s, despite some work to give the area a better access and parking layout during the 1970s, the situation was becoming out of hand. A survey in 1988 showed that 400 000 visitors a year came to the site. These visitors usually stayed for a relatively short time but the sheer wear and tear, congestion and damage from traffic queues meant that the experience gained by these visitors was of inadequate quality.

Design process

The managers felt it was imperative that a completely fresh look was given to the area. The brief was simply to improve the quality of experience for the 400 000 visitors and to protect and enhance the scheduled ancient monument and the surrounding woodland. This implied that the facilities should be expanded to cater for the existing demand but that no increase should be catered for. The site and its surroundings, the highways and nearby communities had reached saturation point.

A team was assembled to carry out the task of design and implementation, work being phased over two periods. The team consisted of a landscape architect, the local forester for the area, the land agent responsible for land use, a civil engineer and a building surveyor. Together they collected information, analysed the site and proposed design

ideas. Consultation was and remains an important process with local communities, the planning, highway and drainage authorities, English Heritage—who are responsible for the ancient monument— and English Nature, as the site is important for nature conservation.

The survey showed that existing parking was inadequate. It was located partly within the ramparts of the fort and inside the ancient monument. Access to and from the public road was difficult, especially the exit that existed at that time. However, there was an area of mature woodland to the south, outside the monument yet near to the site focus, which offered the prospect of better parking. In fact most facilities, including a bigger toilet block, could be placed here and so protect the monument.



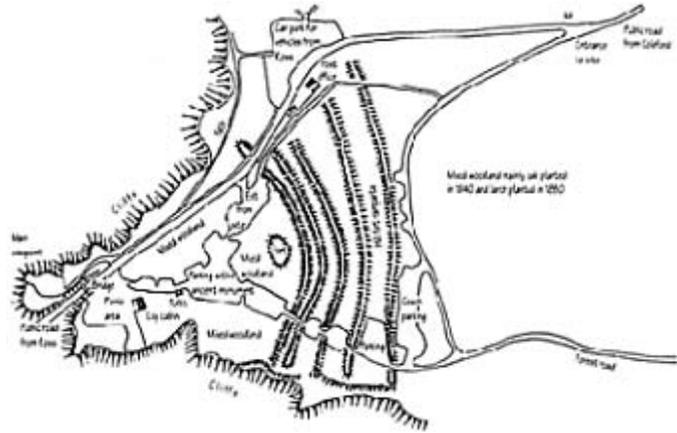
(a)



(b)

*Two views of Symonds Yat before redesign: (a) The worn area around the shop.
(b) The cluttered parking area. (Courtesy James Swabey)*

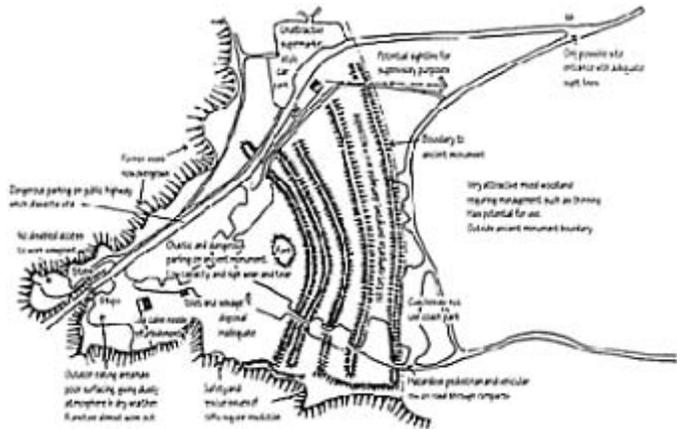
In view of the desire to limit the number of visitors to the existing level, the analysis suggested that some 200 parking spaces were needed. This included coach parking, and an area dedicated to visitors with disabilities, to be located nearest to the entrance to the focus of the main site. To cater for peak numbers an overflow car park of 50 spaces was also allowed for. Vehicle circulation, in particular the entrance and exit, had always been a problem. Analysis of possible alternative access points showed that there was none nearby. The gradients and the sightlines of the highway did not permit any. Instead, the radical idea of developing a new access road-cum-scenic drive to a safer and more distant exit point was conceived. This had the immediate effect of streamlining the vehicle circulation on site, reducing congestion on a narrow public highway, increasing safety for everyone, and reducing the overall amount of traffic passing nearby houses.



The site survey showing the area before redesign work started.

Once the traffic circulation was sorted out, the parking layout needed to be designed. Rather than have a single area of parking concentrated in one place it was felt that a more dispersed arrangement was desirable. There was sufficient space to accommodate dispersion in the area, and this also reduced the need to clear completely an area of the forest. The layout keeps a main flow from entrance to exit in a one-way direction. Off the main flow there are several branches, each with parking bays along either side. These link to a secondary one-way exit route, which meets the main route near the entrance to the overflow parking. A separate coach parking loop allows passengers to be dropped close to the main footpath, while drivers with disabilities or cars with passengers with disabilities can park in their own special area near the focus of the site.

As passengers leave their cars, simple clear signs direct them towards the main focus of the site. Here there is a large toilet block, with sufficient capacity to cope on the busiest days; some information and orientation about the site; some picnicking; the start of the main path to the viewpoint; and the entrance to a second forest trail. People then move along a wide, smooth path, made from the former car park area, towards the focus. The old car park has been reinstated



The site appraisal, demonstrating the problems of the area and some of the opportunities identified by the design team.

to grass in places, and the road has been narrowed to allow vehicular access to service the existing shop and for emergency purposes.

Within the old fort the new design has removed the old toilet block, refurbished the log cabin souvenir shop, provided an information point, and laid out picnic furniture and benches. As the site is a scheduled ancient monument it is not possible to excavate, and so the new furniture has to sit on the ground surface without anchorage.

to reduce their impact. Where the road branches, signs are clearly positioned to direct drivers. The surfacing is of local crushed stone, which is well rolled and gives an attractive appearance. The narrow road, slightly rough surface and tight curves encourage drivers to slow down so that a safe atmosphere is engendered. The parking bays are roomy, so that it is easy to remove things from the car. Signs lead the visitors to the toilets and orientation point, so that the immediate needs of comfort and basic information are satisfied before the main attraction is sought. From there the route to the viewpoint is obvious and irresistible. Once it has been visited, there is the chance to buy an ice-cream or souvenir, to rest, picnic or walk another trail. Equally, there is the choice of visiting other sites within the forest, where people can visit lakes, follow a sculpture trail or undertake several other activities.

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