Trailwork Basics

Contents

1: Introduction

2: Paths

- **2a** Overview
- **2b** Gravel Path
- **2c** Stone Pitched Path
- **2d** Some Common Issues

3: Landscaping

- **3a** Overview
- **3b** Working with Turf
- **3c** Obliterating an Unwanted Path
- **3d** Braiding
- **3e** Off-Roaders
- **3f** Working with Moss

4: Further Information/Tips/Materials

1: Introduction

People visit our landscape because it is exciting and beautiful. The role of trailwork is to help them to enjoy the experience and stay safe while protecting the landscape from damage they might cause by being there.

Natural forces also affect the landscape: rain and snow-melt can cause erosion. This is made worse when combined with visitor impact. For instance water running down a path erodes the surface and it collects in puddles which force walkers to find a way round, creating parallel paths ('braids') which merge into a bare and unstable mess.

Different areas require different sorts of paths:

There are **paths in remote areas and in the mountains** which are used only by enthusiasts who are prepared to be challenged and who expect to enjoy a completely natural landscape. This kind of path requires the lightest possible intervention consistent with safety and with the good condition of the environment it passes through. We might leave some parts untouched, while more difficult or fragile parts can be improved by removal of stone and obstacles, drainage in wet places, waymarking and creation of sight lines.

At the other extreme are **'honeypots':** places visited by very many mainstream tourists usually wearing conventional clothes. These need a more formal path. In some cases there might be a need for wheelchair access. Still, the work should be as discreet as possible so as not to impose itself on the views the tourists expect.

In between these extremes there are **popular walking routes** which, while going through wild country, suffer the impact of many feet. In such cases a judgement call has to be made: strong protection, but with as little visual impact as possible. This kind of path needs a good surface and good drainage. It should follow a pleasing line, not dead straight but with curves. Ascents should use pitching, or strategically placed rocks, rather than steps. In some places it may be possible to keep water away from the path by diverting it through a natural looking grassy gulley before it gets to the path. Landscaping should be used along the sides of the path to blend it into its surroundings and also to discourage walkers from stepping off it.

See *Trailwork Basics 3 - Landscaping; Appendix 1 - Drainage*; *Appendix 2.2 - Stone Pitching.*

Very **fragile landscapes**, for instance boggy ground or moss, present another challenge. In recent years this has become a serious issue because sites can suddenly attract huge numbers of visitors due to publicity on social media.

(Continued)

Roger Whysall

1: Introduction (Continued)

Options here include boardwalks, strongly controlled and limited routes, restricting the number of visitors or banning them altogether. Boardwalks are sometimes criticised as being intrusive, but on fragile ground they can bring about spectacular improvements in the surrounding vegetation by preventing the churning effect of many feet.

See *Appendix 2.4 - Footbridge and Boardwalk*.

If access and budgets allow, machinery is worth considering. A long path might be built more quickly and with less disruption by a **machine and driver** than by a team with spades and wheelbarrows taking many days.

Away from the paths damage is caused by people **going off-road** in 4x4's or on bikes. The best remedy here is of course prevention - by education and information - and by placing barriers in the way. But there will always be a need for restoration where these measures have not worked. This kind of damage mostly occurs on the gravel in highland deserts. Tyre marks need to be obliterated by raking before they harden and become permanent, and to prevent them being seen as an invitation to others to do the same. Damage to moss is much more difficult to deal with: transplanting and reseeding are the only options.

See *Trailwork Basics 3e - Landscaping, Off-Roaders.*

A **desire line** – an informal path created by people following a convenient route – can often be adopted as an official route. It has the advantage that we already know walkers are happy to use it. However sometimes desire lines create ugly scars or cause damage to fragile ground and then walkers need to be redirected. In these cases a less obtrusive route should be provided which is still convenient and is as inviting as possible. Then the desire line should be obliterated and made uninviting to walk on. The sides of the new path should be landscaped to discourage stepping off. Sometimes it might be possible to provide additional attractions and routes so that visitors are spread around and not concentrated in one place.

See *Trailwork Basics 3 - Landscaping.*

In all cases **early intervention** prevents the need for heavier engineering later on. A good surface and good drainage will persuade people to stay on the path. Then, with inspection and maintenance from time to time, the need for reconstruction later can be avoided.

(Continued)

1: Introduction (Continued)

Our **work should be done without leaving signs of disturbance**. For instance, when going off the path to fetch stones or material from a soil mine be careful not to walk the same way every time so that you make a track. If possible walk on hard ground or stones to avoid leaving footprints in soil. Store spoil on bare ground or on a sheet, rather than on grass, so that it can be cleaned away. If you do not reuse it dispose of it discreetly, perhaps by filling holes or by spreading it over a wide area.

When getting stones and when mining soil repair or disguise the holes left behind with turf or stone. If the work involves cutting and chopping wood take care not to leave behind a mess of sawdust and chippings.

See *Trailwork Basics 4 - Further Information/Tips/Materials*

Consider the public: have a routine for alerting tourists and workers when people need to pass through your work site. Keep tools and building materials off the path as they are a trip hazard. Be courteous and ready to explain what you are doing.

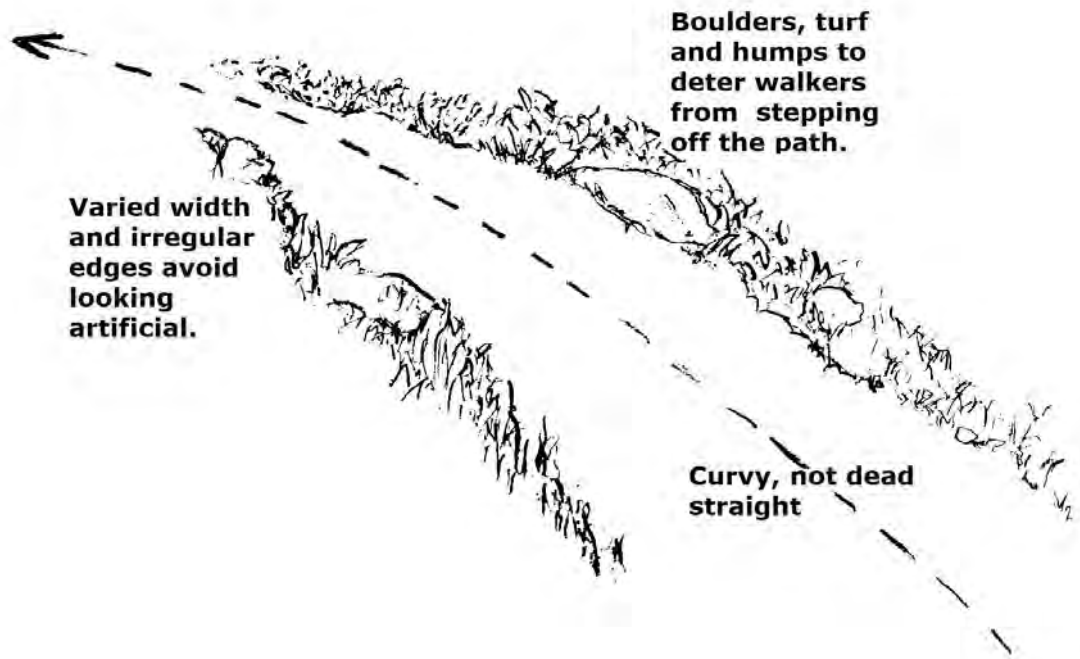
With all trailwork, sites and materials differ from area to area. So it is **not always practical to slavishly follow these Guides in every detail**. For instance you may decide a slope needs fewer, or more, waterbars than specified because of local conditions. If, in some situations, effective alternatives or modifications to the current guidelines are developed, these can be reported back and included in later editions of the Handbook.

After repair all paths need monitoring and maintenance to ensure that they remain in good condition. In this way the expense and effort of large scale rebuilding work in the future can be avoided.

2: Paths

2a: Overview

A path should be better to walk on than the ground next to it. So the surface needs to be firm and comfortable underfoot. A path with a rocky, unstable, surface will drive people to seek a more comfortable route alongside. It should not go straight ahead because that looks unnatural and is discouraging to walkers, as they see what looks like a long march ahead of them. Instead it is better to follow a gently curving, 'serpentine', line. This focuses the walker's attention on a limited section as the route curves in and out of sight. The width should vary slightly – again giving a more natural look - and the sides should be landscaped to deter people from stepping off the path.



Where possible, avoid taking a path up steep slopes as they are likely to wear more quickly. They may also require steps or pitching, which take a lot of time and material to build. Try to find a route which rises more gently.

2: Paths

2b: Gravel Path

> A full account of the construction of a new gravel path to an ideal standard can be found in *Upland Pathwork: Construction Standards for Scotland,* 2015. It is not intended here to deal with path construction to that standard. This is because, in Iceland, we are not called upon to build new trails to this specification, nor have we the resources to do so. Usually, it is our task to improve, repair, redefine or reroute part of an existing path.

Basically, a gravel path is made by cutting a tray about 25cm deep along the route. The width is decided according to the kind of use it will get and is usually between 60 and 120cm.

Layers of stones are placed in the tray, with larger ones on the bottom then reducing in size by degrees until a thick layer of fine gravel is laid on top. (It needs to be thick so that the larger stones do not push through from below.) The stones should be packed tightly together for stability.

The opportunity to do it exactly like this rarely happens. Usually we find ourselves dealing with paths already constructed using other materials and specifications – or we have to use whatever we can find nearby. It is helpful though, to keep this outline in mind as a guide, getting as close to it as possible under the circumstances.

River gravel and pebbles should not be used. They are smooth and rounded which makes them slippery so that they do not hold together. They slide about when walked on, making walking difficult, and they get pushed sideways off the path.

It is never right to make a path by simply laying a strip of gravel on the surface of the ground. This would immediately begin to spread out as it is walked on, and sink into the ground under the pressure of footfall. In a short time it would become a wide disfiguring eyesore, and no use as a path.

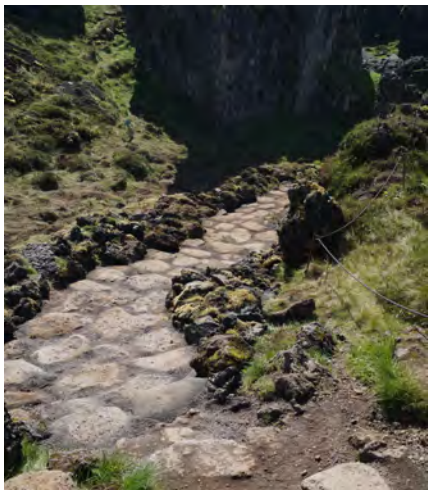
2: Paths

2c: Stone Pitched Path

A very durable path can be made by fitting together flat-topped paving stones (pitching).

(i) One way of doing this is to adapt the technique used for pitched steps, by laying the stones so that surfaces are level with each other instead of stepping upwards. This method is very labour intensive and requires a lot of stone. For more information *see Appendix 2 – Guides to Construction, 2: Stone Pitching.*

(ii) *A more realistic approach has been devised by Icelandic professionals* Gunnar Óli Guðjónsson *and* Guðjón Stefán Kristinsson*. This work was done at Djupalon in Snaefellsnes by ICV trainees under their direction.*



The paving stones, which are plentiful in this area, are laid on a bed of gravel, which is spread in the bottom of the path tray.

(Continued)

2c: Stone Pitched Path (Continued)

This allows for flexibility and precision in setting and jointing the stones as levels can be adjusted.

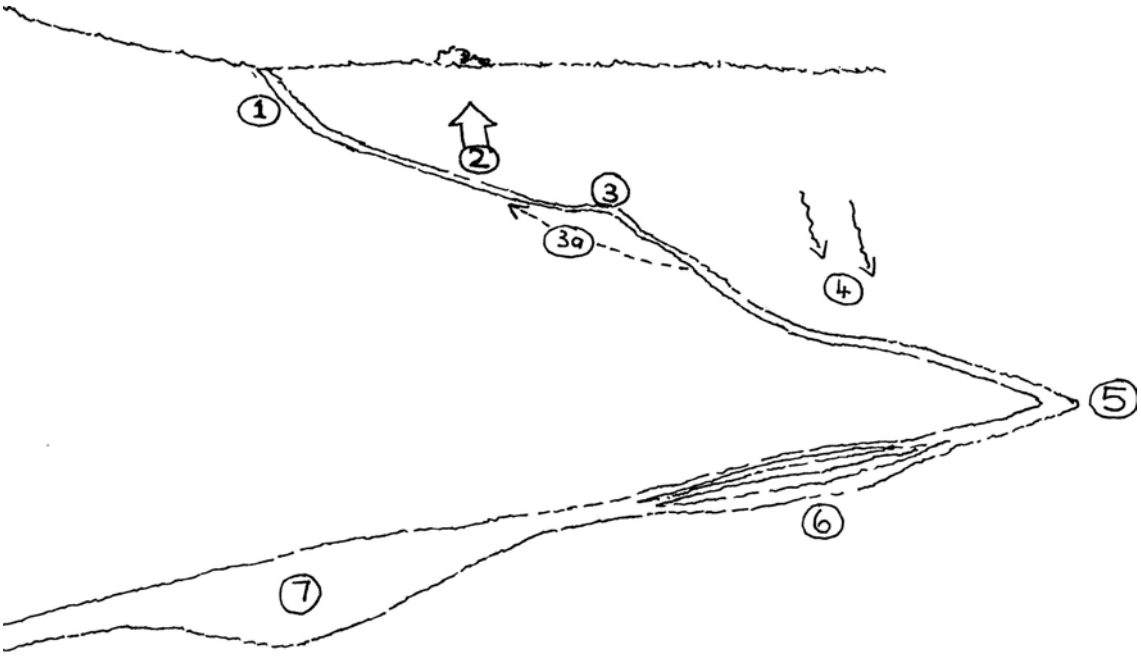
Here, the path has come up a flight of steps, laid by the same method, and will continue on the level.

We hope to get many more of our leaders and volunteers trained in this method during the coming seasons.

Roger Whysall

2: Paths

2d: Some Common Issues



1/ There is an unavoidable steep section.

> Provide a way up using stone pitching. Do landscaping around it to deter downhill walkers from going along the side of the path (this is a common cause of surface damage to a slope).

2/ Walkers leave the path and go straight up the slope, aiming for a prominent feature, creating a desire line. The slope is steep and unstable. Grass is getting worn and soil is washing out.

> Obliterate the desire line and do landscaping on the slope to make it uninviting to walk on. Make the official path comfortable to walk on and use extra landscaping at the side to deter people from stepping off it.

3/ and **3a/** Path goes up and over a poor, unstable, surface. There is a firmer, more gradual, slope nearby.

> Obliterate the existing path and put in deterrence if necessary. Create a new path along the more gradual slope.

For information about all of these see *Trailwork Basics 3 - Landscaping.*

Roger Whysall

2: Paths

2d: Some Common Issues (Continued)

4/ The path goes below a slope down which water runs.

Protect the path with waterbars and/or side drains. In some cases it might be possible to create grass-lined gullies or hollows higher up to intercept water and reduce the amount of water lower down.

See Appendix 1 – Drainage

5/ A sharp bend is inevitable.

Use landscaping to prevent walkers from cutting the corner.

See *Trailwork Basics 3 - Landscaping*

6/ Braiding (secondary paths running alongside the official path), caused here by people walking in groups or by passing each other widely.

Create a good path wide enough to realistically carry the number of people using it. If there are islands of turf between the braids they can be taken up and used to make the edges of the new path. Use landscaping along the sides to deter walkers from stepping off.

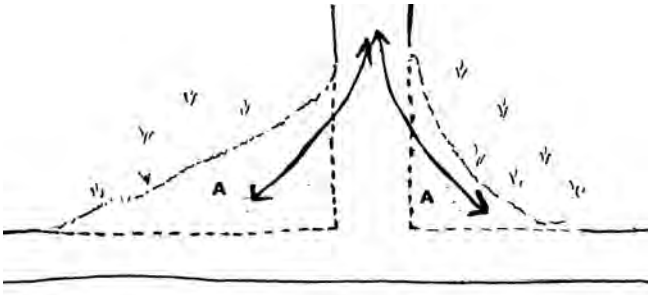
See Trailwork Basics 3d - Landscaping: Braiding

7/ In a level area walkers are spreading out and there is now a wide area of bare, worn, stony ground. It gets muddy and slippery when wet, so walkers step even further to the side, making the problem worse.

Create a path through the area which is comfortable to walk on and which follows an inviting line. Restore the rest of the damaged area using turf, vegetation and rocks. Use landscaping at the sides of the path in a way which will deter people from stepping off it.

See *Trailwork Basics 3 - Landscaping*

8/ At a T-junction of paths walkers cut the corners, wearing the vegetation away to leave bare ground (A).

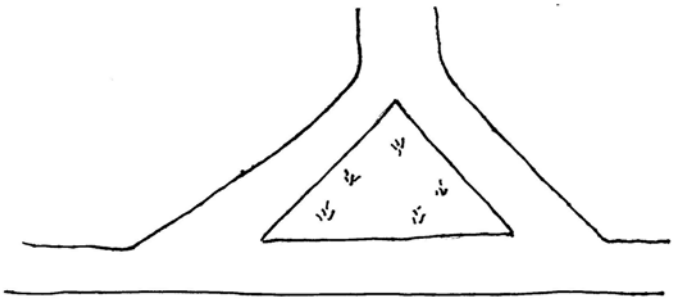


(Continued)

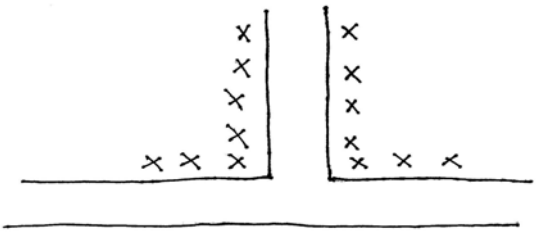
2: Paths

2d: Some Common Issues (Continued)

One solution to this problem is to create a 'godcake'. The side path is split into two, following the ways taken by the walkers. This leaves a triangle – known as a godcake - between the paths. This is then restored with turf and vegetation. It is unlikely to suffer wear as there is no advantage to be gained by walking on it.



An alternative method is to redefine the edges of the original paths, restore the eroded ground, and put in strong deterrents (e.g. banking, boulders, bushes) to stop people going off the path. However this a difficult objective to achieve as usually someone, sooner or later, will make a way through and erosion will begin again.



See *Trailwork Basics 3 - Landscaping* for more information.

3: Landscaping

3a: Overview

We do landscaping when an area of ground needs to be changed. Some common reasons for this are:

- Repair of damage caused by footfall, water, off-roading
- Obliteration of unwanted paths, braiding and desire lines
- Changing the line of a path
- Keeping path users on the approved path and away from sensitive areas
- Deterring off-roading by cars and bikes

How this is done varies according to circumstances and need. Basic approaches are:

Surface

- **Blanket turf:** a new covering of turf laid over the area.
- **Spot turf:** slabs of turf spaced out at intervals over the area so that they take root and spread out over time. This is done when turf is scarce.
- **Raking:** smoothing out the tracks made in desert gravel by off-roading cars or bikes.
- **Roughening:** creating with turf and rocks a surface which, while natural to look at, is uninviting and difficult to walk on.
- **Moss Transplanting:** replacing damaged areas with moss taken from a donor site. This is done either by taking slabs of moss and fitting them into the damaged area or by shredding moss and scattering it over the surface to regrow there.

Features

- **Rocks:** rocks and boulders are placed alongside a path to inhibit moving away from it. They can also be arranged in the area around a highland road to create a visual deterrent to driving off the road.
- **Banks:** these can be built at the side of a road or path where there is a need to discourage drivers or walkers from going off.

(Continued)

Roger Whysall

3: Landscaping

3a: Overview (Continued)

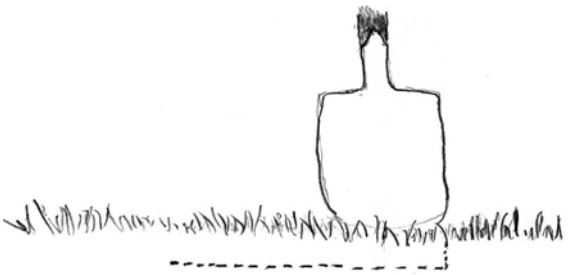
- **Dead hedges:** twigs and brushwood are woven together to make a 'hedge'. This is useful where there is a need for a temporary physical barrier, for instance when a path has been closed and replaced with new landscaping. In the time it takes for the hedge to disintegrate the new landscaping has time to become established.
- **Shrubs and small trees:** planting these can give a natural appearance and can serve as deterrents.
- **Gulleys:** A grass–lined gulley can sometimes be used in a slope above a path to collect water as it runs down the slope and redirect it away from the path.

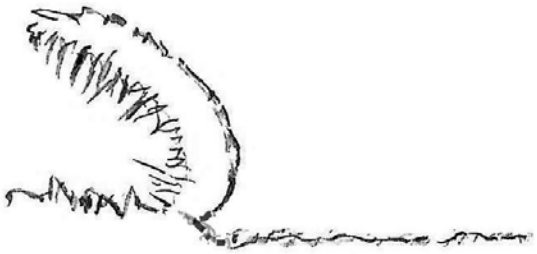
3: Landscaping

b: Working with Turf

Usually we take turf from a donor site near the job site. It should be taken up in small amounts from scattered places to avoid creating a new bare area. These places should be out of sight of the path. The bare patches left behind are, if they are small, quickly recolonised by the surrounding vegetation.

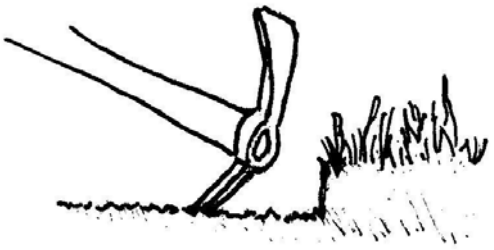
Cut around the piece of turf you wish to take up. Don't make it so big you can't carry it.





With your spade, undercut the turf, roll it back, and lift it. You need to take roots and soil too, but don't make the piece too thick because this will make it difficult to carry and will require more digging in when you lay it.

Prepare the ground to receive your turf: loosen the soil it will lay on and make sure the depth and shape of the tray will make a good fit.

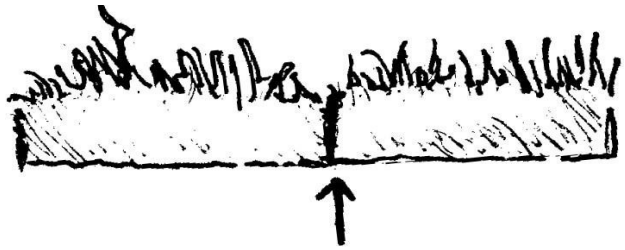


Roger Whysall

3: Landscaping

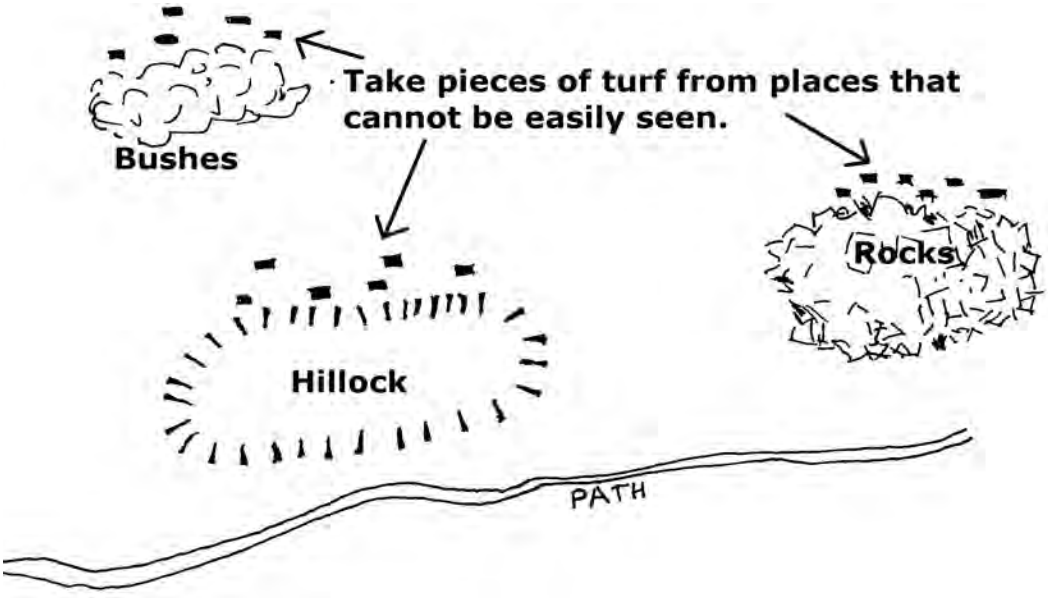
3b: Working with Turf (Continued)

Fit the turf pieces together to make a continuous covering. Make sure they fit tightly together and are at the same level.



If there are any spaces left between the pieces, pack them tightly with soil.

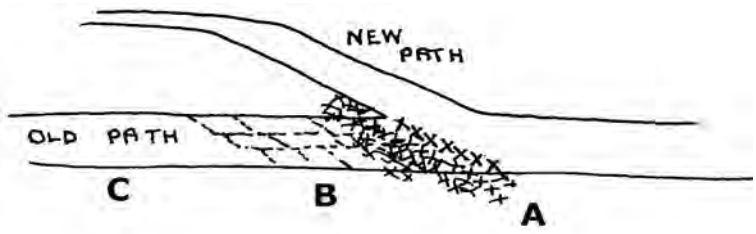
And don't forget, when you are getting turf ...



3: Landscaping

3c: Obliterating an Unwanted Path (i)

In this example walkers are directed into a new path and away from a previously used one.



The old path is obliterated by covering it with turf (B) so that it is indistinguishable from its surroundings.

For some time after the work has been done, and until the turf has blended in, it will be possible to see the line of the old path. To prevent people from walking along it we can use a dead hedge (A) to create a temporary barrier.

To do this, branches and twigs are stuck in the ground and interwoven with bushy twigs and foliage to make an artificial hedge. This will of course wither away eventually. But while that is happening the newly laid turf has time to grow and blend in with its surroundings.

If there is not enough turf to obliterate all of the old path, it should be laid for as far as possible from the junction (B,C). The rest of the path will at least be made difficult to reach and will naturalise in time. If there is a point in the old path where it turns out of sight, it is a good idea to lay the turf as far as that point so that the bare section is invisible from the junction. It is also helpful, if turf is scarce, to use some of it for 'spot' turfing, i.e. planting pieces of turf at spaced out intervals so that they can spread out over time.

For an alternative method see *Trailwork Basics 3c, Landscaping - Obliterating an Unwanted Path (ii)*.

Roger Whysall

3: Landscaping

3c: Obliterating an Unwanted Path (ii)

This section describes a project devised and led by Icelandic professionals Gunnar Óli Guðjónsson *and* Guðjón Stefán Kristinsson *at Djupalon in Snaefellsnes and carried out under their direction by ICV* trainees.

A poor quality path and a desire line (*fig.1)* are being replaced with one good path. The desire line (foreground) is to be obliterated and landscaped to look natural again, and made uninviting to walk on.

(fig.1)

(figs. 2,3) The ground in and around the desire line is thoroughly disturbed.

(fig. 2)

Ground beside the path is included so that the edge line between the desire line and its surroundings is lost.

(fig. 3)

(Continued)

Roger Whysall

3: Landscaping

3c: Obliterating an Unwanted Path (ii) (Continued)

Turf is laid at irregular levels across the area and rocks are placed to break up the line of sight. *(fig.4)*

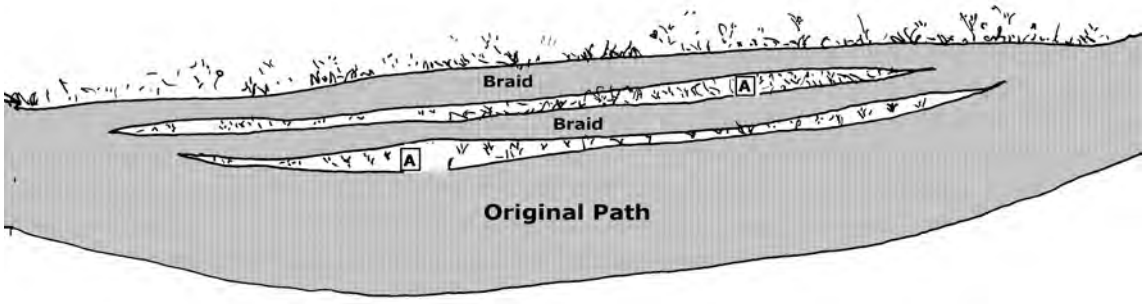
The final result is a piece of rough ground that looks totally part of its surroundings yet is most uninviting to walk on *(fig.5)*.

(fig.5)

3: Landscaping

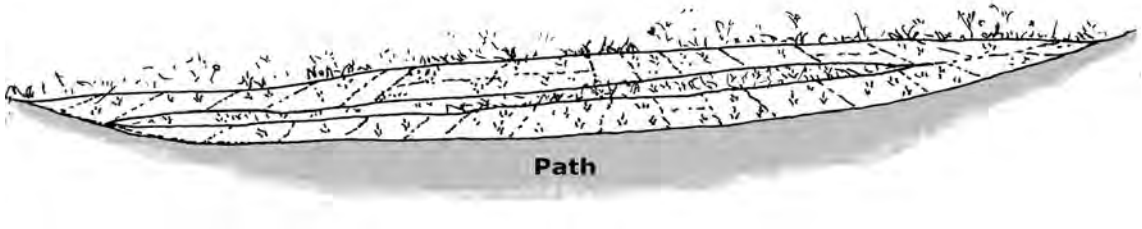
3d: Braiding

fig.1: Secondary paths – braids - have been worn by people walking beside the original path. Islands of turf have been left between them (A).



(fig.1)

fig.2: If widening is thought necessary, this is done, and new edges defined. Then worn areas are repaired by fitting in slabs of turf. Here the turf from one of the 'islands' has been taken up and used for this, along with new turf brought from a donor site.



(fig.2)

Fig.3: To prevent the problem happening again, rocks and humps are used along the edge to discourage people from stepping away from the path. They also give the edge a more natural appearance.

(Fig.3)

See also *Landscaping 3b - Working with Turf*

Roger Whysall

3: Landscaping

3e: Off-Roaders

Typical disfigurement of the beautiful smooth desert gravel, caused by irresponsible drivers leaving the road and playing games. If left, the marks become permanent. Also, other drivers may see the tracks as an invitation to do the same and add their tracks to the mess.

The tracks are gently smoothed out with rakes. The rake can be used in the normal way (points down), or it can be turned over and the back used for a gentler touch. A stiff sweeping brush can also be useful for finishing touches.

(Continued)

3: Landscaping

3e: Off-Roaders (Continued)

It is impossible to remove all evidence of the tracks but a season or two of weathering will finish the job.

Tracks in moss are a much more difficult problem. The compressed earth makes growing conditions different from the surroundings, which alters the species growing there. This becomes permanent and is impossible to deal with except by removal and replanting which in these conditions is unfeasible. The only remedy is prevention – by education and rigorous policing by rangers.

See also *Landscaping 3f - Working with Moss*

Roger Whysall

3: Landscaping

3f: Working with Moss

Transplanting

Slabs of moss are taken from a donor site.

The site should have enough moss for it to be undamaged by the removal of a comparatively small amount.

The moss should be taken in pieces from scattered locations so that a large bare patch is not created.

It should be taken from places not easily seen.

Try to move around the site without damaging the moss. Step on rocks where possible. Do not walk repeatedly on the same piece of moss: it is very fragile and can be killed by being stepped on as few as 5 times. A flat board is used to carry the moss.

With a flat trowel or knife, cut out a slab of moss. In order for it to have a good chance of surviving the move, it should be no smaller than about 60cm square.

It is very fragile indeed and will break apart if roughly handled.

(Continued)

Roger Whysall

3: Landscaping

3f: Working with Moss:

Transplanting (Continued)

Do not attempt to lift the piece as it will break up easily.

Instead, gently push the board under the moss, between it and the bedrock or gravel it is growing on.

It can then be lifted away on the board.

To protect it from breaking apart during transit, string is tied round each piece.

The pieces are taken to the work site...

(Continued)

1.3: Landscaping

3f: Working with Moss:

Transplanting (Continued)

… where they can be fitted into prepared places.

The piece should be an exact fit with the moss around it. There should be no gaps; joints should be tight. If not, the piece will be stripped away by harsh weather.

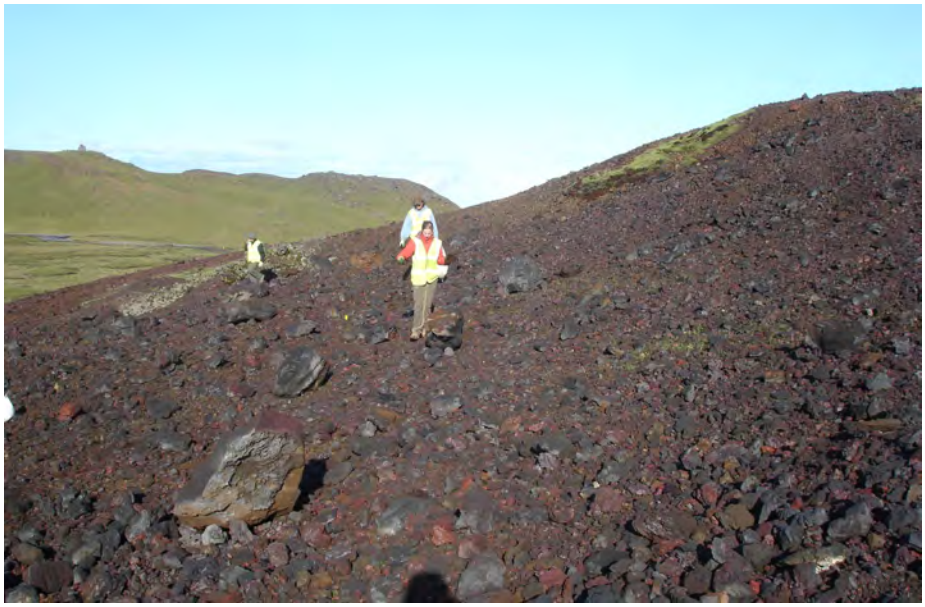
See also *Trailwork Basics 3f - Working with Moss: Seeding*

3: Landscaping

3f: Working with Moss

Seeding

When there is a need to regenerate a large area, moss from a donor site is shredded into small pieces and scattered evenly over the surface. This becomes established to form a new covering over the area. It is a long term strategy.



The examples here are from a project at the Hellisheiði power plant near Reykjavík. Moss which would have been destroyed during building works was instead taken up and used to reseed areas which had been destroyed by previous land users.

Working ahead of the developers the moss was taken up and bagged, then shredded by hand.

It was then scattered evenly over the surface being regenerated.

See also *Trailwork Basics 3f: Working with Moss: Transplanting*

Roger Whysall

4: Further Information/Tips/Materials

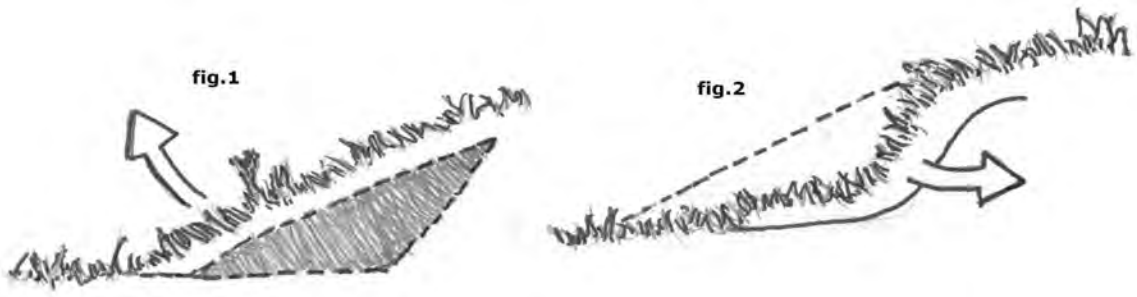
Almost always we get our materials from the area close to the path or landscape we are working on. This can be done in a number of ways:

Turf which has been removed to create a tray for a new path can be used for landscaping nearby. Similarly, stones, earth and boulders might become available. Apart from this it is necessary to look around the area near to the work site for these things.

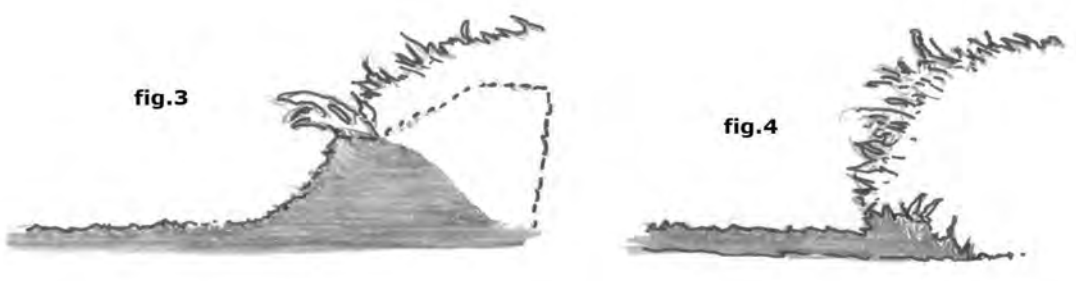
Turf can be cut and brought to the job. It should be taken in small amounts from scattered places to avoid creating a new bare area. These places should be out of sight of the path.

Soil can be taken out of a 'soil mine'.

In this example the turf on a slope is lifted away and the soil underneath it is taken for use (fig.1). When finished, the turf is replaced (fig.2). Care is taken to blend the new contour naturally with the surrounding slope.



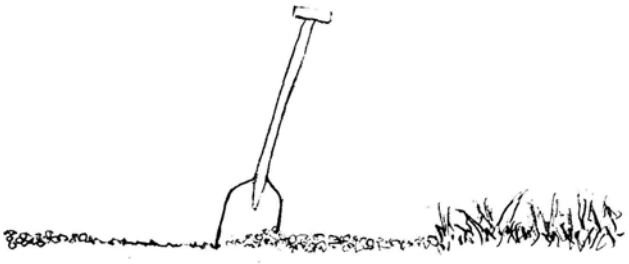
In some areas of heath soil is exposed by erosion (fig.3). With care, this can be hollowed out and the gap closed with turf (fig.4).



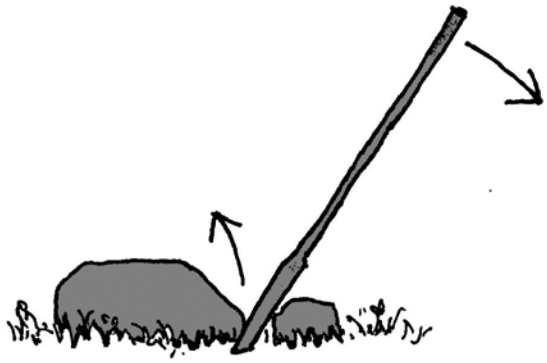
Roger Whysall

4: Further Information/Tips/Materials (continued)

It is sometimes possible to find areas of outcropping **gravel** which can be scraped to provide surface material. To do this, scrape off a thin layer of the exposed gravel for use. Do not dig holes or scrape too deeply into the gravel. Leave the surface smooth and it will weather back into its original condition.

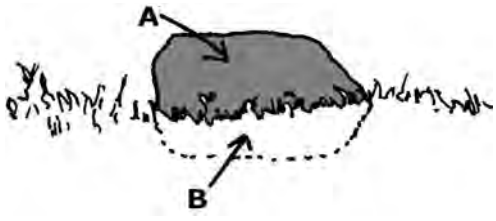


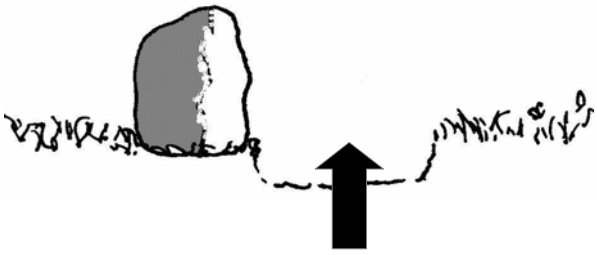
Gravel is sometimes bought from a supplier by the site management. In such cases care should be taken that the gravel has the right appearance for the location in which it is used. The best sort of gravel has clay-like material mixed in with it, which hardens to form a strong, water resistant surface. Unfortunately this is difficult to find in Iceland. **River gravel should not be used** because it is rounded and slippery, causing it to spread out from the path as people walk on it.



Search the area around the project and identify **large stones** which will be useful. Using a rock bar with a smaller stone as a fulcrum, lever the stone out of the ground and bring it to the job by rolling or in a rock carrier.

The surface of the stone above ground will have a weathered appearance (A); the surface below ground will be much paler (B). When landscaping, at the side of a path for instance, try to lay the stone with the weathered face in view.





Before leaving the site, use turf or stones to hide the hole left by the stone's removal.

Roger Whysall