

SLIABH LIAG

An appraisal of the current footpath management project on the mountain Dr. Bob Aitken

Summary

1. **Introduction:** Mountaineering Ireland invited me to visit Sliabh Liag to offer advice on the current path repair project and its execution. I have 30 years of upland footpath management experience in Scotland and other parts of the world.
2. **Site visit:** I spent a full day on Sliabh Liag on 16 September with representatives from Mountain Ireland, from Donegal County Council, and from the contractor managing the current project. We inspected and discussed the full length of the works under contract.
3. **Site appraisal:** Sliabh Liag is inherently unsuitable as a location for the development of a tourist path by virtue of its rugged character, length, and environmental sensitivity, not least as a Natura site. Even for repair and construction to hill path standards it presents awkwardly varied and technically very challenging topographical and ecological conditions, including at least three very difficult sites.
4. **The project:** the conception of the project as a single-push ‘solution’ for the whole length of this difficult path was excessively ambitious, given the scale and technical challenges of the site, but also because the path diagnostic skills, specification practice, and technical ability needed for quality upland path repair and reconstruction are still developing in Ireland.
5. **The specification for the path works:** the engineering-based specification for the work appears excessively prescriptive and inflexible for upland path work, not least in face of the markedly varied site conditions on Sliabh Liag. The criteria for path alignment are unclear; the techniques specified seem heavy-handed and restricted when less constructional, less technically demanding, and less expensive methods could have sufficed on long runs of the path. Prescriptions in respect of key elements such as drainage, path definition, and re-use of spoil are inadequate.
6. **Execution of the works:** the contractor clearly had limited insight into the problems posed by conditions on Sliabh Liag, and there was little evidence that he was ready to take the steps necessary to address those problems. His workers appeared to have minimal relevant experience, with little understanding of the problems they were dealing with and the technical skills needed. The work was advancing in a piecemeal fashion, with key problem sites not yet addressed. There was considerable variation from the specification. Significant hazard to walkers was evident, from loose stones in pitching and from mobile stones laid into peat. The stone being used in flagstone pitching was well below specification, and as laid offered no prospect of stability even in the short term. The current disposal of spoil risks significant damage to the natural vegetation of the site.
7. **Overview:** the current works undertaken on the path are almost certain to be ineffective because of problems of alignment, inappropriate techniques, sub-standard materials, and weak execution due to wholly inadequate levels of skill and experience. It seems very doubtful that the volume of work outstanding can be completed to appropriate standards within contract. A substantial re-structuring of the work would seem to be the only mechanism by which the situation can be remedied.
8. **Recommendations:**
 - > **Set aside the current full-path programme and** focus on selected key sites.
 - > Apply the specification selectively and flexibly to **deal with the priority sites.**
 - > **Reinforce the contract team urgently** to strengthen its ability to delivery safe and sustainable works, by bringing in additional skills and experience in supervision, training and execution.

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1. Introduction

Mountaineering Ireland (MI) invited me at short notice to visit Sliabh Liag and to offer advice on the current path repair project and its execution. My background experience in path management is summarised at Annex 2. I had not previously been on the hill, though I had visited the carpark once some years ago in atrocious weather. MI supplied me with notes and photographs from earlier site visits in the development of the project and during the current works, but I had limited opportunity to read and digest the specification document before seeing the site.

2. Site visit

I visited the mountain on 16 September with Helen Lawless and Dennis Golden for MI; Aidan McGrenra of Donegal County Council (DCC) and Jeremy Smith, advisor to the Council. Paul Duffy of Metro contractors and his assistant joined us at the outset, but after early discussions they distanced themselves from most of our detailed debate, and had left the site some time before we had a final review discussion at the carpark. We spent about 8 hours on the path in total.

We walked out and back over the whole part of the route to Sliabh Liag for which works are proposed. Conditions were exceptionally dry. This is a large site, complex in its range of topography and ground conditions, which really needs two or three visits for a full diagnostic understanding. In particular I would have liked to see it in wetter conditions to assess the patterns of drainage and the state of the ground on the deep-peat sections.

Despite the fine weather the number of walkers on the path beyond the viewpoint was quite limited, probably less than thirty or forty over the day, a good proportion being European visitors.

3. Site appraisal: the nature of the mountain and its path

In my view Sliabh Liag is inherently unsuitable as a location for the development of a tourist path for general visitors. The site is marked by an abrupt transition from the roadend to the rugged cliff top, with its up-and-down crest line and its bounding abrupt drop over the cliffs. It is a good distance along the ridge to the main top of the mountain, making for a considerable walk whether out-and-back or as a circuit via the Pilgrim Route. For visitors not looking for a mountain walk nor accustomed to this kind of wild landscape, it may well feel a somewhat threatening place in any but the finest weather. These attributes may be reflected in the present pattern of use, with only 5% of 160,000 users reportedly venturing beyond the viewpoint area within about 200 metres from the carpark. The first fairly steep and broken initial slope is a useful filter to separate committed walkers from casual visitors.

From a footpath management perspective, this is also a path with awkwardly varied topography and ecology, from apparently dry and reasonably fertile grassy swards on shallow soils on broad open ridges in its earlier stages to difficult sites with deep peat on steep slopes and over steeply shelving bedrock slabs. Deep peat on open slopes of moderate-to-steep gradients presents technical challenges to which no very satisfactory light-touch solutions have yet been found. Some of the sites lie on or immediately behind narrow crests. Even for very experienced path managers and workers, these sites would present considerable technical and safety challenges to achieve a sustainable low-key route to hill path standards for committed walkers.

But to construct a safe, stable and durable footpath for general tourist visitors in these circumstances would need a highly constructional intervention that would cause a radical transformation in the essential nature and quality of the mountain environment, particularly given its Natura designation.

Given these difficult site characteristics, an iterative approach to path management would have seemed advisable, to explore issues of path alignment, visitor containment and direction, and repair or construction techniques in a progressive programme, probably over several years. That might have begun with light intervention along the path to fix or forestall problems, or with a focus on key defining sections or acutely difficult damaged sites. I would suggest there are at least three acute sites where this kind of iterative work could usefully have been focused, two of them having significant safety implications:

- the traverse around the knoll at the Eagle's Nest, where the current path runs round an open corner across an exposed and degrading slope close above the cliff edge.
- the ascent towards the long dome of Shanbally, particularly on the first sharp rise from the col and on the steep upper slope, where it would be advantageous to cut off the current long leftwards traverses to the ridge above the cliff slope. Those traverses have been broken down by trampling into highly conspicuous lines of damage. Both these sites have steep deep peat over boulders.
- the traverse of the lower crest knoll at Keeringear, where the crest line is narrow, airy, rocky and awkward, but the backslope traverse runs on very steep broken peat over sharply dipping rock slabs, and has already seen one substantial slump.

Work was under way on the first two of these sites, but with likely problematic outcomes, as discussed below.

4. The project

Given the challenging scale and difficulty of the Sliabh Liag path, the undertaking of the project as a substantial and ambitious capital programme with a tight timetable has induced its own problems, not least the expectation of a total solution for the full length of the path. In my view this was an overly ambitious objective. The problem was only compounded by the delivery at an early stage of large volumes of stone by helicopter along the path to sites where constructional techniques were yet to be proven.

It is quite understandable that the office who specified the works, the project manager, and subsequently the contractor, lacked a full understanding of upland path process or a firm grasp of the difficult issues along the path. Given the distinctively problematic environmental conditions found on Irish hills, and the currently developing state in Ireland of path diagnostic skills, specification practice, and technical ability needed for quality upland path repair and reconstruction, it would perhaps have been more judicious to proceed by increments along the path, or as mentioned above, to trial and develop solutions for key sites first. The appropriate metaphor would be trying to run before one can walk.

5. The specification for the works

The specification for the path works is a substantial piece of work. However I feel its approach is ill-adapted to the nature of the task on Sliabh Liag. It may have drawn for techniques and standards on footpath management manuals, some of them developed for application in different environments, but it is essentially modelled on engineering practice. I would suggest that that style is excessively prescriptive and inflexible for upland path work, not least in face of the marked variation in site conditions on Sliabh Liag.

While the objectives of the project may possibly be found clearly stated in other documents, they are not explicit in the specification. As a result it is difficult to identify what criteria determined the selected path alignment, the desired path standard and style, or the techniques to be used. From discussion on the ground it appeared that there was an intention to provide a path appropriate to bring tourist visitors up to higher viewpoints on the first section of the path, but not to encourage them beyond that point. Given that premise; the techniques specified for the path as a whole seem heavy-handed and restricted in range and response to site conditions, when less heavily constructional, less technically demanding, and less expensive solutions might well have sufficed on long runs of the path.

The issues of alignment for the path do not seem to be discussed in the specification, so the rationale and the balance of judgement on route selection – by no means straightforward, as at the three problematic sites mentioned under (3) above – is not always clear.

The specification demonstrates a lack of in-depth experience and diagnostic understanding of physical processes on mountain paths, and of the range of path construction and repair techniques. Some of the techniques recommended for general application, especially the strong emphasis on stone construction either as ‘blockstone pitching’ or as ‘flagging’ seem inappropriate for significant parts of the path. At low grades and especially on the earlier parts of the path, a geotextile-based gravel path over peat sections could have been quicker and easier to build than either of the rock-based techniques. The specification’s prescriptions in respect of key technical areas like drainage, path definition, and the re-use of spoil are weak if not flawed.

Though its prescriptions and statements of technical standard were sometimes very precise, I would have to say that the works specified were not always necessary, or not as uniformly required as the specification suggested. Work on Sliabh Liag demonstrates the inherent conflict between the need for a detailed specification on the one hand, and the need on the other for a degree of flexibility in response to the problems posed by unforeseen and sometimes unforeseeable site conditions.

For the sake of brevity here, I have outlined a number of more detailed technical points on the specification in Annex 1, with some related comments on execution.

6. Execution of the works

The contractor clearly had limited insight into the problems posed by conditions on Sliabh Liag. More problematically, there was limited evidence that he was ready to take the steps necessary to address those problems when identified. The work was advancing in a piecemeal fashion, with key problem sites not yet addressed. There was considerable variation from the specification in size of stone being used, in packing base layers of rock into peat, in drainage works, and in the disposal of spoil.

The contractor’s workers, though willing, appeared to have minimal relevant experience, with little understanding of the challenges they were dealing with and the technical skills needed. This was especially true in their execution of ‘blockstone’ pitching, acknowledged as a demanding technique, where the results lacked basic stability and often produced awkward and uncomfortable walking surface. Significant hazard to walkers was evident from loose stones in pitching and from mobile stones laid into peat. The stone slabs helicoptered to site for the flagstone pitching were uniformly well below the specified size, so that even if they had been more systematically butted together for mutual support, there appeared little prospect of stability even in the short term, and much less so when the underlying peat is saturated.

It is a fundamental axiom of sound path work that stones in and around the path, whether in pitching, cross-drains, or blocking, must be solidly bedded and stable so that they can withstand trampling and natural processes of water flow and frost. Unstable rocks are not only hazardous in the short term but their gradual movement is liable to break up the cohesion of the built surface.

Landscaping and the re-use of turf and spoil were also weak. Particularly in the prevailing dry weather, turfs need to be closely butted to avoid drying out from exposed edges. Very little attention was being given at this point to path definition and blocking, whether by carefully bedded rocks or by recycling spoil and turf into defining mounds, which are certainly needed where the path has been pitched over open ground.

The poor standard of much of what had been done was a particular source of concern in considering the problems of addressing the acutely difficult site where the path traverses the back slope of the lower crest knoll at Keeringear. That site would present a considerable challenge to a very experienced contract team, but we could feel no confidence that the current workers could achieve any safe and stable resolution for it.

7. Overview and conclusions

The strong impression from the site visit was, regrettably, of a compound failure of conception and execution of an excessively ambitious project in a delicate and difficult environmental setting. There are major problems in the selected alignment, in the choice and application of path techniques, and in the lack of experience and skill to apply them.

At the moment the path presents intermittent segments of poor-standard work along a good part of its length, many of them being currently incomplete, unsightly and unstable, and some of them unfortunately unlikely to be much used by walkers even if completed. While work is continuing, it was clear that the volume and quality of work required were unlikely to be achieved to a satisfactory, stable, safe standard within the contract price and timing. There was little sense that the problems of current execution, some of them attributable to a failure to obtain and deliver appropriate stone, could be resolved by the present contractor and his workers without substantial reinforcement of direction, supervision, and skills training.

8. Recommendations

- The project should be reshaped, by setting aside the very ambitious full-path programme, and concentrating on a key-sites approach to achieve effective alignment at defining points, and to secure a safe path at hazardous locations and at sites where current path works themselves constitute a potential risk to walkers. It follows that DCC must accept the need for further progressive works and continuing intervention, both in construction and in maintenance, beyond the current contract.
- It is necessary if unpalatable to accept that given the problems of path repair and construction to this point, the DCC specification requires to be applied highly selectively and flexibly. It is apparent that any contractor, however experienced, would have faced considerable problems in delivering this project to a satisfactory standard of environmental and recreational acceptability on the basis of the current specification.
- It is urgently necessary to reinforce the current contractor's workforce to greatly improve its capacity to deliver quality work to appropriate environmental and safety standards. Ideally external expertise should be brought in to provide skills in supervision, training and execution.

Dr. Bob Aitken, 25 September 2014.

Annex 1

Specification: further issues

I have seen only the specification booklet A, without the supporting technical drawings. I have not seen any other documentation, including the tender and contract documents.

The specification of upland footpath works is acknowledged to present distinctive difficulties because of the high degree of variability of site conditions. Gradient along and across the path may change rapidly, the surface and substrate materials can be markedly different, and drainage problems may be highly localised. That in turn demands a high degree of flexibility in techniques and approaches over quite short stretches, and defies generalised prescription, whether of surface construction, drainage, definition, or landscaping

These difficulties are compounded where, as in the Sliabh Liag case, there is limited experience and mutual understanding of the common standards for design and execution of upland path works. The Sliabh Liag specification appears to derive its style from engineering practice, informed by reference to a range of path management manuals. As a result the specification seems rigid and comprehensive in some of its prescriptions, particularly in respect of the strong focus on stone-based techniques, but open and vague in others, notably on drainage and landscaping.

The specification suggests a continuous uphill lateral ditch for most of the path, but that may be impossible to achieve on rocky sites, or entirely redundant on free-draining crests. Although the specification spells out the detailed dimensions for a drainage trench, practice elsewhere has moved on from open trench ditches to shallow v-ditches, preferably with vegetated banks, which are equally effective, less prone to obstruction, less intrusive in the landscape, and better protected against high-velocity scouring in storm conditions.

The specification of drainage on pitched surfaces is seriously deficient. Although it is not clear from the description, it appears that the only form of drainage specified, and described as a cross-drain, is a water bar built between the pitching stones, not a open stone-lined cross drain as generally understood in path management. As far as drainage provision had been made in the execution of the works to date, it comprised virtually no uphill lateral drainage, and only a few water bars, their location being apparently almost random. None of them conformed to the specification's requirement of a 120° skew to the path line, designed to make them self-flushing.

The specification of 'blockstone' pitching lacked emphasis on the packing of stones in a rigid block of joint-offset stone to ensure stability, particularly on steep slopes, and particularly where the pitching was set into a trench in deep peat. The use as a model of the sections of path pitched by a professional Scottish team in 2001 was perhaps unhelpful in this respect, as their work used very large rocks, in good mineral soil, at relatively low gradients.

The specification's emphasis on flagstone pitching on low-gradient peat is perhaps unfortunate. Flagstone pitching has been successful where very large slabs, of the order of 1.6x1m, have been used, butted end to end. It is doubtful whether the size of slabs suggested in the specification (500x500mm) would have been stable, but none of the flags delivered to site met that size criterion. Gravel on geotextile might have been preferable on earlier low-gradient sections on peat.

The recommendations for treatment of spoil were inadequate for a site of high nature conservation value; spreading spoil to a maximum depth of 150mm, with consequent vegetation destruction, is not acceptable. Good practice elsewhere reuses all spoil in restoring damaged ground, in back-filling boulder holes, in building turfed mounds to help define and contain the path. In that respect, the specification on blocking and delimitation of the path was inadequate in not identifying the careful digging-in and landscaping of planted boulders, vital to their effectiveness as a physical and visual barrier; the recycling of spoil into turfed bunds or mounds, as above; and the use of alternatives such as transplanting clumps of rush, a surprisingly effective visual signal. Much attention and careful work needs to be devoted to these forms of landscaping and blocking, particularly where pitching is applied on uncontained open slopes.

Annex 2

Bob Aitken: Path management experience

I am a geographer by training (MA Glasgow, PhD Aberdeen), with a specialism in recreational use and valuation of mountains. I have worked for 40 years in countryside consultancy, including upland recreation surveys, recreation ecology studies, planning and landscape appraisals, and guidebook writing.

Most relevantly, I have been involved in upland footpath management for 30 years, starting when I led a Footpath Management Project for the former Countryside Commission for Scotland, and then for Scottish Natural Heritage, over 15 years from 1984. The Project aimed to identify the scale and dynamics of the then very rapid development of recreation impact on Scottish mountain paths, to test and demonstrate a range of environmentally appropriate technical solutions, and to establish sustainable management structures and funding mechanisms for what has since developed into a significant rural craft industry. Building on that platform of established methodology, national agencies, land-owning NGOs, local authorities, voluntary groups and regional path Trust partnerships have repaired to high standards hundreds of kilometres of paths on the Scottish hills. Much of the work is now carried out by specialised contractors.

By dint of engagement with these processes I have a wide-ranging experience of upland path management from hands-on technical work and volunteer training to large-area survey and strategy. I have given keynote papers, led workshops, and provided advice on path management in mainland Australia and Tasmania, in Canada, and most recently in Ireland for Mountaineering Ireland, as well as observing path processes and path management in all the alpine countries of Europe. I will shortly be going to Iceland on a similar advisory visit.

On a wider front, I have served on a range of public and voluntary conservation bodies for over 40 years, including most recently 8 years on the Board of Scotland's first National Park in Loch Lomond and The Trossachs. I am an Honorary Fellow of Scottish Environment LINK, Honorary Vice-President of the Scottish Rights of Way & Access Society, and an Honorary Member of the Scottish Mountaineering Club. I am also a member of IUCN's World Commission on Protected Areas.