

## SATIN Case Study - Upland path repairs protecting Steall Gorge

### Organisation Name

John Muir Trust for wild land and wild places

### Infrastructure Location

Steall Gorge, Glen Nevis



### Date of Completion

10-May-2013

### Context

A path through Steall Gorge has existed for centuries but the current path was probably formed in the late 1920s. It starts from the car park at the Glen Nevis road end and traverses up through a narrow, steep sided gorge to arrive at Steall Meadows after a couple of kilometres where the terrain opens out and there are views of An Steall waterfall. The path to Steall Meadows is walked by 10s of thousands of people each year, and is popular for the native woodland that it passes through, and the dramatic views of the gorge and waterfall. It also provides access to surrounding hills and longer walks through to Corrou Station, Spean Bridge, and Kinlochleven.

Although the path to Steall Gorge was constructed historically, it is still a rough and rugged path to walk and that is part of its character. The number of walkers using the path combined with the steep terrain and heavy rainfall of the area means that the path gets a lot of wear and tear. Although it was still in a reasonably good condition, in 2012 there were some sections where the soft outside edge was beginning to collapse and other places where water run-off was eroding the path surface, making it rougher and causing people to walk on the grass along the path edge leading to additional erosion. If left these on-going processes of erosion would have lead to bits of the path crumbling away, a loss of vegetation and soils, and the path becoming less accessible. Path repair works completed aimed to consolidate the existing path and provide further protection from erosion whilst maintaining its rugged character.

## Technical Aspects

**Design** - One of the main challenges in designing the repair work was to work out what was actually necessary to consolidate and protect the path and avoid over building the path. On the steep, rocky, mixed terrain of Steall Gorge this is not an exact science but a judgement call based on the physical processes such as surface run-off, soil creep and foot pressure which were evident as well as the history of path construction and repairs which have been undertaken in the past. Site visits undertaken in different weathers and seasons helped to build up a picture of the dynamic processes in action on the path. From a general understanding of path dynamics solutions were then worked out for the specifics of each part of this particular path. The majority of the design focused on stonework - short sections of pitching where it was steep, revetment of the path edge where it appeared soft and weak and drainage features to catch and shed surface water.

**Logistics** - The logistics of undertaking the repair work were very complicated and involved. There was very little stone on site at Steall Gorge for using in the construction of drains and steps, etc. Approximately 100 tonnes of large rocks (over 1,000 individual rocks) were needed for the repairs. The majority of this rock would need to be sourced off site and brought in by helicopter due to the steep ground in the gorge. However, the path passes through mixed native woodland, which has a largely closed canopy and Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI) status for its oak and pine trees. Clearings would need creating to allow bags of stone to be placed on the steep ground. This required consultation with, and permission from, Scottish Natural Heritage (SNH). Six landing sites were agreed with only birch trees permitted to be felled at these sites.

**Helicopter airlift** - An airlift was complicated by several factors: the steep ground onto which the bags of stone were being placed; by the surrounding trees; need to operate a long line with the helicopter; by the popularity and number of walkers using the path; and with the flight path of the helicopter passing over the Glen Nevis road. This necessitated a road closure order for which permission obtained from Highland Council and a lot of publicity work to alert the public of the forthcoming works asking them not to use the path if possible during the days of the airlift. The airlift was delayed by poor weather but when it finally got under way took two days and required further tree felling on the day as the pilot was working in very close proximity to the tops of trees. Several staff were required during the airlift: to manage the landing sites for the bagged stone; to hook the bags onto the lifting cable; to undertake further tree felling; and to marshal the start and finish of the path in case walkers came along.

**Repair works** - The repairs were undertaken during the winter to avoid carrying out work during the busy summer season and minimise any inconvenience caused to the many visitors who walk the path. There are still a good number of walkers using the path in the winter though and the contractor was required to establish a safe working system to enable walkers to pass through the site safely. Undertaking the work in the winter also proved advantageous as the site is relatively low-level and being sheltered in woodland is a relatively good site for contractors to work during the winter months. This led to very competitive bids returned from contractors keen to win the contract.

**Innovation** - There were a couple of sections of repair work which were quite unusual or where it was hard to specify a solution as bedrock was present and underlying ground conditions unknown. Contractors were asked to price these sections as bespoke pieces of work for which they would need to find an innovative solution. Possible solutions were discussed at the site meeting and again during the construction phase with emphasis put on the work being as natural as possible.



Helicopter landing bags of stone on a long line

## Outcomes

The repair work was completed by Arran Footpaths and involved primarily stone built features such as pitching, revetment and drains. Through continued liaison with the contractor, a style of work in keeping with the terrain and existing built features was developed to help protect the path as required but not formalise or sanitise it where possible. Weathered stone was used and features in the ground such as bedrock and bigger boulders incorporated into the finished work to retain the character of the path.



Before - awkward and slippery tree roots



After - stone steps built over tree roots to protect them

Where revetment was required on awkward bedrock sections Arran Footpaths developed revetment 'veins' which filled in hollows in the bedrock but left protrusions of the bedrock showing in between. Once landscaped this proved to look very natural and meant that the awkward surface of the bedrock (which was causing a bottleneck in the path and leading to trampling of vegetation at the side) could be surfaced with aggregate (gravel and fines) which were retained by the revetment.



Before - awkward bedrock section with braiding on the right hand side



After - revetment veins landscaped

## Financing

- Helicopter airlift costs to locate helicopter, lift and land bagged stone on to site - £13,000
- Applications to close the road and store materials - £1,400
- Contractor costs to undertake repair work - £50,000

## Evaluation

One oversight of the project was underestimating the amount of brash that would be left as a result of the tree felling. Some of the trees felled were relatively large birch trees and produced a substantial amount of wood and brash debris. Initially this was moved off the path and left in habitat piles along the path edge but it soon became apparent that this didn't look right and caused some concern within the local community. Once this was realised and understood the larger logs were moved away from the path and brash dragged over the top of them to disguise them as much as possible. This will be reviewed as the brash breaks down and further efforts made to disguise any unnatural looking piles of timber if necessary.

Most of the work was carried out in November and December 2012 when cold, dry, frosty conditions dominated. The milder, wetter weather that followed at the start of 2013 then revealed where surface water puddled. Some of the surfacing material dug from borrow pits on site had too high a clay content and was not granular enough and became very soft in wet conditions. This was resolved when work was completed in April and further gravel added and surfacing topped up to shed water off the path.

The actual stonework carried out is felt to be the main success of the project. Arran Footpaths understood the style of work that was sought and adapted standard techniques to produce finished work of a high standard that is natural and in keeping with the nature of the gorge and the existing path. Feedback from the public regarding this has been very good following concerns from some prior to work that it would be over built and sanitised.



Boulders incorporated into path as features

### Key Learning Points

As a popular walk used frequently by many local residents it would have proved pertinent to have held a site visit or public meeting with interested parties to discuss the work during the planning phase of the project to build better relations with the community, and to aid communication. When a local interest group did have concerns over the state of the brash this resulted in negative publicity in the local press and bad feelings when direct communication would have, and finally did, resolve the situation much more effectively.

Despite the publicity regarding the repair works and helicopter airlift and the notices that were put up at strategic points to inform the public of the road closure there were still a hand full of visitors who turned up during the airlift hoping to walk up Steall Gorge and were disappointed that the path was closed. Helicopter airlifts always involve a lot of work to organise and are frequently rescheduled at the last minute due to poor weather, which makes it difficult to notify the public about exactly when they are going to take place. To have notified all potential visitors would have required large signage along the Glen Nevis road, and more staff to put these up at short notice when the airlift was rescheduled, and better publicity through local radio or television news.

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