

QUARRIED AND RECYCLED MATERIALS FOR PATH CONSTRUCTION

INVESTIGATIVE STUDY AND REPORT

for

THE PATHS FOR ALL PARTNERSHIP

FINAL REPORT

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1. INTRODUCTION

- 1.1 The Paths for All Partnership (hereinafter called “Paths for All”) was set up to facilitate the development of paths for recreation, health and well-being, strengthening communities, sustainable transport and economic development. Based in Alloa, Paths for All is a registered charity and currently comprises 20 partner organisations representing public sector and national representative bodies. Its work falls into two main areas of activity: “Paths to Health”, which promotes the benefits of walking for health, and “Outdoor Access”.
- 1.2 The work of the Outdoor Access team involves:
- Advocating the benefits of path networks
 - Offering support and advice on all aspects of path creation, management and promotion
 - Supporting the recruitment and training of access officers
 - Encouraging the development and implementation of Local Access Forums, Outdoor Access Strategies and Core Paths Plans
 - Working with local access groups and encouraging community action
 - Guiding implementation of practical work on the ground
- 1.3 In December 2006, Paths for All commissioned Bell Ingram to carry out an investigative study which would:
- Examine quarry products and recycled aggregates around Scotland
 - Map the types of material available and promote their availability, properties and uses
 - Provide a basis for new information and guidance on selecting path construction materials
- 1.4 This report describes our findings. It aims to provide a comprehensive and objective assessment of the materials currently available across Scotland, and ultimately to help path providers to select materials which are best fit for purpose, rather than simply always opting for industry-standard materials which might be less suitable.
- 1.5 This report is supplemented by (a) some illustrated case studies, which provide details about a variety of completed path projects in different parts of the country; (b) a map showing the location of quarries and recycled materials suppliers, along with the types of materials they each supply; and (c) two databases: (i) Quarries and other suppliers of path construction materials (ii) Path designers and contractors. The map is designed to be read in conjunction with the quarries database.
- 1.6 The consultation and research for this assignment was carried out principally by Patrick Laughlin during January-April 2007. John Geddes carried out the specialist case studies/mapping and provided technical advice, administrative support was provided by Allison Lawrance, and the project was managed and quality controlled by Guy Wedderburn.

2. BACKGROUND

- 2.1 Scottish quarries provide a variety of aggregates for the construction industry. Regional geological variations lead to quarried materials coming in a variety of physical properties, textures and colours. Production of these aggregates is guided by British and (especially since 2004) European Standards and it is normally the case that public works require the use of materials which are compliant with these specifications. The newest European Standards are for 'aggregates from natural, recycled and manufactured materials', focusing on fitness for purpose and not discriminating between different resources. However, the materials used for path construction are less rigidly governed by industry standards (although many path specifiers do refer to them). Paths for All believes, that those involved in the path industry would benefit from a greater understanding and awareness of what different aggregates are available, and from where these materials can be sourced.
- 2.2 Across the country, path designers and constructors have often used “non-standard” materials with success (and occasionally without success!). These alternative materials and techniques rarely receive much publicity, and path constructors elsewhere are reluctant to try them without reassurances about their performance and suitability. Similarly, in recent years there has been a marked increase in the use of recycled materials for path construction, but again, there appears to be a lack of shared knowledge about their availability and suitability.
- 2.3 It is for these reasons that Paths for All has commissioned this study. It is intended that its findings will supply path providers and contractors alike with information and guidance about the wide range of path construction materials that is now available in Scotland.

Our Methodology

- 2.4 We commenced this assignment with an inception meeting at Paths for All, which ensured that there was full understanding about the tasks to be undertaken and agreement about the methodology to be used.
- 2.5 We then began our work by carrying out desk research which aimed to identify every potential supplier of path materials in Scotland and the north of England (Northumberland & Cumbria). We then contacted each of these suppliers by post, phone or e-mail to ascertain the nature and cost of the materials they could provide. We used a standardised questionnaire for this survey to ensure that the responses were comparable (see Appendix A).

- 2.6 We simultaneously carried out similar survey work amongst path providers - the Access Officers (or equivalents) of each local authority in Scotland, together with other path professionals. We advised them about our project and asked them to identify suppliers and contractors whom they had previously used. Their responses helped us to identify the best potential interviewees and case studies for further investigation (see Appendix B).
- 2.7 After this initial trawl, we selected a sample of suppliers which appeared to offer the most interesting and suitable materials for path construction. Our sample was chosen based partly on the appropriateness of the materials they could provide and partly on their willingness to participate, but also factored in geographical location and (to some extent) geological type, to ensure that most parts of the country were covered.
- 2.8 We then visited these suppliers and conducted detailed on-site interviews with them. In some cases we also collected small samples of the materials available, and have supplied these to Paths for All as teaching aids for use in pathbuilding workshops.
- 2.9 We also had discussions with a large number of path providers and contractors. Our sample included staff from access authorities, path consultants, and those with practical experience in path construction. The main purpose of these discussions was to evaluate non-standard path materials and methods, and to assess impartially whether these had proved successful in the past.
- 2.10 The concluding part of the assignment saw us looking in depth at several individual path projects in different parts of Scotland. We visited each of these locations (which had been identified during the preceding parts of the study) and in each case have produced an illustrated case study report (see Appendix C). This section also includes brief descriptions of other path projects which, we felt, illustrated elements of good practice but did not merit full case studies.
- 2.11 We then prepared a draft report and took guidance from Paths for All about the style of mapping and database presentation which would be required, before producing our final report.

3. SURVEY FINDINGS

Findings from Suppliers' Survey

- 3.1 We should say at the outset that, overall, we were rather disappointed at the poor initial response to our survey from the suppliers of path materials. Our introductory letter (see Appendix A) had made the point that, quite aside from the assistance that their companies would be providing to Paths for All, there could well be commercial benefits to be gained if they were able to provide information, as our findings would be made available to path providers and contractors to assist them in selecting the most appropriate sources of materials. But regrettably, only a limited number of responses were received at first. Though our follow-up calls did yield some further leads, allowing us to reach our target number of site visits, many suppliers - particularly quarries - did not seem very interested in the project.
- 3.2 On a more positive note, however, those providers with whom we *did* establish good contacts were all extremely helpful, and had grasped the growing commercial potential of the paths market. We were impressed on many of our site visits by the thoughtful way in which quarrying companies are now addressing environmental concerns, and also by their ability to respond quickly to changing markets and new legislation, adapting their products as required.
- 3.3 Whilst many quarries in Scotland are still fairly modest-sized family businesses, there has been a degree of consolidation/agglomeration in the industry, and, at least in terms of production volume, several big companies (such as Tarmac, Bardon Aggregates and Leiths) now dominate, and have quarries located across the country. This gives them some commercial advantages in terms of consistency of supply and better-developed distribution networks. However, the independent sector is still strong, especially in less-populated areas and the islands.
- 3.4 **Traditional versus Recycled Materials** - a full review of the different materials available across Scotland, and their suitability for pathbuilding, is provided in Sections 4 and 5 of this report. The following few paragraphs provide some general observations.
- 3.5 The majority of the suppliers we surveyed provide only "traditional" materials - that is, graded aggregates, sand and gravel supplied direct from quarries. There are also a small number of companies providing solely recycled materials. However, interestingly, we discovered that an increasing number of quarry businesses are becoming what might be called "hybrid" suppliers - still carrying out their traditional quarrying, whilst making use of their (often extensive) sites to sort, clean, grade and redistribute a variety of bulk recycled materials.

- 3.6 There is no doubt that new fiscal measures are providing the commercial imperative for companies to adopt this strategic shift in their operations. The Treasury Budget announced in March 2007 will hasten this change: the aggregates levy (aimed at reducing the environmental impact of quarrying) is to rise by over 20% in April 2008 to £1.95 per tonne, whilst the landfill tax (aimed at discouraging landfill as a means of waste disposal) is to rise by £8 per tonne for four consecutive years commencing in April 2008, meaning that it will more than double over that period. The “push-pull” effect of this for quarries is that it is less attractive for them to quarry raw stone, but increasingly lucrative for them to acquire materials (e.g. from demolition sites) which can be recycled using existing quarrying plant and machinery.
- 3.7 Furthermore, new public procurement policies introduced by the Scottish Executive mean that demand for recycled materials is certain to rise sharply; public bodies now have to specify a minimum level of 10% recycled content when procuring construction projects.
- 3.8 **Radius of Supply** - there was a high degree of consistency amongst the materials suppliers when asked about the maximum distance they would deliver to: most said between 20-30 miles, after which point the delivery costs effectively make their products prohibitively expensive. However, the high number of suppliers across Scotland means that most path projects will be within 20-30 miles of a source of suitable materials. The only exceptions are likely to be in the Highlands and Islands, where on occasion it is impossible to source materials locally and there is no choice but to pay high haulage costs. Conversely, where materials *are* quarried in these areas (especially on the islands), prices tend to be higher, presumably because there is a captive market.
- 3.9 There are also a few exceptions to the “20-30 miles” general rule about delivery radius, mainly when the material has a high value to weight ratio (e.g. decorative woodchip) and/or the material is unique to one supplier (e.g. the red granite from Cloburn in Lanarkshire which is shipped across Britain and beyond).
- 3.10 **Northern England** - path projects in the Borders and Dumfries and Galloway could, in theory, use materials supplied from Northumbria and Cumbria; accordingly, we were asked to investigate such sources. In practice, however, we discovered no suppliers of materials in northern Northumberland and only two in Cumbria who are located close enough to the Scotland-England border to make this a likely prospect (our database does list them, nonetheless).

Findings from Path Providers' Survey

- 3.11 We received fairly good co-operation with our survey from local authorities, ultimately making contact with around 80% of the appropriate access/paths officers across the country. Many of them were extremely helpful in providing information and ideas, as were officers in other agencies. However - and this will come as no surprise to those reading this report - it is clear that staff resources in this field of activity are extremely stretched. The current core paths planning process and the growing number of local Access Forums, coming on top of normal workloads, has put considerable strain on local authority staff in particular. This is a situation which will not ease when the implementation of core path plans gets fully under way.
- 3.12 It is not within our remit to comment further on this, but we do make the observation that one of the results of this pressure on staff is that it can be difficult for them to justify the time and trouble required to share knowledge with colleagues in other agencies and/or to research innovative projects carried out in other parts of the country. Simultaneously, financial resources are generally tight, resulting in a risk-averse culture - few people are willing to trial relatively untested materials. Consequently, there is a wholly understandable temptation to fall back on tried and tested pathbuilding methods and materials.
- 3.13 We received excellent co-operation with our study from many path designers and contractors across Scotland, who were willing to share their knowledge with us. We place a good deal of faith in the information they have provided in questionnaires and interviews, and sense that these path professionals are able to be more objective than material suppliers, aiming to promote their own products, are able to be when talking about their suitability for different types of path environment. Much of the detail in Sections 4 and 5 is therefore based on the on-the-ground experiences of path constructors.
- 3.14 Whilst it is clear that the majority of paths are still being constructed using traditional materials, almost all of our consultees reported that they had used recycled materials at least sometimes, and that there was definitely a trend towards using such materials. We also discovered that some path builders are quite opportunistic, making use of unusual materials that have been available in the locality, often on a one-off basis. We have described some of these in Section 5.
- 3.15 As an aside, it was interesting that, unprompted, several of our consultees said that good path design and construction techniques were far more important than the choice of materials used. Some quite outspoken remarks were made about the poor quality of workmanship which has sometimes been evident on paths projects.

Case Studies

- 3.16 Our chosen case studies (see Appendix 3) were selected to try to illustrate projects which have used a wide range of different materials and/or which highlight innovative techniques/materials; we have also placed an emphasis on projects which have used recycled materials.
- 3.17 We had originally thought we would also have to cast a wide net in terms of geographical spread – however, as will be noted, most of our case studies are within 40 miles of Edinburgh/Glasgow. This is simply because after our research, we concluded that the range of projects we had located in Central Scotland was suitably diverse for the purposes of this report. We can, though, supply brief descriptions of some further interesting path projects in other parts of the country on request.

Useful Websites

- 3.18 In addition to the listings on our suppliers' database, the following websites contain a good deal of further information:

Quarry Products Association - www.qpa.org

Aggregain - the sustainable aggregates information service - www.aggregain.org.uk

British Aggregates Association - www.british-aggregates.co.uk

WRAP (Waste and Resources Action Programme) - www.wrap.org.uk

4. REVIEW OF MATERIALS - TRADITIONAL

4.1 This section provides a brief review of each of the different types of “traditional” pathbuilding materials currently available in Scotland. Our descriptions are summaries of the comments made by our consultees, both suppliers and users. All prices quoted below are indicative, based on reasonable quantities being ordered. Prices are per tonne, ex works, and in most cases we show a range of prices from lowest to highest.

4.2 **Type 1** - this is the most common material used for path bases, and is a tried and tested component of paths across the country. Type 1 is supplied by quarries throughout Scotland. It is a granular material comprised of crushed rock graded to different specifications, normally 40mm down to dust but sometimes supplied as 100mm down. It is subject to regional variations: most is grey whinstone, with a few quarries in the east of Scotland producing reddish whinstone, and farther north, Type 1 is often made from granite.

Strengths: angular nature leads to good compaction; binds together well; always available; consistent in quality.

Weaknesses: prices are increasing due to aggregates levy; considerable regional variations in price

We understand that on occasion, Type 1 made from gravel has been utilised for paths and it could be anticipated that this would be freer-draining than Type 1 whinstone; however, we have been unable to pinpoint any such projects to confirm this.

Price Range - £6.80-£15. Availability - widespread and good. Delivery - generally up to 30 miles.

4.3 **Type 2** - sometimes known as “scalpings”, this material is usually used for bulk fill/bottoming, but sometimes also as a base material. It is generally supplied as either 100mm down or 40mm down and is of lower specification than Type 1. Pathbuilders report that its quality can be inconsistent, but it has the merit of being cheap. Two of our consultees said that they quite liked to specify Type 2 for path surfacing in undulating areas because the material binds and compacts quite well and resists erosion/slip. Larger stones can be removed by hand if necessary and very little dust surfacing material need be added.

Price Range - £6.50-£7.90. Availability - widespread and good. Delivery - generally up to 30 miles.

- 4.4 **“As-Dug”** - these materials are usually sands and gravels which are not crushed or graded, but taken straight from the quarry or (more typically) from borrow pits alongside the routes of paths in rural areas. When the latter is the case, as-dug materials have the benefit of being naturally in keeping with their surroundings, so are environmentally ideal. Some of our consultees like to use them as sub-base for paths and also in places remote from surfaced roads, where it is time-consuming and awkward to bring in quarried aggregates on to the site. On occasion, as-dug materials can be screened on site using portable screeners and they can be used as quick-fix and low-cost solutions to minor maintenance problems. Though sand and gravel are not typically thought of as pathbuilding materials, as one of our case studies shows, on occasion they can work effectively.
- 4.5 **Self-binding materials** - we are aware of only one recent path project in Scotland (described in our case studies) which has used such materials. Their self-binding properties come about as they are dolomitic lime-based and hence cementitious. But our surveys have uncovered no Scottish suppliers of limestone materials suitable for pathbuilding, so all such materials have to be imported from England or France, making them expensive and environmentally unsustainable except in special cases. Reports from England also suggest that these materials go mushy in wet conditions.
- 4.6 **Specialist aggregates** - some Scottish quarries provide specialist materials e.g. waste from slate quarries (not suitable for horses or cycles due to sharp edges) or the red granite quarried at Cloburn. This latter material is washed and crushed into different products used extensively as road surfacing, along hard shoulders and in car parks. Technically, Cloburn’s “Firechip” would be extremely good as a path material, compacting and binding well with good drainage qualities; but it has had limited use, probably because of its vivid red colour and also its cost. **Price - £29. Availability - excellent. Delivery - nationwide.**
- 4.7 **Surfacing materials** - a variety of “traditional” materials are used for surfacing and top-dressing paths. A great deal of attention is paid to selecting the correct surfacing, obviously because this is the part of the path which makes contact with the users’ feet, wheels or hooves, but also because it is the element of the path which is most visually intrusive. The most common surfacing used is whin dust, 6mm down. The problem with this material appears to be its variability, with some sources of whin dust much better than others in terms of compaction quality, proportion of clay fines, and so on. Whin dust was at one time produced to a defined specification, but is now classed as “waste”.

We received mixed reports about granite dust as a surfacing material: whilst one variant (grey granite dust) was said to be a durable material and scour-resistant, we were also told another variant (quarried granite dust) did not bind well and was easily scuffed by wheelchairs, bicycles and pushchairs in a well-trafficked lowland path setting.

Limestone dust is rarely used in Scotland; it is said to bind well but sticks to boots in wet weather and can blow away during windy, dry spells.

Bituminous macadam/hot rolled asphalt - bitmac-type products, though in widespread use for pathbuilding, are not covered within the brief for this study, as a wealth of information about them already exists and they are covered by British/European standards.

The price, availability and delivery details for dusts are all as for Type 1 - see 4.2 above.

4.8 **Materials which have not been successful** - we received some reports of unsuccessful materials, as follows:

Alluvial Type 1 - aggregates separated during handling, causing the surface course to fail on a stretch of the West Highland Way.

Whin dust surfacing - was reported to be unsuccessful on steep gradients, where there was surface run-off and scouring soon after the path was completed.

5. REVIEW OF MATERIALS - RECYCLED AND NON-TRADITIONAL

- 5.1 Most of this section examines recycled materials, though we have also discovered some interesting examples of alternative, non-recycled materials which have been used in path construction. The range of recycled products available in Scotland is, unfortunately, not as wide as that available to pathbuilders in England. We discovered a number of case studies carried out south of the border which demonstrated the successful use of materials such as blast furnace slag, steel slag fines and glass-enriched tarmac, none of which are produced in Scotland.
- 5.2 As before, our descriptions of materials are based on the comments made by our consultees, both suppliers and users, and all prices quoted are indicative, based on "reasonable" quantities being ordered. Prices are per tonne, ex works.
- 5.3 **Recycled Aggregate** - with improving technologies and government grants for new machinery, much more effective recycling of waste materials such as construction waste and rubble from demolition sites is now taking place. The biggest issue in using such materials in the past was that they were inconsistent in quality, and often contaminated with substances such as ceramics, wire and glass. However, more advanced screening, washing and crushing techniques (combined with more efficient demolition methods) are greatly reducing these problems, as well as creating a wider range of higher-value materials with different sizes and specifications. Nevertheless, given their variable nature in terms of colour and texture, recycled aggregates are still normally only suitable for use as Type 1 and Type 2 path bases.

Strengths - as for quarried aggregates. Low price.

Weaknesses - still some inconsistency, especially in binding quality; not always available in rural areas (where there is less construction and demolition going on).

Price range - £3.85-£6.25. Availability - variable but rapidly getting better. Delivery - up to 30 miles.

- 5.4 **Road Planings** - recycled planings are a well-known, popular and often-used pathbuilding material, created during road repairs or resurfacing works. Normally, road planings are about 75mm down, making them suitable for path bases. Our consultees reported occasional difficulties in laying the material, a process which appears to be easier in the summer, when the tar re-melts during rolling. But the major issue with planings is the supply of the material: ideally, a road resurfacing contract should specify that the planings are delivered directly to a local path project, but this requires close liaison between different organisations and different departments of local authorities. In practice, supply and demand rarely coincide, and so the planings have

to be stockpiled and delivered later to the path project, greatly increasing costs.

Strengths - durable, strong (can take vehicles)

Weaknesses - large variations in price; supply can be inconsistent

Price - £4.50-£6.50. Availability - good, but seasonal variations. Delivery - up to 30 miles.

- 5.5 **Proprietary Materials** - a number of companies supply recycled bitumen products under proprietary names. By far the best known - and the single material which was most highly commended by our consultees - is "Toptrec", a recycled road waste product produced by Tarmac. This is supplied as a surfacing material/wearing course (20mm down), applied by roller, and has been used in a wide variety of path settings (see one of our case studies). It is normally applied as a top layer of 25-75mm, on top of a Type 1 base, and it is said to be hard-wearing and durable with a finish suitable for all types of path users. Its main drawback is that its look and finish might not always be an appropriate look in some locations. Tarmac is currently supplying black and red Toptrec from Blochairn (Glasgow) and Addiewell. **Price £8.50; availability good (black) and intermittent (red); Delivery - no limit.**

Other similar products are apparently coming onto the market, including a foam backed macadam derived mainly from road planings (supplied by Peter Lawless, Cambuslang) but we have not been able to find any examples of these being used for Scottish paths as yet.

- 5.6 **Environmental considerations** - at this point it should be mentioned that use of these bituminous products is not always possible. SEPA has expressed concern about toxic contamination of watercourses caused by runoff of tar materials from paths.
- 5.7 **Glass Aggregate** - recycled glass has been used successfully for a wide number of applications, often in combination with other materials. On its own, it is most often used as a replacement for primary sand (sub 6mm) and has the advantages of being wholly inert, free draining and good compaction; thus, it is often used for slab laying and pipe bedding. One path project on Arran has used the material as a replacement for whin dust, with some success. The only large-scale supplier in Scotland, Wm Tracey at Linwood, has said the material could be screened to sub-17mm on request, which might offer some further applications. **Price - £6.50. Availability - good. Delivery - 20-25 miles.** A small-scale supplier, Enviroglass, exists in Shetland. **Price £8.50. Availability - good. Delivery - Northern Isles.**
- 5.8 **Recycled Woodchip** - this is being promoted by its Scottish manufacturer, Wm Tracey, as a suitable material for path surfacing. It is certainly a more sophisticated product than bark, as it is longer

lasting and can be dyed (organically) to a range of different shades. It is being used on some golf courses for footpaths, where it is said to be suitable for wheeled golf trollies. Reports from England say that it can be a bit soggy (its moisture content is up to 25% in wet weather) and needs fairly frequent replenishing because it rots down. However, we have found no known usage of this material for public paths in Scotland. Perhaps it might be suitable for low-intensity use and/or visually sensitive areas such as nature reserves. **Price - £95 to £118. Availability - generally OK but not always available ex stock. Delivery - across Scotland.**

5.9 **Recycled Plastic Paving** - a number of companies across Britain, including one in Scotland (BPI, Dumfries) manufacture products made from recycled plastics, including interlocking pavers, grass/turf reinforcers, boardwalk-style planks, bridges and other path materials. We examine two such products in our case studies; they have the advantages of being virtually maintenance free and have very long lifespans; however, their high costs normally restrict their applications to short stretches of paths in particularly sensitive areas. **Price - varies enormously depending on materials chosen - say £65-£135 per metre of 1.8 metre wide path. Availability - generally good. Delivery - nationwide.**

5.10 **Pulverised Fuel Ash (PFA)** - the Paths for All Partnership conducted some trials in 2002 using PFA as a soil stabilisation agent and hopes to do further trials, as this material shows promise as a simple fix for muddy paths. We had received reports that waste ash from Longannet and/or possibly other coal-fired power stations had been used as a path construction material. However, Scotash (owned by Scottish Power) says this is not the case; it believes the material might be suitable, but only if mixed with other materials such as planings or cement, but this has never been tried to their knowledge. PFA has been used as a filler in bituminous road surfaces, but this does not meet current British standards. Furnace Bottom Ash (FBA) is coarser (150mm down to 37mm) than PFA but cannot be used as a Type 2 sub base due to its 10% fines content.

5.11 **Recycled tyre bales** – we are aware of one Scottish supplier of this material – Northern Tyre Recycling in Evanton. The bales are a standard size (1.5 cubic metres) and weigh just under a tonne. They have been used successfully mainly on road construction and civil engineering projects, but also on some Forestry Commission roads/paths in the Western Highlands. The experience on these projects, which is echoed by reports of similar projects in southern England, is that the material works best as a replacement for aggregates in circumstances where soils are soft and/or conditions are boggy (e.g. peat): it is a much lighter material and imposes less than half the load on the underlying ground than aggregate would do. Its permeability is similar to natural aggregate. Less manpower and fewer construction vehicles are also needed during installation, resulting in

considerable cost savings. This product is highly regarded by those who have used it but its main drawback is that at present the supply is limited both in quantity and geographically. **Price - £15 per tonne. Availability - limited. Delivery – Scotland-wide.**

- 5.12 **Materials which have not been successful** - two consultees reported problems with using recycled bricks for paths. In one of these cases, the bricks were used in a poorly-drained area and the brick dust turned into a glue-like consistency, making the route almost impassable; in the other, the bricks were susceptible to frost heave and were said to drain poorly. Reports from England are also lukewarm about using brick for either sub base or (crushed) as a surfacing material.

6. CONCLUSIONS AND RECOMMENDATIONS

- 6.1 Our overall conclusion is that Paths for All's initial analysis - which lay behind the reasons for commissioning this study - was wholly correct. Whilst excellent pathbuilding projects are taking place all over Scotland, information about them is not always easy to find; similarly, though increasing use is being made of recycled and "alternative" materials, knowledge about their suitability and availability is not being disseminated widely enough.
- 6.2 Our study has confirmed that a real sea-change is under way in terms of the use of recycled materials. This is being driven partly by demand - the genuine environmental concerns of most path designers and builders - and partly by fiscal measures (landfill and aggregates taxes). The quarrying industry is adapting rapidly to this changing landscape; all over the country, quarries are beginning to stockpile and supply recycled materials, and the supply issues which have perhaps hampered the use of such materials until now should ease somewhat in the coming years.
- 6.3 The quarrying industry's awareness of the Paths for All Partnership seems to be extremely low (we encountered only three companies who had even heard of Paths for All). In itself, this is perhaps not too important, but it demonstrated to us that there is a wider issue - namely, many suppliers of suitable materials think only in terms of roadbuilding and bulk fill for construction sites, and do not seem to be aware of the current "boom" in pathbuilding and path maintenance. Hence, they tend not to view the paths industry for what it is - a potentially major customer for their raw materials.
- 6.4 **Recommendation 1** - Paths for All should consider carrying out an information-sharing and awareness-raising exercise with quarries and other suppliers of path materials throughout Scotland, to illustrate that they are well placed to capitalise on the demand from path building projects, but that they might need to become more "pathbuilder friendly" in their approach.
- 6.5 On a similar note, we discovered that there are good linkages amongst and between certain sectors of the paths industry, but other sectors, notably the materials suppliers, are disconnected. Even where there are established contacts between, say, path providers and path builders, these tend to be based on geographical proximity rather than anything else. As a result, expertise and knowledge is not being shared around the country as well as it might. Some of the more "switched on" suppliers - especially those who provide recycled materials - are keen to establish business links with path designers and contractors, but are unsure about how they might embark on this process.

- 6.6 **Recommendation 2** - Paths for All should help to encourage greater networking and business linkages throughout the paths industry. A good first step would be to make our database of materials suppliers, freely available to all, perhaps via the Paths for All website, in the same way that the site currently includes lists of path design and construction firms. We do recognise that, as with all such databases, regular maintenance and updating would be required, with a resultant time and cost implication, but we feel that it should not be too onerous and that it would be a worthy use of Paths for All's resources. (Please note also that in compiling our databases, we have not sought Data Protection Act clearance from the companies and individuals included).
- 6.7 **Recommendation 3** - Paths for All should consider producing an advisory publication based on this report and case studies. This would be a good addition to the excellent existing "family" of advisory guides available for download via the Paths for All website.
- 6.8 As noted in Section 3, we are definitely of the opinion that pressures on staff time and budgetary constraints are inhibiting the wider use of non-traditional methods and materials. There is definitely an interest in using different materials but an unwillingness amongst many to experiment with them.
- 6.9 **Recommendation 4** - we understand that Paths for All is planning to create a footpath construction demonstration area at Oatridge College. In addition to demonstrating construction methods and techniques, this area should include examples of paths constructed from different types of material, particularly some of the new, recycled materials now becoming available. The producers to whom we have spoken would almost certainly be prepared to sponsor supplies of their materials for demonstration purposes.
- 6.10 In conclusion, we would like to thank the Paths for All Partnership for commissioning Bell Ingram to carry out this study. We have found it to be a most interesting and stimulating project and hope that our findings will be of productive assistance in the months ahead, not only for Paths for All as an organisation but also for the whole paths industry across Scotland. Finally, we acknowledge with thanks the generous help provided to us by many quarries, recyclers, path contractors, path builders and the staff of local authorities and other agencies, all too numerous to name.

APPENDIX A - PATH MATERIAL SUPPLIERS' QUESTIONNAIRE

21 December 2006

Dear Sirs

Quarried and recycled materials for path construction

We have been contracted by the Paths for All Partnership to carry out research into the use of differing types of quarried and recycled materials for path construction across Scotland.

We are seeking in the first instance to establish exactly what materials are available, and where. Our findings will be made available to path providers and contractors to assist them in selecting the most appropriate sources of materials for their footpath projects.

We hope that you will be able to assist us with this work (not least because of the potential commercial opportunities for your company) and would greatly appreciate it if you could take a few minutes to complete and return the attached questionnaire.

Thank you in advance for your help. If you would like to speak to us about this project, please do not hesitate to contact either myself or my colleague John Geddes.

Yours sincerely

Patrick Laughlin

E: patrick.laughlin@bellingram.co.uk

QUARRIED AND RECYCLED MATERIALS FOR PATH CONSTRUCTION

SUPPLIERS' QUESTIONNAIRE

Thank you for taking part in this survey. You can complete the questionnaire electronically or, if you prefer, print out and write in your answers, returning it by fax/post.

1. Name and address of your company:
2. Contact name and contact details (phone and e-mail):
3. Have you in the past provided materials for path construction? YES/NO
(If NO, go to question 5)
4. Which materials have you provided in the past for path construction? (please provide a brief technical description e.g. "Type 1 sub-base" "100m down to dust" etc and state for what purposes they have been used)
5. At the present time or in the coming year, which materials can you provide which in your view would be suitable for path construction? (please provide a brief technical specification e.g. "Type 1 sub-base" "10mm down to dust" etc. It would also be helpful if you could briefly describe the characteristics of each material in the table(s) below).

Material 1	Description
Name of material	
Texture	
Colour	
Binding qualities	
Drainage characteristics	
Compaction characteristics	

Material 2	Description
Name of material	
Texture	
Colour	
Binding qualities	
Drainage characteristics	
Compaction characteristics	

(COPY FURTHER TABLES AS REQUIRED)

6. Are all of the materials you described in Q.5 available from stock? YES/NO (If NO, please give details)
7. What is your approximate annual output (tonnes) of each of the materials you can provide?
8. Please provide a guide price (per tonne) of each of the materials you can provide (prices should be quoted at source, ex-delivery)
9. What is your typical radius of supply (in miles)?
10. Would you be willing to have an on-site visit from one of our team to carry out an interview, if required? YES/NO

Thank you for your assistance.

Please return this questionnaire to allison.lawrance@bellingram.co.uk or fax it to 01324 632550, or post it to Bell Ingram, Callendar Estate Office, Slamannan Road, Falkirk, FK1 5LX.

APPENDIX B - PATH PROVIDERS AND CONTRACTORS' QUESTIONNAIRE

21 December 2007

Dear Colleague

Quarried and recycled materials for path construction

We have been contracted by the Paths for All Partnership to carry out research into the use of differing types of quarried and recycled materials for path construction across Scotland.

Paths for All hopes to identify the best examples of innovative materials and good practice; often, "non-standard" materials are used with great success, but their wider use and acceptance can be constrained owing to a lack of information on availability and performance.

Our findings will be made available to path providers and contractors to assist them in selecting the most appropriate sources of materials for their footpath projects, and therefore we hope that you will be able to assist us with this work.

We are seeking in the first instance to establish exactly what materials you might have used in footpath construction in the past, and what materials (especially "non-standard" ones) you feel have been successful - or unsuccessful. We would greatly appreciate it if you could take a few minutes to complete and return the attached questionnaire.

Thank you in advance for your help. If you would like to speak to us about this project, please do not hesitate to contact either myself or my colleague John Geddes.

Yours sincerely

Patrick Laughlin

E: patrick.laughlin@bellingram.co.uk

QUARRIED AND RECYCLED MATERIALS FOR PATH CONSTRUCTION

PATH PROVIDERS AND CONTRACTORS' QUESTIONNAIRE

Thank you for taking part in this survey. You can complete the questionnaire electronically or, if you prefer, print out and write in your answers, returning it by fax/post.

1. Name and address of your company/organisation:
2. Contact name and contact details (phone and e-mail):
3. Thinking about materials you have used/commissioned in the past for path construction, which have been most successful? *(please provide a brief technical description of the materials e.g. "Type 1 sub-base" "100m down to dust"; state for what purposes they have been used; and describe why you think they have been successful, for example in terms of cost, availability, suitability and durability. We are especially interested in identifying successful usage of non-standard and recycled materials)*
4. Have you ever used path construction materials which have NOT been successful? *(please provide a brief technical description; state for what purposes they have been used; and describe why they were unsuccessful)*
5. Are you aware of any businesses in your area (e.g. power stations, cement works, brickworks) which either currently, or potentially, could supply quantities of recycled materials suitable for bulk fill? *(brief name and address details would suffice)*
6. Could you please provide contact details for any "approved" path contractors either in your area or whom you have used/worked with in the past? *(we already have a contractors' database but want to ensure it is as comprehensive as possible)*
7. Would you be willing to have one of our team contact you to carry out a telephone interview? YES/NO

Thank you for your assistance.

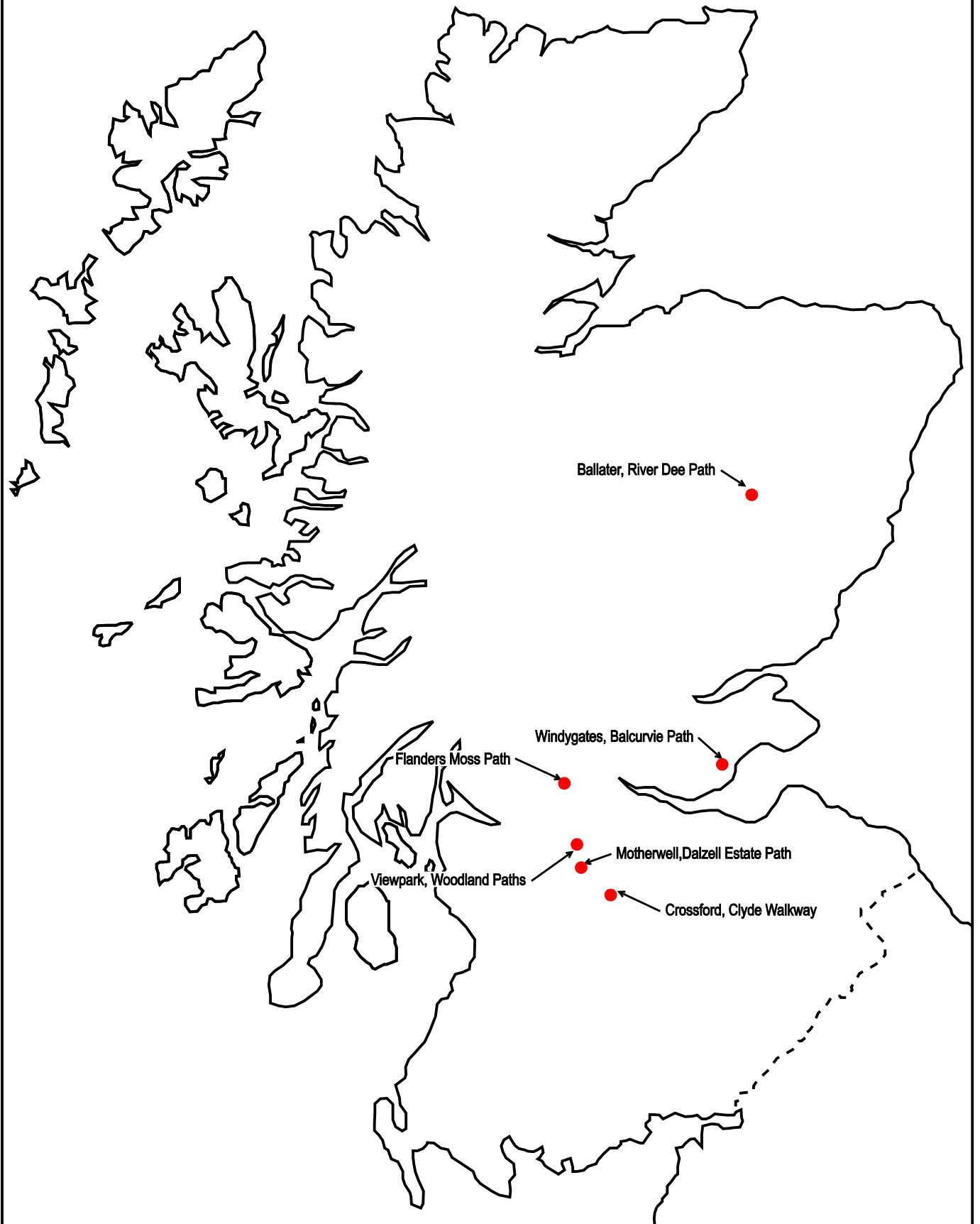
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APPENDIX C – CASE STUDIES

- Ballater, River Dee Path
- Windygates, Balcurvie Path
- Flanders Moss Path
- Viewpark, Woodland Paths
- Motherwell, Dalzell Estate Path
- Crossford, Cycle Walkway

QUARRIED & RECYCLED MATERIALS FOR PATH CONSTRUCTION

PROJECT CASE STUDIES - LOCATIONS



Ballater, River Dee Path

A green recycled surfaced solution to enable wheelchair access across a river floodplain with frequent inundations.

The Route

The path is part of a network of waymarked circular paths within Ballater, Upper Deeside. The path is a 1.9km linear easy access path built on an existing popular route, along the north bank of the Dee, with superb views of the surrounding Cairngorms National Park. It is easily accessible from the main A93, starting from a picnic site and car park.

Context

- History of the path - In 1999, Upper Deeside Access Trust in consultation with local groups and landowners, identified the need and demand for improving the existing Ballater path network. This path was identified then as a priority route. The opportunity to deliver it arose in 2003, when a partnership initiative was awarded £2.5 million to complete the Eastern Cairngorms Access Project, a programme of high quality access improvements within Angus and Upper Deeside. Path agreements were secured with the two landowners, Ballater Golf Club and Invercauld Estate.
- Landscape - The path runs alongside the River Dee Special Area of Conservation and Ballater golf course. Part of the path has been re-aligned and re-created across a low-lying area of rough unimproved grassland on a floodplain, which inundates when the Dee is in spate.
- Modes of use - The aim was to upgrade the existing path to provide a readily accessible route for a wide range of people: walkers of all abilities including children in pushchairs, wheelchair users, the elderly and other less-abled users. Occasional use by local horseriders and cyclists does occur.

Technical Details

- Specification - Phase 1 path improvements to upgrade 1325m evolved path line along the river embankment. A 1.2 metre wide formation was excavated to depth of 50mm. The constructed path base is built with 75mm depth of imported crushed granite Type 1 sub base (40mm down) from Craighash Quarry, Torphins. Compaction of the laid path base layer formed a 1:40 (2.5%) centre camber. The compacted path base is surfaced with a 25mm layer of imported 5mm down crushed grey granite dust from Toms Forest Quarry, Kemnay.
- Phase 2 path improvements were a continuation of phase 1 from the end of the river embankment to the caravan park, which involved simple genuine lowland path construction methods, as implemented on phase 1 path works above, to upgrade 356 metres of loose stony surface path. A 220m section of heavily worn and flood damaged path line across a low-lying area of rough unimproved grassland upon the river floodplain was re-aligned and constructed to create a grass path creation scheme. The grass path creation scheme involves an innovative solution to protect the new path from inundation when the River Dee is in spate, which over the years had resulted in surface washout and deep eroded gullies forming along the evolved path line.
- UDAT has created a sustainable solution to re-route and re-create this 220m section of path. The path works involved the careful alignment and construction of a landscaped causeway, protected by a 2m wide x 1m deep continuous grass-covered side ditch incorporating four 1100mm diameter rigid PVC twinwall pipe culverts with stone headwalls. The grass path itself

runs along the top of the causeway, formed from a rigid, heavy duty Golpla® grass reinforcement and erosion control system designed to provide a permanent green sward structure, to perpetuate the growth of grass under conditions of intensive non-motorised access use, and to be permeable (no path surface camber or cross fall required). The Golpla® system is compliant with current practice on Sustainable Urban Drainage Systems (SUDS).

- The construction of the Golpla® system involved the following steps:
 - The new path line was excavated to form a 1.5m wide x 150mm deep formation tray. A 300mm depth of local screened graded alluvial gravel (75mm to grit) and 150mm depth of local screened graded stone (20mm single size), won from onsite burrow pits were laid within the formed tray and compacted with a ride-on vibrating roller to form a uniform, well-compacted level base.
 - A 100mm depth of moist rootzone (local screened stone-free sandy loam soil won from onsite burrow pits) is laid onto the top surface of the compacted stone base and consolidated with a light vibrating plate to form a firm level surface ready for laying the pavers. The rootzone was laid to level with a tolerance of 10mm. A slow-releasing, high-phosphate starter fertiliser was applied to the moist rootzone layer.
 - The paving was laid onto the constructed level bed of rootzone and nailed down using specified 245mm long Golpla® nails to form a 1.2m wide path. Once all pavers were laid the whole paved area was consolidated with a light vibrating plate. All paving is filled, to within 5mm of the top edge, with clean friable-screened sandy loam topsoil; won locally from onsite burrow pits. Overfill was scrapped off so that the top edges of each growing cell are viable. Settlement of the soil within the pavers occurred, the pavers were not topped up, as this will allow for grass growth without direct impact from users. The whole paved area was seeded with an approved grass seed mix at the sowing rate of 45grams per square metre. The grass seed mix contained both drought-tolerant species and wear-resistant cultivar species such as perennial rye grass.
 - The bank sides of the raised causeway and margins and edges of the path were formed using clean friable-screened sandy loam topsoil; won locally from onsite burrow pits and turfs generated from the excavation of the causeway formation tray. The landscaped margins and edging were constructed level with the paving edges and taper away from the paving edge down the causeway banksides.

Screening of local available materials won from onsite burrow pits, was carried out on site using a mobile Viper Mini Power Screening plant. Both the aggregate path and the raised causeway incorporating the Golpla® system were constructed using specified plant and material requirements which minimised wider landscape impact, whilst allowing for the character of the route to be maintained and upgraded to all abilities standard.

- Date of works - May 2004 to September 2005.
- Contractor - Grey granite dust path along the embankment was constructed by H.P. & T. Restoration Ltd. The raised causeway with the Golpla® system

and grey granite dust path, from the end of the embankment to the caravan park, were constructed by Dulnain Bridge Plant Ltd.

- Maintenance – Works to be undertaken in conjunction with the UDAT maintenance of the wider path network as part of an annual maintenance schedule.

Funding

- Contributors - Aberdeenshire Council, Angus Council, Angus Environmental Trust, Cairngorms National Park Authority, European Regional Development Fund, Heritage Lottery Fund, Scottish Natural Heritage (Grampian & Tayside), Scottish Enterprise (Grampian & Tayside), Visit Scotland (Aberdeen & Grampian and Angus & Dundee).
- Cost - £55,000

Evaluation

- Successful elements - Landscape fit - the use of imported grey granite dust surfacing, which raised some local concerns about its 'white' appearance, has subsequently blended into the landscape after six months of being laid. The combined gritty properties and fines content of the surfacing have bound very well, causing no major surface drainage issues.

The path represents a very good local path project that satisfies the principal aim of being fit for its intended purpose. Since its completion, there has been positive feedback from local residents, visitors and landowners.

The natural quality of path, its low gradients, gentle meandering line and close proximity to the river combine to give the route many special attributes. A sensitive and low impact approach in designing and constructing the path has ensured that these traits were not lost.

Members of the local community have responded very positively to the raised causeway with the grass-paved path improvements across the low-lying rough grassland.

The causeway / grass-paved path were subjected to and inundated by a very high river spate in autumn 2006. On inspection, as waters retreated, no damage had occurred to either the causeway or the grass-paved path surface.

- Less successful elements - 20% of reinstated vegetation in the side ditch did not survive the very warm dry summer of 2006 and was washed out by the first autumn river floods, exposing the alluvial gravels. The exposed gravels were subjected to further floodwaters and the path was in danger of being undermined without protection measures implemented. In April 2007, UDAT repaired the damaged ditch by re-profiling, re-dressing with soil and re-seeding the ditch base and bank sides, and installing biodegradable coir netting (100% coconut fibre), a simple engineering solution to protect the ditch from water erosion whilst the grass seed becomes established. The coir netting will eventually disappear within 5 years, leaving well-established grass sward cover.

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When the grass seed was trying to initially establish itself within the individual cells of the Golpla® system, during the first 3 to 4 weeks after being sown, a 100% grass sward cover was not achieved, leaving minor patches of exposed bare soil along the whole path. This was the result of some grass seed not surviving the very warm dry summer of 2006.

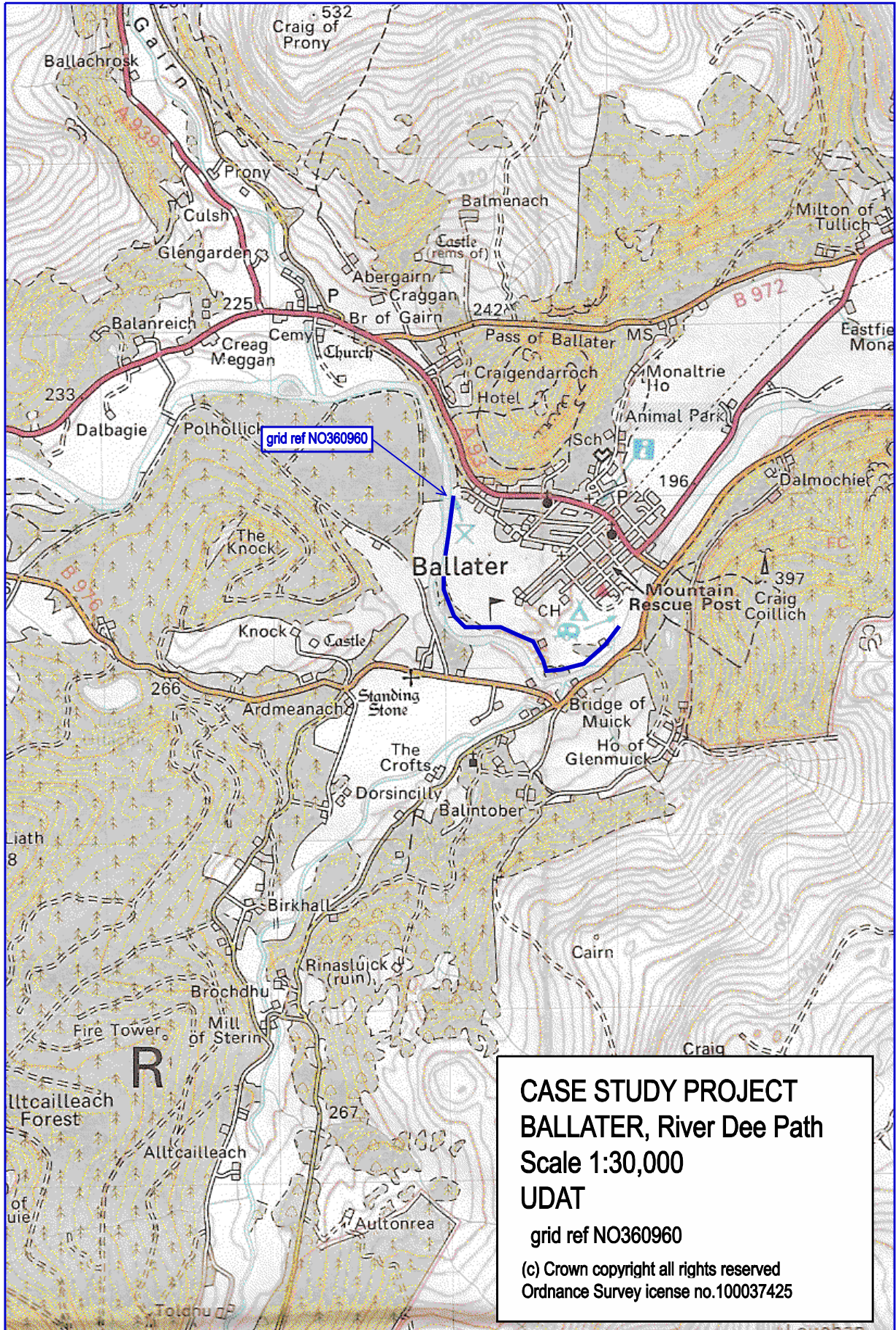
- Unpredicted elements - Wading birds nesting within individual Golpla® system cells.
- Maintenance issues - Lack of maintenance / aftercare of the Golpla® system grass sward will eventually result in loss of grass cover. For example, no application of annual granular fertiliser would result in grass die back caused by lack of nutrients.
- Durability assessment – The Golpla® system provides a quality finish that is very durable and can last as long as tarmac. As mentioned previously the path has already withstood its first inundation therefore the signs are good that this is a long term solution to a difficult site.

Studies

- A Schmidt people counter has been installed with numbers recorded so far between January and April 2007.

Thanks

- Many thanks to Kevin Fairclough, formerly Project Access Officer, Upper Deeside Access Trust, for his assistance with this Case Study.



CASE STUDY PROJECT
BALLATER, River Dee Path
Scale 1:30,000
UDAT

grid ref NO360960

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BALLATER, River Dee Path



The stone path and landscaped car park and picnic site.



Good landscape fit.



The causeway across the floodplain.



The Gopla grass reinforcement system.

Windygates, Balcurvie Path

A low cost solution using local 'as dug' sand and gravel quarry materials.

The Route

A right of way set in open farmland near to Windygates, Fife linking the Balcurvie Small Holdings area to the open countryside north west towards Balgonie and Castleheggie.

Context

- History of the path - A well used right of way which due to heavy use had become very muddy with the Council receiving a lot of complaints about the poor state of the surface. The Council had maintained the route as it was important and close to the community of Windygates, but the scheduled works were verge cutting, litter clearance, etc., and did not extend to the major re-surfacing work required. The local riding school uses this path as one of their main access routes, this very high use especially at the weekends, damaged the path and made the route impassable for walkers for much of the year. A low cost solution was required.
- Landscape - an old estate track through mixed farmland with views to the Lomonds.
- Modes of use – The path is well used by horseriders, walkers and crossed by agricultural traffic. The path is accessible to prams and wheelchairs users but the natural steep gradient make full mobility access impossible to achieve.

Technical Details

- Specification - Scrape the surface mud off to expose a hard sub-base, lay 100mm depth sand / gravel mix (approx. 75mm down) with camber to either side. Clear shallow ditch on top side. Roll to compact and then "dust" with very fine sand/gravel on top. The 'as dug' materials were supplied directly from the local sand and gravel quarry; Lomond Quarry, Lomond Hills, Leslie, Fife KY6 3HD Tel: 01383 510248, not necessarily the first choice supplier for path materials.
- Date of completion -March 2003
- Contractor - Fife Council (in-house)
- Maintenance – ongoing verge, access furniture, litter pick, etc, maintenance schedule carried out by Fife Council.

Funding

- Funders - Levenmouth Regeneration Group, SNH
- Cost - £4,451

Evaluation

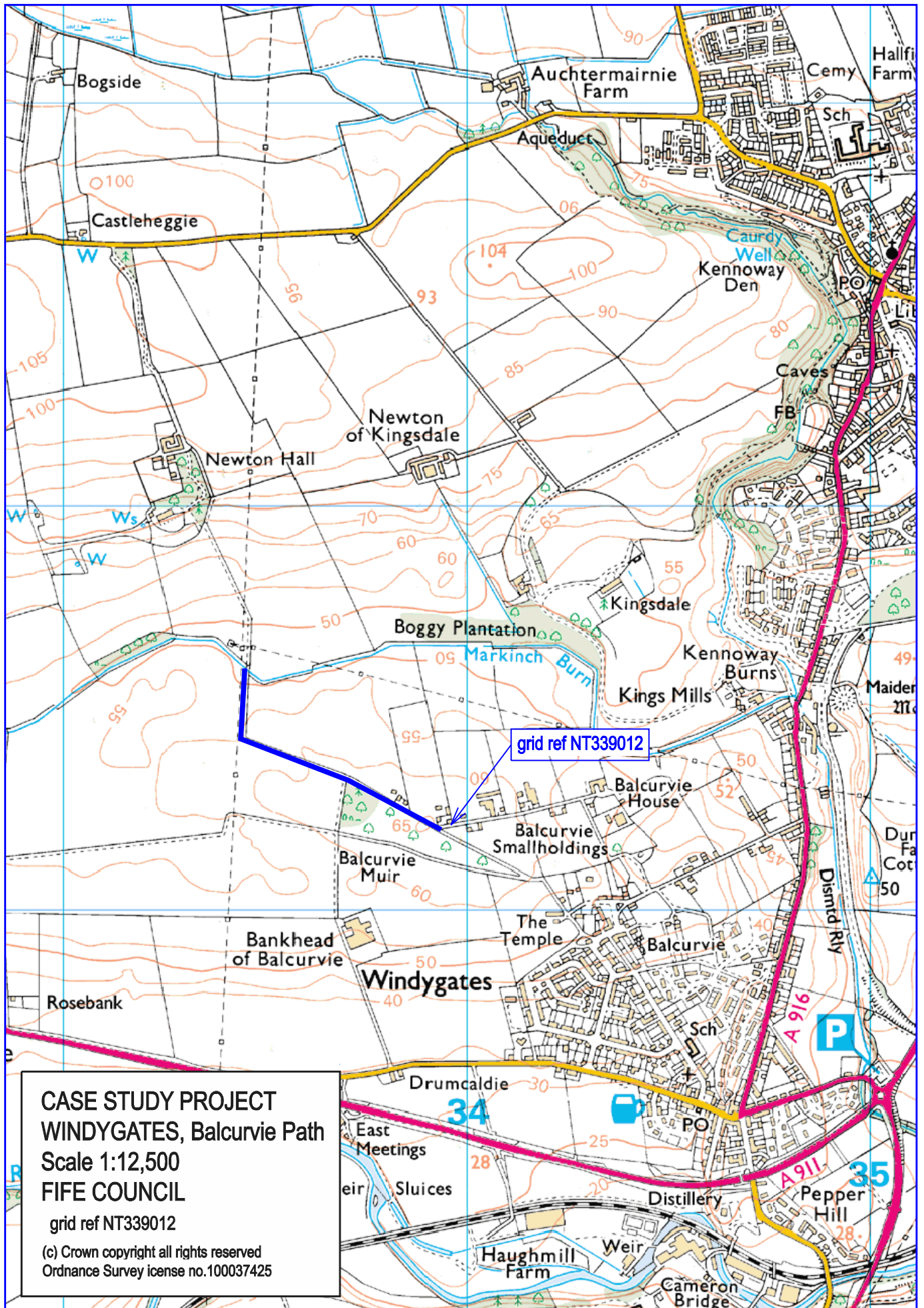
- Successful elements - the surface has bedded in well after an initial period where some of the larger round stones came to the surface, the high number of users removed these stones from the surface over a short period of time.
- Less successful elements – apart from initial loose stones none to date.
- Maintenance issues - no surface maintenance to date, grass cutting and strimming of edges as per previous schedule.
- Durability assessment - Withstanding riding use well, better than any thin based aggregate track would have, and still in good pedestrian order although now after four and a half years showing some signs of surface scouring.

Studies

- There are no plans for any follow up surveys or counters.

Thanks

- Many thanks to Alison Irvine, Access Officer, Fife Council, for her assistance with this Case Study.



CASE STUDY PROJECT
WINDYGATES, Balcurvie Path
 Scale 1:12,500
FIFE COUNCIL
 grid ref NT339012
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WINDYGATES, Balcurvie Path



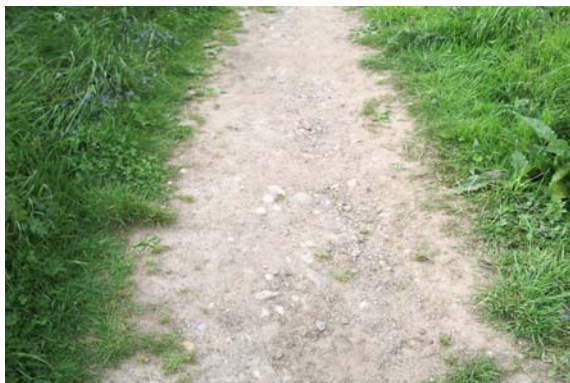
Newly completed path.



Before and after.



General views 2007.



The surface 2007.

Stirling, Flanders Moss SSSI

A well thought out solution to the problem of visitor access into a raised bog by the use of a recycled rot proof and non toxic plastic 'boardwalk'.

The Route

The site is a developing visitor interpretation centre with a 900m circular access path from a site car park out onto the bog area offering the opportunity for people to get close to the fragile peatland habitat of Flanders Moss, access taken from the B822 Thornhill to Kippen Road.

Context

- History of the path - Flanders Moss National Nature Reserve is a site which until the start of the current scheme had no formal public access. Restrictions on access have prevented the Reserve from fulfilling one of the main purposes of all NNR's, namely to help raise national public awareness and appreciation of these nationally important wildlife sites. The bigger scale proposals are to create a visitor experience to help reconnect people with these peatland habitats.
- Landscape - The path is set on a lowland raised bog in the Carse of Stirling, Flanders Moss is a fragile remnant of peatland habitat and rich in natural and human history.
- Modes of use - The main users will be pedestrian but the path is full mobility /wheelchair compliant.

Technical Details

- Specification - The path meets with the 'Urban and Formal Landscapes' BT Countryside for All Accessibility Standard with the exception of rest area seating.
Specification 1: 400m x floated construction recycled plastic boardwalk, 1250mm wide with double edge rail. Timbers used: boards – grooved 1,250 x 160 x 50mm, edge 100 x 42mm, 3 x stringers 100 x 60mm, set on sleepers 230 x 80mm. The cost of the boardwalk roughly estimated at £170/m. The 'timbers' are light, versatile, tough, durable, resistant to chemicals, steam cleanable, non-absorbent with a choice of colour and surface texture.

Hanit timber (<http://www.hahnkunststoffe.de/en/wirueberuns.php>) supplied by Kasey, Auchterarder.

Other main suppliers are Fusion Marine (<http://www.fusionmarine.co.uk/>)

Specification 2: 500m x 1200mm wide whindust surfaced path with sub-base of 200mm Type1.

- Date of completion – The path was completed in July 2006, interpretation and other works ongoing with first boards completed June 2007.

- Contract - The original design work and contract supervision has been undertaken in-house by SNH. The main path contractor was Boyd Henderson, Upland Contracts Ltd, Carrbridge 01479 841859 who had additional design input.
- Maintenance – SNH will take on responsibility for the completed works.

Funding

- Funders and contributors are SNH and Lomond and Rural Stirling LEADER + project
- Total cost £120,000

Evaluation

- Successful elements - The suitability of the material in a rural setting, the local variations and patterns makes it look like wood rather than a man made material.
The low boardwalk set into the heather and the meandering route keep the path hidden and unobtrusive.
The skill of the contractor, who was able to adapt and work with a new material and produce a high quality boardwalk, including corners and the construction of a 6m recycled plastic timber bridge on floating endseats. Minimum damage to the integrity of the bog, the use of upland techniques, helicopter layout, allowed prefabrication of 2.5m sections of boardwalk to be lifted in from the car park, keeping most of the arising from cutting etc away from the bog and minimum damage to the surface.
Potential deep water soft spots along the route which were deemed to pose a H&S risk were infilled to just below surface water level with heather bales.
- Unexpected – lizards sunbathing on the hot boards.
- Less successful elements – none so far identified
- Maintenance issues - none expected on the boardwalk other than some initial leveling of the boardwalk as the floated construction finds its level on the bog.
- Durability assessment. The design life expectancy of the ‘timbers’ is way beyond that of wood and is totally maintenance free - 25 years +

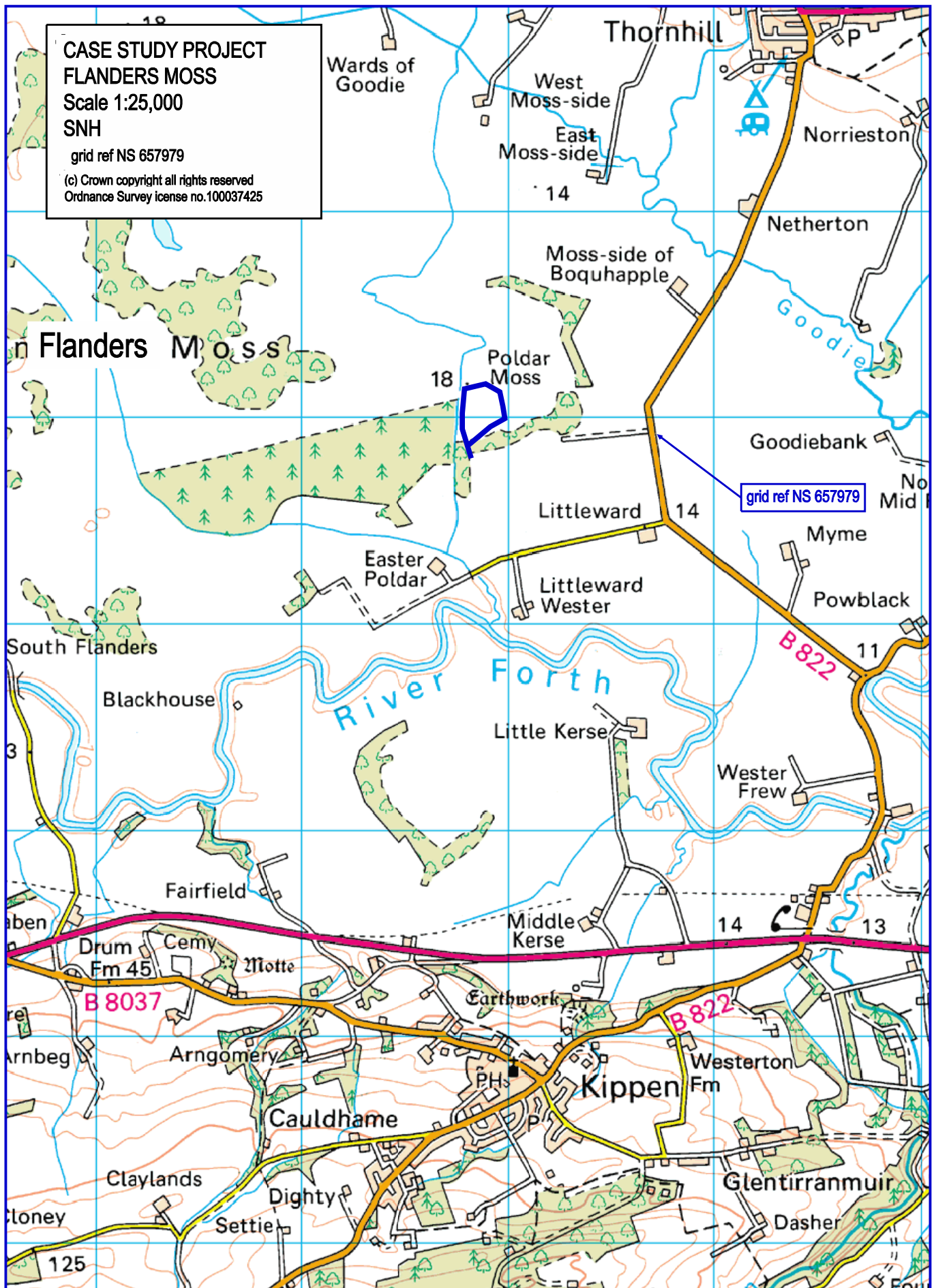
Studies

- A pressure pad visitor counter has been fitted to monitor use, also a site Disabilities Discrimination Act (DDA) audit was undertaken and passed.

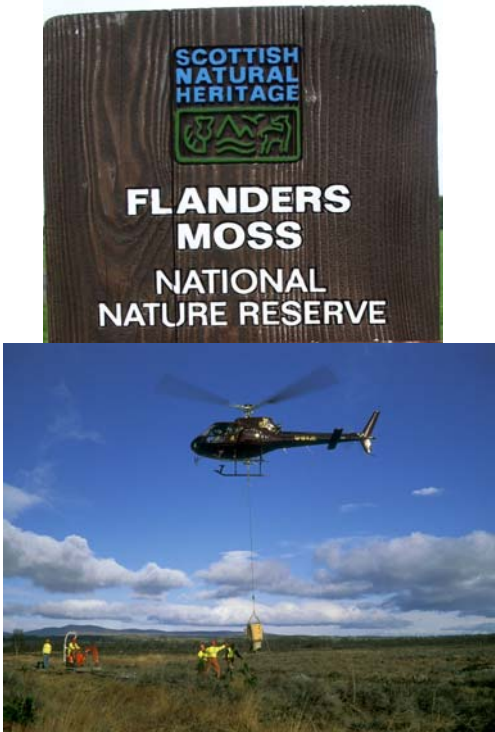
Thanks

- Many thanks to David Pickett, Reserves Manager SNH for his assistance with this case study.

**CASE STUDY PROJECT
FLANDERS MOSS**
Scale 1:25,000
SNH
grid ref NS 657979
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FLANDERS MOSS PATH



The construction phase



Floating bridge endseats and floating boardwalk.



Good design and landscape fit.

Viewpark,Woodland Paths

A Toptrec, paver machine laid, recycled surfaced solution to enable all abilities access around the Viewpark Glen.

The Route

The project creates a link with new and upgraded paths from the existing NLC route in the south at NS718615 northwards through the woodland corridor between Viewpark and the Red Burn and then North Calder Water linking to NS714626 (Redisholm Crescent) in the north. A 1,000m of new path has been laid. The path serves as an alternative to the stepped route along the side of the North Calder Water valley. The route to the east of the Red Burn offers a possible link to both Strathclyde Business Park (an informal link is used at present) and to the Douglas Support land north of the North Calder Water which is subject to interest for business development. A link to National Cycle Route NCN 75 could be formed in the future if the landowner to the north west of this area can be persuaded to have a route over his land.

Context

- History of the path - Within the Red Burn corridor, the Toptrec paths are aligned along former paths which have fallen into disrepair. The new routes are based on community aspirations for a local path network.
- Landscape - The Paths run within the valley of the North Calder Water and its tributary, the Red Burn. Both are incised water courses so the routes tend to sit on the crest of the valley. The area is largely wooded, though the northerly route deliberately takes an alignment that is largely visible from the adjacent houses to vary the type of route available and increase their appeal to less confident users.
- Modes of use - Toptrec was deliberately used to make a surface robust enough for cyclists, prams and buggies, and wheelchairs. Both red routes – see map - are at a gradient suitable for a wide range of users.

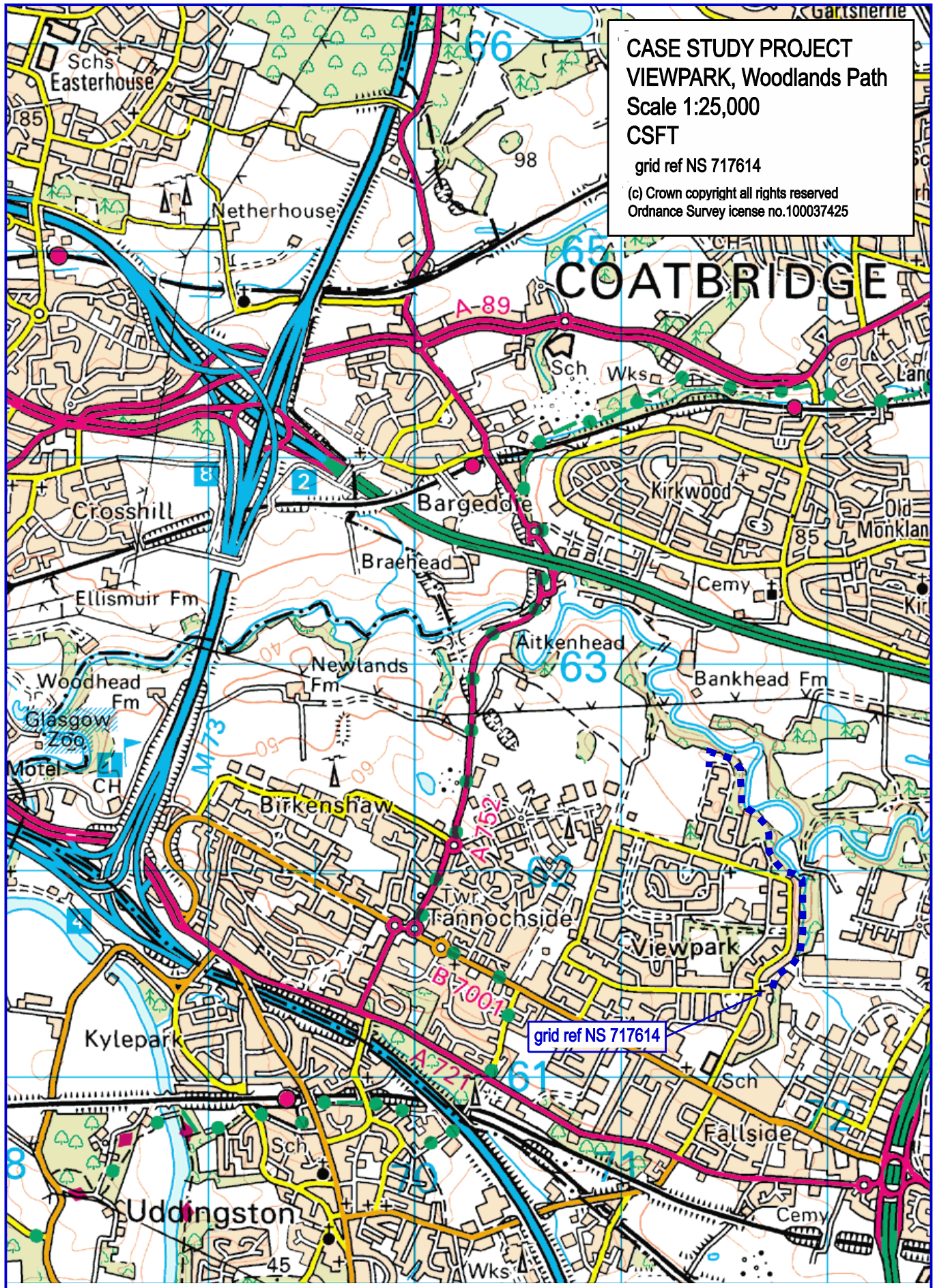
Technical details

- Specification -The specification was as per the standard laying guide as provided by Tarmac for the use of Toptrec – see www.tarmac.co.uk. A 75 mm thickness Toptrec coating laid by mini-paver on an aggregate sub-base of 150 mm depth to a 1300 mm width.
- Date of completion - Spring 2006
- Contract – Design work and contract supervision by Hirst Landscape Architects Ltd, 18 Royal Terrace, Glasgow, G3 7NY
Tel: 0141 332 0292 Email: info@hirsts.co.uk

CASE STUDY PROJECT
VIEWPARK, Woodlands Path
Scale 1:25,000
CSFT

grid ref NS 717614

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VIEWPARK, Woodland Paths



The paths link from the houses through public open space to the woodlands.



Paths within the woodland sections.



The Toptrec surface.



The wider project.

Motherwell, Dalzell Estate Path

A challenging project to lay a traditional path surface using today's materials and techniques.

The Route

The path is part of the network within Dalzell Estate which is situated close to Fir Park Football Stadium and the North Lanarkshire Civic Centre in Motherwell. Dalzell Estate is open to the public from dawn to dusk throughout the year.

Context

- History of the path - Dalzell House dates from the sixteenth century and the path route probably predates that. The old path surface, over a hundred years old, was formed by incorporating building stone with lime cement had been extensively and variedly patched over the years and had reached the stage that it required to be renewed. The challenge was to develop and lay a traditional surface using modern day materials and techniques.
- Landscape - Nestling in well-wooded parkland on the southern boundary of Motherwell, adjacent Dalzell House which is one of the finest mansions of the Scottish Lowlands.
- Modes of use - Suitable for all modes of use including light transport and emergency services, however the natural gradients make full mobility access difficult.

Technical Details

- Specification – excavate 275/300mm of the existing roadway surface down to white/grey sandstone layer and fully consolidate. Lay 225mm well consolidated lean mix concrete laid with 40mm camber, surface with 75mm Cloburn Quarry 40-20 aggregates mixed with a 2/5 lime/sand matrix. Once the surface has been laid and tightly compacted apply retarder spray compound to the finished surface, the lime bound surface is then coated in Hessian and soaked to allow curing which could extend to 28 days. The finished surface is of the hard wearing red aggregate bound by a lime based mortar.
- Date of completion – the contact was completed in October 2006.
- Contract - Main contractor: Murdoch Mackenzie Ltd, Coursington Road, Motherwell, ML1 1NR, tel: 01698 265171.
Specialist contractor: Cloburn Quarry Company Ltd, Lanark ML11 8SR. tel: 01555 663444 who supplied the stone and developed the mix and the pavior required to lay the mix.
- Maintenance – no early maintenance expected but path will be managed as part of the Park path network.

Funding

- Funders and contributors – North Lanarkshire Council, and Historic Scotland.
- Cost - the path project was part of a bigger £100k project which included historic bridge and cemetery remedial works.

Evaluation

- Successful elements – The development of a suitable stone and lime based mortar surfacing material and therefore being able to recreate a century old road using modern machinery and techniques. The good quality of the finished path surface, which is very much in keeping with the spirit and history of the place.
- Less successful elements – none so far.
- Maintenance issues - no maintenance expected once the retarder and excess lime mortar mix has washed off to expose the bound red aggregate.
- Durability assessment – meets all trade standards for concrete and is a long lasting solution.

Studies

- There are no plans for any follow up surveys or counters.

North Cabrian School, Cumbernauld

Cloburn Quarry has a range of unique high quality aggregate products which are especially good for demarcation, due to the natural permanent red colour of the rock giving no need for added pigment it is therefore good for the environment too. The clean aggregates (no fines) are available down to 1-3mm which is extremely good for surfacing as they bind well without fines; these are used extensively on cycle paths in Netherlands and other countries.

The visibility and cleanness of the surface make this aggregate especially appropriate for specialist use such as at North Cabrian School in Cumbernauld where it has been used as a sensory guide for play areas.

Thanks

- Many thanks to David Morrison, Cloburn Quarry Company Ltd., for his assistance with this Case Study.

- Contractor - Caley Construction Ltd. 136 Glenpark Street , Glasgow, G31 1NZ . Tel: 0141-556-7275.
- Maintenance - 12 month contract defects period reverting back to NLC as landowner.
- Funders and Contributions - Greenspace Scotland, £26,350:
North Lanarkshire Council, £36,638: SNH, £20,257:
Forestry Commission Scotland, £12,715
- Total Project Cost £95,960

Evaluation

- Summary - Too early to do any meaningful assessment other than the path surface seems robust, the surface has stood up well to very heavy cycle and occasional motorcycle use, and shows no sign of surface water scouring. There are some drainage issues to be remedied, expected given the steep banks, but the Toptrec still remains robust in these wetter areas. Toptrec was the preferred surface with lower anticipated maintenance costs, the use of recycled product rather than primary aggregate and a consistent approach using the same surface as the NLC path route to the south of this path. The project should have a further phase of woodland and green space management which will allow a greater level of engagement with local people as dumping and fly-tipping in the woodlands is a serious problem which needs joint action.

Surveys

- There is currently no plan for any detailed survey in this location.

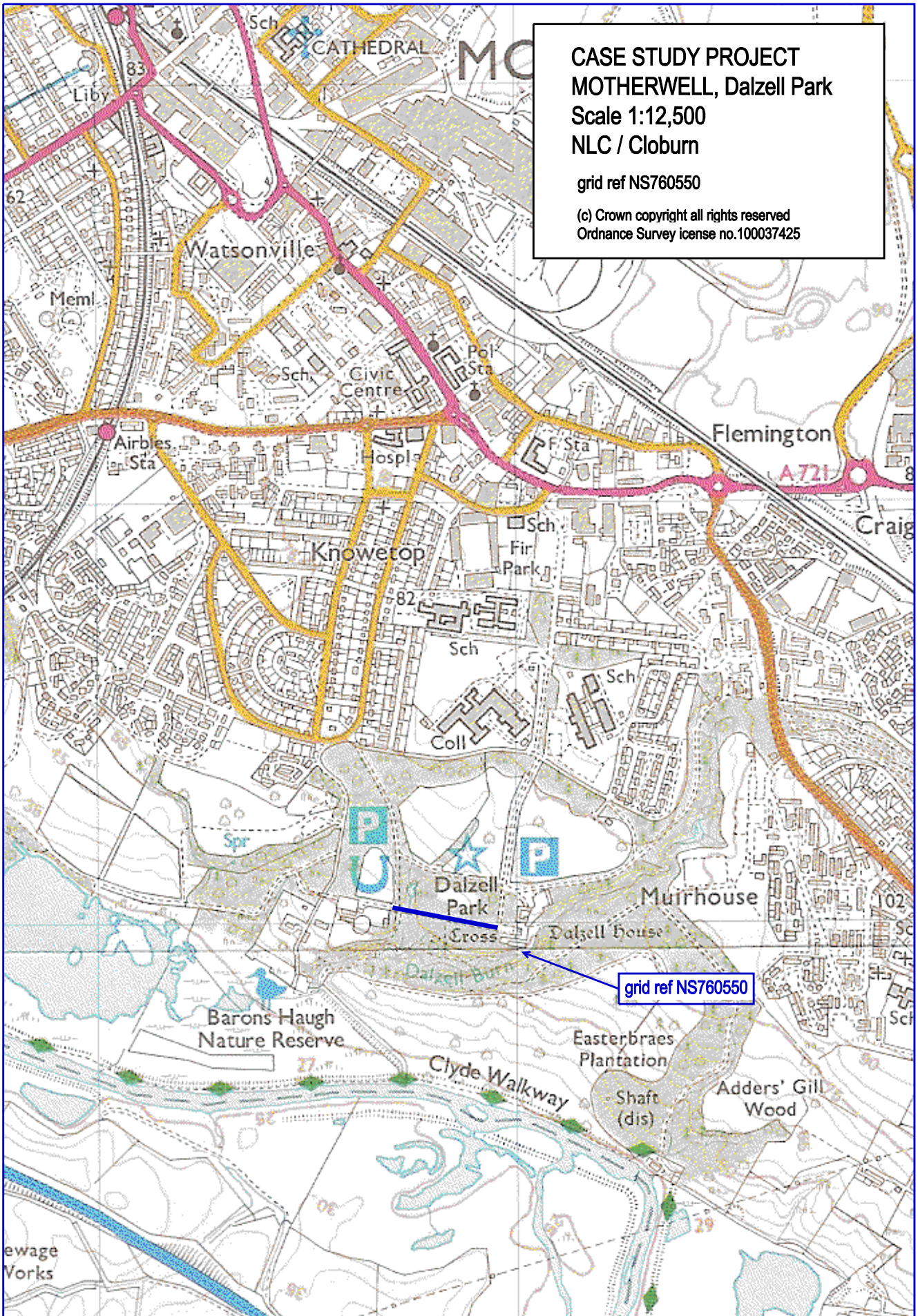
Thanks

- Many thanks to Mike Batley, Sustainable Development Officer, Central Scotland Forest Trust for his assistance with this Case Study.

CASE STUDY PROJECT
MOTHERWELL, Dalzell Park
Scale 1:12,500
NLC / Cloburn

grid ref NS760550

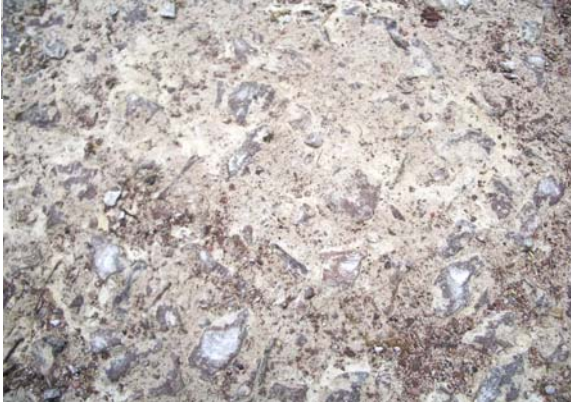
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MOTHERWELL, Dalzell Estate Path



The section of new path and the setting.



The new surface slowly being revealed.



The old path breaking up and the new laid surface.

Crossford, The Clyde Walkway

A Toptrec, hand laid, recycled surfaced solution to enable wheelchair access across a river floodplain with frequent inundations.

The Route

This 4 mile section of Clyde Walkway route between the villages of Crossford and Rosebank represents one of the most significant 'missing links' in the 45 mile long riverside path between Glasgow city centre and the World Heritage Site of New Lanark and the Falls of Clyde. The path runs through a section of the Clyde valley which is characterised by a mixture of small villages and scattered residential development, agricultural land, orchards and semi natural woodland all of which are contained within steep sided valley of the River Clyde.

Context

- History of the path – Development of the Clyde Walkway has been on-going since the mid 1970's and although originally envisaged by the then Countryside Commission for Scotland as a candidate designated Long Distance Route was subsequently considered not to meet the eligibility criteria. Consequently development and implementation of the route has been undertaken on a piece-meal basis by the local authorities through which it passes.
- Landscape – The Clyde Valley Landscape Character Assessment describes this section of the Clyde Valley as that of incised river valleys dominated by mature largely broad leaved woodlands with enormous biodiversity value.
- Modes of use – Due to a number of topographical constraints along the route notably a series of incised burn valleys and steep slopes which the route has to traverse the primary mode of use is walking although it is acknowledged in the context of the land reform act other users (cyclist and horse riders) may and do make use of some sections of the route where it is appropriate and reasonable for them to do so. As far as is practically achievable the path has been made accessible to wheelchair users although the constraints of the site make full mobility access impossible to achieve.

Technical Details

- Specification 1 – Surfaced path - the 1.8m wide path is of a simple construction. The path sub-base consists of 200mm Type1 (recycled) and is surfaced by 50mm hand laid Toptrec. Toptrec is a 100% recycled surfacing material from Tarmac. www.tarmac.co.uk 01902 382322 The recycled road aggregate has been used successfully in path construction, the good binding quality gives a reasonable surface without top dusting, Biggar Water Path is a good example.
- Specification 2 – Boardwalks and steps – sections of treated timber paths to gain access across the difficult and steep sections.
- Specification 3 – Grass trod, sections of path fenced off from agriculture.
- Date of completion – Construction of the route started in July 2005 and is scheduled for completion in early 2008

- Contract – Design work and contract supervision has been undertaken by Ironside Farrar Ltd., Grovewood Business Centre, Bellshill, Glasgow ML4 3NQ E-mail: belshill@ironsidefarrar.com Tel: 01698 747266.
The main construction contractor Caley Construction Ltd. 136 Glenpark Street, Glasgow, G31 1NZ Tel: 0141-556-7275.
A number of specialist / sub contractors have been involved for various elements of the work.
- Maintenance – The first 2 years maintenance has been ‘capitalised’ as part of the main contract and is being undertaken by the main contractor thereafter South Lanarkshire Council will take on responsibility.

Funding

- Funders and contributors are South Lanarkshire Council £25,000; Scottish Natural Heritage £25,000; Heritage Lottery Fund £425,000; European Regional Development Fund £400,000
- Total project cost £875,000

Evaluation

- Successful elements. The negotiation of 18 separate public path creation agreement with private landowners of whose land the route passes. The ability to accommodate a variety of diverse natural heritage and landowner needs and interest (security / privacy/ livestock management, biodiversity sensitivity).
The strength of the Toptrec path to withstand cattle pressure and poaching in the path sections through grazing land, the verges have eroded away in places but the path has stayed firm.
The fit of the Toptrec surface within the local environment, exhibiting strength properties but with bleaching from an original strong colour to one in keeping with the countryside. This recycled surface does not look or feel like a bitumen top dressing. The Toptrec surfacing has successfully survived one river water inundation when the Clyde burst its banks.
- Maintenance issues – The proximity of the path to the river does raise some issues associated with the potential damage caused by flooding and high water levels in tributary burns feeding into the River Clyde. Where possible design measures have been incorporated to minimise the potential damage caused by such events these include the use of boardwalk sections and bank stabilization.
Durability assessment. The design life of the various built components (bridges, steps, access controls etc is in excess of 25 years). The grass trod sections may prove to be a weakness if the number of users rises.

Studies

- Pressure pad type electronic counters have been installed at both ends of the path to monitor usage, over the first sixteen weeks the counters have averaged a weekly count of: Clyde 1 – 375 visitors; Clyde 2 – 210 visitors.

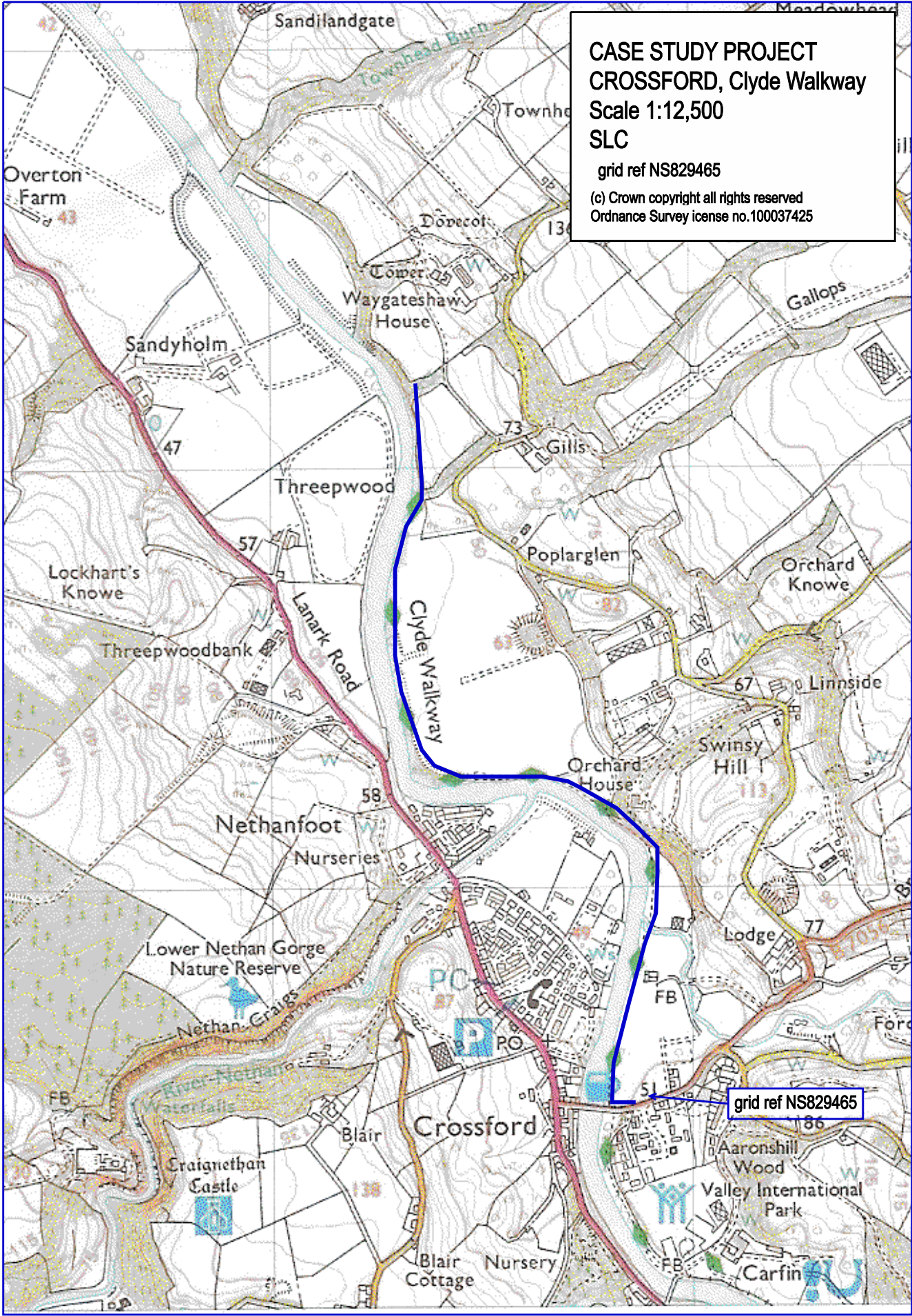
Thanks

- Many thanks to Simon Pilpel, Landscape and Access Development Manager, South Lanarkshire Council & Greenspace for his assistance with this Case Study.

CASE STUDY PROJECT
CROSSFORD, Clyde Walkway
Scale 1:12,500
SLC

grid ref NS829465

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grid ref NS829465

CROSSFORD, Clyde Walkway



The Toprec surface and typical views of the path.



The unsurfaced and boardwalk sections of the path.



Biggar Water Path - recycled type1