

# Feasibility Study for Mountain Bike Trail Sites in the West Pennine Moors



Prepared for Lancashire Council by

**BackOnTrack**  
TRAIL DESIGN SPECIALISTS

---

Summer 2010

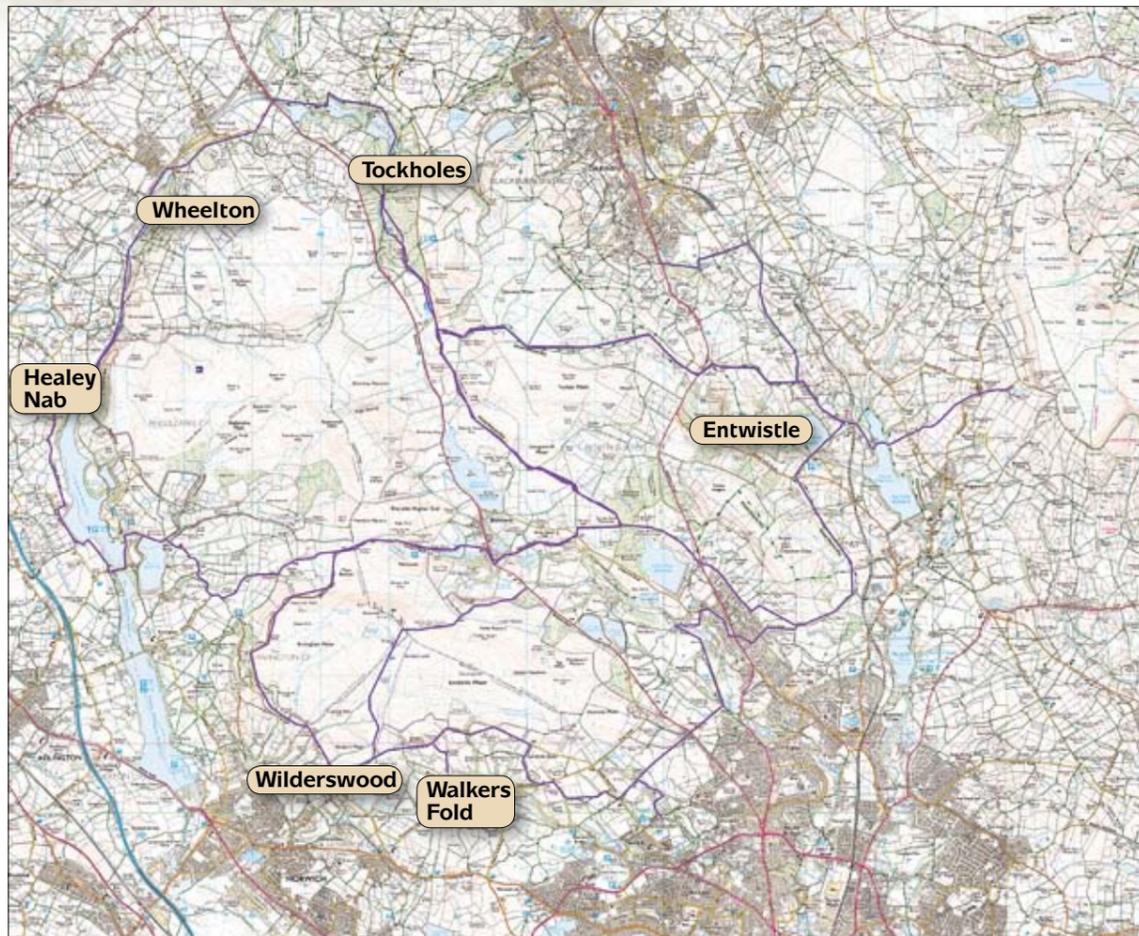
# MTB Trail Sites in the West Pennine Moors



## SUMMARY

Back on Track Mountain Bike Solutions were commissioned in April 2010 to test the feasibility and scope for mountain bike trail development and tourism, at the Entwistle, Tockholes/Roddlesworth, Wheelton Plantation, Walkers Fold and Wilderswood sites in the West Pennine Moors (WPM). Each site was to be evaluated both on its individual merit and within the wider context of mountain biking in the West Pennine Moors.

The map shows the study area and identifies the five proposed sites plus the existing developed site at Healey Nab



## STUDY BACKGROUND

MOUNTAIN BIKING is a growing recreational activity in the UK, and Visit Wales estimates that mountain biking, as a whole, is worth £23.4m to the Welsh economy. The provision of mountain bike facilities in England is still in its growth phase and somewhat behind the more developed models found in Scotland and Wales. The North West of England has a very limited number of technically advanced mountain bike centres; currently they are located at Gisburn Forest and Lee & Cragg Quarries in Rossendale. There are a few smaller developments such as Healey Nab near Chorley and Whitton Park in Blackburn. The North West of England and the West Pennine Moors has a huge population catchment area, many of whose riders currently travel into the Lake District, North Wales and the Scottish Borders to experience well developed and well designed mountain bike trails.

The concept under evaluation here is to develop smaller satellite sites around the West Pennine Moors, linked by the well developed PROW network. It is proposed that a development of this nature could provide a close to home alternatives to the trail centres found around the UK, for the local population, and create a different mountain bike trail product from those currently offered for mountain biking tourists.

This study explores the feasibility of providing such a facility, which could include an off-road trail for family/beginner riders, visitor facilities and provision of more challenging routes for experienced riders.

The main aim of the study is to determine the scope and feasibility of a mountain biking tourism product in the West Pennine Moors and whether it is sustainable with minimal management by the major landowners.



## THE STUDY AREA

THE WEST PENNINE MOORS (WPM) covers an area of approximately 90 square miles and is dominated by large moorland blocks and reservoir catchment valleys. It lies between significant areas of population with Blackburn to the north, Bury and Bolton to the south, Chorley to the west and Haslingden to the east. The study area of the WPM currently has just one formalised mountain bike trail located at Healey Nab near Chorley, this facility has been well used by mountain bikers and led to the formation of volunteer trail build group 'I Dig Healey Nab'. There is considerable

pressure on the land from mountain bikers living in the study area who are looking for more accessible and challenging routes than those found on the ROW network. Rivington, the Commonwealth Games course which ran through the woodland surrounding the reservoir and the Pike, is perhaps the primary example of illegitimate use experiencing increased usage largely as a consequence of the legacy of the Games with no formal facilities being created.

Well designed and well built dedicated mountain bike routes can go a long way

towards managing this informal use and alleviating the various user conflicts that often comes hand in hand.

The Commonwealth Games event has put the area on the map for mountain bikers and only a well built and exciting trail that offers more interest than the current informal trails will help reduce this activity.

The areas proximity to population centres and major transport arteries suggests that it has good potential to increase leisure cycling, subject to the appropriate facilities, management and land owners consent.



## Further Background

### MOUNTAIN BIKE TRAILS AND FOREST TRAIL CENTRES

MOUNTAIN BIKING, and the creation of waymarked trail destinations supported by visitor centres, has been recognised by The Forestry Commission Wales as being extremely successful in driving visitor numbers, increasing new visitor spending and supporting local economic and business development. (Forestry Commission Wales Strategic Plan for Mountain Biking 2005-2007).

Across Wales, Scotland and more recently in England, trail centres featuring purpose-built mountain bike trails and bike-friendly facilities have been created. These are located almost exclusively on Forestry Commission land and take the form of a prescribed forest loop made up of purpose-built singletrack trails and are for cyclists only.

There are a few trail centres within travelling distance of the study area; they are Coed Llandegla near Ruthin in North Wales and Grizedale in the Lake District, both one and a half hours drive away in each direction. Gisburn Forest one hour away within Lancashire, and Lee Quarry 50 minutes away offer trails but with no supporting facilities that are usually found at these centres.

Trail centres have seen a huge growth in the number of users as the expertly designed trails cater specifically for mountain bikes and give riders a great riding experience. They have made what was a relatively inaccessible sport for the masses, accessible to almost anyone. Riders no longer have to be able to map read and deal with ever changing trail conditions. Modern trail centres have well built sustainable trails that challenge and excite riders in a relatively safe environment, so that all they have to do is follow the arrows. A 15km trail centre ride can provide more fun and trail features than a 50km traditional hilltop ride ever could. Importantly, with sound construction techniques and materials it is possible to ride them all year round.

### VISITOR CENTRES

WHILE MANY RIDERS when surveyed claim it is the quality of the trails and the great natural environment that draws them into an area, it is also clear that the additional facilities that a bike focussed visitor centre can offer, enhances their experience, encourages them to stay longer, to spend money, and increases the likelihood of them visiting in the first place. This is apparent when you compare some of the other existing Forestry Commission sites that either have, or do not have a visitor centre or supporting facilities – the visitor numbers are generally half those found at the facilities-focussed trail centres, whilst both trails may well be of similar quality.

For a rider to have access to basic spares and servicing for their bike within easy reach of the trails, be able to get a coffee and warm food, wash their bike and get changed indoors are all important factors in the overall trail experience and, more importantly for a community. These are all ways of generating revenue.

*A successful centre will have provision for the following:*

**Car Parking:** There needs to be sufficient car parking space available. Riders are generally happy to pay for parking that is of a good standard and secure. If a centre were to be used for a large annual event, there would need to be the capacity to provide additional temporary parking.

**Bike Wash:** Riding in the UK is, for the most part, a somewhat messy experience, due to our often inclement weather. Riders invest thousands of pounds in their bikes and like to look after them. A basic bike washing area, preferably with power washers, is considered an essential facility.

**Information Point:** The Visitor centre should also serve as the point at which riders can find out the latest trail conditions and updates, view trail maps, book skills courses, get general advice on riding in the area. This should also be the point at which accidents on site are managed in partnership with the landowners.

**Café:** Perhaps the most successful bike cafés are those found at Glentress and Glynorrwg both of which were set up by bikers, for bikers. The formula is simple: Good quality, healthy food, real coffee, a relaxed 'rider-friendly' atmosphere, bike magazines, good photography on the walls and bike videos of the area and other inspirational footage playing on screens, couple this with Wi-Fi internet access and you're onto a winner.

**Bike Storage:** Riders will not stop to use the cafe and après ride facilities if they do not feel their bikes are safe. Generally, at the end of a ride, bikes will be washed and put in/ on the car. However this can depend on the perceived security of the car park, closeness of the car park to the café and visibility. Cafés can incorporate a balcony

area where bike racks are installed which helps users feel at ease that their bike is close to hand and safe. Any other form of bike storage areas should be visible from the café.

**Showers/Changing/Toilets:** For years mountain bikers have been used to stripping off and changing into clothes to travel home in out in the open car park. Still muddy underneath, this is not a nice prospect when facing an hour plus journey home. The biggest improvement suggested by respondents to the Wales Mountain Bike Survey 2002 was the provision of showers, and new visitor centres include them wherever possible.

**Shop:** A fully stocked bike shop is not essential, but at the most basic level, the ability to provide spares is essential. This should be close enough to the riding areas that riders can drive to collect spares in a short space of time, but it would be more beneficial if they, or a new enterprise, had a presence at the trail head, so any mechanicals can be dealt with there.

**Camping/Accommodation:** As the trail network expands riders will be attracted from further away and there will be more call for accommodation. A basic camping facility should be found at, or nearby, the trailhead areas, with provision to expand to nearby areas for events camping. The local community should be encouraged to offer B&B.

To summarise, whilst it is not essential to have a visitor centre to support a trail development, any sizeable trail network will benefit greatly from the effect of providing these supporting facilities, visitor numbers increase and revenue can be generated through one set of facilities.



### THE EVOLUTION OF MOUNTAIN BIKE FACILITIES

AS MOUNTAIN BIKING has continued to grow, biking centres and trail developments have evolved in different environments that face different challenges in bringing mountain biking to more users. Traditionally most, if not all, mountain bike developments followed the trail centre formula. Recently, where trail centres are beginning to reach saturation point (especially in Scotland and Wales); or where land managers have restricted areas available for development; or funding has been insufficient; new models have been formed and successfully delivered. These are the main three:

**A Trail Centre** – As previously detailed, these sites would typically provide enough riding in one area to fulfil all riders' needs and help contain and manage the use of mountain bikes in an area, whilst providing economic benefit to often deprived, towns or rural areas. They will have a designated car park and facilities such as toilets, showers, café, bike shop, bike wash. To date the vast majority of these trail centres have been provided on Forestry Commission land and have trail loops of around 15km to 25km. The trails are expertly designed to provide an exciting and interesting ride in a safe environment. Project costs can vary from £250,000 to in excess of £1,000,000.

**A Community Trail** – These are short trails that serve a local community, no different in concept from a sports pitch or a playground facility. Well designed trails will attract people from surrounding communities and further afield to the facility. These are often funded by community grants. Budgets for these shorter community trails can vary between £20,000 and £80,000 and give great value for money. They can be true mountain bike trails in forest and hillside terrain around communities or skills

development loop and pump tracks located in the community and town itself. This is an approach favoured by local authorities or where multiple land owners restrict larger trail development. These trails can bring mountain biking to the people, utilising parks and smaller areas of recreation land in and around conurbations and help younger people, who cannot travel to the big trail centres, utilise the trails. Healey Nab is a good example of a community based trail, serving Chorley, but with riders travelling from a wider catchment area to use the facility.

**A Linked Set of Neighbouring Smaller Community Trails** – Using the community trails format above, but spread between nearby towns or villages, these linked trails effectively create much larger trails, but without the need for the visitor centre and central facilities. This is the solution that many local authorities will favour, as they do not own large forestry blocks, but they can link a number of smaller community trails, each individually providing 2–4 km of technical riding, with cycle paths or suitable PROWs. Lancashire is pioneering this approach, at present, with the phased developments in Rossendale, and this study



is evaluating the merit of a similar scheme in the West Pennines. In Rossendale they are utilising old quarries in their ownership to create shorter technical rides, linked by the local bridleway network. In this way they meet both the requirements of the shorter community trails that people can tackle in a shorter space of time (after work etc) and the longer rides found at trail centres that provide a full day out for the rider. These draw in tourists for a day or possibly even a weekend on the bike. Importantly, the spend in an area can be more widespread as people move between communities, whereas the reality of a trail centre is often that all the money goes to just one or two businesses.

## THE CASE FOR MOUNTAIN BIKE TRAILS

MANY LAND AGENTS and Government Bodies are realising the important economic and health benefits that mountain biking can bring to an area, when expertly designed facilities are created.

There are statistics available from various surveys to support the development of these purpose built bike trails:

**BIKE OWNERSHIP:** CTC and the National Byway estimated that there were 23 million bikes in ownership in 1998, and this has grown exponentially year on year. The bicycle association estimated that 33% of households had at least one bike in 1995 and Mintel estimated one in three adults owned a bike. British Cycling estimate that there are two million bikes sold each year.

**TOURISM VALUE:** The well-publicised Coed-y-Brenin survey estimated that £40 is spent per overnight visitor. A study by The

Peak National Park in 1996 estimated that, on average, cyclists spend £25 per cycling day, and indicated an expected growth in visit expenditure at 5% per year.

**HEALTH BENEFITS:** Regular cyclists enjoy a fitness level equal to that of a person ten years younger (National Forum for Coronary Heart Disease) and cycling at least twenty miles a week reduces the risk of heart disease to less than half that of non-cyclists who take no other exercise (British Heart Foundation).



## MOUNTAIN BIKE USER GROUPS AND GRADED TRAILS

MOUNTAIN BIKE TRAILS use a similar grading system to skiing, with colour coded blue, red and black routes to denote their difficulty. The several user groups within mountain biking tend to match their particular grades of trails.

It is important for any project and design to have a firm grasp of which user groups they are aiming their product at and likewise which grade trails they will design. Similarly it is important to evaluate whether the terrain is suitable for the grade. The following categories are most often used to define and identify the target market for any given cross country trail development:

**BLUE ROUTES** are aimed at novice mountain bikers, leisure riders and families who want to try out real off-road riding in a managed environment. With little off-road experience necessary to enjoy the trails, the routes have shallow gradients with a confidence building uniform width and smooth surface. These are, however, off-road mountain bike trails and are not suitable for everyone as they still require some basic bike handling skills. They are not suitable for bikes other than mountain bikes. They are sometimes confused with the easier Green grade trails that are usually level roads, disused railways or canal towpaths whereas blue graded trails will feature singletrack through woods and similar off-road environments.

**RED ROUTES** are designed for experienced off-road riders: usually sport and enthusiast users. The routes require more physical strength and technical skill often with steeper climbs and descents and technical trail features. The majority of enthusiast mountain bikers would fit into this category and red routes are by far the most common trails found around the UK.

**BLACK ROUTES** are designed for expert mountain bikers. Generally, with many technical features along their length that require more advanced riding techniques to tame. Similarly Black trails will often pose a more physical challenge with greater distances and more strenuous climbs.



With Blue Trails, the users typically are novice groups, family groups and/or younger mountain bikers or more experienced riders looking for a shorter ride or a warm-up trail. This is where the larger potential user numbers are found; typically, they will be local day visitors or riders of bike trails as an activity on holiday. With around nine million recreational cyclists (five million children) and 800,000 regular cycle users, there is a large potential user group for blue graded trails. (Source: [www.ctc.org.uk](http://www.ctc.org.uk)). **It is important to note that just because a trail is deemed easier by grading does not mean that it should be any less fun to ride.**

Users of a Red Trail are generally mountain bikers with more skill and fitness. They will travel long distances to visit new or well reputed trails and often stay in an area to ride on more than one day.

Users of a Black Trail are generally keen and passionate mountain bikers who have built up a higher level of skill. These riders are always seeking the best and most challenging trails, travelling long distances. There are smaller user numbers here, due to the higher skill level and experience required. It is this end of the trail spectrum that earns kudos for a trail development within the mountain bike industry and media.

The gradings and descriptions are typical of modern cross-country (XC) mountain bike development. But as mountain biking has continued to increase in popularity and develop, smaller, niche user-groups have increased into sizeable groups that require space to take part in their chosen sport. The two activities that fall outside the main cross-country activity are:

**Freeriders** – These are riders looking for the more extreme challenges. Their trails often provide jumps, berms and drops, and skill levels range from the first steps of getting airborne, through to the advanced and highly skilled who can jump 50 feet or more, in the air with ease. This group is typically difficult to provide for, as landowners do not want liability for the associated high risk of injury that comes with this more extreme aspect of mountain biking. Often riders will build their own stunts tracks without permission where they can. Freeride does offer a major opportunity for commercial success operate as riders will happily pay to use an area where they are permitted to freeride. A more recent development in mountain biking has been the evolution of pump tracks (see the section on pump tracks page 32) these offer some cross-over between the different disciplines, with freeriders and cross country riders all enjoying the pump tracks.

**Downhillers** – This gravity fed area of the sport is increasingly popular with riders using larger and heavier bikes with strong brakes and good suspension, that allow riding over challenging terrain with steep slopes and banks. Riders return to the top, preferably by a vehicular uplift, or in reality, in most cases, by pushing their heavy bikes back up the steep slope to repeat the descent again and again. This area of the sport has commercial potential although many public sector landowners shy away from downhill developments due to the higher risk levels of injury. This is occurring on a lot of suitable terrain all around the UK informally, where the risks are higher and are not managed. So really, it becomes in everyone's interest to regain some control over the activity, create better facilities and manage the illegal use.

**Endurance Riders** – These are riders who like to be challenged physically and will tackle long distance routes far in excess of what your average rider could manage or enjoy. It is a smaller niche of riders and they are mainly provided for by the PROW network. However, all endurance riders enjoy the added spice provided by purpose-built mountain bike trails, whether that be a full trail centre style route or shorter 'stop-off' loops.

**Pump Tracks** – These are a relatively new idea and development. One that brings almost all of the users together as they are fun to ride and improve riders skills and bike handling. The basic concept is a looped trail that is made up of banked corners (berms) and humps or rollers that the riders 'pump' to gain momentum. They build and maintain speed by just pumping these features (with their arms and legs) and not by pedalling. Pump tracks occupy a space anything up to the size of a football pitch though most are more likely to be approximately 50m by 20m.

Importantly for landowners' liability, pump tracks are self limiting, that is, riders can not generate enough speed to try big jumps until they have mastered the basic skills. Momentum is generated through mastering the skills and with that comes the ability to ride competently at higher speeds and over jumps.

The well documented successes of the current forest trail centres have not happened by chance. A lot of planning, design and money, has been invested in these centres to create purpose-built mountain bike only trails, which provide a fun, safe and exciting experience for the rider.

Facilities have been developed at all the major sites to create a more pleasant enjoyable experience for the visitor and crucially – to create revenue as use of the trails is generally free of charge.



## CONSULTATION

CONSULTATION was carried out with organised members of the local mountain bike community and with the major stakeholders. Ian Hart of Lancashire County Council's Countryside Service undertook further consultation with United Utilities, reporting back the study's initial findings. Site based consultation was carried out with Ian Hart of LCC, Bill Farrell of Bolton County Council and Woodland Officer Stuart Cairns as well as with key members of the Pennine Mountain Bike Action Group.



## TRANSPORT LINKS

READ ANY REPORT or survey assessing the demographic of Mountain Bikers and you will see the same thing: middle aged, predominantly male, professionals with a high disposable income. Whilst this may well be true in most cases, most of these surveys have been conducted at trail centres and therefore exclude those who cannot travel.

The existing trail centres' success has been formed almost exclusively on the trade that this demographic has provided. However, it is short-sighted to think that this model is really catering for everyone. The remote locations of many of these centres excludes many potential users who do not have the means of transport to reach them, but would love to ride the trails. The second wave of mountain bike trail development should aim to reach out and engage all users.

The WPM study area is very close to many large conurbations and could serve several large communities who can ride from the doorstep to the trails, most notably Chorley, Bolton, Horwich, Adlington and Blackburn and Darwen. The road network to the areas is good, although parking at the identified sites range from no real provision, to well provided for. All of the aforementioned villages and towns have railway stations, further increasing the opportunities for riders to access the trail network. Overall, the transport links are very good although it would be prudent to consider viewing the possibilities of creating cycle lanes from the main towns to the feeder routes up to the trail if the off-road network were to be developed considerably and was deemed to attract potentially large numbers of visitors.

## THE WEST PENNINE MOORS STUDY AREA IN A WIDER REGIONAL CONTEXT

THE STUDY AREA offers miles of trails to ride, using the bridleway network and the WPM feeder routes. With the addition of the shorter technical loops at the identified sites, the WPM will offer a true mountain bike experience for residents and tourists. This is strengthened further when looking at the wider linkages and trails available for touring cyclists and endurance mountain bikers. The recent developments in Rossendale of Lee and Cragg Quarry and the Mary Townley Loop will probably be linked to the WPM area by the pending national feeder trail. This will open up a further huge distance of tracks and bridleways for those looking to clock up the miles, or off-road touring. While these longer distance rides will not capture the main market of mountain biking due to the lack of technical challenge versus the distances covered, it will give options for those who want to explore further. In addition, there is a proposed loop around the WPM, of 56 miles that, if approved, will provide a more basic, non-technical trail. It is important to understand that the desire of the rider groups is to develop the smaller, wooded, technical singletrack trails, without these, the miles of bridleways do not offer much interest at all. They would sooner drive to a trail centre where they will enjoy their 'fix' of technical singletrack.



## AN INTRODUCTION TO THE FIVE SITES



### ENTWISTLE AND TURTON RESERVOIR

Located the furthest east of all the five sites, Entwistle is an aesthetically pleasing area that is currently well used by dog walkers and family groups who regularly walk around the perimeter of the reservoir.

The strongest point of this site is the space and terrain available to create a modest trail centre product. This could be a site where groups of riders arrive by car, train, or from the ROW network – ride the trails around the reservoir and use on-site facilities pre and post ride before heading home.

The surfaced path around the perimeter of the reservoir is not suitable for cyclists to use; it is not safe to encourage shared use around this path. Doing so would be bad practice and lead to user conflict, especially with the potentially dangerous unprotected edge found on the reservoir side of the path where the reservoir walls drop away



very steeply. If mountain bikers are to be introduced to this area then it would be necessary to create a new 'bike only' trail that separates the users, minimising conflict and maximising both the safety and the experience, for those who would come and ride the trail.

*The above image shows the area of the Entwistle Reservoir*

### WALKERS FOLD WOODS

Located near to the WPM hub site of Smithills Hall, and closely linked to Wilderswood and the Rivington area, within easy access of Horwich and Bolton, Walkers Fold is a small plantation that follows the route of a stream down to Walkers Fold Road and, along with Wilderswood, is the most southern of the proposed areas. Walkers Fold is well linked to the WPM bridleway network.

It is currently not very well used, there is a concessionary footpath and a right of way footpath but both are in poor condition with slippery and damaged wooden boardwalks and steps. It is used as a camping area for teenagers and suffers from a lot of litter and broken glass as a result. Opening up the woods to a new



and regular user group could help with the future management of the woods – as the increased presence of other users could deter the more anti-social users.

*The above image shows the area of the Walkers Fold Woodland*

## WHEELTON PLANTATION

Located near to the village of Brinscall, at the northern end of the study area, Wheelton plantation is well linked to the wider WPM.

It has an obvious and clear link with the current Healey Nab site as the newly constructed Goit bridleway forms a direct and easy route between the two. The terrain here would, similarly, mirror the type of development found at Healey Nab. The site already attracts downhill riders who use the site informally, and whose use is unmanaged which could lead to user conflict issues.



The above image shows the area of the Wheelton Plantation

## WILDERSWOOD

Located nearby to Rivington and Walkers Fold, Wilderswood could be developed to ease the informal and difficult to manage use of Rivington by bikers.

It links well into the wider trail network and the terrain on site is such that it could be a great stop-off for bikers on longer rides, whilst providing a good facility for local riders, drawing them away from the informal trails in Rivington.



The above image shows the area of Wilderswood

## TOCKHOLES – RODDLESWORTH

This site is located to the north of the study area in good proximity to Blackburn and Darwen, and also to Healey Nab and Wheelton plantation.

It is well linked to the rest of the WPM network both by the upland challenge routes and lower bridleway links. The site has the added benefit of existing facilities being located here; there is a reasonably-sized car park, toilets and a café, all on site.



The above image shows the area at Tockholes

## VIABILITY OF CREATING A MULTI-STOP TRAIL CENTRE

AN ASSESSMENT of the study area was made to assess the viability of creating a multi-stop loop based on the five or six small technical sites. It would operate by utilising the upgraded ROW network to link the small technical trail stops (the five study sites plus Healey Nab) into an overall long distance ride.



The map below shows the ROW network and the six sites.

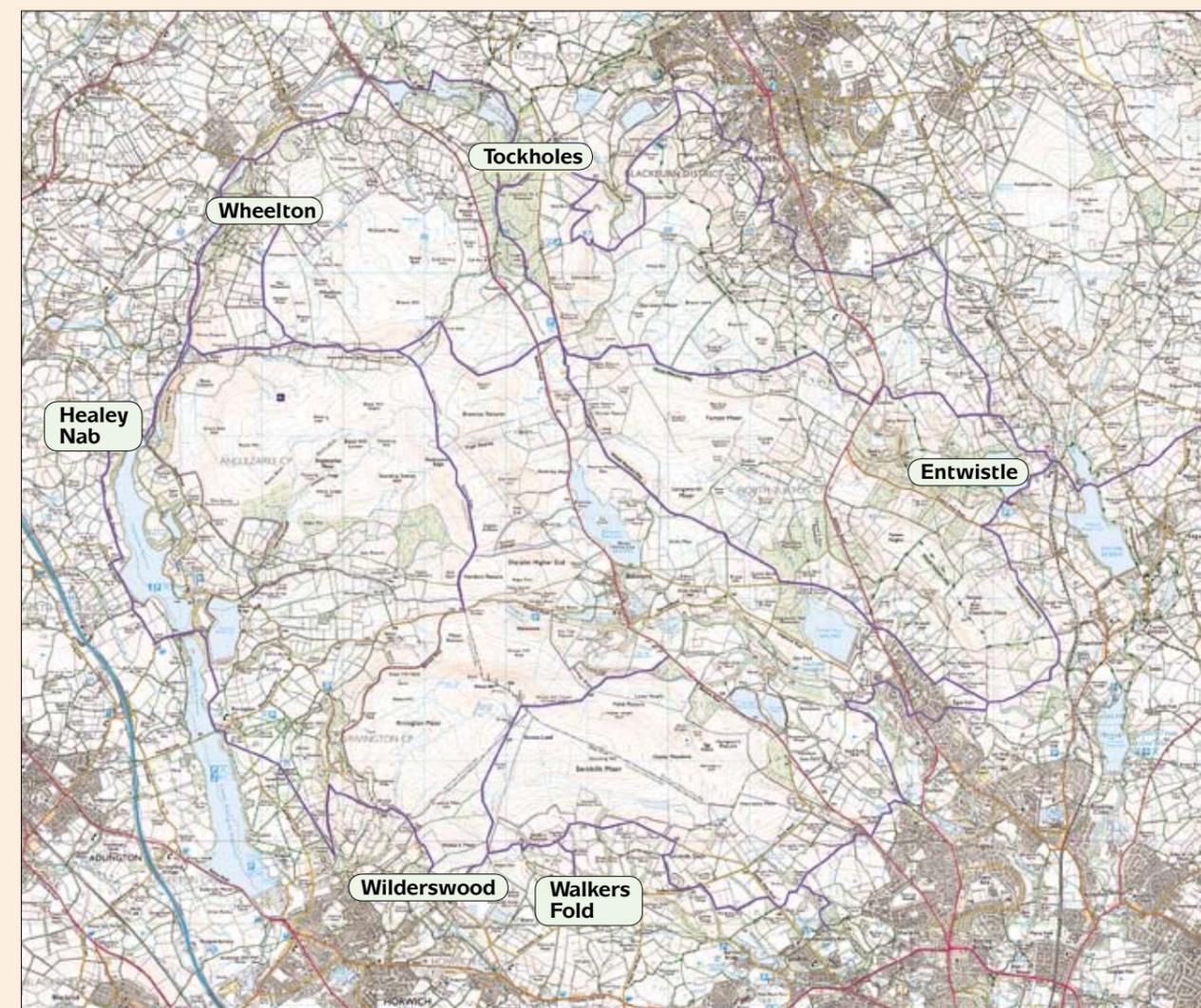
The purple lines mark the existing or proposed bridleways and multi-user trails that can be used to link the sites. Some of the upland challenge routes are particularly tough with large elevation changes. The main perimeter route is in excess of 50km excluding the distances of each of the technical trails themselves. Including the technical trail stops, the full loop would be in excess of 70km.

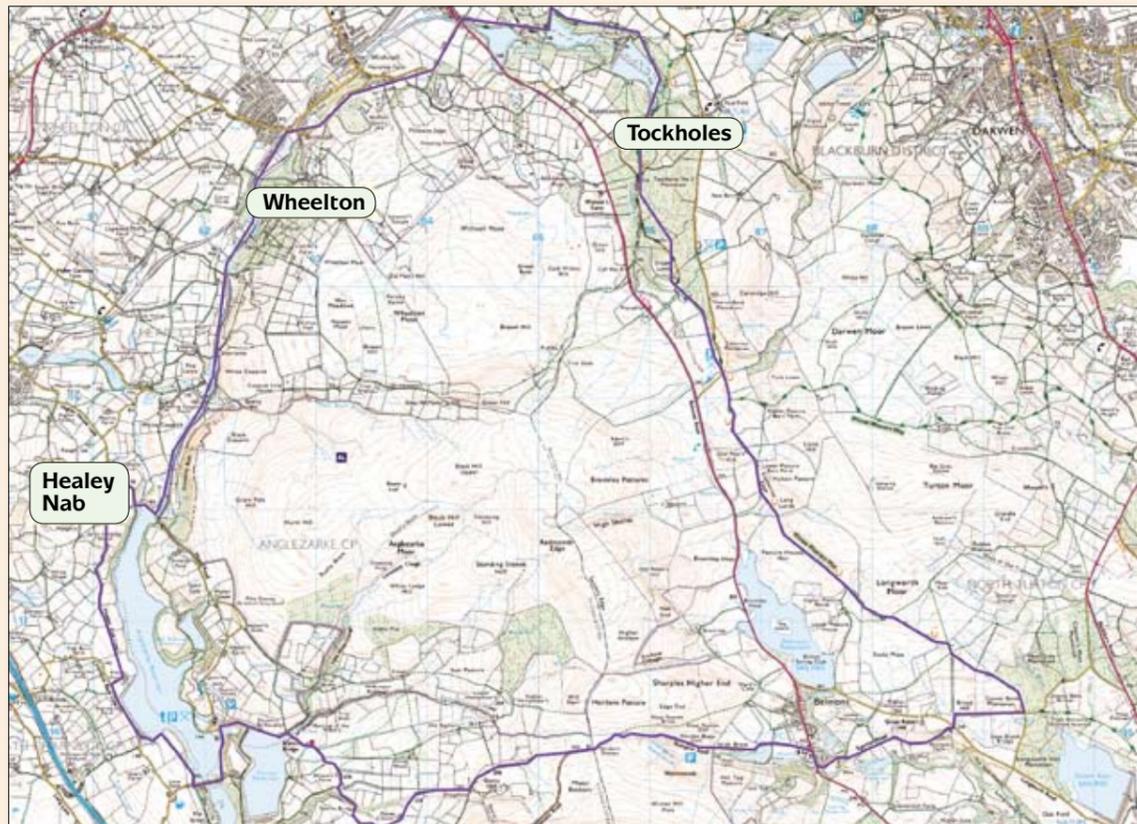
The idea of linking the sites around the perimeter would not be particularly feasible as the large distances of the WPM and the cumulative distance to ride all the technical sites and the linking trails between them, would mean that most riders would not have the physical stamina or the inclination to ride such a distance. It would really only

be the niche group of endurance riders and established enthusiasts who can dedicate a whole day on the weekend who would tackle the full loop. Although, it has to be said, it would be a superb ride!

The reality is that the average rider likes to feel they are challenging themselves physically, and enjoying some technical trails along the way, but they do not always have the time and more often than not, the fitness or stamina to tackle long circular routes. Most trail centre trails are between 15km and 25km in distance and this has proved to be a good benchmark for trail developments. The network of bridleways open up a few opportunities and the best ways of using these to provide a trail to suit the majority of riders was investigated.

With Tockholes and Entwistle being the largest sites, they both lend themselves to being focal point or hub sites. Tockholes has the advantage that it has facilities on site with a good sized car park, toilets and a café. It also links up very well with the remaining sites in the north and Entwistle, and similarly, with the sites in the south of the study area. This allows for a northern circular loop and a southern circular loop to be developed. These loops are still relatively long in distance – over 30km excluding the extra technical stop-off trails – but it does present a more achievable ride for the average rider whilst still maintaining the option of the full WPM loop for the very fit enthusiasts.





## NORTHERN LOOP

This loop totals approximately 30km excluding the technical stop-off loops at the three sites. This would be a distance achievable to most moderate to fit riders.

## SOUTHERN LOOP

The Southern Loop is considerably further at about 35–40km, not including the technical stops. These are the loops we would suggest, and of course, there are many other variations that can be created to the same effect. Using online pdf printable maps and by stocking leaflets with all the bridleways and multi-user paths shown, it would allow riders to pick and choose their routes.

Information for all the bridleways being developed in the WPM can be found here: [http://www.westpenninemoors.com/visiting\\_cyclinghorseriding](http://www.westpenninemoors.com/visiting_cyclinghorseriding)



## THE PROBLEM WITH GRADING TRAILS, BRIDLEWAYS AND ROADS IN THE LOOP

IT IS IMPORTANT to understand the difference between the technical mountain bike trails loops that could be created at each of the study sites, and the routes that would link them, making use of the existing and proposed bridleways of the WPM.

The technical cross country trails are graded using the colour coded system explained earlier. When designing and setting out trails within this grading system factors such as speed, peripheral hazards, other users and trail surface are all considered and, generally, the speeds of riders are kept relatively low unless the rider is skilled enough to negotiate the corners, dips and rises with good momentum. This reduces the risk of accidents to an acceptable level.

Bridleways by their historical nature and due to their need to be multi-user friendly have a whole different set of objectives when they are being set out, they generally do not have the same flexibility to create control over gradient and speed and the surfaces used will vary quite significantly depending on whether they have recently been re-worked or if they are an older and more eroded route. So whilst bridleways have always served as routes that could be followed by bikes, before the advent of mountain bikes many parts of bridleways were simply a case of pushing the bike up or down hill. Whereas mountain bikes can cope with all sorts of terrain and carry speed over rough terrain, herein lies the problem, all the design work to minimise risk and control the riders speeds in the graded trails cannot be replicated out on the bridleways and those routes cannot be graded under the current system (those that could would all undoubtedly be graded Black).

So whilst legally mountain bikers have always been able to ride bridleways, it is important to understand that these really are two different products and the creation of smooth multi-user trails simply encourages higher speeds when cycling on the bike. We have to rely on users having enough common sense and respect for each other to prevent issues. Essentially it will not be possible to mark out a red route and a Black route that is inclusive of the roads and bridleways, I would keep the grading system to the technical trails and not elude to any grading on the wider WPM loops but provide the information on the type of gradients, surfaces and conduct that is expected on those routes via websites signage boards and trail leaflets.



## CASE STUDY: HEALEY NAB

HEALEY NAB is a small forest plantation under Lancashire Council ownership on the urban fringe of Chorley. There had been informal use by mountain bikers for several years. With concessionary bridleways and a footpath running through the sites, the safety of users at these crossing points was becoming a concern, together with the ad hoc building practices that were migrating around the site. Ian Hart, Countryside Officer for LCC decided to put forward Healey Nab as a pilot site, to trial the management of mountain bikers' use in the woodland by creating a purpose built trail, rather than simply quashing their use. Rowan Sorrell of Back on Track was brought in as a consultant to view the current usage and discuss ideas for managing this safely. As a result of this initial site meeting, a design phase was undertaken by Rowan to design a route that maximised the potential of the site whilst improving the safety of all users. The trails were implemented using a local contractor,

and a volunteer workforce was raised and formalised ([www.idighealeynab.com](http://www.idighealeynab.com)). The response from riders who volunteered their time to the project was impressive. They were supported and assisted by LCC with tools and the provision of contractors and the designer to work alongside them, when possible, on set dig days. Now that the trails are in place, they have proven very popular with local riders, and there have been no incidences of user conflict with the improved crossings and sightlines. Ongoing trail maintenance has been taken on by the volunteer group, who are now raring to get their teeth into a new project.

Looking at the project objectively, one notes issues with how the project was delivered, and in bringing all rider groups on board. The site was being used by some downhill riders for practice, but it was clear during the assessment that it would not be possible to provide a downhill run there, due to the presence of other users, and the path crossings. To try to find a balance a more technical Black Graded cross country line was constructed, which would test riders. However, it was not a genuine downhill trail, so a site to provide for these

riders is needed, to prevent more informal downhill track building around the WPM. A further problem has been caused by the number of riders who have driven up to the site to ride, where there are no designated parking facilities. Riders tend to park on a narrow lane, which understandably, upsets residents. Ian's vision was for riders to incorporate the Nab as part of a longer ride, or to park in the nearby suitable car parks and link to the site by bridleway. In reality, with just the one technical trail available, riders wanted to get there and 'session' this one trail. Provision of two or more of these trails would help to enforce the idea of the sites being linked as a longer ride, and encourage riders to restrict parking to suitable car parking areas, preferably supported with facilities.

# EVALUATION OF THE SITES AND THE PROPOSED DESIGNS

WHILE desktop surveys are useful for getting a feel of a site and to plan initial route investigations, there is only one effective way to assess the viability of, and the best potential routes through, a site, and that is to walk them, walk them again and then walk them some more. Only then can you really map how the trail will fit on the ground, how it will link with the wider project, and how any constraints or other trails will be managed. Equally important is to determine whether in fact it is viable for a mountain bike trail to be built there in the first place.

All five sites were surveyed and evaluated for their suitability for a trail development; each of the sites has had the trail corridors identified on map and in-situ, with markers being added for all the trail routes. Preference was given to two primary sites of Tockholes and Wilderswood, where Chainages and Bill of Quantities have been provided.



## TOCKHOLES/RODDLESWORTH

UPON SURVEYING the site we found that many areas were not suitable for the development of trails. The terrain consists of large gullies and streams that restrict trail building and in many areas the soil is poorly drained and the ground is boggy. This dictated the type and scale of any mountain bike development here. The site at Tockholes does not have the terrain to support a technical Black Trail and, similarly, the terrain does not lend itself to the creation of an exciting Red Graded trail. Whereas the topography allows for a good quality Blue Trail, with excellent supporting facilities provided on site in the shape of the café, toilets and parking.

This all fits well with the overall balance and strategy of the project. Almost all of the trails in the study (primarily due to the terrain and their location) are aimed at the more experienced rider or enthusiast. Tockholes has the perfect location and terrain to support a very easy and fun Blue Trail where families can drive to the trails and have the advantage of toilets and a café.

The Blue Route we have planned provides a short flowing and fun introduction to mountain biking that does not require any level of fitness to enjoy. It is accessible to all, maximising the number of users who could enjoy it. It should serve as the stepping stone to the rest of the proposed developments in the WPM, which offer more technical riding.

Tockholes would also serve as the ideal location for a pump track, either high up in the woods amongst the trees (near the start of the Blue Trail) which would offer shelter, but would require some maintenance around autumn/winter to remove leaf litter. Or sited on the moorland, by Vaughan's Café, where there is plenty of space although it would be less sheltered in poor weather.



## TRAIL DESCRIPTION

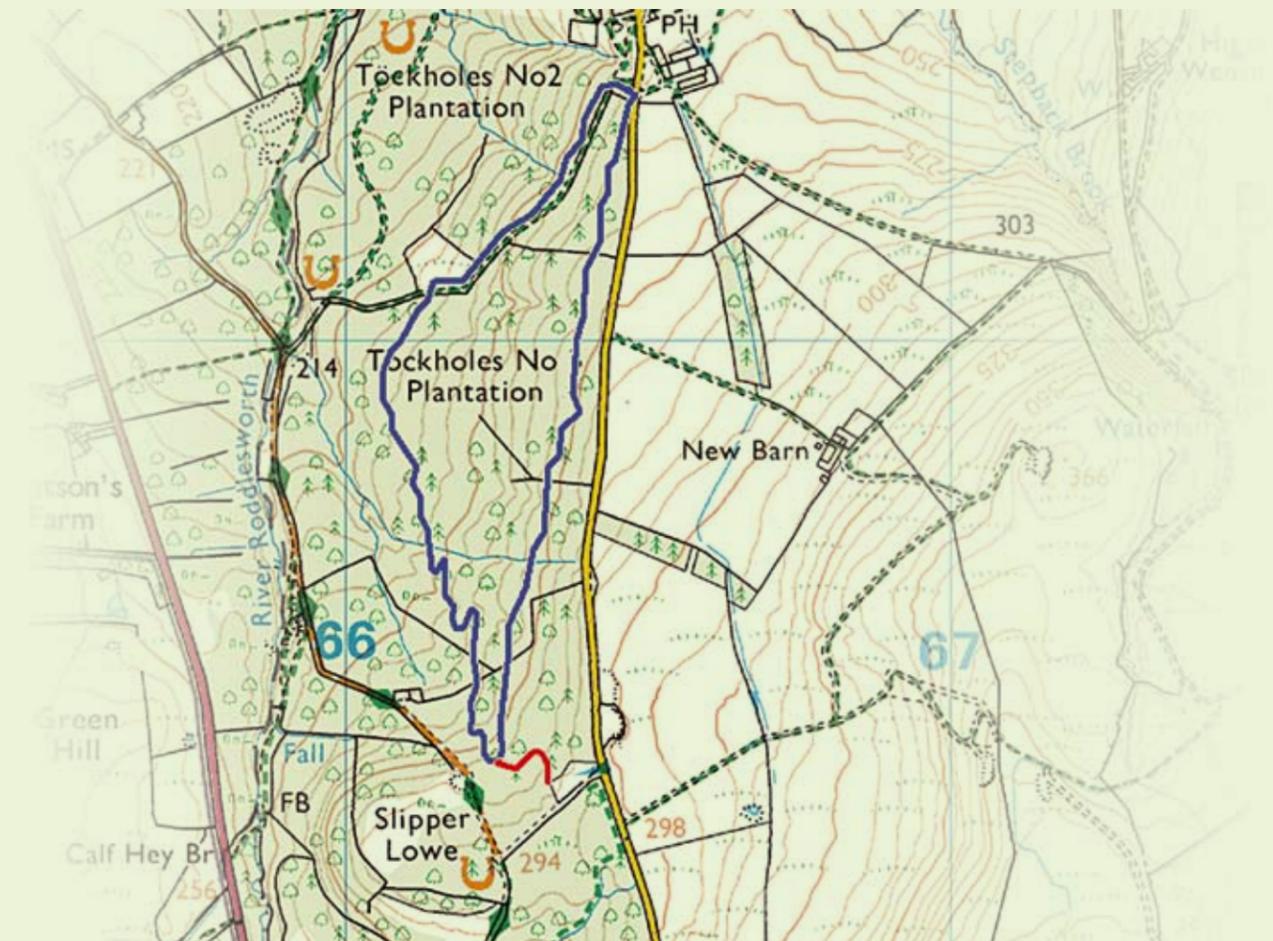
The Blue Route at Tockholes enters the woods opposite the existing car park and Vaughan's Café; here it gently meanders through the well thinned trees, with a trail surface of imported aggregate, that would allow any novice or family member to give mountain biking a go. The trail traverses the contours, with an overall fall in gradient and one medium sized culvert, until it reaches the area where the secondary car park will be linked by a two-way feeder trail (marked in red).

The ground conditions are not great here, so top side drainage will be required in the wetter areas to drain the water into adjacent drainage channels. The trail switches back in direction and starts to enter a more prolonged descent of 5-7% gradient with long sweeping turns adding to the flow and controlling riders as they descend down the bank. There are two minor stream crossings that will require culverts. The trail reaches its lowest point and traverses across to the concessionary bridleway, where this well-surfaced and the

wide track could support the ascent back to the car park, or an alternative singletrack trail could be created, alongside, to the left of the track, which would be preferable, although more expensive.

### Trail Length = 3.1km Blue Trail

The Blue Trail at Tockholes has been marked out with yellow marker spray on the inside of the trees where the trail corridor would be located.



## TOCKHOLES – Blue Graded Trail

Item	Chainage	Trail/Tread Description	Qty	Unit	Rate	Total
1.0	0m	Trail starts on wooden pedestrian barrier				
2.0	0-4m	Normal Trail Formation (N.T.F.). Organic layer stripped away to mineral sub soil to form trail tray. Tray to be min 750mm and max 2000mm width. Average trail width should be 1500mm. Tray is filled with imported crushed 40mm to dust aggregates to a depth of 0.15m	4	m		
3.0	4-5m	Culvert – 450mm	1	item		
4.0	5-41m	N.T.F.	36	m		
5.0	41m	Trail passes through stone wall	1	item		
6.0	41-214m	N.T.F. with slight bench cut	173	m		
7.0	214-234m	Bench cut through gully (trail runs up hill to decrease trail descent gradient into gully)	20	m		
8.0	234-236m	Culvert – 450mm	1	item		
9.0	236-241m	Bench cut exiting gully (trail runs downhill to decrease trail ascent gradient out of gully)	5	m		
10.0	241-333	N.T.F.	92	m		
11.0	333-334m	Trail passes through stone wall	1	item		
12.0	334-429m	N.T.F.	95	m		
13.0	429-446m	Bench cut through gully (trail runs up hill to decrease trail descent gradient into gully)	17	m		
14.0	446-448m	Culvert – 450mm	1	item		
15.0	448-458m	Bench cut exiting gully (trail runs downhill to decrease trail ascent gradient out of gully)	10	m		
16.0	458-740m	N.T.F.	282	m		
17.0	740-742m	Trail Passes through stone wall	1	item		
18.0	742-902m	N.T.F.	160	m		
19.0	902-914m	Bench cut through gully (trail runs up hill to decrease trail descent gradient into gully)	12	m		
20.0	914-916m	Culvert – 450mm	1	item		
21.0	916-920m	Bench cut exiting gully (trail runs downhill to decrease trail ascent gradient out of gully)	4	m		
22.0	920-992m	N.T.F. 72	m			
23.0	992-1004m	Boggy section – top side ditch required into culvert	12	m		
24.0	1004-1032m	N.T.F. 28	m			
25.0	1032-1033m	Culvert – 1000mm – top ditch required into culvert	1	item		
26.0	1033-1075m	N.T.F. 42	m			
27.0	1075-1083m	Boggy section – top ditch required into culvert	8	m		
28.0	1083-1085m	Trail passes through stone wall and barbed wire fence	2	item		
29.0	1085-1095m	Boggy area – raised camber construction with top side ditch and culvert	10	m		
30.0	1095-1140m	N.T.F. 45	m			
31.0	1140-1142m	Culvert	2	m		
32.0	1142-1180m	Water logged ground – raise camber with top side ditch and culvert – Slight climb	38	m		
33.0	1180-1182m	Culvert – 450mm	1	item		
34.0	1182-1202m	Water logged ground – raise camber with top side ditch and culvert – Slight climb	20	m		
35.0	1202-1218m	N.T.F. slight climb	16	m		
36.0	1218-1222m	Culvert	1	item		
37.0	1222-1236m	Boggy section, top ditch required into culvert	14	m		
38.0	1236-1365m	N.T.F. slight climb	129	m		
39.0	1365m	Trail merge with trail from second car park	0	m		
40.0	1365m	From trail merge (main trail and trail from 2nd car park).	0	m		
41.0	1365-1443m	N.T.F.	78	m		
42.0	1443-1453m	N.T.F. Trail runs parallel before crossing footpath	10	m		
43.0	1453-1454m	Footpath	1	m		
44.0	1454-1513m	N.T.F.	59	m		
45.0	1513-1527m	Left hand berm – 1m high	14	m		
46.0	1527-1560m	N.T.F.	33	m		
47.0	1560-1571m	Right hand berm – 1m high	11	m		
48.0	1571-1592m	N.T.F.	21	m		
49.0	1592-1596m	Culvert – 450mm	1	item		
50.0	1596-1620m	N.T.F.	24	m		
51.0	1620-1630m	Boggy section, top side ditch required with culvert	10	m		
52.0	1630-1643m	N.T.F.	13	m		
53.0	1643-1645m	Culvert – 450mm	1	item		
54.0	1645-1685m	N.T.F.	40	m		
55.0	1685-1697m	Wet gully, top ditch/funnel required into culvert – raised camber trail construction	12	m		
56.0	1697-1707m	N.T.F.	10	m		

## TOCKHOLES – Blue Graded Trail

Item	Chainage	Trail/Tread Description	Qty	Unit	Rate	Total
57.0	1707-1711m	Barbed wire fence and dry stone wall crossing	4	m		
58.0	1711-1771m	N.T.F.	60	m		
59.0	1771-1784m	Left hand berm – 1.5m high	13	m		
60.0	1784-1801m	N.T.F.	17	m		
61.0	1801-1815m	Right hand berm – 1.5m high	14	m		
62.0	1815-1872m	N.T.F.	57	m		
63.0	1872-1881m	Culvert with top side ditch – 450mm	9	m		
64.0	1881-1894m	Bench cut trail formation	13	m		
65.0	1894-1957m	N.T.F.	63	m		
66.0	1957-1969m	Left hand berm – 1.5m high	12	m		
67.0	1969-2000m	N.T.F.	31	m		
68.0	2000-2011m	Right hand berm – 1.5m high	11	m		
69.0	2011-2034m	N.T.F.	23	m		
70.0	2034-2045m	Left hand berm – 1.5m high	11	m		
71.0	2045-2059m	N.T.F.	14	m		
72.0	2059-2066m	Right hand berm – 1.5m high	7	m		
73.0	2066-2078m	Trail runs parallel with footpath before sharing path to cross large gully on culvert	12	m		
74.0	2078-2100m	Shared with footpath	22	m		
75.0	2100-2199mm	N.T.F.	99	m		
76.0	2199-2203m	Culvert – 1000mm	4	m		
77.0	2203-2278m	N.T.F.	75	m		
78.0	2278-2284m	Culvert – 600mm	1	item		
79.0	2284-2455m	N.T.F.	171	m		
80.0	2455-2461m	Culvert – 1000mm	1	item		
81.0	2461-2476m	N.T.F.	15	m		
82.0	2476-2477m	Culvert – 600mm	1	item		
83.0	2477-2553m	N.T.F.	76	m		
84.0	2553-2556m	Culvert – 600mm	1	item		
85.0	2556-2565m	N.T.F.	9	m		
86.0	2565-2573m	Trail runs parallel with wall – Pinch point between wall and stream	8	m		
87.0	2573-2575m	Through gap in stone wall	2	m		
88.0	2575-2580m	N.T.F.	5	m		
89.0	2580-2583m	Culvert – 600mm	1	item		
90.0	2583-2589m	Wet area – side ditch to drain into stream on right hand side	6	m		
91.0	2589-2602m	Trail runs parallel to foot path running uphill before crossing	13	m		
92.0	2602-2604m	Culvert – 600mm	1	item		
93.0	2604-2611m	Surfaced bridalway crossing	7	m		
94.0	2611-2663m	N.T.F.	52	m		
95.0	2663-2674m	Rolling crown switchback – right hand turn	11	m		
96.0	2674-2735m	N.T.F.	61	m		
97.0	2735-2738m	Culvert – 600mm	1	item		
98.0	2738-2760m	N.T.F.	22	m		
99.0	2760-2766m	Rolling crown switchback – right hand turn	6	m		
100.0	2766-2777m	Bench cut trail formation	11	m		
101.0	2777-2792m	N.T.F.	15	m		
102.0	2792-2799m	Rolling crown switchback – climb left hand turn	7	m		
103.0	2799-2897m	Trail runs parallel with surfaced bridalway – Runs on a raised ridge	98	m		
104.0	2897-2992m	N.T.F.	95	m		
105.0	2992-3017m	Trail shares existing surfaced bridalway path to cross large gully over wide culvert	25	m		
106.0	3017m-3176m	N.T.F. Trail runs parallel with existing surfaced bridal way path	159	m		
107.0	3176-3188m	Bench cut trail onto higher ledge	12	m		
108.0	3188-3202m	Raised cambered with inside ditch	14	m		
109.0	3202-3210m	Bench cut to existing surface bridalway path	8	m		
110.0	3210-3265m	Follows surfaced bridalway to finish (wooden pedestrian barrier)	55	m		
111.0	3265m	<b>End of Blue Trail</b>	-	-		
		<b>TRAIL OFFSET: Link to Car Park 2</b>				
1.0	0m	Trail starts at bottom of second car park				
2.0	11m	Through wooden fence				
3.0	40-48m	Boggy section, top ditch required into culvert				
4.0	104m	Trail merge with main line.				



## WILDERSWOOD

This small plantation has a good gradient and enough space to allow for a full trail loop to be constructed. A Red descent and climb would fit, towards the periphery of the site, and an optional more challenging Black route running more directly down the slope to engage and manage the riders who are currently using the site informally. This would reflect the design principals set out at the Healey Nab site, which have proven successful. The Red Trail caters for all but beginner riders, whilst the Black Trail caters for the enthusiast riders and motivates a volunteer workforce.

The proposed trails in Wilderswood offer an opportunity to provide an excellent facility for the mountain bikers living in the surrounding area, but also to go some way towards alleviating the pressures on other more sensitive sites, found nearby, such as Rivington Pike. Bikers have been illegally using that site for many years now, and, as mountain biking has continued to grow, so has the usage levels. If left unmanaged, the chances of incidents and collisions between user groups is increasingly likely.

The soil in Wilderswood is very good and there is an abundance of stone and large rocks that are perfect for trail building. It is similar in geology to Healey Nab, which has proven good ground conditions. This allows the trails to be constructed at reduced cost, without requiring large amounts of aggregate to be brought onto site, while retaining the trails in keeping with the environment, and providing a more interesting and technical ride.

A project like Wilderswood could attract Lancashire's motivated and skilled volunteers to assist in the construction of the trails. The Black graded trail would create great interest among these groups, and could be managed by a designer or contractor, to oversee the design and assess the trail as the work progresses.



## TRAIL DESCRIPTIONS

### RED TRAIL

The Red Route utilises the perimeter of the woods whilst avoiding the 'desire line' found right on the far edge that is well used by walkers. The Red Trail starts from the small car park and heads across the contours climbing slightly through the trees to a clearing where the trail reaches the top of the woods and starts to descend weaving through the thinned crop.

The trail crosses three tracks and paths as it descends, and these will be controlled, by slowing riders with turns that switchback across the hill, and running the trail parallel to the paths before they cross. This allows the different users to see the riders coming and, similarly, for riders to see any walkers on the paths before they cross. Signage would be installed on the paths to warn that bikes will be crossing. This system has been used successfully on numerous sites around the UK.

The Red Trail continues to descend down the length of the hill, with berms and roller doubles adding flow and technicality. As it nears the bottom quarter, it enters into an area of good natural terrain, the shape maximising the bowls and rises with berms and bombholes. The descent finishes here and the trail traverses across to the foot of the quarry. The Black Trail also merges here and both trails begin steadily climbing up from the quarry towards the old stone wall. Here the trail switches back and traverses till it reaches the main path cut across the slope. The trail joins this path and doubles back to the right hand side and follows the route of this path back up to the car park.

Some remedial work would be necessary on this path, it would be a shared user path so some additional saplings and branches would need to be cleared to allow enough space for users to pass. Riders would be heading uphill so there is no risk of conflict caused by speed.

*NB. There are some old steps on one short section of the trail which are in a state of disrepair and overgrown by vegetation. The 'desire line' runs to the side of these steps, and I would suggest the removal of the steps, and some improvements made to the line to ease the gradient.*

### BLACK TRAIL

The Black Trail is a more technical 'downhill only' route that will be usable by riders on trail (cross country) bikes or by riders on larger freeride or downhill bikes, with the requisite level of rider skill. Once at the bottom, riders can use the Red Trail climb to reach the top again, or more likely, they will push up. So a defined push-up path will be identified, alongside the descent, to allow riders to repeat the run again and again.

The trail begins on the main top path and descends to the other side of the quarry from the Red graded climb. It drops into an area with a good gradient to support this type of trail, the route weaves around several trees, making sweeping left and right turns and over roller doubles, before entering an area of interesting landform where the trail utilises the good lay of the ground with steep banks, bermed turns and rollers.

The trail is slowed up on the approach to the one path crossing on this run; sightlines will need to be cleared here, and signage installed on the path warning of the bike track. Below this path, the terrain becomes more interesting again with some more steep and rocky short banks, technical rooty corners and a bombhole section into some tricky turns to finish the short but feature-packed trail.

**Trail Length = 1.92km Red Trail**

**Trail Length = 500m Black Descent**

Both of the trails in Wilderswood have been marked out with yellow marker spray on the inside of the trees where the trail corridor would be located.



### WILDERSWOOD – Red Graded Trail

Item	Chainage	Trail/Tread Description	Qty	Unit	Rate	Total
1.0	0m	Trail starts on wooden pedestrian access	-	-		
2.0	0-10m	Existing path, no trail formation required	10	m		
3.0	10-53m	Normal trail formation (N.T.F):- Organic layer stripped away to mineral sub-soil to form trail tray. Tray to be min 500mm and max 1000mm width. Tray is filled with mineral sub-soil material won in-situ from borrow pitting.	43	m		
4.0	53-54m	Rock feature (large rock in-situ on climb – stone pitch to either side)	1	item		
5.0	54-212m	N.T.F.	158	m		
6.0	212-224m	Rock garden, slight climb. Pitch between to stabilise	12	m		
7.0	224-233m	N.T.F.	9	m		
8.0	233m	Start of downhill and holding area on left	-	n/a		
9.0	233-275m	N.T.F.	42	m		
10.0	275-285m	Left hand berm - 1m high	10	m		
11.0	285-300m	N.T.F.	15	m		
12.0	300-305m	Pump roller double - 0.7m high	5	m		
13.0	305-317m	N.T.F.	12	m		
14.0	317-330m	Right hand berm - 1m high	13	m		
15.0	330-349m	N.T.F. Trail runs parallel before crossing surfaced path	19	m		
16.0	349-352m	Crosses Surfaced path - no work required	3	m		
17.0	352-365m	N.T.F.	13	m		
18.0	365-370m	Humped Roller 0.7m high	5	m		
19.0	370-386m	Left hand berm - 1m high	16	m		
20.0	386-396m	N.T.F.	10	m		
21.0	396-406m	Pump roller double - 0.7m high	10	m		
22.0	406-407m	N.T.F.	1	m		
23.0	407-421m	Right hand berm - 1.5m high	14	m		
24.0	421-438m	N.T.F.	17	m		
25.0	438-450m	Left hand berm - 1m high	12	m		
26.0	450-471m	N.T.F. Trail runs parallel before crossing surfaced path	21	m		
27.0	471-472m	N.T.F.	1	m		
28.0	472-476m	Surfaced path - Trail Crosses - No work required	4	m		
29.0	476-481m	N.T.F.	5	m		
30.0	481-492m	Pump roller double - 0.5m high	11	m		
31.0	492-509m	N.T.F.	17	m		
32.0	509-517m	Pump roller double - 0.7m high	8	m		
33.0	517-520m	N.T.F.	3	m		
34.0	520-532m	Right hand berm - 1.5m high	12	m		
35.0	532-564m	N.T.F.	32	m		
36.0	564-574m	Left hand berm - 1m high	10	m		
37.0	574-581m	N.T.F.	7	m		
38.0	581-590m	Pump roller double	9	m		
39.0	590-596m	N.T.F.	6	m		
40.0	596-606m	Slightly inverse cambered left hand corner	10	m		
41.0	606-640m	N.T.F.	36	m		
42.0	640-650m	Table top jump - 1m high	10	m		
43.0	650-672m	N.T.F.	22	m		
44.0	672-681m	Left hand berm - 1m high	9	m		
45.0	681-686m	N.T.F.	5	m		
46.0	686-695m	Bench cut trail formation - Trail slightly up hill	9	m		
47.0	695-703m	Right hand berm - shaped into bank	8	m		
48.0	703-720m	N.T.F.	17	m		
49.0	720-725m	Pump roller double - 0.5m high	5	m		
50.0	725-750m	N.T.F.	25	m		
51.0	750-755m	Pump roller double - 0.5m high	5	m		
52.0	755-766m	N.T.F.	11	m		
53.0	766-782m	Left hand berm - 1.5m high.	16	m		
54.0	782-796m	N.T.F.	14	m		
55.0	796-803m	Pump roller double - 0.7m high	7	m		
56.0	803-807m	N.T.F. Trail runs parallel before crossing path	4	m		
57.0	807-816m	Trail Crosses Path - No work required	19	m		
58.0	816-824m	N.T.F.	16	m		
59.0	824-838m	Left hand berm - shaped into bank of a bomb hole	14	m		
60.0	838-853m	N.T.F.	15	m		
61.0	853-864m	Left hand berm - 1m high.	11	m		
62.0	864-869m	N.T.F.	5	m		
63.0	869-879m	3x pump bumps - 0.5m high	10	m		
64.0	897-908m	N.T.F.	11	m		
65.0	908-917m	Right hand berm - 1m high	9	m		
66.0	917-924m	N.T.F.	7	m		
67.0	924-933m	Left hand berm - 1m high	9	m		
68.0	933-941m	N.T.F.	8	m		
69.0	941-954m	Bench cut trail formation	13	m		

### WILDERSWOOD – Red Graded Trail

Item	Chainage	Trail/Tread Description	Qty	Unit	Rate	Total
70.0	954-961m	Right hand berm shaped into bank	7	m		
71.0	961-973m	Bench cut trail formation	12	m		
72.0	973-979m	Left hand berm - 1m high	6	m		
73.0	979-1056m	N.T.F. With small bench cut	77	m		
74.0	1056-1061m	Bomb hole 1m deep	5	m		
75.0	1061-1071m	N.T.F.	10	m		
76.0	1071m	Bottom of trail descent – merges with path running parallel with stone wall	1	item		
77.0	1071-1127m	Existing path surface - Leave natural as possible	56	m		
78.0	1127-1155m	Start of climb back up. N.T.F. / Bench cut	28	m		
79.0	1155-1170m	Stone pitched section of climb - Stones found in situ	15	m		
80.0	1170-1212m	N.T.F.	42	m		
81.0	1212-1220m	Rolling crown switchback – Left hand turn	8	m		
82.0	1220-1324m	Bench cut climb to existing path	104	m		
83.0	1324-1441m	Existing trail	117	m		
84.0	1441-1442m	Gap in stone wall – no work required	1	m		
85.0	1442-1534m	Remedial work on existing climb (remove wooden steps) Recut bench	92	m		
86.0	1534-1625m	N.T.F.	91	m		
	1625m	Trail ends (Wooden gate by carpark)	-	-		

### WILDERSWOOD – Black Graded Trail

Item	Chainage	Trail/Tread Description	Qty	Unit	Rate	Total
1.0	0m	Down hill start. Clear holding area 10 x 10m – Holding area 233m up red trail from start at wooden gate	1	Item		
2.0	0-16m	N.T.F.	16	m		
3.0	16-23m	Table top - 1.5m high	7	m		
4.0	23-50m	N.T.F.	27	m		
5.0	50-56m	Roller double - 0.7m high	6	m		
6.0	56-60m	N.T.F.	4	m		
7.0	60-66m	Roller double – 0.7m high	6	m		
8.0	66-79m	N.T.F.	13	m		
9.0	79-88m	Left hand berm – 1m high	9	m		
10.0	88-101m	N.T.F. T rail runs parallel with surfaced path before crossing	13	m		
11.0	101-108m	Trail crosses surfaced existing path	7	m		
12.0	108-115m	N.T.F.	7	m		
13.0	115-125m	Right hand berm – 1m high	10	m		
14.0	125-163m	N.T.F.	38	m		
15.0	163-167m	Right hand berm - 1m high	4	m		
16.0	167-168m	N.T.F.	1	m		
17.0	168-172m	Roller double - 0.5m high	4	m		
18.0	172-182m	N.T.F.	10	m		
19.0	182-192m	Left hand berm - 1m high	10	m		
20.0	192-200m	N.T.F.	8	m		
21.0	200-212m	Rock garden - Rock feature found in situ	12	m		
22.0	212-215m	N.T.F.	3	m		
23.0	215-230m	Right hand berm - 1.5m high	15	m		
24.0	230-238m	N.T.F.	8	m		
25.0	238-246m	Table top - 1m high	8	m		
26.0	246-249m	N.T.F.	3	m		
27.0	249-254m	Right hand berm - 1m high	5	m		
28.0	254-266m	N.T.F.	12	m		
29.0	266-286m	Long left hand berm - 1m high	20	m		
30.0	286-310m	N.T.F. Trail runs parallel with path before crossing	24	m		
31.0	310-314m	Existing path	4	m		
32.0	314-322m	N.T.F.	8	m		
33.0	322-329m	Steep rocky descent - Rocks found in situ	7	m		
34.0	329-336m	Natural root section	7	m		
35.0	336-342m	Right hand berm - 1m high	6	m		
36.0	342-348m	N.T.F.	6	m		
37.0	348-351m	Right hand berm - 1m high	3	m		
38.0	351-354m	N.T.F.	3	m		
39.0	354-362m	Left hand berm - 1m high	8	m		
40.0	362-376m	N.T.F. Following natural gradient and shape of ground	14	m		
41.0	376-382m	Roller double – take off from existing bomb hole feature	6	m		
42.0	382-384m	N.T.F.	2	m		
43.0	384-395m	Right hand berm - 1.5m high	11	m		
44.0	395-409m	N.T.F.	14	m		
45.0	409-420m	Left hand berm - 1.5m high	11	m		
46.0	420-473m	N.T.F. Following natural gradient and shape of ground – Trail runs parallel with red climb and stone wall	53	m		
47.0	473m	<b>End of down hill</b> (joins red climb).	-	-		

# ENTWISTLE

There are parking facilities located at the dam end of the reservoir and the site is easily accessible by road. Additional parking is found near the bottom main car park, slightly higher up the bank; we will refer to this as the middle car park. It was suggested during initial consultation that a new car park could be constructed higher up the banking, in the area known as the memorial forest. Upon investigation it proved to be very difficult to create a Blue graded trail here that would stay within the gradients and requirements for construction, whilst keeping within the plantation. Gradients should be on average 5% and no more than 8%, and this is not possible with the placement of the car park here, high up on the banking.



If the trail could run over the open ground surrounding the plantation, then a meandering climb would be possible here that would spread the increase in elevation over a greater distance, and therefore make the route more viable. Ideally the trails would start and finish lower down the bank towards the reservoir.

Our evaluation showed that the optimum position for any development would be by the expanded middle car park. In the case that a visitor centre would be added, this would also be the best location; if it was located high up at the memorial forest, it would not capitalise on the custom of other users of the site – dog walkers and people there for a stroll to enjoy the surroundings. This location would maximise the footfall in a visitor centre, whilst allowing the Blue Trail to keep within grading.

We surveyed the whole of the plantation surrounding the reservoir, and found there to be many gulleys and pinch points that restrict access in certain areas. We also found there to be some excellent terrain for mountain bike trails that would enable fun novice singletrack to be created, and more challenging technical trails for the expert rider.

If a visitor centre were to be created, then the area would benefit greatly from a pump track. It would provide a central focus and something for people to watch and ride whilst they are relaxing around the centre. This could either be located up in the meadow area, where the visitor centre would be located, or down in the relatively level area of trees near the dam.

The plantation encircles the reservoir and hides a variety of terrain. The area most of interest to mountain bikers is that found to the south and the west of the reservoir. To the south, the side slope is very steep and enables Red or Black graded bench cut trails to be constructed across the bank. Gulleys restrict the feasibility of an economically viable trail construction in many areas. This somewhat dictates where the trail can be located, with most of the best bridging or crossing points found near the top of the slope, before the water has gained too much momentum from the steep gradient. To the west of the reservoir, the slopes are gentler, with very usable gradients and some areas of interest around old quarry workings. To the north of the reservoir, the gradients are very shallow and allow for a relatively smooth and fast trail to be created that weaves through the mature trees. The east of the reservoir is bounded by the dam itself and this poses the only feasible way to cross and complete a loop of the reservoir area.

The final assessment of the best trail routes was to create two graded trails that run right around the reservoir, as shown in the map below:



## TRAIL DESCRIPTIONS

### RED TRAIL

Starting from the middle car park, the Red Trail enters the wood above the existing footpath and climbs steadily up through the adjacent grass meadow. From here, it runs parallel with the top road and crosses three streams (the middle stream runs through a culvert-pipe) until it finally reaches the Memorial Forest.

From the Memorial Forest, the Red Trail enters the mature plantation and the trail weaves above the surfaced path through the open trees. It soon reaches a very large stream gorge. The trail then switchbacks down to join the existing surfaced path and crosses the gorge. This would be expensive to cross.

Once across the culvert, the Red Trail drops below the path and descends, following the natural contours with grade reversals creating a roller coaster-like section leading into switchbacks to the bottom of the slope up above the top of the reservoir. The average fall of this descent is 8% using switch backs to lose any immediate height. The bottom half of this descent crosses several streams and boggy sections. The water would need to be controlled by top side ditches and several culverts, creating a raised camber trail.

From the valley floor; the trail climbs at a 5% grade to the surfaced forest path above, where the trail crosses and continues to ascend up into a 'wind-blown' forest. The trail crossing via a culvert, a wide but shallow stream until it reaches the disused quarry.

The quarry sides are very steep, so a 5–10m gap is maintained from the edge. The trail descends to the quarry floor and climbs up out of the other side where it reaches quarried bowls, to add features and to control speed, before crossing the surfaced forest path.



From the disused quarry; the next descent is on a steep side slope (a specialist walking excavator would be required for construction here). The trail switches back following the contours between the descending turns, down to the surfaced forest path below, where it would run parallel. From here, the Red Trail would climb (crossing a footpath) and then descend slightly to the wide footbridge at the lake's end. The speed is controlled, before reaching the lake perimeter path, by climbing slightly. Riders will briefly share the path and wide footbridge with other users, in order to reach the other side, although the trail design here would slow riders right down with a pinch point to reduce any possible conflict.

From the reservoir bridge the Red Trail re-enters the woodland and begins its return leg on the far side of the reservoir. This return leg, back to the car park, is a shared section of trail for both the Blue grade trail and the Red Trail riders. This section crosses several boggy areas and streams, where water control and several culverts are needed, to provide a dry and long lasting trail. On the largest stream crossings, the trail will drop down close to the perimeter lake path, to utilise existing culverts and taking advantage of firmer ground (trail would be built parallel to the current path but kept separate, to manage user conflict).

This return trail meanders gently through the woodland using the natural terrain features, then merges onto the reservoir road and returns over the dam back to the car park.

**The Red Trail would offer some exciting features with switchback berms and flowing grade reversals.**



### BLUE TRAIL

Starts at the middle car park; trail enters into the woods below the existing footpath and crosses a pinch point (between fence line and reservoir) by using the perimeter reservoir path (trail built parallel and separated with demarcation). This pinch point section has two gulleys to cross and runs into a boggy area before reaching the reservoir, where additional aggregates will be needed to create a firm trail foundation. An existing footpath already crosses this narrow point by a wooden bridge.

From the pinch point; the Blue Trail then climbs slightly and flows along the contours of the hill, using the natural terrain to form mellow rollers, pumps and bowls, suitable for the blue grading. Further along the banking, there is one very substantial gully that cannot be crossed without expensive major engineering works. It would be necessary to descend the bank here to adjoin the reservoir path below.

Once past the gully the trail rejoins the bank and sits just behind the stone wall, running along to join up with the wooden footbridge at the top of the reservoir. Once across the bridge, the trail joins up with the Red route and the shared trail route is followed back to the car parks, as described above.

The Blue Trail would be relatively easy and ride-able by most people with basic off-road skills; this would allow more people to take part in mountain biking on a single site. The enthusiasts will take on the Red route with beginners enjoying the Blue Trail.

**Trail Length = 5.5km Blue Trail**

**Trail Length = 7.5km Red Trail**

The trails in Entwistle have been marked out with yellow marker spray on the inside of the trees where the trail corridor would be located.



## WALKERS FOLD

These woods are modest in size and, in their own right, would not provide enough trail to attract anything more than very modest numbers of local bikers, however in the context of the wider WPM development, and serving as a 'fun stop' on part of a longer ride, the woods become more appealing.

The plantation follows a thin strip, either side of the stream, on moderate to steep side slopes. The ground condition and soil structure in this area is poor with many wet and boggy areas and unsuitable soils for trail building. Our study of these woods led us to believe that it might be uneconomically viable to construct a trail through this site. This would depend on funding available, as the trail here will be comparatively expensive in terms of price per metre. That said, the terrain itself and the lay of the land is excellent for the creation of a technical and interesting mountain bike trail that would really engage riders, bring them into a new woodland, and would create added interest to the wider WPM trails.

### ROUTE DESCRIPTION

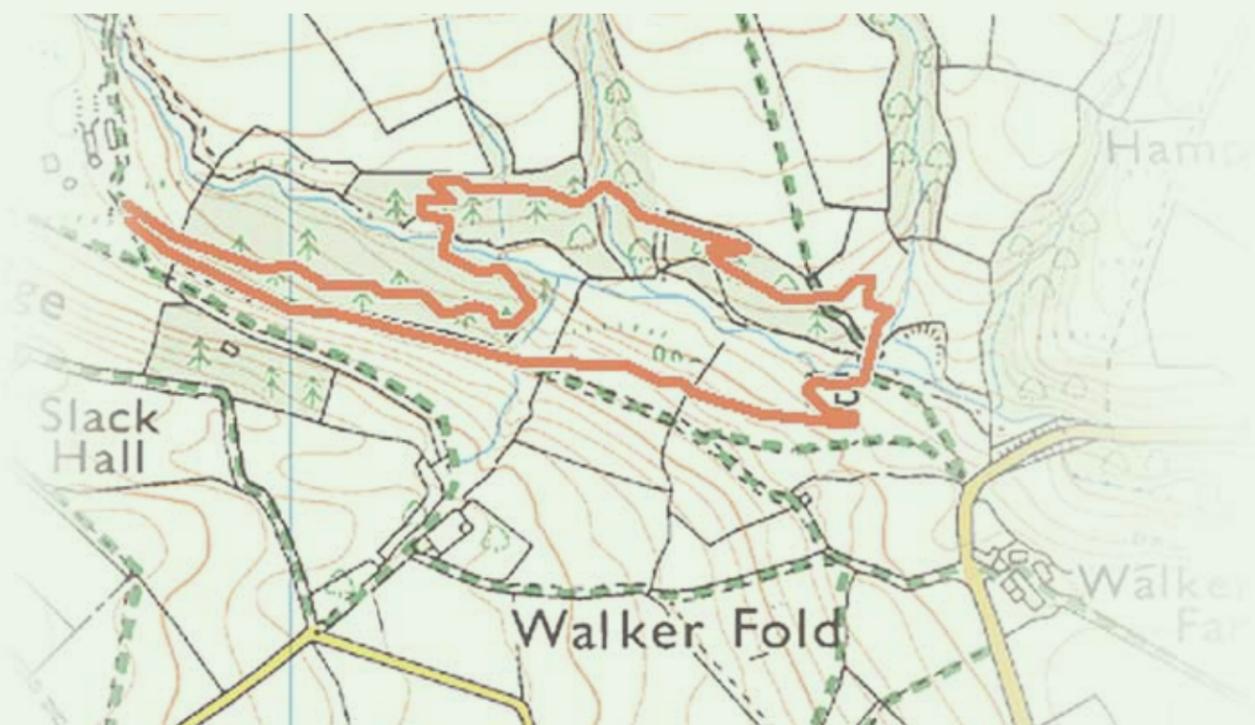
From the start, the trail traverses the river bank on the bridleway side of the stream; it features grade reversals and flowing turns that lead into an area of interesting terrain, with some good shape to the ground, including some small bowls, that the trail utilises to create a fun and challenging route. The trail then switches back on itself and leads down towards the current footbridge; this would have to provide shared access for both walkers and cyclists with cyclists having to dismount to cross the bridge. After the bridge, the trail bears left and climbs the bank, with three switchbacks/climbing turns. The trail heads

downstream across the bank and crosses a minor stream. After the stream, the trail climbs steadily whilst heading across a steep bank of mature deciduous trees before entering the more usual conifer cover. The trail continues across a steep side-sloped bank and descends down two switchback turns, to drop to the level of the footpath, and continues along the top side of the footpath. The trail then comes to a junction where two footpaths split, and the trail follows the line of the main path through the woods for a short while, before bearing off to the left through some sweeping turns, and down across a stream and onto the flat approach to the bridge.

The trail then approaches the metal footbridge, and cyclists would, again, have to dismount whilst they cross this short bridge. At the end of the bridge the footpath bears left and out onto the road, whilst the new mountain bike trail would head right, around two climbing switchbacks, before making the ascent back up onto the bridleway, by traversing the length of bank upstream.

#### Trail Length = 1.75km New Build

The trails in Walkers Fold wood have been marked out with yellow marker spray on the inside of the trees where the trail corridor would be located.



## WHEELTON PLANTATION



Wheelton plantation is set on a moderate side slope that is quite consistent along its length. The woods have been used by local riders for some time already and there is evidence of a number of downhill routes being used that cross the footpath without any consideration of the potential conflict. Any development in these woods needs to be sympathetic to the walkers who use the path that cuts through the woods, and, also to the desires and behaviour of the riders themselves, understanding what is required to manage this use.

The woods offer exactly the terrain that bikers look for when developing trails that are fun to ride. The soils are good, the gradient is fairly consistent, allowing for a flowing trail. It is not too steep here (where riders would have to use their brakes constantly) and it is not too gentle (where riders would have to pedal to maintain momentum). This happy medium results in trails that are fun for most abilities to ride, although the terrain suits the more technical end of the spectrum with Red and Black Trails, and I would suggest that a more downhill style trail, here, would go a long way to appease the downhillers who do not have an official place to ride. The layout of the site is such that a footpath dissects the wood, meaning that to maximise the amount of descent possible the trails would need to finish in the southern-most part of the site, next to the stone **boundary wall and the . . .**

The map shows the three trails all running towards the bottom corner of the site to maximise the descent and to remove the need to cross any rights of way unnecessarily. With two flowing Red graded descents and one more downhill race style Black route this site would cater for all enthusiast bikers. The blue line represents the route back up to the top, this is a wide, surfaced path currently recorded with footpath status, so the status would need to be altered to allow riders to utilise this as the return/climb back to the top. Riders would be travelling no faster than people on foot due to the gradient of the path, so conflict should be minimal.

### TRAIL DESCRIPTIONS

On this site we have marked out three trails that maximise the use of the woodland. Due to the walker's path that dissects the woodland running diagonally, the trails all traverse the slope, to maximise the descent and vertical drop, without causing any unnecessary management or conflict issues where they are not needed. Thus, there is only one area where the bike trails adjoin the surfaced track, and the riders are controlled as they join the path. Riders would then use this surfaced track (which would require a change of status from footpath to bridleway) as the climb back up towards the top of the woods with a short, sharp, climb on the lane to reach the top of the plantation. The trails all begin on the same route that feeds into the plantation from the lane and run across the top fence boundary.

**Trail One** is a Red graded route. It is the easiest and the mellowest of the three trails. It branches off the top fence line



route first, and traverses the slope, weaving its way down and across, through the well thinned woodland. The trails all have to negotiate one large drainage gully and culverts would be used to cross here. Once across the gully, the trail continues to weave, with many turns and grade reversals along its length to add flow and technical challenge (and to control the water running on the trail). This Red route joins the middle Red Trail at the bottom and they merge so as to control the access back onto the surfaced track/ride up path.

**Trail Two** splits off the top perimeter run further along than Trail One and nearer the culvert. It takes a slightly more direct route down the hill than Trail Two and is the next in progression in terms of difficulty. The trail does not feature any notable obstacles; it is more about the flow and turns that make up a really fun trail. A few straighter sections are used to maintain speed, and the trail is constantly turning left or right, which really tests riders' skills and improves novice and intermediate riders' ability with each ride.

**Trail Three** is accessed by staying on the top perimeter route and following it as it descends, more directly than the previous two. The more direct lines and downhill style (albeit simple downhill) of Trail Three would mean that it would be graded Black, the most technical of the cross country grading. This trail features more challenging

sections, maximising the undulations and shape found on this side of the woods, with root sections and small rock gardens. This would provide a route more in-keeping with the Black Trail completed at Healey Nab, although the run itself would be longer.

**Trail Length = 1km Trail Three**

**Trail Length = 700m Trail Two**

**Trail Length = 1.75km Trail One**

All three of the trails in Wheelton have been marked out with yellow marker spray on the inside of the trees where the trail corridor would be located.

The soils and rock found on site here would allow the trails to be constructed using the materials found on site (similarly to Healey Nab) rather than hauling in large quantities of aggregate. This is less expensive to build and has the added effect of creating a trail that is more in-keeping with its surroundings and is more interesting to ride, with a more challenging surface. The rocks come through to add technicality, and the larger roots and the surface, change its ride characteristics from summer to winter whilst never becoming too wet or muddy.

The trails are progressive in their layout, that is, they increase in difficulty the further across you travel. So the final trail, which begins at the opposite end of the plantation from the lane, is the most challenging route and uses the gradient more directly to create a faster and flowing Black graded descent.

All of the trails would be suitable for riders on general trail bikes, although it would be expected that this woodland would continue to attract riders on downhill bikes. The trails here, whilst not particularly challenging downhill trails in their own right, would certainly support the downhill bikes and offer something new, whilst not isolating the main user group who ride trail bikes. A basic uplift service could operate around this site, part time.



## MANAGEMENT AND COMMERCIAL OPPORTUNITIES FOR WPM

MOUNTAIN BIKING in the UK has, almost exclusively, been delivered by the Public Sector to date. The large scale developments on Forestry Commission land around the UK have created the highly successful models of the trail centres, however the maintenance and management of these centres has, to date, all been taken on by the Forestry Commission and so they are not proving sustainable in the longer term, as budgets are tightened. They do however support a number of small businesses, usually bike shops and cafés located on site, uplift services for downhill courses, and accommodation providers and restaurants. So the argument has been that the wider economic benefit to an area has justified the public expenditure required to deliver and maintain these trail centres, not to mention the increase in participants taking part in healthy outdoor exercise.

Many other political agendas are fulfilled through a well thought out and delivered mountain bike trail development, but the situation is changing, especially in light of our current financial climate. Existing centres are now looking at ways to tie in partners and let the private sector take on more responsibility so that fewer resources are committed to trail centre management from the public sector.

### Any new developments need to have clear objectives from the start to consider:

- What resources can be directed towards the management of these facilities?
- How will the trails be maintained in terms of the trail formation and the relevant signage?
- Who will conduct trail inspections?

This can range from the management of one small trail such as Healey Nab, to a complex centre with all the facilities that would come with it, such as a full scale trail centre like Glentress or Coed y Brenin.

It may well be that the landowner or manager has sufficient resources to deal with the management from the outset, however, it may be necessary to consider whether some, or all, of the management of the trails or site, should be handled by a commercial partner or leaseholder.

How this can be done, varies depending on the site, the disciplines or type of trails that it may support and the scale of the venue.

### Commercial enterprises can generate revenue from mountain bike trails in a variety of ways, including:

- Uplifts for downhill trails
- Cafe, Bikeshop and Visitor Centre revenue
- Coaching / tuition
- Entry fee to use the trails and/or car parking fee.

## CASE STUDIES

### Management and Commercial Opportunities

#### CWMDOWN

This is a business that provides uplift for a downhill track at the Cwmcarn trail centre in South Wales. The operation of uplift facilities for downhill riders to enjoy repeated runs of the downhill tracks is one of the most profitable ways of generating revenue from mountain biking.

Cwmtdown have a contract to operate at Cwmcarn and pay a percentage of turnover, as their lease, to the FC. At present, they do not invest any money directly into the upkeep of the trails.

In general, downhill trails and uplift facilities offer one of the best commercial models.

#### LLANDEGLA FOREST

This is a privately owned forest that has been opened up to mountain bikes, with a well equipped trail centre that offers a number of trails, a visitor centre with a café, conference room, showers, toilets and a bike shop. They also run coaching and skills improvement courses.

The day to day operation of the café, bike shop and coaching courses is operated by *One Planet Adventure* who lease the visitor centre on a medium term lease arrangement. *Tillhill*, the owners, maintain a background role in the operation of the site and it returns a good profit for both parties.

Its success is largely down to a good location and suitable and sizeable terrain. The trails were largely funded by public money grants.



### CYCLEWISE, WHINLATTER

Cyclewise is a mountain bike training provider that offers skills tuition days for beginner riders, through to leadership and coaching courses for those seeking to teach themselves. They have created a small centre and skills area on the back of the main trail centre at Whinlatter, in the Lake District.

The skills area is closed to the public unless they are enrolled on one of the courses and it is the responsibility of Cyclewise to inspect and maintain the facility.





## COMMERCIAL OPPORTUNITIES AT THE FIVE SITES

### Entwistle

This site has the terrain to support two good quality trails, and perhaps, develop a third as a separate, later phase of development. A visitor centre could be created to support these trails, and a pump track and skills area installed, to create a focus around the centre. A skills area would provide a good package, alongside the trails, for coaching providers to operate classes.

The limitations for Entwistle lie in the total area and distance that the trails would cover. It would fall well short of the trails at some of the established larger centres where trail distances are usually 15–25km, rather than just the 8km Red Trail at Entwistle. However, the centre could be developed as a hub site for the WPM, and the large number of riders within close proximity of this site would enable it to be a sensible consideration. The area already receives high levels of use from other user types and a pump track and skills area would further support the visitor centre. This would allow basic parking charges to be introduced, which could be fed directly back into the upkeep of the trails.

Along with the centre at Tockholes, Entwistle could serve as the hub for the wider WPM trail scheme, by encouraging all rides to start from, or end from, Entwistle. Information boards and leaflets would show the mountain bike routes around the WPM. An operator here, could offer a good package with a café, coaching facilities and basic cycle spares, but it would be essential to aim the centre at all users and not be focussed exclusively on mountain bikers.

### Walkers Fold

We do not foresee any commercial opportunity for such a small development in Walkers Fold.

### Wheelton

It would be possible to operate a small uplift from Brinscall, for the Wheelton plantation to allow riders to enjoy multiple runs of the short descents. Riders could cycle back along the new Goit route to the road at Brinscall to collect an uplift vehicle. The driver and vehicle would have to be covered by PSV licensing laws. The viability and success of this would not be guaranteed, due to the very modest size of the hill at only a 80m vertical descent. However, Wheelton does have in its favour the greater distances it takes any local rider to travel to access any of the other uplift facilities in the UK (2.5 to 3 hrs minimum). Certainly on weekends and holidays there is potential for enough business to sustain one bus and trailer, whose operator could be asked to make a contribution towards the upkeep of the trails.

### Wilderswood

The type of development in Wilderswood would be very similar to that found in Healey Nab, a small scale loop that would receive good use and great support from local riders. However, there is not the scope or scale there, to develop a commercial element to support this trail. A partnership could be explored and entered into with a rider group.

### Tockholes

This site is in a great position to benefit from mountain biking. There is a café, toilets and car park already in place, the terrain lends itself perfectly to a compact short but great fun Blue Trail which will encourage the largest number of users possible to enjoy it. The overall project costs to develop a basic centre here would be low, due to the facilities already being in-situ. Some negotiation and thought would need to be applied, to assess the current revenue turnover and possible increase once the trail was added – a percentage of this turnover could be used to maintain the trails.

Further ways of securing funding for any repair works to the trail have been discussed. Parking fees have been suggested, and Bill Ould of Blackburn and Darwen MTB Club questioned whether an annual membership, for Pennine bikers to use the trails, would be feasible. Whilst it is clear that neither of these methods will secure contributions from all of the trail users, those that pay, will do so willingly if they understand the money is directed straight back into the trails. Supplying a bike sticker or similar item, that changes each year it will help to self-police the support. If you do not have the bike sticker on your frame, you have not paid the year's membership contribution, which will be clear to all other users. This would be a pioneering scheme but one that could be very effective.

It is also clear that all volunteer hours put into the trails by Lancashire's volunteers, should be logged, to benefit from potential match funding.

## LANCASHIRE VOLUNTEER TRAIL WORKFORCE

Over the short period of time that Lancashire has been developing purpose-built mountain bike trails, it has mobilised and formalised a highly motivated and effective volunteer workforce. These riders and builders have given up many hours of their own time to help drive trail projects forward, accelerating build rates, assisting contractors and taking on sections of build in their own right.

The reason there has been such a strong response from the riding community here must be twofold: for years, Lancashire mountain bikers have not had any official trails to ride apart from a less technical bridleway network, so riders have had to travel to Scotland, Wales and the Lake District to ride purpose-built mountain bike singletrack. Being presented with the opportunities to develop mountain bike trails near where they live, the riders have really taken up the gauntlet like no other. There have been trail groups formed at Healey Nab ([www.idighealeynab.com](http://www.idighealeynab.com)), Gisburn Forest, Billinge Hill and Lee Quarry, all led by highly motivated and skilled people. What is important for the future, is that these groups have come together under one non-profit making body, to drive forward and support Lancashire's trail development.

The newly formed Pennine Mountain Bike Action Group has been consulted with and is keen to support and work as partners with landowners on any new and existing developments. With over 350 members, on their social networking page, this body should be the first port of call for any proposed trail development. With basic support from providers and landowners, this organisation can send more and more of its members to be accredited and certified to carry out trail inspections. This is the backbone of any trail management program – regular inspections recorded on paper and filed with action points if any issues are arising on the trails. The second most important part of the trail management is to have the resources to carry out any necessary repairs to the trails. As the Group becomes more efficient and skilled, it gains the know-how and resources to carry out most basic repairs to the trails, although sometimes assistance will be needed, in terms of the supply of materials or working with contractors on larger scale operations.

While the Group will be required to carry out trail inspections and repairs, it would be possible for Lancashire's well developed volunteer ranger service to provide further support in the form of general facility inspections to check all signage remains in place, litter pick and report any dangerous trees/windblow.

## CONTROLLING ILLEGAL USE BY MOUNTAIN BIKES

Mountain bikers are often looking for more technical routes than those found on bridleways, as many bridleway or multi-user trail upgrades remove many of the features that bikers were attracted to in the first place. Generally, mountain bikers will be drawn into the woods where they are provided shelter. The trees help to demarcate and define the trail line and can be weaved in and out of to create a more interesting trail, whilst the tree roots add some technicality. In some cases, this does not harm anyone, but more often than not there are other users in these woods beside the bikers and user conflict can be an issue when bikes are crossing paths at speed or spooking horses. The trails themselves can sometimes be built by riders with more advanced skills and feature big jumps or drops that they can tackle with ease but when other less skilled riders stumble across the new trail they can end up having accidents.

These are all reasons for managing this use; one of the early tactics employed by landowners was to block these trails by felling trees and generally to try and destroy the tracks and trails built by bikers. This approach has proven unsuccessful as it just moves the problem around the woods and never really reaches a direct solution.

Management and partnerships are the only ways this has been successfully managed. If a site is particularly sensitive then consider whether an alternative could be provided where these issues are not so prevalent.

Designing a few set routes allows the riders to feel they have some ownership of the trails (maintenance, self policing etc) whilst allowing all the other safety and liability considerations to be taken into account, such as the safety and standards of the trail construction itself, and the management of points with potential user conflict.



Encouraging the user group to formalise themselves as a club or working group brings benefits for all. Educating riders, as to why certain things have to be done in certain ways, and how this will benefit them in the longer term, is key as the groups will then impart this knowledge to their peers who may not be in the group and help to police and manage the site.

It is important to realise that mountain bikers will not just go away if you place a 'no bikes' sign up or remove one of their favourite trails; there are more people than ever owning mountain bikes, and all the evidence suggests that participation in the sport continues to grow.



## PRIORITISING DEVELOPMENT

**MOVING FORWARD**, the development is dependent on securing the required funding and the necessary partnerships / management arrangements being in place. Ideally, the funding would be available to develop all of the trails in one large WPM mountain bike project but, in reality, it is more likely that smaller amounts of capital will be available over a longer period of time, so a clear priority list is required for the project. The following lists show how the sites break down in terms of priority and ease of delivery with 1st place being the highest or easiest to deliver.

### Priority

- 1ST: **TOCKHOLES**
- 2ND: **WILDERSWOOD**
- 3RD: **ENTWISTLE**
- 4TH: **WHEELTON**
- 5TH: **WALKERS FOLD WOODS**

### Ease of Delivery

- 1st: WILDERSWOOD AND WHEELTON
- 2nd: TOCKHOLES
- 3rd: WALKERS FOLD AND ENTWISTLE

Tockholes is high priority, as it will serve a whole new group of users within the study area whilst still adding a short extra piece of trail for the enthusiasts. It is relatively easy to deliver, using contractors to build the short trail, and financially, the costs are far lower than trying to create the same type of development at Entwistle, although the ride would be different so they should not be compared like for like.

Wilderswood is a high priority development to divert the attention of bikers away from

Rivington. It is an easy trail to provide, as the grading of the trails and the geology allow for the trail to be built from materials found in-situ. Furthermore Lancashire's volunteer labour could work in conjunction with contractors to create the trails saving on overall expenditure.

Entwistle is a desirable development, since some excellent, albeit short, trails could be created there, but also, from the commercial point of view. A centre there to support the new trails and the existing visitors to the site, will give the best return providing the initial capital costs can be largely grant funded. Its ease of delivery is lower, due to the cost of creating the trails, car park and visitor centre, and the challenging terrain for trail construction.

Wheelton remains a priority site, due to the fact that development here, together with Tockholes, will complete the northern loop and will help to control the building and use of this and other sites by downhillers. Its ease of delivery is 'top notch' along with

Wilderswood as the geology here is very similar to Healey Nab. That will allow trails to be built from the materials on site and the nature of the trails means that there would be no shortage of interest from volunteers.

Walkers Fold, perhaps of all the sites, has the lowest priority or ease of delivery. It would undoubtedly add something to the overall product or brand that could be created around the WPM mountain bike routes, and the terrain will make it an interesting and fun piece of singletrack. But on a per metre comparison this would be the most difficult and expensive trail to build.

Crucially, the final priority list will come down to funding, but I would suggest that Wilderswood, Tockholes and Wheelton are the lowest cost builds and most straightforward trails to deliver. Rider groups such as Blackburn Wheelers and the Volunteer groups (*I Dig Healey Nab*) should also have a key say in this process.

## TOURISM POTENTIAL AND MARKETING

WHILE ASSESSING the tourism potential it was clear early on in the study that, whilst the product with the greatest impact and growth in tourist numbers is that of a full scale trail centre, with trail network and supporting facilities, this was not a viable product here. In the WPM, none of the sites have enough land to create trails long enough to stand on their own.

The catchment and accessibility of the WPM is excellent, and any well designed and implemented mountain product will undoubtedly be well used, but to maximise the tourism potential it is necessary to look at the sites collectively rather than individually. Suddenly, what is being offered to riders becomes a lot more interesting, and the two largest sites of Tockholes and Entwistle can now play hub or supporting role to the other sites rather than being a centre in their own right. This will offer the best of both worlds with 'short visits after work' being confined to the trails at the site, and longer day and weekend rides heading out on the wider available loops.

Creating a brand around all of the sites (rather than campaigns behind individual sites) and having a template to which all the signage will conform, the message will be consistent and the sites will promote each other. Information boards at each of the main reception points at these trails will help inform both locals and visitors of the wealth of potential riding they have accessible to them. A well thought out brand and website, together with social network site pages (facebook etc) will soon inform enthusiasts around the country of this new area to explore.



## FINDINGS AND CONCLUSIONS

**THERE** is a basic need for the provision of off-road cycling facilities in the WPM's area, to improve the provision of leisure facilities and to ease the pressure from informal use by mountain bikers on existing sensitive sites.

- Mountain bike trails are a successful tourism driver, and well developed and designed trail centres can attract up to 200,000 visitors per year.

- Smaller off-road cycling hub sites, utilising existing support facilities, provide the best opportunity for trail development within the WPM's, creating a tourism product, and only requiring modest levels of capital to prove sustainable.

- Each of the sites evaluated has its own character and suits a different style of trail.

- Development may not prove to be economically viable at all of the proposed sites.

- Partnerships will need to be formed with commercial operators or formalised rider groups to help manage these sites

- Illegal use of woodlands by mountain bikers will not go away without providing better facilities to entice them away from their own constructed trails.

- Consultation with the rider groups indicated that whilst they are grateful for increased rights of way access across the moors, it is not their priority. Creating technical wooded singletrack trails is the priority for mountain bikers who live around the West Pennine Moors.

The WPM moors have the potential to develop some modest sized and popular sites. The size of the sites is such that they need to work as a package and be marketed together under a WPM branding. Each site will provide a different aspect of biking with the opportunity to develop Blue graded novice mountain bike trails, skills areas, pump tracks and downhill trails. The management of these sites cannot all be undertaken by the landowners or local authorities due to a lack of resources, so the Pennine Mountain Bike Action Group will become increasingly important in the management and support of these potential new sites.



## PROJECT COSTS

The costs to develop the pump track(s) identified at Tockholes and Entwistle to a high standard, with tarmac berms, start ramp and stone dust trail surfacing, would be between £30,000 and £50,000 per track depending on the size of the area and the design of the trail. A £30,000 track would be built to a good standard but would be smaller, with fewer line options. A track at £50,000 would feature a very high level of design and would be larger, with more line options, preventing riders gradually becoming bored with the facility.

A skills area could also be developed at Entwistle which would further help to support a visitor centre and a coaching business. The cost of a decent skills area can range from £20,000 to £80,000 dependant on size and materials used. The area of woodland near the centre in Entwistle that would support this development is quite modest, so a budget of £25,000 would fund a good skills area, with imported aggregates used to make it robust and functional all year round.

### Examples of pump track designs



## TRAIL FEATURES DESCRIPTIONS

The following descriptions explain some of the terms and features incorporated in the trail designs:

### Berms

These are cambered turns that allow riders to ride around corners at increased speeds as they support the tyres and give grip. This can increase the fun and flow of a trail as the berms allow riders to carry their momentum through sections more easily. Berms can range from slightly supportive cambers at 20% to sheer vertical faces that hold riders into the turn. On these more advanced turns, riders can be perpendicular to the ground or horizontal due to the support of the berm and the 'g' force generated through the turning momentum. Berms can also serve to flatter rider's ability by allowing novice riders to carry their momentum along sections of trail; this serves to give riders an 'adrenaline rush'.

### Grade reversals

These dips and rises in the contours give a trail added flow, control riders' speeds and also control the flow of water, pushing the rainwater off the trail at regular intervals. On side slope traverses, you can make the route more interesting by 'surfing' the contour lines, creating a rolling trail that dips and rises frequently. Where possible, natural features such as rock outcrops, trees, stumps and boulders are used to provide the demarcation and define where the grade will be reversed. On steeper side slopes devoid of natural features it is possible to create this flow by expertly designed grade reversal sequences.

### Rollers

These features are rounded humps that the bike rolls up and over. They are usually found on flatter ground but can also be built into a bench cut. Rollers can occur in trails naturally where an embankment is crossed and rounded over, or be created from imported material. Rollers are particularly suitable on flat trail with little to no side slope where digging down to create grade reversals will create a low lying area that will not drain. The key to rollers' effectiveness and safe construction is a smooth transition from level ground to up-slope, from up-slope to down-slope and back to the level ground. Rollers can be built into sequences that add interest and can control inexperienced riders' speeds whilst simultaneously allowing experienced riders to 'pump' (pedal) the obstacles gaining, more speed. Rollers height and length will vary depending on the trail grading and the speed of the trail, this must

be checked by an expert rider, as a general rule: Blue graded trails will feature lower and longer mellow rollers whereas Black graded expert trails can feature much higher rollers often with relatively short lengths due to the steeper up and down slopes.

### Switchback Turns

These are defined by the entry point of the turn heading back in the same direction as the entrance point and are usually in the region of 180 degree bends. They can be slow, tight, controlled, rolling switchback turns, climbing turns or, often on descents, big sweeping bermed turns to carry riders' momentum onto the lower leg of the trail.

### Drop Offs

These features are added to increase interest, excitement and technical difficulty to sections of trail, they can occur naturally and only require trail work to the entrance and exit points or to be artificially created as TTF's out of rock or timber. Generally before any drop off, riders' speeds and rainwater should be controlled by a grade reversal, followed by a pinch point which gives riders a visual warning and serves to further control their speed. On approach to the drop off itself, there should be two bike lengths where the trail is smooth and clear of any obstructions, this is the necessary set up area. After the drop off, there will be an armoured landing and then again 3-5 bike lengths of smooth obstacle-free trail in the landing area. Following this, it is good practice to create another grade reversal, which will control riders speed and divert rainwater. Any vertical drops over 300mm high should be provided with a route around or a roll-able section added to one side of the drop by using a choke stone.

### Jumps

As bike technology and riders' skills have increased, together with the creation of more technically challenging trails, it has become more common practice for jumps to be incorporated into trails. While jumps are now desired by the current trail users it is important that their inclusion is carefully considered and is in keeping with the grading of the trail. All jumps on Red and Black trails should be roll-able and more challenging jump features or areas where the speed of the trail is higher must be 'opt in' sections or provide a clear alternative route around the feature. Most jumps on XC graded trails take the form of tabletops where there is a take off ramp, a flat top and then a clear down-slope or landing ramp. Also found are roller doubles, much like tabletops but instead of a flat top these have a scooped or dipped mid section, again they are roll-able to all riders and jumpable to those with the confidence, experience and skill to do so. Other jumps that can be incorporated are step up and step down jumps. Step-up

jumps have a higher landing area than the take-off, therefore riders step up onto the landing ramp and similarly on step down jumps, the landing ramp is found lower than the take off, so riders step down onto the landing area.

### Rock Gardens & Causeways

These are features utilising rock found in-situ or imported. In the case of quarry sites, nearly all the rock is in-situ and just requires settling into a suitable formation to form a trail tread. So for the most part, these are large rock slab causeways. These, when designed correctly, so they maintain speed and flow, can be exciting to ride and fit perfectly with the natural environment. On the more technical Black graded features the rock slabs can be pitched on steep gradients due to the material being perfect to counter erosion. Rock causeways can also incorporate drops offs and rock chokes where the trail is pinched to control riders speed. On Red graded trail the rock features should all be roll-able as the visual impact of the causeway creates a trail feature in itself.

### Compressions, G-outs or Bombholes

These features have earned their most commonly used name of bombholes as they look exactly like a bomb crater. Similarly G-outs and compressions refer to the 'g' force and compression experienced as the rider and bike quickly transition from down slope to upslope. The hollowed out shape can exist naturally or be constructed on side slopes. Naturally occurring bombholes on flatter ground need consideration as to where they will drain, as unless the ground is particularly porous they will usually hold large puddles in their base after rainfall. It is then wise to use the bombhole shape almost as a berm hugging one of the sides as the low point and therefore staying out of any holding water. When creating bombholes on a side slope it is possible to leave the bottom open on the downside of the slope to allow them to be free draining. These are exciting trail features that are often key features in a trail and will be positive control points when laying out a route. When riding bombholes, riders drop in one side and their momentum shoots them up and out on the opposite side. The key factor is a smooth transition and a clear sight line. If it is designed correctly, an average rider should not have to brake. By not using their brakes, mountain bikers will not pull dirt down the steeper section of trail. Good sight lines are key: riders must be able to see the entire drop from either side. Remember to limit steep sections to 15-to-30 feet.

## MOUNTAIN BIKE TRAIL BUILD SPECIFICATIONS

### Cross Country Mountain Bike Trail Construction Specifications (relating to Red and Black graded trails)

#### MTB TRAIL CONSTRUCTION

**a.** These specifications relate to the construction of mountain bike trails. They are essentially two types of trails, contour trails, and fall line trails and these can be surfaced using materials in-situ or surfaced by imported aggregates. Contour trails are trails that traverse side slopes by following the contours and only crossing them at oblique angles. Contour Trails are the most desirable type of trails and the following specifications relate to them. Fall Line Trails are trails that follow the shortest line down a slope, crossing contours at right angles. Fall line trails should only be built on slopes of no more than 5% and the gradient of the trail itself should not exceed 5%.

#### b. Width

Maximum 2000mm, Minimum 500mm. The width of the trail is defined as the width of the trail tread. The trail tread is defined as the part of the construction which bears the weight of traffic and may be demarcated by the edge of any surfacing or revetment material used in the construction. Trail width is a vital part of the management of riders on the trail, and also contributes to the visual impact of the trail. Ideally, trails should be as narrow as possible to control rider's speeds and reduce visual impact. Supplementary action must be taken to clear any obstruction or hazard following detailed inspection, removing anything that may be seen to present a hazard to trail users to a distance of 2m either side of the edge of the trail tread. Hazards might include low branches, protruding sprags, brash, stumps or anything that is not a natural feature such as fences, walls or gates.

#### c. Gradient

Gradient is a vital factor in the sustainability of any trail. Average trail gradients should not exceed 15%, though the maximum trail gradient is 30%. However, 30% sections should not be greater than 30m in length in any one section. The gradient of the trail should not exceed 50% of the gradient of the slope-side, i.e. if the gradient of the slope side is 20% the trail gradient should not exceed 10%. Contour trails: the trail tread should out-slope at a gradient of no less than 3%, and no more than 5%, and the entire trail tread profile must consist of well compacted mineral soil, if suitable, or imported aggregates. This allows rainwater to sheet across the trail surface without causing damage to the trail tread. The back slope or batter must be blended into the side slope and never left vertical. Blending the back-slope allows it to re-vegetate and further prevent erosion. Downhill specific routes: Downhill specific routes can, and will, break the rules set for gradients above when constructing cross country mountain bike trails. This is due to the more challenging trails that the user group seek. Downhill specific sections should be designed to control erosion where possible – slowing riders into steep corners and utilising stone pitching and rock gardens where possible to help limit erosion.

#### d. Construction

There are 3 basic types of trail construction

● **Full Bench Cut:** This is the most basic of all types of trail construction, but its use is limited to areas where ground conditions allow. Ideal ground conditions for carrying out a full bench cut are thin organic soil layers overlying free draining mineral soil, preferably on a side slope of no less than 7%. Full bench cut can be used on side slopes of as much as 80% using specialist machinery. Full Bench Cut technique should only be used to construct contour trails. The trail tread should slope out at a gradient of no less than 3% and no more than 5% and the entire trail tread must consist of well compacted mineral soil or be surfaced with a 150mm layer of compacted imported crushed stone aggregates of 40mm to dust limestone or a material with similar cohesion properties. This allows water to sheet across the trail surface without causing damage to the trail tread. The back slope of the batter must be blended into the side slope and never left vertical. Blending the back slope allows it to re-vegetate and prevents erosion. The height of the back slope will be dependent on the ground conditions and the gradient of the side slope.

● **Full Bench Construction** is a method of achieving the same trail profile as in full Bench cut, in conditions that do not allow for that method to be used, by building up the tread or pavement levels using imported materials. This method is best used when there are waterlogged soils, where there is a thick surface layer of organic material or when the side slope is too shallow to allow for a full bench cut trail to be formed. Full Bench Construction should only be used to construct contour trails on side slopes of less than 10%. Full Bench Construction is carried out on top of a full bench cut, where a cut is formed down to the mineral soil – this will result in a trough or trail tray being formed. The tray is excavated down to firm mineral soils, and the construction will take place on top of this. Full Bench Construction consists of a firm mineral base, a surfacing layer and if necessary, revetment structures. The base layer can consist of suitable mineral soils and rock won on site or imported quarry stone. The method used will vary from site to site and is dependent on the ground conditions. All base layers must be established on a stable base, i.e. on compacted mineral soil. All organic material including minor root systems must be removed. The base layer must be laid to a depth that protrudes a minimum of 70mm above the surrounding organic material. Surfacing should consist of 40mm to dust road stone laid to a minimum of 100mm. All surface material should be compacted using mechanical compactors in such a way as to establish an out slope or negative camber of no less than 3% and no greater than 5%. This will allow water to sheet off the trail without damaging the tread. Revetment structures may be needed on steep slopes (over 30%) but should be avoided wherever possible by compacting both sub-base and surface material into the outside edge or batter of the trail. Revetment structures should be constructed from stone or treated timber and they must never impede drainage across the trail tread.

● **Raised Camber Construction:** Raised camber construction is where the trail is raised above the surrounding organic material and has either a pronounced 'crown' or is out-sloped on one side. This technique should only be used on slopes of less than 7%. Prior to construction, all organic



material should be removed, including minor root systems, and a compacted base established on the mineral soil. Construction consists of a base layer and a surface layer. The Base layer can consist of compacted 'as dug' quarried stone or larger stone laid using 'stone pitching' techniques. All base layer material should protrude a minimum of 70mm above the surrounding organic material. Surface material should consist of 80mm to dust road stone, laid to a minimum depth of 80mm and compacted using a mechanical compactor to achieve a pronounced crown or out-slope.

#### e. Surfacing

Trail surfacing will vary from site to site and will be specified by the trail designer in the bill of quantities. Essentially there are two main types of trail construction surfaces.

1. Trails that are constructed using the mineral soils and rock found on-site which are either established by way of full bench cut or by using the cut and fill method or full bench construction.
2. Trails that are prepared using full bench cut or full bench construction and that are surfaced with imported crushed stone due to unsuitable soils on site.

In order for mineral soils to be suitable they should be compactable with good cohesion properties whilst allowing for a free draining surface. Heavy clays are not suitable. Surfaced trails must be covered to a minimum depth of 150mm with 40mm to dust crushed limestone aggregate or aggregates with similar cohesion properties. If the dust content is particularly low the trail surface will be quite bony and not well bonded so a blinding course of dust is required to bond the mixed size stone.

#### f. Groundwork

All groundwork should be carried out as follows:

- All organic material must be removed from the area required to establish the trail tread.
- Groundwork activities must be restricted to a maximum of three meters either side of the trail tread unless agreed with the site supervisor.
- Minor root systems must be removed, as should small stumps. Major root systems may only be removed with prior consultation with Forest Enterprise staff. Larger stumps should be used for demarcation.
- Material removed from the area of the trail tread must not restrict either the drainage of the trail or the surrounding area and must be disposed of carefully. This should be done by spreading it thinly over the surrounding area to allow rapid regeneration of vegetation.

#### g. Trail Structures

Where trails need to change direction, turns must be designed by an experienced trail designer and tested by a suitably qualified professional before sign off, the following specifications must be adhered to;

**Climbing Turns:** These are turns where there is a gain of height during the turn itself, regardless of whether the trail is climbing or descending. Climbing turns must have a minimum radius of 15 meters and should only be constructed on slopes of less than 12%. The trail tread must be sloped throughout the entire length of the turn. When a climbing turn exceeds 7%-12%, grade erosion is likely to occur (depending on specific site conditions). Erosion can be minimized by using a grade dip above the turn, to sheet water off before the fall line section.

**Rolling Crown Switchbacks:** A 'rolling crown switchback' is a structure that ensures the turn is happening on a near level gradient. This deck is slightly crowned so that water sheets off, away from where users are turning. They are small radius turns for use on steep side sloped climbs of up to 70%, or on descents where the side slope is too steep to allow the safe and/or sustainable use of a bermed switchback. The minimum radius of a rolling crown switchback is five metres, though ideally this should be somewhere between 5–8 metres. The trail on the upward leg of the turn must be sloped for a minimum of five meters from the fulcrum of the trail. The downward leg of the turn must be sloped out from the fulcrum. The trail gradient of both the upper and lower legs must not exceed 10% for a minimum of ten metres from the fulcrum. Revetment, or suitable excavation of material and compaction to reach an angle of repose, must be established on the lower leg to achieve this. All revetment structures must be of either stone or treated timber, and the filling material must be compacted in layers of no greater than 300mm or settling subsidence will occur. For every 10% of side slope gradient, there must be a 300mm retaining structure. The turning area itself should be crowned to shed water off the outside of the turn. A rock barrier should be constructed from the fulcrum of the turn to a point of three meters along the upward leg of the turn. This is to prevent riders from cutting the corner.

**Full Radius Switchbacks:** These are wide radius turns for use on slopes of greater than 10%, but no more than 20%. In this case, the turn itself is a wide arc, and the trail gradient during the turn must be 0 and the trail must be out-sloped throughout its length. Again the gradient of the upper and lower legs must not exceed 10% for a minimum of ten meters from the turn. Grade reversals must be used above the turn to prevent erosion at the point of the turn.

**Bermed Turns:** These are built up or banked turns where the camber supports the riders and the angle of turn is anything up to 120 degrees while continuing to descend. They can be used on side slopes of up to 60% while the trail is contouring. The trail tread during the berm should have a positive camber from 20% to 100% / vertical depending on the approach. The faster the section of trail or the tighter the radius of the turn the steeper the face of the berm should be.

Revetment can be used to shore up the material on the berm; this tends to be high maintenance and should only be applied where there is no alternative. The preferred methodology is to win the material needed for the berm and create an angle of repose on the back of the berm to support the riding tread. Berms built after a grade reversal should have adequate trail out-slope before them to shed water. Berms sweeping downhill should have a negative camber after the turn to allow water sheeted off

the berm to exit the trail. On poorer soils, these exit points should be armoured by stone pitching. Berms must be sealed by a compactor plate with at least one pass.

**Switchback Berms:** These are bermed turns of over 120 degrees and up to 240 degrees where the berm exits, heading back up the gradient. They can be used on side slopes of up to 40% when switching back the direction of flow. The entry point to a switchback berm should usually be up hill to prevent braking. Material will be won on-site by means of 'borrow pits' to build up the retaining back-slope of the bermed turn on the side slope; this must be built out to an angle of repose. The trail tread during the berm can have a positive camber from 20% to 100% /vertical. The faster the section of trail or the tighter the radius of the turn the steeper the face of the berm should be. At the lowest point of the turn, a culvert must be installed under the berm to allow water to exit the trail and flow under the turn. This should be built by pipe, with a catchment pit on the inside of the turn or as a stone slot drain. For piped drainage, header walls must be constructed as in section (h).

#### h. Drainage

It is imperative that the construction of the trails should not significantly alter any established drainage patterns in the area of the trail.

#### i. Culverts

Culverts may be established to prevent this from happening. All culverts must be constructed using a minimum of 300mm double skinned plastic piping or larger if the water flow dictates this. Pipes should be over specified to cope with a 50 year event. Check if there are existing culverts along the watercourse and spec to the next size up. Ditches leading to and from culverts must be a minimum of 450mm wide and 500mm deep for a minimum distance of 20 meters either side of the culverts. Culverts may be required to cope with areas with a lot of surface water or may be incorporated into raised camber sections or switchback berms. Pipes must be sloped downstream at a gradient of at least 10%. These may be constructed from stone or pipe. Stone culverts must be constructed from slabs sufficiently large that they cannot be rocked or moved by the traffic flow. All pipes must have stone header walls and a catchment pit at the upslope end, and a large slab placed at the exit point of the pipe to prevent undermining of the culvert. Fill over the culvert to a minimum level of 300mm to ensure the pipe does not become exposed.

#### j. Watercourses

Watercourses shall be kept clear of any branches, wood, stumps, soil spill and all other deleterious materials.

#### k. Rolling Grade Dips

These are features that allow any water not shed by the trail out-slope itself to leave the trail surface without causing damage to the trail tread. Rolling Grade Dips are designed to shed water across the trail without channelling it and without causing an obstruction to bikes. Either rolling grade dips or grade reversals should be incorporated into the bench cut trail design at intervals not exceeding 25m. They are subtle though quite large features comprising of an out-sloped diagonal dip or scoop in the trail gradient with a slight mound or bund downhill of this. The scoop should be a minimum

of three meters in length, with a pronounced out-slope. The gradient of the scoop should not exceed 10%. The bund must also be a minimum of three meters in length and no more than 500mm higher than the lowest point of the scoop. The trail tread at the lowest point of the scoop should be no less than 5% and no greater than 15%.

#### l. Grade reversals.

These features build on the principles of rolling grade dips, taking the concept to the next level of both design and functionality, but their use is limited to contour trails where full bench cut construction is used on side slopes of more than 7%. Reversals of grade greatly add to the flow of a trail and serve to control riders speed, though their primary purpose is to control water, diverting flow off the trail at regular intervals. A grade reversal is the point at which trails, in short intervals, switch from descending to ascending and back again to descending, thus reversing the grade as part of an overall descent or climb. Grade reversals' length and amplitude need to reflect the trail grading. Blue graded trails need long, mellow reversals of the grade of 10 – 25m from peak to peak; Black graded trails feature steeper, bigger reversals of grade and often over shorter distances. When on side slopes of more than 7%, reverse the grade every 20–40 feet. The trail grade must always remain less than half the side slope grade. For example, if you're building across a mountainside that slopes at 40%, no part of the trail should exceed 20% for more than 20m. Route the trail on the uphill side of established trees to utilize the bench and avoid undermining the tree or damaging the tree's major root system.

#### m. Trail Demarcation

Trail demarcation relates to the defining of the line of the trail, to keep trail users within a narrow corridor. This reduces the visual and environmental impact of the trail, and ensures riders are riding the trail as designed, preventing trail creep or excessive speed made possible by straightening out corners. Trail demarcation should take the form of periodically and strategically placed obstacles, which defines the line, such as trees, stumps, boulders and rock outcrop. Where additional demarcation features are required, these should be placed in such a way that they cannot be easily moved, and should never be less than 750mm from the top of the trail tread. In the quarry environments rocks used for demarcation can also be built into Rock Choke trail features. A series of large immovable boulders staggered on either side of the trail forms a narrow choke or slot that enhances the ride. This trail build technique slows users down and adds challenge; the trail designer should ensure that this also creates a more technical line choice, over the choke obstacle, and that riders cannot ride around the obstacle, thus negating the effect of the demarcation.

#### n. Technical Trail Features (TTF's)

Modern trails are packed with plenty of TTF's to excite and challenge riders. The following general specifications relate to their construction. The creation of TTF's is always done in situ with qualified trail designers and builders.

#### Drop Offs

These are steps in the trail with a vertical or near vertical 'drop off' in the trail tread. These relate to the features that would be included in a Red or

Black graded trail. It is imperative for a drop-off to have a clear site line in approach and landing. 4m before the drop and 4m after should be cleared of any obstacles to allow riders to set up and ride out of the feature. Before the set up area for the drop there must be a grade reversal and/or a stone or stump pinch point. The vertical drop should lie between 150mm and a maximum of 900mm. Drops over 300mm should have a clear alternative route or a choke stone on one side of the drop. The landing area must be armoured with a material high in stone content or stone pitched.

#### Tabletop Jumps

Table jumps have a:

*Take off transition*

*Level top*

*Landing transition*

These form the ideal jump feature for most trails as, if a rider can't make a jump span or has a problem getting over a jump due to its technical difficulty, they have the option of riding over the jump safely – it is roll-able.

Jump height should be 2–3 feet for beginner jumps – increasing by a foot or two as difficulty increases through a trail. Jump length will be 4–7 feet from the lip to the landing for beginner jumps, and will increase with difficulty. Jump length must be paired with jump height and take-off angle so riders will hit the landing. Jump width should be five feet or greater – landing ramps should be even wider to allow for wayward landings.

The distance between the landing of one jump and take-off of the next should be about 22–26 feet. The angle of take-off and landing ramps on beginner jumps doesn't need to be curved or 'transitioned.' More advanced trails will have transitioned ramps that curve upwards and launch the rider smoothly into the air. Only the largest jumps require transitioned landings. Take-off transitions are an art and play an important part in the feel of a tabletop jump with the output goal one of smooth, predictable lips.

#### Rolling Double or Camel Jumps

Rolling doubles have a:

*Take-off transition*

*A dipped smooth rolling centre*

*Landing transition*

Rolling double jumps are common on trails; they do not require as much material as a tabletop jump and add another dimension to the ride, as riders can roll over the obstacle pumping the middle transition, lift the front wheel to manual it or jump over the gap to the landing transition. It is important the second peak of the jump is very slightly higher than the first as this enables riders who are jumping the obstacle to judge the distance as they approach it. The landing area should not be too shallow, as riders use this angle to control their landing – too shallow and they will tend to land heavily and lose control. A reasonable angle also stops the less experienced riders jumping down and landing on the front wheel only, which can easily cause loss of control. These can easily be created when bench cutting in successive grade reversals. The dipped centre will be only slight on a Red graded trail but can be more prominent on a Black graded trail but needs to be in relation to the dimensions of the rest of the jump.

#### In any Jump Construction

Specialist/expert help is *essential*. It is essential that the specialists/experts are involved in the initial design/concept and then in the final surface level/ micro grading stage to ensure that the take off angle, gap and landing design has been translated to the actual build on the ground, correctly.

There is no rigid formula for height /angle/distance with jumps. Using people with experience of designing and building them is the only way to guarantee the desired results are achieved and that the jumps are both fun and safe.

#### Guidelines for Jumps on Blue Grade routes:-

- *Max angle on the take off transition – 50°.*
- *Max height of the construction of the jump – 0.75m.*
- *Max length of the jump – 2.10m from the lip to the landing.*

#### Guidelines for jumps on a Red Graded route:-

- *Max angle on the take off transition – 65°.*
- *Max height of the construction of the jump – 1.0m.*
- *Max length of the jump – 5m from the lip to the landing*

#### Guidelines for jumps on a Black Graded route:-

- *Max angle on the take off transition – 80°.*
- *Max height of the construction of the jump – 2.0m.*
- *Max length of the jump – 7m from the lip to the landing*

It is critical that the design of the trail controls the speed of the rider approaching the jump to prevent over speeding and therefore over jumping; this must be checked by an expert.

#### o. Rollers

This is the term used to describe where the trail rises up and over a crest or rounded hump in the ground. These differ from grade reversals, as they are usually placed on flatter ground, where a grade reversal would not drain. The gradient changes all occur over the roller obstacle rather than a continued reversing of the grade. Natural rollers must be over suitable mineral material; if not deemed suitable, the organic layer must be stripped and an aggregate layer surfaced over the feature. Rollers must have a continuous smooth rounded shape. Rollers height and length will vary depending on the trail grading and the speed of the trail. This must be checked by an expert rider, as a general rule: Blue graded trails will feature lower and longer, mellow rollers no higher than 1.0m and over 8m length whereas Black graded expert trail can feature much higher rollers of up to 2.5m over a similar length due to the steeper up and down slopes. What is critical is the rounded smooth transition and matching the roller to the entrance speed.

#### p. Rock Gardens

This is the term used to describe where the trail is routed over and through existing rocky areas, or importing rocks to create technical features. Rock gardens are preferable TTF's as they are sustainable and aesthetically pleasing, fitting in with their environment more comfortably than timber features. People expect rocks in nature and won't avoid them if they seem natural. No matter how difficult the rock section might be, it still must be



the easiest route through that area. This keeps riders on the trail, avoiding trail sprawl and desire lines. More technical options can be created as 'opt in' lines.

#### q. Boulder Causeway

This technique uses giant boulders and rock slabs immovable by hand, as the trail tread. Machinery is required to move these large slabs into position. On gentle gradient climbing sections, small steps and drops should be incorporated of no more than 200 mm height difference with at least 1½ bike lengths between each step. Likewise on slight descents, 'stepping' the causeway will provide additional technical interest. The faster the section of trail the greater the number of bike lengths required between steps. For example, a faster flowing descent of 10% requires 4–5 bike lengths between steps.

#### r. Stone Pitching

This is an ancient road building technique, in which medium sized rocks are set on end, or 'pitched' up on their side. Stones must be hand-fitted tightly together with smaller packing stones and aggregate packed into the gaps to tighten the construction. Think of a book in a bookshelf, only the spine is showing and the rest of the book is hidden.

#### s. Flagstone Paving

This is the most common and simple armoured technique and easier to achieve than boulder causeways as it is a manual technique. Medium to large flat-faced stones that can be manually handled are placed directly on a mineral soil base or set down into the trail tread. The stone's largest and smoothest face is placed up to form the armoured tread surface.

#### t. Compressions, G-outs or Bombholes

These are features with a large dip in the trail with equal or slightly less rise after the fall. There must be a smooth transition into the steep down-slope, from down-slope to up-slope, and from the up-slope out of the feature, back to the trail tread. Sight lines must be long and clear. With these two factors carefully considered and designed into the bombhole, an average rider should not have to brake and their momentum from the down-slope will carry them through the hole, up and out of the steep rise the other side. The trail grade can be steeper here in these features than normal with gradients of up to 70% on Black graded sections. Good sight lines are key: riders must be able to see the entire drop from the approach. ●

## ANTICIPATED COSTS TO DEVELOP THE CROSS COUNTRY TRAILS

THE MOUNTAIN BIKE cross country trails have a number of variables that influence the cost from site to site; in brief these will be: geology and ground conditions, clearance, plant mobility on site, surfacing materials and access, drainage and grading. Development in Wilderswood where materials are to hand and access is good is significantly cheaper than cutting new trails into Entwistle where access is poor and surfacing would be required throughout.



**ENTWISTLE BLUE TRAIL** - This is based on the fact that the return shared section of trail on the far side of the reservoir is covered in the budget for the red graded trail. The Blue trail will also require a walking excavator to construct a few of the switchback turns.

Item	Description	Total
Labour including:	Trail build team Designer	£14,820.00
Plant including:	2.5 T excavator 5T excavator 1 tonne dumper 1 tonne dumper Whacker plate Haulage Plant diesel Welfare cabin Security – Harras fencing	£11,712.00
Materials including:	40mm to dust limestone – Type 1 Pipes for culverts	£14,120.00
<b>Total</b>		<b>£40,652.00</b>

**WALKERS FOLD WOODS** – This is a relatively short section of trail but proportionally one of the most expensive due to the poor ground conditions, tree clearance and access tracks that would need to be formed on the far side of the stream.

Item	Description	Total
Labour including:	Trail Build Team Designer	£23,100.00
Plant including:	2.5 T excavator 5T excavator Whacker plate Haulage Plant Diesel Welfare cabin Security - Harras fencing	£15,900.00
Materials including:	Pipes for culverts	£500.00
<b>Total</b>		<b>£39,500.00</b>

**WHEELTON PLANTATION** – These costings are based on a contractor building all of the three trails in this woodland. There may be opportunities for volunteers to assist in the build or even to take on one of the trails themselves. Costs are lower in these woods due to decent access and good ground conditions where surfacing is not needed.

Item	Description	Total
Labour inc	Trail build team Designer	£10,700.00
Plant inc	2.5 T excavator 5T excavator Whacker plate Haulage Plant diesel Welfare cabin Security – Harras fencing	£7,700.00
Materials inc		£0.00
<b>Total</b>		<b>£18,400.00</b>

**WILDERSWOOD** – The above costings are for a contractor to build the red trail and for a volunteer group to build the short black route. The materials on site are suitable for trail construction removing the cost of buying and transporting aggregate.

Item	Description	Total
Labour including	Trail Build Team Designer	£10,700.00
Plant including	2.5 T excavator 5T excavator Whacker Plate Haulage Plant Diesel Welfare Cabin Security – Harras Fencing	£7,700.00
Materials	–	£0.00
<b>Total</b>		<b>£18,400.00</b>

**TOCKHOLES BLUE TRAIL** – Access at the Tockholes site is pretty good though ground conditions are poor for much of the trail. The whole trail will be surfaced.

Item	Description	Total
Labour including:	Trail build team Designer	£20,660.00
Plant including:	2.5 T excavator 5T excavator 1 tonne dumper 1 tonne dumper Whacker plate Haulage Plant diesel Welfare cabin Security – Harras fencing	£15,100.00
Materials including:	40mm to dust limestone - Type 1 Pipes for culverts	£25,160.00
<b>Total</b>		<b>£60,920.00</b>



# Feasibility Study for Mountain Bike Trail Sites in the West Pennine Moors



**BackOnTrack**  
TRAIL DESIGN SPECIALISTS

A submission by:

---

Back-on-Track MTB Solutions Ltd

---

16 Poplar Court, Caerleon, Newport NP18 3EB

---

[info@back-on-track.org](mailto:info@back-on-track.org)

---

[www.back-on-track.org](http://www.back-on-track.org)

---

0044 (0) 7799 417 559

---