

**DERBYSHIRE COUNTY COUNCIL**

**CABINET**

**16 April 2013**

**Report of the Strategic Director for Children & Younger Adults**

**THE BUILDING OF A MOUNTAIN BIKE TRAIL AT WHITE HALL CENTRE - INCLUSION IN THE CAPITAL PROGRAMME – (Young People)**

**1. Purpose of the Report**

To seek approval to include in the Capital Programme Asset Management Plan the construction of a Mountain Bike Trail at White Hall Centre.

**2. Information and Analysis**

White Hall Centre currently has over 5,550 young people who attend residential and non-residential courses and programmes each year. Courses include a wide range of adventurous and developmental programmes that stimulate personal growth, encourage team work and the development of a healthy lifestyle. In order to further develop the facilities available to schools, community and Youth Groups, the Centre made a successful bid for £20,000 matched funding project grant to Sport England (as detailed in the approved Young People Cabinet Member report dated 24<sup>th</sup> July 2012) in order to create and build a single track, off-road bike track of approximately 1 km in length.

Currently the Centre does not have the appropriate facility on site or easy availability in the locality (local bridleway network) to give the necessary level experiences for novices or to develop skills in a progressive way, or in ways that meet the needs of different physical abilities or disabilities for some young people.

The creation of a mountain bike/cycle track will greatly assist in the continued development of cycling within the programme and will build on the already successful cycle ability training programmes that the Centre currently provides for schools and young people.

### **3. Financial Considerations**

This earlier successful grant application has already generated £20,000 of external capital income which will need to be matched from the Centre budget. This will be made possible by a restructuring of spending on kit and activity equipment for one financial year and will be further bolstered by income generated by Outreach projects and from use of the mountain biking facilities.

In line with current financial regulations three quotes have been requested and received. All three quotes are approximately the same financial amount of £40,000 (see Appendix One) as forecasted by the initial scoping proposal and funding bid. It has been identified by the Acting Centre Director and staff managing the project that the bid from Architrial represents the most advantageous and economical proposal. This is backed by a successful and current track record of similar projects (including current Commonwealth Games projects in Scotland). The company has also undertaken to provide training days on operation and maintenance at no cost to White Hall to ensure good risk management and the presence of a sustainable maintenance schedule.

### **4. Human Resources Considerations**

The proposed project would have no HR or staffing implications.

### **5. Other Considerations**

In preparing this report the relevance of the following factors has been considered: Prevention of Crime & Disorder, Equality of Opportunity, Environmental, Health, Legal & Human Rights, Property and Transport Considerations.

### **6. Key Decision**

No

### **7. Is it required that call-in be waived in respect of the decisions being proposed within this report?**

No.

**8. Background Papers**

Details of quotes for construction of MTB trial at White Hall will be held at White Hall Centre, but copies are attached for information.

**9. Strategic Director's Recommendations**

That Cabinet approves the inclusion in the Asset Management Plan / Capital Programme 2012/13 the construction of an off road Mountain Bike track at a cost of £40,000 and to approve the transfer of £20,000 to an earmarked reserve in the current financial year to fund the balance of expenditure which is not financed by the external capital grant.

**Ian Thomas, Strategic Director for Children and Younger Adults.**

## **APPENDIX ONE**

**(See attached PDF Documents )**

**THREE QUOTATIONS FOR THE CONSTRUCTION OF  
A MOUNTAIN BIKE TRAIL AT WHITE HALL CENTRE  
BUXTON.**



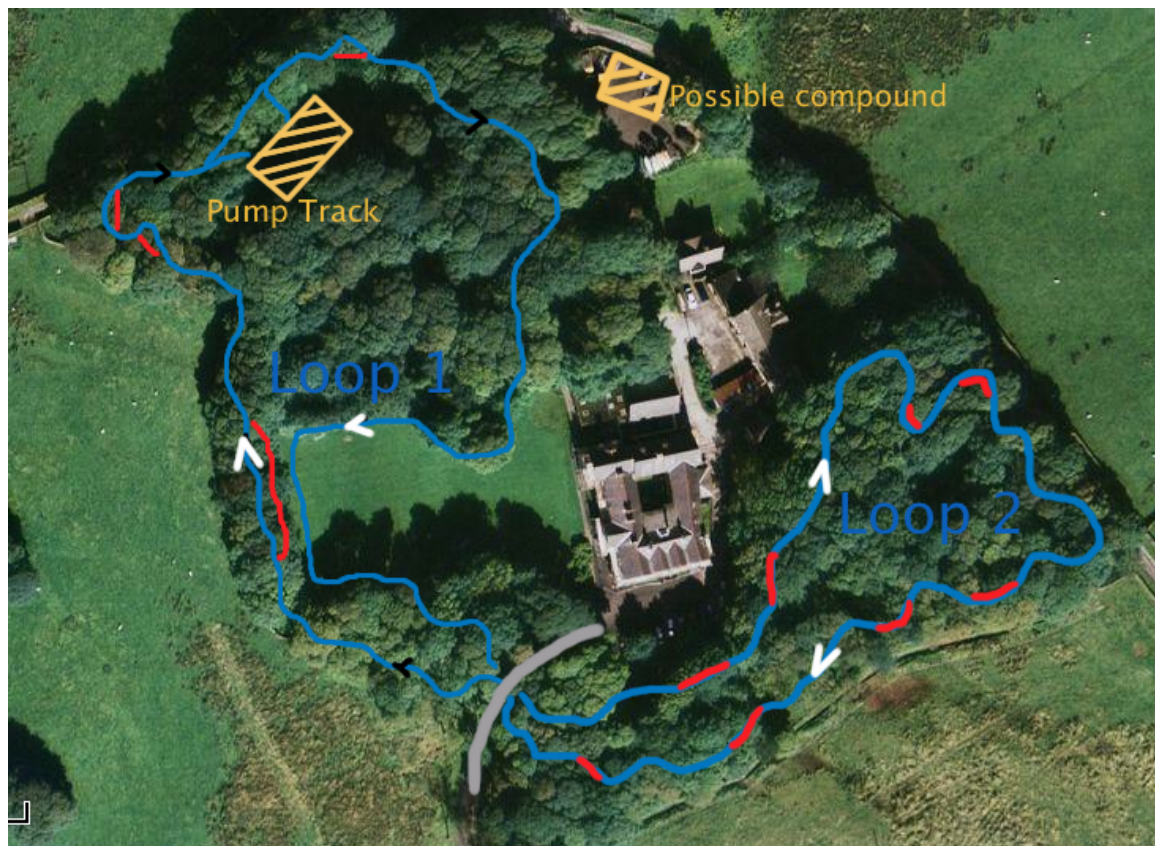
## 2.0 Description

Loop 1 - North of the estate entrance main road and will be approximately 454m in length. It will be of blue grade with technical features that riders will have to opt into. Half way round the trail passes an old tennis court, this area will be used for the pump track.

Loop 2 - South of the estate entrance main road and will be approximately 459m. It comprises of a small climb and small descent. This loop will be of blue grade with technical features that riders can opt out of riding with chicken lines. It will be more technical than loop 1 and contain more features.

Pump Track - Design of an oval, with a cross being situated on the inside, in order to create a number of variations when riding laps. This would mean that both circuits and figure eights would be possible.

Please see the proposed draft trail overview below;



## 3.0 Features:

Architrail aim to construct exciting trail, which is feature rich, these features are regarded to as 'Technical Trail Features' or TTFs.

With a background in World Cup 4X track design, Architrail have gained unparalleled experience in designing all forms of jumps, berms and other features and have an unmatched depth of knowledge of them. In recent years Architrail have taken this knowledge and applied it to construct TTFs on projects of various scales. Together, we uphold the ethos that a trail should always be doing something and TTFs are vital for maintaining this.

There are a number of technical features that Architrail have pioneered over the years, which we are proud to have constructed. Through the implementation of these in our UK trail centres we have earned ourselves a reputation as an innovative company. Please see the associated TTF design sheets of features listed below as a few examples of the TTFs that we aim to create at White Hall.

<b>Loop 1:</b>	<b>Loop 2:</b>	<b>Pump Track:</b>
Chicane x 1	Chicane x 1	Large 180 Berm x 2
Rock causeway x 1	Rock Gardens x 2	Rollers x 8
Rocky inside line x 2	Berms x 5	Roller Double x 4
Rollers x 5	Jump/Tabletops x 3	
Berms x 5	Root section x 2	
	Climb switchbacks x 3	
	Drop off x 3	

Please see the extensive list attached for alternative options; we propose a consultation exercise with yourselves and the outdoor instructors during the inception meeting. At these meetings we can discuss the exact requirements of the features and their locations. In addition we aim to be flexible during the construction period and react to feedback on completed work.

We take a creative approach to creating mountain bike trails and always aim to optimise a trail for its location ensuring that the trail flows in a fun and sustainable manner, whilst making sure that the trail stays within its grade boundary and adheres to its design. Flow is an essential part of any cycling trail and is the aspect most responsible for the enjoyment factor of any given trail. Without flow, a rider can easily be left unsatisfied, reducing the likelihood of repeat visits, which can be a fundamental shortcoming for any trail project. Flow is given to a trail by carefully balancing the line of the trail with the shape of the topography and the distribution of turns, climbs and descents along the trail corridor. This precise distribution on the ground is almost impossible to predict during the design phase, unless the design is deliberately lacking in features or turns. We would want the trail at Whitehall Outdoor Education Centre to be continually turning and packed full of features. The trail is relatively short so we would want to fill that short distance with a trail that is constantly “doing something”. We always try to avoid creating sections of straight trail, with the trail either rising, falling or turning. This method of filling all available length of trail with features has many benefits;

- The trail controls riders’ speed at all times. With a feature packed trail with few straight sections, it is difficult to go very fast unless you are a highly skilled rider. This reduces areas of heavy braking and therefore erosion, increasing the trail’s longevity.
- The increase in skill required to ride the trails faster limits users, which allows and encourages them to improve their technique with this type of trail. The trail is therefore very progressive, meaning one trail can be suitable, challenging and fun to ride for a much wider range of abilities than is traditionally expected. A beginner could enjoy the blue trails, whilst an expert would also be provided with excitement by navigating the trails at a faster pace. This makes the facility more inclusive, ensuring groups of mixed ability riders are able to ride together, but ride within their ability to get the most out of the trail.

- A trail full of features constantly engages riders in the trail, building anticipation for the next corner or feature. There are few sections where a rider can rest resulting in riders having a smoother transition of speed reducing braking or acceleration (and therefore erosion) hotspots. Reducing erosion results in less maintenance costs and avoids degradation of the trail as a whole.
- Lastly, a trail with a good flow and full of features is simply much more fun and exciting. We have shown our capability in this respect through the design of the Ashton Court and Leigh Woods trail projects. These have surpassed their brief by creating a fun trail for all levels of user on a predominantly blue graded trail and attracting unprecedented visitor figures.

The above points highlight that the exact line of the trail is therefore fundamental to many aspects of the trail making it essential to have the ability to discern the best line for the trail onsite during the build process. Our approach would ensure this by having our experienced trail designers monitor the construction process, who can make precise adjustments to the line and the shape of the trail to ensure good flow and the optimal product is achieved. Furthermore, having dedicated trail designers on site will allow built features to be assessed through client and contractor consultation before subsequent sections are started, ensuring the highest quality product. We take extreme pride in the quality of their work and will not settle for anything less than the most creative and most enjoyable trails possible. We take the view that the creation of off road cycling trails is an art form, with more in common with sculpture than with civil engineering.

#### **4.0 Braided Sections and Multi-line TTFs**

We have a great deal of experience of multi-line TTFs taken from World Cup 4X, downhill and cross-country tracks (as well as Olympic and Commonwealth Games tracks). A number of UK trail centre projects have also contained multi-line TTFs enabling expansion of the trail's user base, allowing groups of mixed ability to ride together and find features to challenge everyone. Multi-line TTFs can also aid riders to develop skills, which can be done in a repeatable and progressive environment. The advanced riders are stimulated by the challenge of the more advanced features, whereas riders of lower ability are able to ride around or attempt intermediate features. The race experience gained has influenced our work by creating features that give a time or distance advantage to those choosing the more technical line. The choice to opt-in from the main line to a more technical feature is rewarded by a shorter distance to travel or allowing the rider to take a favourable line into the proceeding section of trail. Multi-line TTFs can also be formed as trail braids of up to 30m in length where users are given the option to choose a section of more technical grade trail. This route may also contain a time advantage applying one of our latest techniques, which allows mixed ability riding groups to tackle the same TTF at varying speeds. This is carried out by braiding the trail (with a suitable qualifying feature) and pushing the higher grade user into a position which gives them greater line choice or a much higher entrance speed into a shared TTF. This TTF may be as simple as a jump or corner but it may have entirely different characteristics when ridden at speed. Another option is to provide a split (or a number of splits) in the trail which features identical feature and section length, this allows riders to overtake using their own power alone instead of both riders wanting to take the same 'inside' line and remaining in the same position.





Trail braid with qualifier

In locations identified as being suitable for braided sections and technical trail features, Architrail must determine where the most suitable position is for each braid. Along each braid they must then position each TTF carefully to maximise safety and to maximise the learning aspect of braided TTF sections and progressive difficulty.

At all times in Loop 1, the main trail itself should flow into the easiest of the braided section options. This ensures that riders are not forced into riding technical features beyond their ability and maintains the safe riding environment provided by the trail. All braids of *increased* technical nature are “opt in”.

The Loop 2 would include many of the harder features of Loop 1, but would incorporate more technical features. However, as specified, ‘chicken lines’ would also be included for the more technical features. The berms would be larger and steeper and spaced closer together. The Loop 2 would include features that occur in close succession with each other and with corners, which would be more technical than those found on Loop 1. The returning trail on Loop 2 would include technical rock causeway climbs to learn the skills required for climbing and riding over rocks at low speed.

The Pump Track is proposed to create a destination and practice facility. Pump Tracks provide a training facility to be used to improve skills suitable to the wider trail network.

## 5.0 Ground Clearance

Rhododendron (an invasive and non-native species) clearance total of approximately 40m will be necessary, this will be cleared with our NPTC qualified chainsaw operator. No additional felling of any mature trees will be necessary. The lower branches of mature trees running alongside the trail corridor are to be stripped back to a minimum of 10mm in order not to cause a hazard for passing riders. This should

be carried out to a height of 2.5m. Cleared trunks, branches and brash should be collected in habitat piles at cut to lengths not exceeding 2.0m and placed outside of the fall zone. Fall Zones are areas adjacent to the immediate trail edge, most importantly adjacent to TTFs, the bottom of descents and outsides of corners. These are areas that a rider may potential fall into in the event of losing control or crashing. The zone is defined as the area 1.5m each side of the trail and must be checked to reduce injuries happening and their severity. Sharp stones, small boulders and surface debris should be removed; sharp points on rocks over 300kg should be dulled or rounded. Tree stumps below 250mm in diameter should be removed along with branches cut back to the shoulder. If the cutting back of hazards is not possible then a natural covering may be possible, though crash matting and fencing is sometimes necessary on exposed and fast sections. [The fall zone does not need to be cleared of all foliage; the purpose of these fall zone guidelines is to reduce the chance of injury, if a crash occurs.](#)

## **6.0 Plant**

3t-5t Zero Swing Tracked Excavators and 2.5t Tracked Dumpers will be used on site, the corridor and footprint of trail will have to be narrow as to not affect the grounds of the house. This corridor will be 3.0m through areas of forest and appropriate smaller machines may be used in less accessible parts of the site. The later stage of the construction to create the finished shape is to be done utilising hand machinery including tracked wheelbarrows and whacker plates alongside appropriate excavators. All finishing is to be done by hand with hand whacker plates used to compact the trail surface.

## **7.0 Construction Materials and Trail Formation**

To ensure that the trails remain 'all weather' the trails on the site have been specified to receive strip and fill surfacing technique. This technique has many names within the trail building industry (e.g. excavated tray) and therefore for clarity a brief explanation follows. An excavator will excavate or 'strip' the existing ground surface to remove any existing vegetation and the upper organic layers of earth. The excavated material will be laid to either side of the trail for later use in landscaping activity. The excavated strip will then be filled with appropriate amounts of stone to create an elevated trail surface or an appropriate trail undulation or feature as required. The surface will be cambered or an appropriate cross fall should be created. The stone will then be shaped and compacted to form the trail surface.

The trails have been specified to receive stone surfacing. This will improve longevity and sustainability of the surfaces, which are expected to receive a very high level of use. All sections will require base course and wearing courses to provide armouring and protect the soil against erosion processes.

The trail surface will be broken into two distinct courses as appropriate:

1. Sub-base course 80mm crusher run ( $\approx$ 250mm) (bottom);
2. Limestone Dust Wearing course 0-4mm ( $\approx$ 30mm) (top);

This will be formed to an average width of 1.0m. After shaping of the base course has been carried out by and excavator then hand finishing with rakes will be employed to ensure a correct finish. This will then be compacted with a whacker

plate. If surfacing is necessary then additional shaping and compaction will be required.

The pump track will require Type 1 crushed stone of (four times) higher quantity than that of the trail loops and a 50mm surfacing with dolomite dust in order to get the best finish possible. Dolomite dust from Longcliffe Ltd. Quarry in Matlock is regarded as the best track surfacing material available and is used at the 2012 Olympic BMX venue and National Cycling Centre in Manchester. Up-to-date quotes have been sought from the local quarries, which are given in the cost section of this proposal.

#### Demarcation

When this term is used in relation to mountain bike trail it is creating a boundary on the edge of the trail, predominantly on the inside of corners. The use of demarcation prevents trail braiding, trail being undermined, soil being brought onto the track surface by cutting corners and desire lines forming. This allows a trail to remain sustainable and reduces maintenance. These features can be natural and may be built into the designed trail line however where necessary they may be artificially created from local natural resources such as large boulders, wood or wood piles, vegetation mounds, tree stumps and earth bunds.

#### Drainage

Given the gradients on site, the drainage on the trail will largely be natural and will be dealt with by adequately forming crossfalls, grade reversals and cambers on the surface. The specification is designed to allow the free flow of water across the path without the use of culverts; however culverts are sometimes required in order to allow the passage of water under the route. This may also be necessary to allow water to away from inside of in-sloped corners/berms. When this is necessary they are sometimes referred to as 'bottom turns'. Trenches shall be excavated down to firm ground with all organic soil removed where practicable. These will normally be basic construction with  $\approx 160\text{mm}$  perforated plastic pipe. Larger ditches may require 300mm twin walled plastic pipes laid on crushed stone (or bed line across water course as required) requiring rough stone headwalls to mask the appearance if visible. Culverts are to be installed as needed are estimated at ten at this stage.

#### Signage and Interpretation

It should be noted that the presence of the trail surface would act as a signpost for most of the trail infrastructure. Signage can be simple with appropriate coloured arrows indicating the trail, which is to be ridden, inserted into recycled plastic or wooden posts. The posts should be in keeping and consistent with the existing way marking on the site. Interpretation may also be required at the start of the trail loops and pump track. The exact wording of the interpretation is to be discussed at the end of the construction process to accurately reflect the final lengths and position of the trails. All interpretation design and ordering will be considered and delivered by the client. The project manager and client can agree all signage locations on site post construction.

#### Timings

Rural areas including woodlands are special places and are protected under national law. In particular the Breeding Bird Season (1st of March to the end of August) will affect this site. Works should occur outside this time period unless other steps are taken to remove the breeding habitat along the line of the route, or walk the line of the route prior to construction. These should be agreed with an ecologist. Weather

conditions may also play a role within the construction of the trails. If prolonged periods of heavy rain are forthcoming the construction may have to halt to avoid any sub-standard construction techniques. This will require consideration within the contract documentation to ensure both client and contractor are treated fairly during construction process.

### **8.0 Labour**

It is envisaged that the construction timetable for this work would be approximately 5 weeks based on a team of 3-5. This said, the construction period is difficult to quantify as the following issues may affect the programme;

1. Other site operations which may inhibit the works;
2. Discovery and reaction to of unforeseen ground conditions;
3. Discovery of ecological issues

### **9.0 Compound and Stockpiles**

Compounds locations have not yet been agreed. Compounds will be agreed formally in forthcoming consultations in agreement with landowners/managers. We propose a small compound most likely be erected in the car park behind house; this would be approximately 8m x 8m and surrounded by Heras fencing. Access points to the trail have not yet been agreed. During construction, access points are likely to be along the line of the trail and via surfaced estate roads or existing routes. Access from the main roads will also be agreed so as not to conflict with existing site users. Material stockpiles are proposed next to the main entrance road and fire road to north of house.

### **10.0 Additional Services**

Furthermore, Architrail are able to offer two extra services free of charge. The first will be a trail maintenance skills day offered to the client and property managers. Architrail have delivered a number of these in the past to help individuals identify early signs of trail degradation and how to mitigate problems. The second service Architrail can offer is a mountain biking training event, which would involve a day of riding and coaching with the trail designers. Architrail's elite level riders Duncan Ferris and Andrew Titley would lead a ride around the trail and demonstrate how riders can improve their skills on the trail. Teaching trail riding skills can improve enjoyment of the trail and decrease the need for maintenance due to good riding technique.





Phil Saxena, Architrail. Trail maintenance skills day, Blessingbourne, Northern Ireland.



Duncan Ferris, Architrail. Leigh Woods, Bristol.

## 11.0 Costs

The table below provides the costs for each of the trails to be constructed. **The costs are exclusive of VAT.**

		Rate	Quantity	Cost
<b>Labour</b>	2 x Trail Designers/Trail Finishers	£200/day	40	£8,000
	2 x CPCS Operators	£200/day	50	£10,000
<b>Plant</b>	2 x 3t 360 ZS Excavator	£700/week	5	£3,500
	2 x 2.5t tracked dumper	£600/week	3	£1,800
	Fuel Cell (1000l)	£50/week	5	£250
	Mobilisation/Transport of all Plant	£300/trip	2	£600
	Whacker Plate	£25/week	4	£100
<b>Materials</b>	Scalpings 80mm (Doveholes Quarry) Ceemex	£9.15/t	500	£4,575
	MOT Type 1 (Doveholes Quarry)	£10.45	200	£2,090
	Dolomite Stone Dust (Long Cliff Matlock) 0-4mm	£12.38/t	80	£990
	Large Boulders (500mm x 500mm x 1000mm)	£20.10/t	20	£402
	Topsoil	£30.50	30	£915
	160mm Perforated Pipe x 50m	£148.50	2	£297
	Grass Seed	£40/bag	1	£40
<b>Preliminaries and misc.</b>	Site Compound	£250/week	5	£1,250
	Sustenance	£53/pppd	90	£4,770
	Travel	£65/week	5	£325
	Marking Materials	£5/item	8	£40
<b>TOTAL</b>				<b>£39,944</b>

I trust this is of interest and look forward to hearing from you. If there is anything you wish to discuss regarding the proposal then please do get in contact.

Yours Faithfully,

A handwritten signature in blue ink, reading "P.A. Saxena". The signature is fluid and cursive, with a long, sweeping underline.

Phil Saxena  
Architrail Ltd.  
Tel: 07811449935  
Email: [info@architrail.co.uk](mailto:info@architrail.co.uk)



# Mountain Bike Trail Design Sheet 005 // TT: Cross Country Trails



## Description

Cross country (also known as XC, singletrack or trail riding) is the traditional form of mountain biking where riders ride up, down and along, typically on singletrack trails (wide enough for a single rider), often tackling technical features (TTFs) in their path. Whilst XC is the most traditional form of mountain biking, the discipline is still evolving, driven by advances in bikes' technology alongside creative trail building.

## Design Comments

Trail must always be moving, with consistent interest and constant TTFs. There must be;

- A suitable mix of corners, jumps and rough technical sections
- Variable speeds
- If a mix of ability levels are sharing trail ensure black and red riders are catered for with braided options
- A mixture of short/medium/long flow

## TTFs

- Mimicking those found naturally
- To test riders gradually, before leading them in to more technical sections

## Safety and Sustainability

- Corner tightening (e.g. chicanes) before crossings
- Stone armoring
- Boulder pinch points
- Gated pinch points
- Option qualifiers to get onto a more severe braided trail
- Demarcation important for sustainability

## Trail Tread

- Constant camber or water shedding tread/features
- Install culverts where necessary
- Install necessary open ditches



## Construction Methodology

Strip and fill construction on slopes less than 7% gradient  
Bench cut when cross slope is greater than 7%

## Construction Materials

- Base/sub-base options (see Trail Design Sheet 01A – Surfacing)
- Wearing course options
- Bedrock available
- Causeway
- Stone pitching

## Maintenance

- Close trail for a bedding in period
- Know and work to the specified defect period
- Look at possibility of instructing a trail workshop to landowners/users
- Naturalisation and stabilisation period

## Construction Machinery

- 360° excavator
- Dumper
- Whackerplate
- Hand tools

## Health and Safety and Construction Design Management

The main health and safety issues to be addressed with relation to the construction activity will be: The presence of large machinery, manually moving heavy weights, communication when working in remote locations and protection of public and unofficial persons as well as staff on site. CDM regulations apply to any trail build project. If more than 500 person days or 30 working days on site are due to be completed the project will be notifiable to the Health and Safety Executive and a CDM coordinator will need to be appointed—Tel: HSE 0845 345 005



# Mountain Bike Trail Design Sheet 008 // TT: Pump Tracks



## Description

This type of trail is a relatively new phenomenon, consisting of a loop of berms, rollers and other trail features that are used to generate speed without pedaling (by a technique known as pumping). This type of track is not only fun to ride, but can also teach riders skills that can be applied to all mountain bike disciplines. Pump tracks are extremely versatile and can be tailored to your requirements, be it to compliment other trails, or to fit in small urban spaces.

## Technical Trail Features (TTFs)

Berms, rollers, roller doubles, triples, step ups, step downs

## Design Comments

Pump/rolling features only  
Gradient should be avoided

## Safety and Sustainability

- Minimum 45° batter on the back and sides of features in order to minimise erosion and injury
- Minimum 3m distance from fixed structures to correspond with ROSPA guidelines
- Demarcation may be required on corners <135°

## Trail Tread

- Constant camber or water shedding tread/features
- Install necessary culverts
- Install necessary open ditches

## Construction Methodology

Pump tracks work best when built on sites with very little gradient, preferably flat. If no leveling is needed then any organic material should be stripped beforehand. After leveling has been carried out, material should be placed in the line of trail. This is then shaped by machine/hand and compacted. The surface is then laid on top of this and compacted.

## Construction Materials

- Base/sub-base options (see Trail Design Sheet 01A – Surfacing)
- Wearing course options

## Maintenance

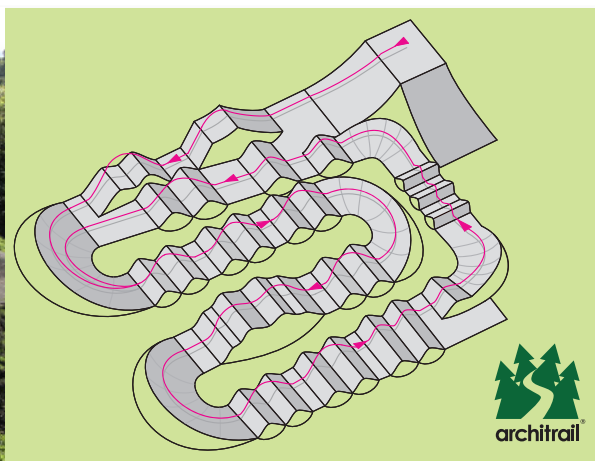
- Close trail for a bedding in period
- Know and work to the specified defect period
- Look at possibility of instructing a trail workshop to landowners/users
- Naturalisation and stabilisation period

## Construction Machinery

- 360° excavator
- Dumper
- Whackerplate
- Hand tools

## Health and Safety and Construction Design Management

The main health and safety issues to be addressed with relation to the construction activity will be: The presence of large machinery, manually moving heavy weights, communication when working in remote locations and protection of public and unofficial persons as well as staff on site. CDM regulations apply to any trail build project. If more than 500 person days or 30 working days on site are due to be completed the project will be notifiable to the Health and Safety Executive and a CDM coordinator will need to be appointed—Tel: HSE 0845 345 005



# Mountain Bike Trail Design Sheet 010 // TTF: Berm



## Description

A berm is a banked and curved cornering feature on a trail that provides support for the rider when turning a corner allowing them to turn in a smooth manner. A berm allows the user to maintain speed while cornering. The features are usually used on flat or downhill sections of trail. A blue graded berm will be generally open and shallow with more difficult berms encompassing tighter angles, steeper surfaces and higher entrance speeds. The speed at which a berm is ridden increases with rider skill and experience. Berms may also be used as trail feature in themselves, with a series of berms on a descent being a typical feature of modern bike trails.

## Design Comments

It is important to ensure that a berm is continued around a bend to a point where the rider is able to exit safely on the line of the trail. Riding the feature during construction will indicate the correct exit point much better than design sketches.

## Construction Methodology

Berms are created by either constructing a bank from earth or stone or identifying an existing bank/gradient that has suitable properties for the trail. A basic 20-45° bank should be formed in a rough semi-circle with an inverted dished face and a suitable turning angle for the grade of trail. An excavator should sit on top of the bank and distribute local stone into the face of the feature. A whacker plate may be used to compact the stone into the face of the berm, which should appear sealed when finished with no loose stone. An appropriate drainage area on the inside of the berm should be excavated to ensure water is shed successfully off the surface.

## Construction Materials

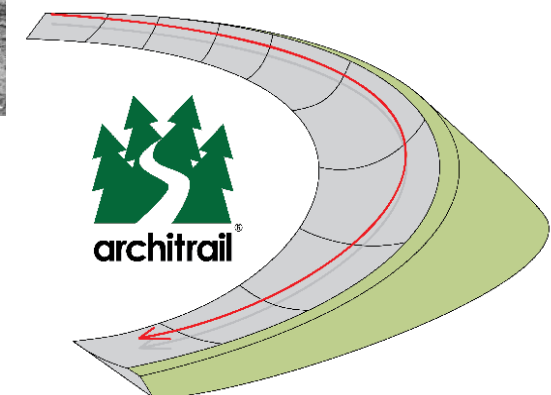
Locally won stone  
Local earth/soil

## Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whackerplate

## Health and Safety and Construction Design Management

The main health and safety issues to be addressed with relation to the construction activity will be: The presence of large machinery, manually moving heavy weights, communication when working in remote locations and protection of public and unofficial persons as well as staff on site. CDM regulations apply to any trail build project. If more than 500 person days or 30 working days on site are due to be completed the project will be notifiable to the Health and Safety Executive and a CDM coordinator will need to be appointed — Tel: HSE 0845 345 005





# Mountain Bike Trail Design Sheet 100 // TTF: Rollers



## Description

A roller is a trail feature where the trail surface rises then falls smoothly, which should be rideable without pedalling. As the name suggests, rollers are designed to be rolled over. Skillful riders can use rollers to gain speed and control by 'pumping' them. Rollers can occur on the trail singularly, or in series, depending on the grade of trail. On blue grade trails, rollers should generally be singular, although multiple rollers could be used if there is a minimum of a bike length (~1.5m) gap between them. Red grade rollers can occur in succession and are steeper, taller and spaced closer than blue grade. Black grade rollers should be technically challenging to ride, due to their steepness and height. In some cases on black trails, riders can jump from one roller to another.

## Construction Methodology

Rollers can be constructed from material on site or from imported material from local sources. Rollers can be built up on flat terrain, or use naturally occurring features. If built on flat terrain, a roller can be expected to use typically 0.5t of sub base. Machinery should be used to import and manipulate material into the appropriate spacing and heights. The shape of the rollers should then be refined using hand tools. The trail surface should be built according to specifications.

### Construction Materials

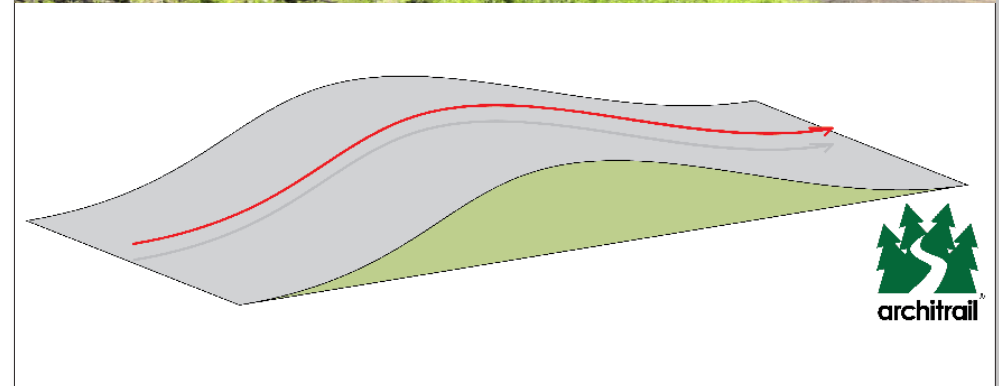
Locally won stone  
Local earth/soil

### Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whacker Plate

## Health and Safety and Construction Design Management

The main health and safety issues to be addressed with relation to the construction activity will be: The presence of large machinery, manually moving heavy weights, communication when working in remote locations and protection of public and unofficial persons as well as staff on site. CDM regulations apply to any trail build project. If more than 500 person days or 30 working days on site are due to be completed the project will be notifiable to the Health and Safety Executive and a CDM coordinator will need to be appointed—Tel: HSE 0845 345 005



# Mountain Bike Trail Design Sheet 101 // TTF: Jump



## Description

A jump is an exciting trail feature allowing riders to take off from the ground and land safely using their momentum. The larger the feature, the more severe the grade of jump. The entrance to and exit from a ramp is usually long which provides a safe environment within which to gain momentum, undertake the feature and land safely. Jumps may be constructed on all gradients, making them ideal trail features.

## Design Comments

Poorly constructed jumps are dangerous. Focus should be on creating the correct entrance and exit to the feature which will enable users to take the jump at different speeds requiring different skill levels.

## Construction Methodology

An excavator should construct a solid ramp out of local or imported earth or stone. Dumpers may import material and ramps may be shaped roughly by an excavator, before being finished by hand and compacted using whacker plates. Rocks and boulders may be installed on the lip of the ramp to allow users to drop off or roll out of the jump if the feature is not to be 'jumped'. Slabs or extra stone may be laid on the feature landing to reduce erosion caused by landing bikes. The route corridor at the entrance and exit to the jump should have a good line of sight.

## Construction Materials

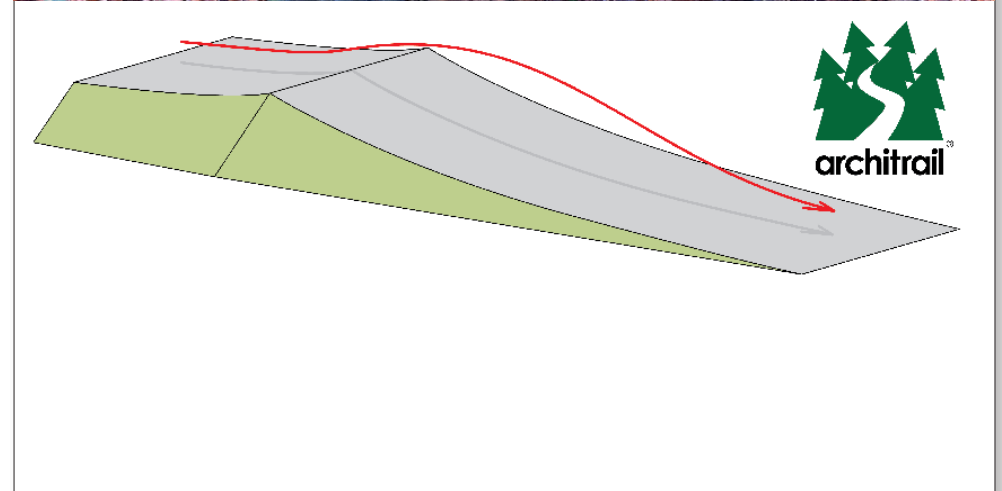
Locally won stone  
Local earth/soil

## Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whacker Plate

## Health and Safety and Construction Design Management

The main health and safety issues to be addressed with relation to the construction activity will be: The presence of large machinery, manually moving heavy weights, communication when working in remote locations and protection of public and unofficial persons as well as staff on site. CDM regulations apply to any trail build project. If more than 500 person days or 30 working days on site are due to be completed the project will be notifiable to the Health and Safety Executive and a CDM coordinator will need to be appointed—Tel: HSE 0845 345 005





# Mountain Bike Trail Design Sheet 102 // TTF: Tabletop



## Description

A tabletop is a jump feature that allows riders to experience jumps with a gap between the take off and landing in a safe and controlled manner. The feature is fundamentally a take off ramp with a flat top and a downslope. The advantage of using this type of jump is that the gap is not mandatory, allowing a rider to jump onto the flat top of the jump, working their way up to jumping to the downslope of the landing. The difference in tabletop design between the moderate (blue) and severe (black) grades of trail is focused on the gradient encountered on the up and down slopes, the height of ramp to be navigated and the overall length. Tabletops can be constructed out of earth or stone material. It should be noted that whilst tabletops allow riders of all abilities to attempt the jump, the lip of the take off is therefore more susceptible to erosion than jumps with mandatory gaps.

## Design Comments

Dividing the entry route into two will provide opportunity to offer users different approach options to the same feature (e.g. steeper and cambered options for more difficult grades).

## Construction Methodology

A tabletop feature is usually constructed from stone or earth that has been imported from appropriate local sources. An excavator should be used to form material into a flat topped mound of 2m-15m long which has a side batter of no more than 45°. A dumper may be used to bring material onto the site if appropriate. The excavator should be used to compact the material at regular intervals until a tabletop is achieved. A final stone surface should be installed within a tray on top of the feature and compacted with a whacker plate so that the surface appears sealed to the naked eye. Grass seeding may be required for landscaping purposes.

## Construction Materials

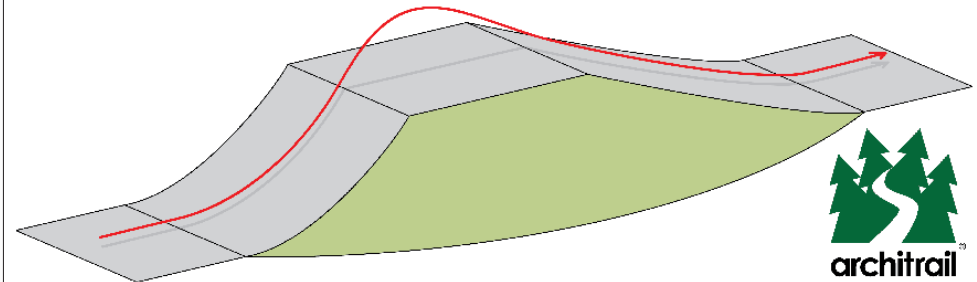
Locally won stone  
Local earth/soil

## Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whacker Plate

## Health and Safety and Construction Design Management

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# Mountain Bike Trail Design Sheet 104 // TTF: Roller Double



## Description

A roller double is a manmade jump feature with a smooth, shallow bowl between the take off and landing slopes. This allows the feature to be rolled over providing an inclusive feature with no opt out route necessary. The difference between a moderate (blue) roller double jump and more severe grades (red/black) is the length, height and angle of transition.

## Design Comments

Roller double jumps are good for trails requiring features to be included for a variety of skilled users. Less able users will be able to simply roll over the feature where as better riders can perform a large jump.

## Construction Methodology

A roller double jump may be constructed from stone or earth found on site or which has been imported from appropriate local sources. An excavator should be used to form local material into two ramps with a rollable center and side batter of no more than 45°. A wacker plate should be used to compact the material at regular intervals to a required height. A final stone surface should be installed in a tray on the top of the ramps and compacted with a whacker plate so that the surface appears sealed. The entry on the first ramp may be split into 2 to provide different angles of approach. The landing points on the downhill of the second ramp can be fortified with extra stone and should be elongated to provide a safe landing strip.

## Construction Materials

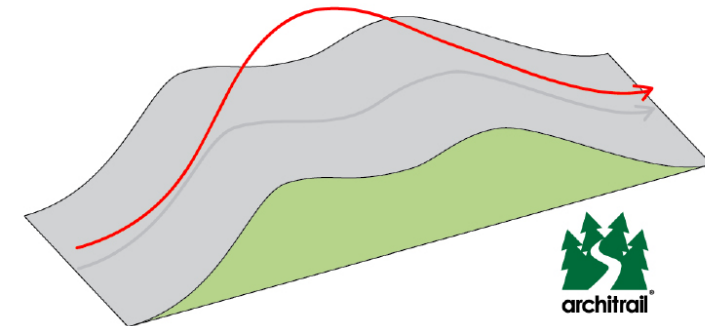
Locally won stone  
Local earth/soil

## Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whackerplate

## Health and Safety and Construction Design Management

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## Description

A drop off is a feature on the trail where the rider will undertake a step down from a high level to a lower level, defined by instantly losing vertical height over a trail edge. Commonly stone is used in drop offs features as it is not subject to rot or erosion and can take continual braking and impacts. At the moderate (blue) end of the scale, a drop off may be no more than a 10cm step down which will cause the rider a minor disturbance in the ride. At the severe (black) end of the scale the drop off may be several metres, which will require significant commitment to the feature and high levels of skill. It should be noted that a landing slope might be required for larger drop offs.

## Design Comments

Drop offs need to have a suitable landing area installed as part of the feature. This is dependent on the exit speed and next trail feature. This will prevent erosion of the trail surface immediately following the feature, which increases durability.

## Construction Methodology

A drop off may be constructed from boulders and large rocks /slabs found on site or have been imported from appropriate local sources. Natural rock features may also be adapted to create the features . Appropriate machinery should be used to move earth/stone to create desired levels for height differences and excavate a bed into the existing route surface into which boulders may be set. A dumper may be used to bring boulders on to the site and tip them in rough positions. Hand tools may be used by multiple labourers to align the boulders into final position. Boulders should be set with at least 30% of their mass within the ground to avoid movement.

## Construction Materials

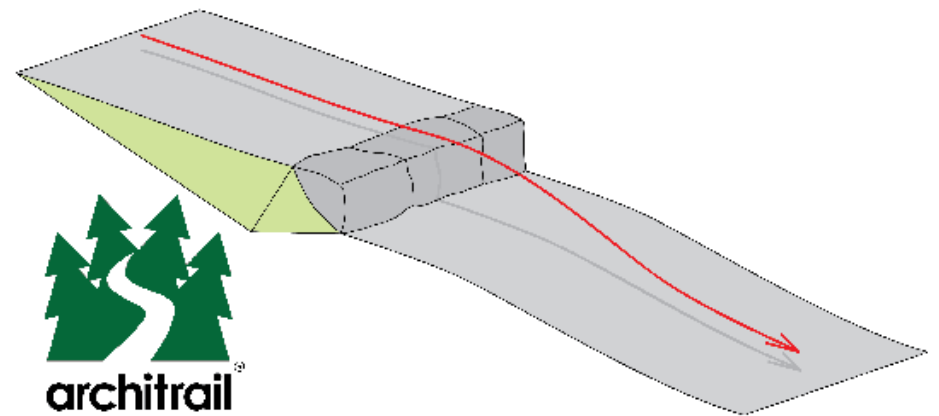
Locally won stone  
Local earth/soil

## Construction Machinery

Hand Tools  
Dumper  
360 Excavator

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## Description

A rock garden is a technical feature where rocks and small boulders are installed into the trail surface in close proximity to each other providing unavoidable small obstacles. This roughened surface is fun to ride as it tests bike handling skills as well as slowing riders down over the section of trail. The difference between moderate (blue) and severe (black) rock gardens may be down to gradient on which the rocks are set, the size of the rocks (height above ground) or the distance between the individual rocks, which limits navigable options.

## Design Comments

Some users may try and avoid the rock garden sections due to the uncomfortable nature of the ride. The use of larger boulders or timber at the edge of the trail will prevent users from diverting off the line of the trail.

## Construction Methodology

A rock garden should be constructed using locally won or imported rocks which are no bigger than 500 x 500mm. Rocks may be imported using a dumper or tracked wheelbarrow. The rocks should be installed to a shallow depth by hand in the existing trail surface. Rocks should be positioned in appropriate positions relating to the grade of trail. A surface/wearing course should then be installed over the rocks, which should be compacted down with hand tampers. The finished trail should be finished with at least 40% of the rock mass within the ground. This will prevent movement as bikes run over the rock sections.

## Construction Materials

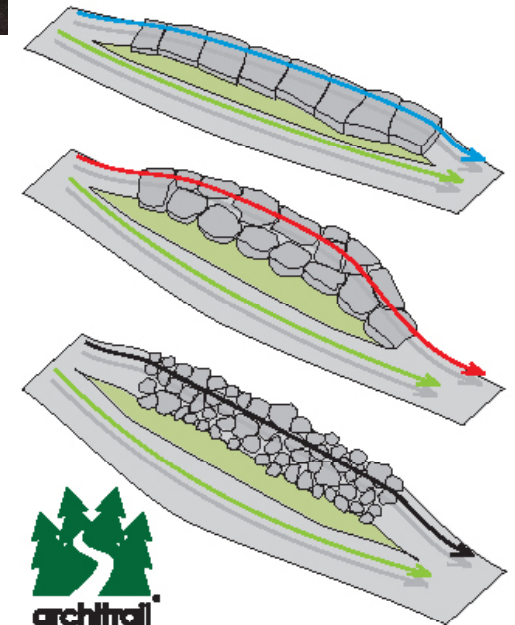
Locally won stone  
Local earth/soil

## Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whacker Plate

## Health and Safety and Construction Design Management

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## Description

Rock Causeway is simply a section of trail constructed from rock boulders rather than crushed stone. At the moderate (Blue) end of the scale, a causeway may be no more than flagstones, or large flat boulders and provide a change in surface. At the severe (Red and Black) end of the scale boulders will provide a more challenging technical feature for riders to overcome with greater momentum required to navigate the feature. This may feature small steps where a rear wheel lift is required or might include small drop-offs. Rock Causeways can be used in trail of any gradient and also in order to provide a shorter, more technical route as an overtaking braided feature. Causeways may also be used as a practical trail tool to overcome wet areas where standard trail section may not be sustainable. Causeways may also be used in areas of high usage where stone trail will become eroded quickly.

## Design Comments

Changes to the gaps and heights between the boulders can change the nature of the feature to a large extent. Minor changes can be used to challenge or encourage the user.

## Construction Methodology

A causeway may be constructed from boulders found on site or imported from appropriate local sources. An excavator should be used to clear a route corridor (if not already done) and excavate a bed into the surface which boulders may be set. A dumper may be used to bring boulders on to the site and tip them in rough positions. Hand tools may be used by multiple labourers to align the boulders into final position. Boulders should be set with at least 30% of their mass within the ground to avoid movement once in place. If being set into boggy ground allowance should be made for some downward movement within the first few weeks.

### Construction Materials

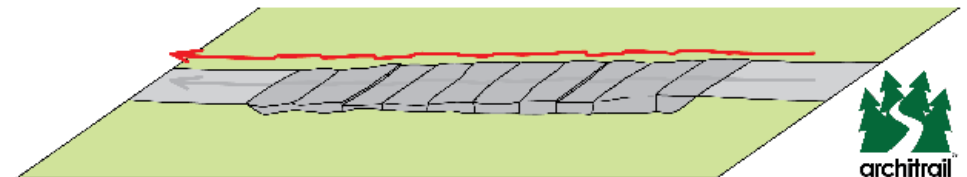
Locally won stone  
Local earth/soil

### Construction Machinery

Hand Tools  
Dumper  
360 Excavator

## Health and Safety and Construction Design Management

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## Description

These features are designed to create multiple line options where technical trail features are in parallel pairs to allow easier overtaking. Riders with more technical ability will be awarded with the chance to overtake slower riders on these features. Unless there is a suitable width or a different line available, then on most sections of trail it can be very difficult for a more skilled rider to gain enough of an advantage over one feature. These sections allow a small increase in technical skill, over a small distance, to be rewarded. The features can be any type of rock based TTF though a highly technical rock garden or causeway will have best results. See individual rock section or rock causeway TTF sheet for difficulty of each grade. A slow speed feature will show larger differentiation between more and less skilled riders. The key is to build them in an equal and parallel manner with care taken to make sure neither side has an advantage of line choice. This also means that the run in should be straight so as not to favor those coming around the inside of a corner. This allows a rider to use purely their technical skill to overtake.

## Design Comments

It is important to ensure that a dual TTF section is equal in technicality and sufficient testing during construction will be needed.

## Construction Methodology

Follow construction methodology for each individual TTF found within the section and repeat in parallel

### Construction Materials

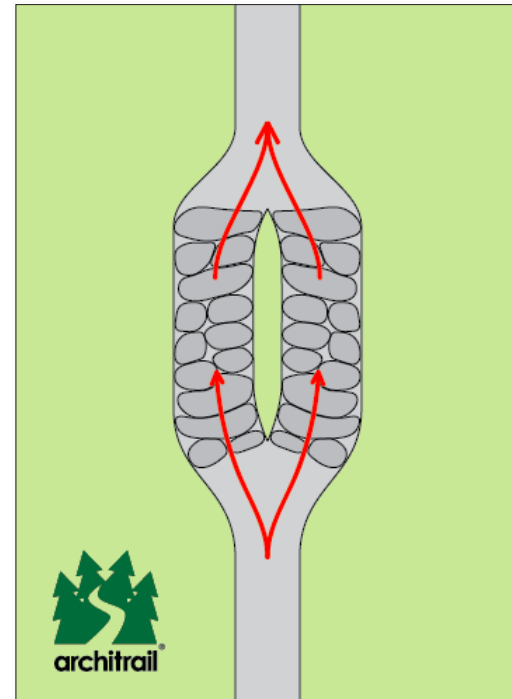
Locally won stone  
Local earth/soil

### Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whacker Plate

## Health and Safety and Construction Design Management

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## Mountain Bike Trail Design Sheet 207 // TTF: Rocky Inside Line



### Description

A rocky inside line is one that is designed to reward those with better corner and handling skills. It is a difficult skill to be able to turn on technical and challenging surface and terrain whilst keeping forward momentum and pedaling. This feature allows a user to pick an inside line which is shorter but more technical, allowing their handling skills to let them overtake, as long as they can ride it in a controlled but fast manner. The inside line is usually a difficulty grade above the trail which it cuts the corner of. See individual rock garden or rock causeway TTF sheet for grading.

### Design Comments

Riding the feature during construction will indicate the correct technicality of both corners.

### Construction Methodology

Construct a rock causeway from locally won stone or large flat boulders that have suitable properties for the desired inside line. Stone pitching may also be used. This is in addition to the corner, which it is inside of. Most shaping should be carried out by a 360 Excavator with multiple laborers finishing with hand tools. A whacker plate may be used to compact the stone, which should appear sealed when finished with no loose stone. An appropriate drainage plan to allow water to exit either side of the feature should be created to ensure water is shed successfully off the surface.

### Construction Materials

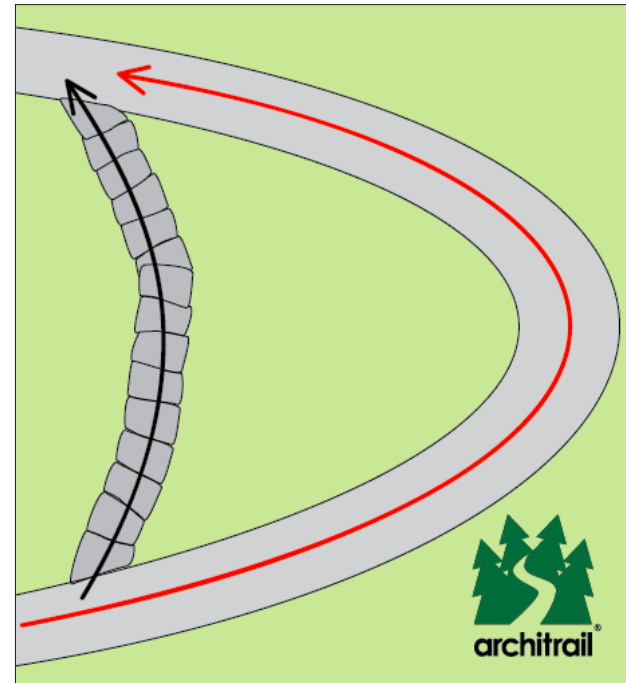
Locally won stone  
Local earth/soil

### Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whacker Plate

### Health and Safety and Construction Design Management

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## Description

Grade reversals are a feature that can be used when traversing a side slope where a full bench cut is needed. The feature helps to maintain trail flow, add interest, control speed and shed water at strategic points on a traverse, by reversing the trail gradient a number of times over a distance. The line of the trail can be descending, slightly ascending or flat. The gradient of grade reversals can vary hugely in length, height, gradient and frequency. Riders can gain speed by pumping the down sides of the reversals and carry momentum up the next incline before repeating. Grade reversals are also very useful for managing runoff on the trail surface, as water can be shed quickly from the troughs of the grade reversals. This avoids high volumes of water flowing on the trail surface and therefore reduces erosion. Grade reversals on a blue trail would typically have a wavelength of 15m-25m, red 10m-15m and black 5m-10m. Grade reversals on a blue trail are generally smooth and low, with more technical grade reversals encompassing shorter wavelengths, higher amplitudes and faster entrance speeds. The speed at which grade reversals are ridden, increases with rider skill and experience. For best practice, the trail gradient should always be less than half that of the side slope.

## Design Comments

The turning pad should be no less than 3m diameter in order to give the rider enough space to turn.

## Construction Methodology

Construction starts at the end of a bench cut trail where the direction needs to be reversed. The lower leg should come up to the pad in the form of an out-sloped ramp to shed water. Then the pad itself should be slightly domed in shape in order to shed water. Revetment can be used to secure the turning pad on the lower side. The upper leg of the trail coming out of the turn will be gently in-sloped for 10m-15m above the turning pad so that water will drain off the backside of the turn. Building all components of the feature together ensures that the lower half will be firmly tied into the upper half.

## Construction Materials

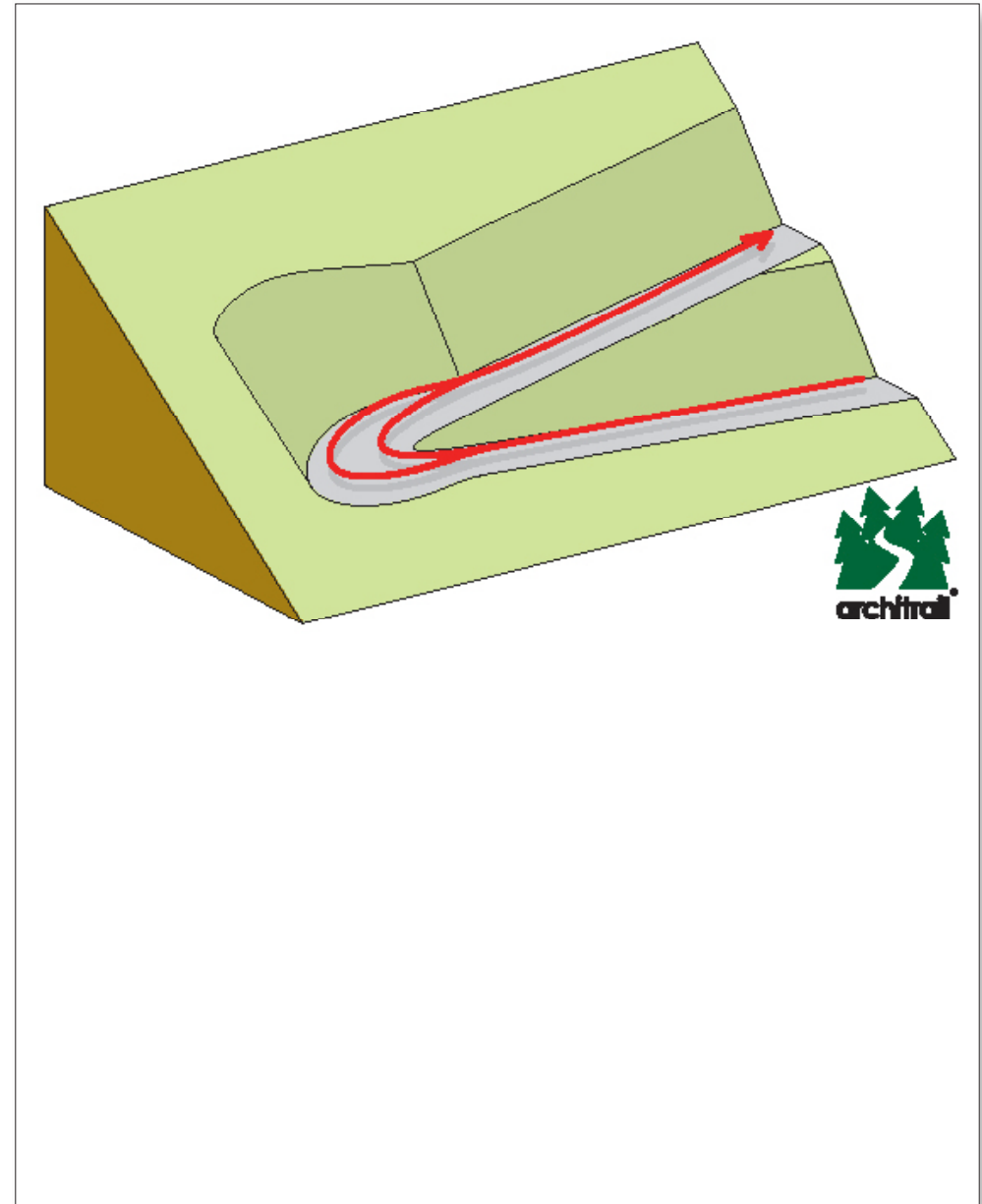
Locally won stone  
Local earth/soil

## Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whackerplate

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# Mountain Bike Trail Design Sheet 602 // TTF: Chicane



## Description

A chicane is used to force riders to slow down in a controlled manner by using two two tight corners. The chicane consists of a minimum of two boulders placed on the inside of two opposite tight corners.

## Design Comments

The trail should have a capacity more than 6m of straight trail before reaching the chicane, in order to avoid heavy braking and therefore erosion before the chicane. A small drop off may also be installed to further control speed, and can also dissuade users from entering the trail in the wrong direction. Location, entry speed and gradient will determine whether a pinch point is also required. In some cases it may be necessary to use additional boulders to block any potential desire lines avoiding the chicane that could occur.

## Construction Methodology

Large boulders (>200kg) set into the ground to a minimum depth of 400mm with a corner radius <4m. Boulders should be orientated so that they cannot be ridden over or used as a jump. Boulders should be secured in the ground and should not move.

## Construction Materials

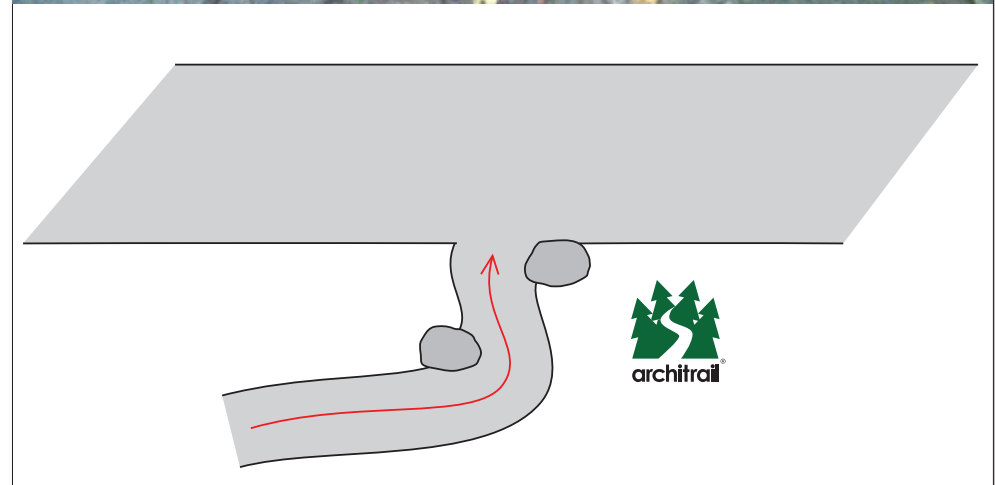
Locally won stone  
Local earth/soil  
Boulders

## Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whacker Plate

## Health and Safety and Construction Design Management

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## Architrail TTF List

010\_Berm  
011\_Jerm  
012\_Pendulum\_Turn  
013\_Flat\_Turn  
014\_Insloped\_Descending\_Corner  
015\_Rainbow\_Berm  
100\_Rollers  
101\_Jump  
102\_Tabletop  
103\_Benedek\_Kicker  
104\_Roller\_Double  
105\_Double  
106\_Triple  
107\_Step\_Down  
108\_Step\_Up  
109\_Hip\_Jump  
110\_Grade\_Reversals  
111\_VCA  
112\_Whoops  
201\_Drop\_Off  
202\_Rock\_Garden  
203\_Rock\_Causeway  
204\_Natural\_Rock\_Roll  
205\_Wallride  
206\_Dual\_Rock\_Garden  
207\_Rocky\_Inside\_Line  
208\_Artificial\_Rock\_Roll  
209\_Exposed\_Bedrock  
301\_Bus\_Stop  
302\_Mogul\_Field  
303\_Off\_Camber\_High\_Line  
304\_Dual\_Slalom  
401\_Off\_Camber\_Climbing\_Turn  
402\_Terraced\_Inside\_Climb  
403\_Climbing\_Switchback  
404\_Insloped\_Climbing\_Turn  
405\_Terraced\_Climb  
501\_Root\_Section  
502\_Water\_Splash  
503\_Bridge\_Crossing  
504\_Boardwalk  
505\_Log\_Ride  
506\_Off\_Camber\_Inside\_Corners





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Fiona Thomson  
White Hall Outdoor Education Centre  
Manchester Rd  
Buxton  
Derbyshire  
SK17 6SX

11<sup>th</sup> July 2012

Dear Sir/Madam,

Please find enclosed our tender for works to construct a Mountain Bike Trail at White Hall Outdoor Education Centre as detailed in documents provided. We have enclosed examples of previous projects along with our quote value to show our level of expertise in this area of works.

If you require any further information please don't hesitate to contact us.

We hope we have met your requirements and look forward to hearing from you in the near future.

Yours faithfully

A handwritten signature in black ink, appearing to read "S. J. Taylor", with a long horizontal flourish extending to the right.

S, J, Taylor



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### **Quote details**

Our quotation is to create 2 no. Blue Grade Mountain Bike Trail loops including Technical Trail Features with opt in Red Grade Technical Trial Features alongside. Each loop with be approximately 500m in length.

Temporary fencing is to be installed and maintained where required during works.

We may require an area to use as a material transfer zone during the works. We have indicated a possible location for this area on the site plan attached.

We would require constant vehicle access for up to 8 wheel lorries (20 ton) during the works. We have shown the area required for vehicle access during the works on the site plan attached.

If possible we would require a constant water supply on site. We would be happy to pipe this from nearby if required.

All our onsite workers will be sufficiently qualified in the use of the plant machinery required for the track build. We currently have sufficient time in our work schedule to complete the works as well as the resources to do so.

During the construction process our onsite workers will be testing each element of the track as it is completed. We have many years riding experience throughout our work force and always test ride our tracks before completion.

Our quote value will be fixed for a period of 6 months, although the best will be done to keep any extra cost down following this period we may have to check for any increases imposed on us via our suppliers.





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### **Design Details**

Following our site visit and discussions with Fiona Thompson regarding the requirements and intended usage of the Trail on Thursday the 2<sup>nd</sup> of August we have created a Site Plan showing the Trail Line and Technical Trail Features to be included.

The Trail designed will be constructed to IMBA Standards for Blue Grade MTB Trails with the Opt in sections to Red Grade Standards.

We would be happy to set out the detailed trail onsite and run through each element with the centers instructors and make any alterations required following discussions prior to construction.

All Technical Trail Features Shown on the Site Plan will be detailed by our vastly experienced onsite employees during the build (details of employees attached). Additional features will be included wherever possible to increase flow, difficulty and interest in the Trail. These will again be detailed by our vastly experienced onsite employees and discussed with coaches/employee's of the centre before installation.

Best possible use will be made of existing land forms and features on site. All aspects of the trail will be integrated into the exiting land forms as much as possible.

We have included examples of Technical Trail Features in our proposal which will form part of the Blue and Red Trail sections. Additional features to these will be included wherever best suited.

### **Trail Description.**

This section of our proposal runs through the trail from a rider's point of view explaining each Technical Trail Feature as the Trail progresses.

Although both loops will be Blue Grade we feel the South Loop will be more difficult than the North Loop This is because of the natural of the slopes required to be negotiated as the South Loop will be a climb and descent with the climb being a lot longer length than any on the North Loop side.



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#### North Loop (around the main lawn area)

Access to the Start Area is off the Main Access road to the centre and directly onto a hard standing Start/Finish Area for the Trail.

The fence to the pond area has been taken back to allow extra room for the riders around the activity area close by.

The Trail starts off on the flat and takes the riders to the left of the activity area near the start/finish area.

After negotiating the first right turn there is a opt in Red section to the right which climbs up a rock armored section onto the lawn level area. The main trail continues along the wall side while the Red opt in winds its way round before rising up over the old wall and rejoining the main Blue trail as it turns right into the woodland.

This section begins to steepen as it climbs through the woodland until it meets the main path on the top of the climb.

The first descent heads down towards the climbing nets. There are a few roots and a rock drop to negotiate at the top of the descent before dropping down and into an open right hand berm which allows riders the carry speed towards the next section.

Riders then have the option to continue on the main trail by the side of the wall or up the short steep climb to the skills area.

Following the skills area opt in the main trail begins to climb back towards the top of the area be snaking up the slope to be able to gain the height whilst staying in the Blue Grade parameters.

This section has another Red opt in line consisting of more difficult climb which is rock armored up the steep slope.

At the top of the climb the riders are faced with an exciting drop down appearing out on the north side of the main building. There is another Red opt in on this section which make use of the banking to the right hand side of the drop as a berm then crosses the path straight into a right hand berm before rejoining. As these two lines cross there will be a rock armored section which will become a feature to both the Red opt in and main Blue line whilst still help to control the natural speed gain from the drop. On the exit of this drop will be a right hander into a table top jump for the riders that have been able to carry sufficient speed.



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The trail then make its way onto the corner of the main lawn before nipping through a small clump of trees before dropping down and making it way round the lawn/football area.

The trail makes its way round the law area with a number of berms and other jump/obstacles to keep interest for the riders.

The final right hand corner of the trail takes the riders back towards the start finish area just before a small rock armored area to force the rider to lose any final speed before finishing.

#### South Loop (in front of the parking area)

The South Loop starts directly across the access road from the north loop. It begins to the left hand side of the recently installed land drain with the finish descent on the right.

The Trial begins with and easy climb winding its way through the trees in front of the car park area.

As the Trial gets to the denser woodland it begins to snake more severely to gain the height at sufficient grade. This includes the hairpin corner and continues past the pond and up to the top of the area.

It maybe difficult to include a separate Red opt in on this climb as there is not much width but if we feel there is a good position to do so it will be included.

At the top of the climb there is a level plateau for rider groups to collect before the descent back to the Start/Finish area.

The descent begins with a simple roll off into a right hand berm. There is then a Red opt in to the left which heads more direct down the slope with a kicker/double over the main track line before linking back onto the main trail.

After the Opt in choice the main line continues with a rock drop before a rock armored section and into a left hand berm. The Red line then crosses over as the main trail continues to snake its way gradually down the slope.

In between each of the corners there are different Technical Trail Features all adding interest to the Trail.



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There will be one more Red opt in section before the final right hand berm which has been placed in the bottom corner of the site with a flat exit rock armored section designed to kill the riders final speed prior to reaching the finish area.

#### Skills Area (accessed midway through North Loop)

This area will be constructed to aid instructors in determining the skills of riders before continuing on the main loop. This would be used either prior or during the main Northern Loop.

As many Technical Trail Features will be included that form part of the main trail so riders understand the features that they will be asked to negotiate through out each loop.

We have designed it in such a way that it could also be used as an additional Red opt in section for the more confident riders when using the Northern loop. This could mean the whole skills area or just the top line using the link path then rejoining the main trail through the exit.

On entering the Skill Area up the steep climb there are 2 rollers to help the rider gain a small amount of speed to rise up on to the start area which is around 1m in height.

From the start area the rider go into a right hand berm before a roller then into a left hand berm, a simple rock drop then another left hand berm. The next straight consists of a rock armored area with a route round for less confident riders before an option of riding back onto the start area or riding the right hand berm. This berm take riders over a roller then table top with a more difficult rock skinny by the side before a rock drop which leads the riders back onto the main trail



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## **Specification**

The Trial line will be set out using a clinometer to determine the slope stays within the trail grades required.

Track line to finish 1m wide. This will reduce over time as vegetation grows in and the riding line is determined.

Technical Trail Features will be included throughout the trail wherever possible, including berms (banked corners). These will be constructed to maintain Trail flow and increase interest in the trail. Too many features make the trail difficult to ride, too few means the trail will become boring quickly. There will be no limited number of Technical Trail Features we will include as many as the Trail requires using our vast experience to do so.

Top 100mm of topsoil will be removed from the trail line.

Drainage will be included in the trail where required to disperse water away from the track line.

Locally sourced 20mm to dust limestone will then be laid to a compacted depth of 100mm. This product will be small enough for the trail to feel reasonable smooth but large enough for the trail no to feel rough and slow the riders flow.

4mm to dust maybe used on areas of large wear such as berms and landings to extended the longevity of the trail without sanitizing the whole trail line.

Top soil removed from track line will be disbursed across area adjacent.

## **Employee's Details**

Steve Taylor - Proposed Designer and Project Lead

Founder member of Bike Track.

Steve has been working on Trail building projects for well over 12 years. From building and maintaining the local trails to designing and managing construction of International Standard BMX Race Tracks.



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His expertise originate from racing a range of cycling disciplines up to international level from XC racing to world cup MTB 4x to downhill mountain biking. Steve brings all his expertise together to create individually designed and built trails to meet the local user group requirements weather it be a basic trail with minimal Technical Trail Features suitable for coaching or a Downhill Track suitable to hold national events Steve and the Team can meet the requirements needed.

Jordan Gould - Proposed Designer, Team Leader and Machine Operative.

Founder member of Bike Track.

As well as managing the majority Bike Track's onsite activities Jordan is heavily involved in the design procedure which is signed off by him before construction is begun. As well as being a skilled machine operative Jordan makes all decisions required for tweaking the trails during the build phase onsite. If he feels the flow of a trail could be better or TTF should be altered he has the experience and know how to make the right decision first time. He has been involved in trail builds for almost 15 years from local trails to national race tracks.

Jordan has been racing and riding bikes all his life. He begun racing BMX at 9 years old and never looked back. He continues to compete at MTB 4x in national and international events as well as selected Gravity Enduro's and BMX at a national level.

David Gregory - Machine Operative

David had been working with Bike Track for over 2 years. He has over 20 years experience creating shapes with all sizes of 360 machines and is a very experienced Mountain Biker. Prior to joining Bike Track David spent many years Building and Maintaining trails in Wharncliffe Woods on a volunteer basis. David is well known in the Sheffield biking scene for his Digger skills when it comes to adding new features to local tracks and trails.

Dave Taylor - Consultant Designer

Founder member of Bike Track.

Dave has been riding and racing bikes since the early 80s. Beginning with BMX racing which moved onto XC MTB then Downhill MTB. He has worked in the construction industry in Sheffield for almost 25 years and has been working on local Track and Trails for the majority of this time.



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He was instrumental in the creation of 'Wheelbase' in Sheffield, the only permanent indoor BMX Race Track facility in Europe of its time around 8 years ago. In recent years Dave continues visiting European and World BMX events to support his daughter, Abbie Taylor who is current World Junior Silver Medallist and competes full time on the British Cycling's Olympic programme as well as acting as a consultant for Bike Track.

### **Timescale**

We envisage proposed works to take 6 weeks in total to complete.

We intend on using 4 employee's onsite to complete the works. This maybe increased during key phases.

### **Guarantee**

We will guarantee our work form any construction defects for a period of 6 months but this does not account for any vandalism or adverse weather conditions that may damage the track surface.



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## **Mountain Bike Trail**

### **White Hall Outdoor Education Centre, Buxton.**

	<u>Total</u>
1km of Blue Grade MTB Trail including Technical Trail Features and Red Opt in Sections as detailed (approx length).	<u>£39,770</u>
<b>Total exc. vat</b>	£39,770.00
<b>vat @ 20%</b>	£7,954.00
<b>Total inc. vat</b>	£47,724.00
 <u>Breakdown of costs:</u>	
Preliminaries	£3,550
Labour	£19,220
Plant	£7,850
Materials	<u>£9,150</u>



# Design and Build of MTB Skills Loop

Prepared for Derbyshire County Council by



25<sup>th</sup> March 2012



***A submission by:***

Back on Track MTB Solutions Ltd

16 Poplar Court

Caerleon

Newport

NP18 3EB

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

t • 00447799417559

## **Quotation for Skills Loop**

Following recent discussions regarding the installation of a skills training mountain bike loop, we are delighted to provide our quotation for the design and construction of the mountain bike track.

Design and Construction of mountain bike skills loop 1km in length: **£40,000.00**

### **What is included in the price:**

- All trail design
- Any tree and ground clearance for trail corridor
- Moving material into position for the track layout and berms
- Crushed stone sub base
- Crushed stone dust wearing course / riding surface
- Compaction / shaping / testing
- Grading trackside batters / general landscaping of trail corridor
- Five no: Braided skill sections allowing for a more progressive trail design

### **What is not included in the price:**

- Trail signage or any perimeter fencing.

**Breakdown for Skills Loop:**

Item	Description	Total
<u>Labour</u>	Trail Design and Build Team	£13,100.00
-		
<u>Plant</u>	2.5 T excavator	£11,100.00
-	7.5 T Excavator	
-	Dumper	
-	Dumper	
-	Haulage	
-	Whacker Plate	
-	Diesel	
-		
<u>Materials</u>	Stone sub-base	£12,800.00
	Stone Tread	
	Timber for Features	
<u>Misc</u>	Preliminaries	£3,000.00
Total		<b>£40,000.00</b>

All prices quoted are excluding VAT. VAT to be added at current rate of 20%





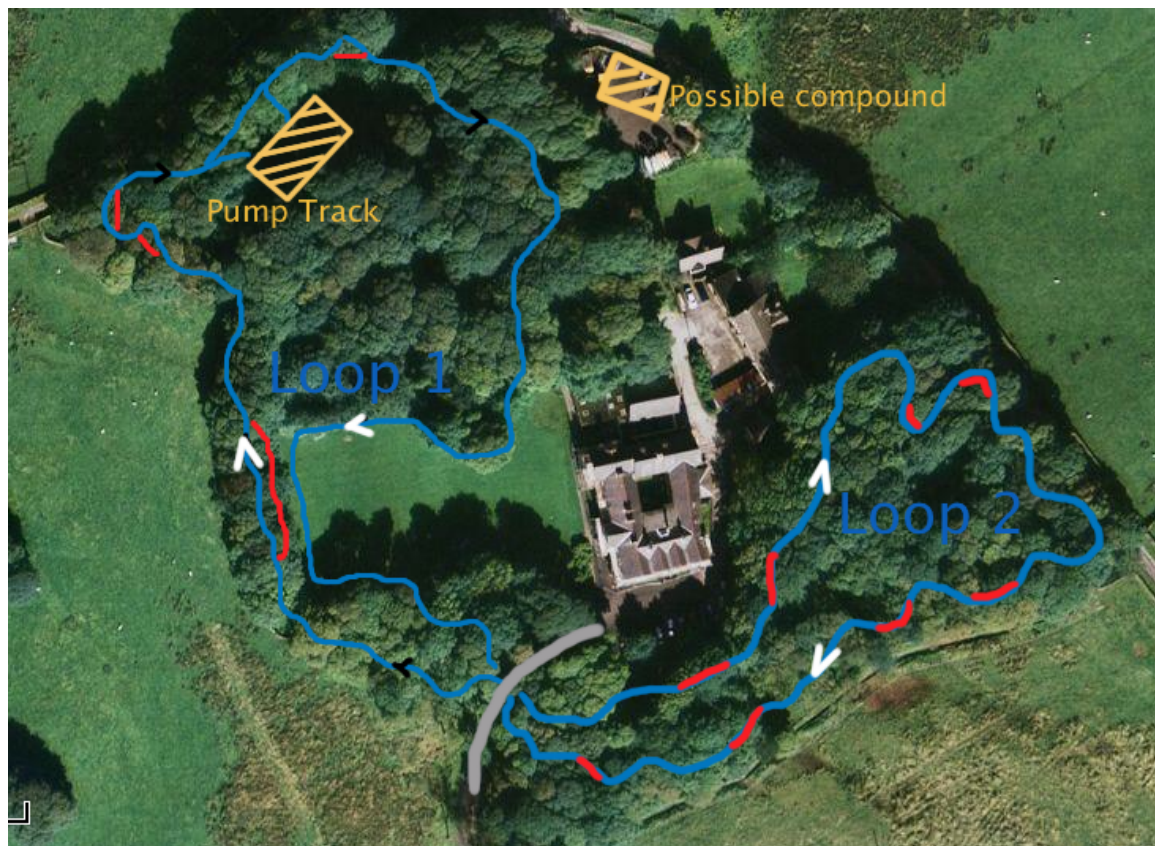
## 2.0 Description

Loop 1 - North of the estate entrance main road and will be approximately 454m in length. It will be of blue grade with technical features that riders will have to opt into. Half way round the trail passes an old tennis court, this area will be used for the pump track.

Loop 2 - South of the estate entrance main road and will be approximately 459m. It comprises of a small climb and small descent. This loop will be of blue grade with technical features that riders can opt out of riding with chicken lines. It will be more technical than loop 1 and contain more features.

Pump Track - Design of an oval, with a cross being situated on the inside, in order to create a number of variations when riding laps. This would mean that both circuits and figure eights would be possible.

Please see the proposed draft trail overview below;



## 3.0 Features:

Architrail aim to construct exciting trail, which is feature rich, these features are regarded to as 'Technical Trail Features' or TTFs.

With a background in World Cup 4X track design, Architrail have gained unparalleled experience in designing all forms of jumps, berms and other features and have an unmatched depth of knowledge of them. In recent years Architrail have taken this knowledge and applied it to construct TTFs on projects of various scales. Together, we uphold the ethos that a trail should always be doing something and TTFs are vital for maintaining this.

There are a number of technical features that Architrail have pioneered over the years, which we are proud to have constructed. Through the implementation of these in our UK trail centres we have earned ourselves a reputation as an innovative company. Please see the associated TTF design sheets of features listed below as a few examples of the TTFs that we aim to create at White Hall.

<b>Loop 1:</b>	<b>Loop 2:</b>	<b>Pump Track:</b>
Chicane x 1	Chicane x 1	Large 180 Berm x 2
Rock causeway x 1	Rock Gardens x 2	Rollers x 8
Rocky inside line x 2	Berms x 5	Roller Double x 4
Rollers x 5	Jump/Tabletops x 3	
Berms x 5	Root section x 2	
	Climb switchbacks x 3	
	Drop off x 3	

Please see the extensive list attached for alternative options; we propose a consultation exercise with yourselves and the outdoor instructors during the inception meeting. At these meetings we can discuss the exact requirements of the features and their locations. In addition we aim to be flexible during the construction period and react to feedback on completed work.

We take a creative approach to creating mountain bike trails and always aim to optimise a trail for its location ensuring that the trail flows in a fun and sustainable manner, whilst making sure that the trail stays within its grade boundary and adheres to its design. Flow is an essential part of any cycling trail and is the aspect most responsible for the enjoyment factor of any given trail. Without flow, a rider can easily be left unsatisfied, reducing the likelihood of repeat visits, which can be a fundamental shortcoming for any trail project. Flow is given to a trail by carefully balancing the line of the trail with the shape of the topography and the distribution of turns, climbs and descents along the trail corridor. This precise distribution on the ground is almost impossible to predict during the design phase, unless the design is deliberately lacking in features or turns. We would want the trail at Whitehall Outdoor Education Centre to be continually turning and packed full of features. The trail is relatively short so we would want to fill that short distance with a trail that is constantly “doing something”. We always try to avoid creating sections of straight trail, with the trail either rising, falling or turning. This method of filling all available length of trail with features has many benefits;

- The trail controls riders’ speed at all times. With a feature packed trail with few straight sections, it is difficult to go very fast unless you are a highly skilled rider. This reduces areas of heavy braking and therefore erosion, increasing the trail’s longevity.
- The increase in skill required to ride the trails faster limits users, which allows and encourages them to improve their technique with this type of trail. The trail is therefore very progressive, meaning one trail can be suitable, challenging and fun to ride for a much wider range of abilities than is traditionally expected. A beginner could enjoy the blue trails, whilst an expert would also be provided with excitement by navigating the trails at a faster pace. This makes the facility more inclusive, ensuring groups of mixed ability riders are able to ride together, but ride within their ability to get the most out of the trail.

- A trail full of features constantly engages riders in the trail, building anticipation for the next corner or feature. There are few sections where a rider can rest resulting in riders having a smoother transition of speed reducing braking or acceleration (and therefore erosion) hotspots. Reducing erosion results in less maintenance costs and avoids degradation of the trail as a whole.
- Lastly, a trail with a good flow and full of features is simply much more fun and exciting. We have shown our capability in this respect through the design of the Ashton Court and Leigh Woods trail projects. These have surpassed their brief by creating a fun trail for all levels of user on a predominantly blue graded trail and attracting unprecedented visitor figures.

The above points highlight that the exact line of the trail is therefore fundamental to many aspects of the trail making it essential to have the ability to discern the best line for the trail onsite during the build process. Our approach would ensure this by having our experienced trail designers monitor the construction process, who can make precise adjustments to the line and the shape of the trail to ensure good flow and the optimal product is achieved. Furthermore, having dedicated trail designers on site will allow built features to be assessed through client and contractor consultation before subsequent sections are started, ensuring the highest quality product. We take extreme pride in the quality of their work and will not settle for anything less than the most creative and most enjoyable trails possible. We take the view that the creation of off road cycling trails is an art form, with more in common with sculpture than with civil engineering.

#### **4.0 Braided Sections and Multi-line TTFs**

We have a great deal of experience of multi-line TTFs taken from World Cup 4X, downhill and cross-country tracks (as well as Olympic and Commonwealth Games tracks). A number of UK trail centre projects have also contained multi-line TTFs enabling expansion of the trail's user base, allowing groups of mixed ability to ride together and find features to challenge everyone. Multi-line TTFs can also aid riders to develop skills, which can be done in a repeatable and progressive environment. The advanced riders are stimulated by the challenge of the more advanced features, whereas riders of lower ability are able to ride around or attempt intermediate features. The race experience gained has influenced our work by creating features that give a time or distance advantage to those choosing the more technical line. The choice to opt-in from the main line to a more technical feature is rewarded by a shorter distance to travel or allowing the rider to take a favourable line into the proceeding section of trail. Multi-line TTFs can also be formed as trail braids of up to 30m in length where users are given the option to choose a section of more technical grade trail. This route may also contain a time advantage applying one of our latest techniques, which allows mixed ability riding groups to tackle the same TTF at varying speeds. This is carried out by braiding the trail (with a suitable qualifying feature) and pushing the higher grade user into a position which gives them greater line choice or a much higher entrance speed into a shared TTF. This TTF may be as simple as a jump or corner but it may have entirely different characteristics when ridden at speed. Another option is to provide a split (or a number of splits) in the trail which features identical feature and section length, this allows riders to overtake using their own power alone instead of both riders wanting to take the same 'inside' line and remaining in the same position.





Trail braid with qualifier

In locations identified as being suitable for braided sections and technical trail features, Architrail must determine where the most suitable position is for each braid. Along each braid they must then position each TTF carefully to maximise safety and to maximise the learning aspect of braided TTF sections and progressive difficulty.

At all times in Loop 1, the main trail itself should flow into the easiest of the braided section options. This ensures that riders are not forced into riding technical features beyond their ability and maintains the safe riding environment provided by the trail. All braids of *increased* technical nature are “opt in”.

The Loop 2 would include many of the harder features of Loop 1, but would incorporate more technical features. However, as specified, ‘chicken lines’ would also be included for the more technical features. The berms would be larger and steeper and spaced closer together. The Loop 2 would include features that occur in close succession with each other and with corners, which would be more technical than those found on Loop 1. The returning trail on Loop 2 would include technical rock causeway climbs to learn the skills required for climbing and riding over rocks at low speed.

The Pump Track is proposed to create a destination and practice facility. Pump Tracks provide a training facility to be used to improve skills suitable to the wider trail network.

## 5.0 Ground Clearance

Rhododendron (an invasive and non-native species) clearance total of approximately 40m will be necessary, this will be cleared with our NPTC qualified chainsaw operator. No additional felling of any mature trees will be necessary. The lower branches of mature trees running alongside the trail corridor are to be stripped back to a minimum of 10mm in order not to cause a hazard for passing riders. This should



be carried out to a height of 2.5m. Cleared trunks, branches and brash should be collected in habitat piles at cut to lengths not exceeding 2.0m and placed outside of the fall zone. Fall Zones are areas adjacent to the immediate trail edge, most importantly adjacent to TTFs, the bottom of descents and outsides of corners. These are areas that a rider may potential fall into in the event of losing control or crashing. The zone is defined as the area 1.5m each side of the trail and must be checked to reduce injuries happening and their severity. Sharp stones, small boulders and surface debris should be removed; sharp points on rocks over 300kg should be dulled or rounded. Tree stumps below 250mm in diameter should be removed along with branches cut back to the shoulder. If the cutting back of hazards is not possible then a natural covering may be possible, though crash matting and fencing is sometimes necessary on exposed and fast sections. [The fall zone does not need to be cleared of all foliage; the purpose of these fall zone guidelines is to reduce the chance of injury, if a crash occurs.](#)

## **6.0 Plant**

3t-5t Zero Swing Tracked Excavators and 2.5t Tracked Dumpers will be used on site, the corridor and footprint of trail will have to be narrow as to not affect the grounds of the house. This corridor will be 3.0m through areas of forest and appropriate smaller machines may be used in less accessible parts of the site. The later stage of the construction to create the finished shape is to be done utilising hand machinery including tracked wheelbarrows and whacker plates alongside appropriate excavators. All finishing is to be done by hand with hand whacker plates used to compact the trail surface.

## **7.0 Construction Materials and Trail Formation**

To ensure that the trails remain 'all weather' the trails on the site have been specified to receive strip and fill surfacing technique. This technique has many names within the trail building industry (e.g. excavated tray) and therefore for clarity a brief explanation follows. An excavator will excavate or 'strip' the existing ground surface to remove any existing vegetation and the upper organic layers of earth. The excavated material will be laid to either side of the trail for later use in landscaping activity. The excavated strip will then be filled with appropriate amounts of stone to create an elevated trail surface or an appropriate trail undulation or feature as required. The surface will be cambered or an appropriate cross fall should be created. The stone will then be shaped and compacted to form the trail surface.

The trails have been specified to receive stone surfacing. This will improve longevity and sustainability of the surfaces, which are expected to receive a very high level of use. All sections will require base course and wearing courses to provide armouring and protect the soil against erosion processes.

The trail surface will be broken into two distinct courses as appropriate:

1. Sub-base course 80mm crusher run ( $\approx$ 250mm) (bottom);
2. Limestone Dust Wearing course 0-4mm ( $\approx$ 30mm) (top);

This will be formed to an average width of 1.0m. After shaping of the base course has been carried out by and excavator then hand finishing with rakes will be employed to ensure a correct finish. This will then be compacted with a whacker

plate. If surfacing is necessary then additional shaping and compaction will be required.

The pump track will require Type 1 crushed stone of (four times) higher quantity than that of the trail loops and a 50mm surfacing with dolomite dust in order to get the best finish possible. Dolomite dust from Longcliffe Ltd. Quarry in Matlock is regarded as the best track surfacing material available and is used at the 2012 Olympic BMX venue and National Cycling Centre in Manchester. Up-to-date quotes have been sought from the local quarries, which are given in the cost section of this proposal.

#### Demarcation

When this term is used in relation to mountain bike trail it is creating a boundary on the edge of the trail, predominantly on the inside of corners. The use of demarcation prevents trail braiding, trail being undermined, soil being brought onto the track surface by cutting corners and desire lines forming. This allows a trail to remain sustainable and reduces maintenance. These features can be natural and may be built into the designed trail line however where necessary they may be artificially created from local natural resources such as large boulders, wood or wood piles, vegetation mounds, tree stumps and earth bunds.

#### Drainage

Given the gradients on site, the drainage on the trail will largely be natural and will be dealt with by adequately forming crossfalls, grade reversals and cambers on the surface. The specification is designed to allow the free flow of water across the path without the use of culverts; however culverts are sometimes required in order to allow the passage of water under the route. This may also be necessary to allow water to away from inside of in-sloped corners/berms. When this is necessary they are sometimes referred to as 'bottom turns'. Trenches shall be excavated down to firm ground with all organic soil removed where practicable. These will normally be basic construction with  $\approx 160\text{mm}$  perforated plastic pipe. Larger ditches may require 300mm twin walled plastic pipes laid on crushed stone (or bed line across water course as required) requiring rough stone headwalls to mask the appearance if visible. Culverts are to be installed as needed are estimated at ten at this stage.

#### Signage and Interpretation

It should be noted that the presence of the trail surface would act as a signpost for most of the trail infrastructure. Signage can be simple with appropriate coloured arrows indicating the trail, which is to be ridden, inserted into recycled plastic or wooden posts. The posts should be in keeping and consistent with the existing way marking on the site. Interpretation may also be required at the start of the trail loops and pump track. The exact wording of the interpretation is to be discussed at the end of the construction process to accurately reflect the final lengths and position of the trails. All interpretation design and ordering will be considered and delivered by the client. The project manager and client can agree all signage locations on site post construction.

#### Timings

Rural areas including woodlands are special places and are protected under national law. In particular the Breeding Bird Season (1st of March to the end of August) will affect this site. Works should occur outside this time period unless other steps are taken to remove the breeding habitat along the line of the route, or walk the line of the route prior to construction. These should be agreed with an ecologist. Weather

conditions may also play a role within the construction of the trails. If prolonged periods of heavy rain are forthcoming the construction may have to halt to avoid any sub-standard construction techniques. This will require consideration within the contract documentation to ensure both client and contractor are treated fairly during construction process.

### **8.0 Labour**

It is envisaged that the construction timetable for this work would be approximately 5 weeks based on a team of 3-5. This said, the construction period is difficult to quantify as the following issues may affect the programme;

1. Other site operations which may inhibit the works;
2. Discovery and reaction to of unforeseen ground conditions;
3. Discovery of ecological issues

### **9.0 Compound and Stockpiles**

Compounds locations have not yet been agreed. Compounds will be agreed formally in forthcoming consultations in agreement with landowners/managers. We propose a small compound most likely be erected in the car park behind house; this would be approximately 8m x 8m and surrounded by Heras fencing. Access points to the trail have not yet been agreed. During construction, access points are likely to be along the line of the trail and via surfaced estate roads or existing routes. Access from the main roads will also be agreed so as not to conflict with existing site users. Material stockpiles are proposed next to the main entrance road and fire road to north of house.

### **10.0 Additional Services**

Furthermore, Architrail are able to offer two extra services free of charge. The first will be a trail maintenance skills day offered to the client and property managers. Architrail have delivered a number of these in the past to help individuals identify early signs of trail degradation and how to mitigate problems. The second service Architrail can offer is a mountain biking training event, which would involve a day of riding and coaching with the trail designers. Architrail's elite level riders Duncan Ferris and Andrew Titley would lead a ride around the trail and demonstrate how riders can improve their skills on the trail. Teaching trail riding skills can improve enjoyment of the trail and decrease the need for maintenance due to good riding technique.





Phil Saxena, Architrail. Trail maintenance skills day, Blessingbourne, Northern Ireland.



Duncan Ferris, Architrail. Leigh Woods, Bristol.

## 11.0 Costs

The table below provides the costs for each of the trails to be constructed. **The costs are exclusive of VAT.**

		Rate	Quantity	Cost
<b>Labour</b>	2 x Trail Designers/Trail Finishers	£200/day	40	£8,000
	2 x CPCS Operators	£200/day	50	£10,000
<b>Plant</b>	2 x 3t 360 ZS Excavator	£700/week	5	£3,500
	2 x 2.5t tracked dumper	£600/week	3	£1,800
	Fuel Cell (1000l)	£50/week	5	£250
	Mobilisation/Transport of all Plant	£300/trip	2	£600
	Whacker Plate	£25/week	4	£100
<b>Materials</b>	Scalpings 80mm (Doveholes Quarry) Ceemex	£9.15/t	500	£4,575
	MOT Type 1 (Doveholes Quarry)	£10.45	200	£2,090
	Dolomite Stone Dust (Long Cliff Matlock) 0-4mm	£12.38/t	80	£990
	Large Boulders (500mm x 500mm x 1000mm)	£20.10/t	20	£402
	Topsoil	£30.50	30	£915
	160mm Perforated Pipe x 50m	£148.50	2	£297
	Grass Seed	£40/bag	1	£40
<b>Preliminaries and misc.</b>	Site Compound	£250/week	5	£1,250
	Sustenance	£53/pppd	90	£4,770
	Travel	£65/week	5	£325
	Marking Materials	£5/item	8	£40
<b>TOTAL</b>				<b>£39,944</b>

I trust this is of interest and look forward to hearing from you. If there is anything you wish to discuss regarding the proposal then please do get in contact.

Yours Faithfully,

A handwritten signature in blue ink, reading "P.A. Saxena". The signature is fluid and cursive, with a long, sweeping underline.

Phil Saxena  
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# Mountain Bike Trail Design Sheet 005 // TT: Cross Country Trails



## Description

Cross country (also known as XC, singletrack or trail riding) is the traditional form of mountain biking where riders ride up, down and along, typically on singletrack trails (wide enough for a single rider), often tackling technical features (TTFs) in their path. Whilst XC is the most traditional form of mountain biking, the discipline is still evolving, driven by advances in bikes' technology alongside creative trail building.

## Design Comments

Trail must always be moving, with consistent interest and constant TTFs. There must be;

- A suitable mix of corners, jumps and rough technical sections
- Variable speeds
- If a mix of ability levels are sharing trail ensure black and red riders are catered for with braided options
- A mixture of short/medium/long flow

## TTFs

- Mimicking those found naturally
- To test riders gradually, before leading them in to more technical sections

## Safety and Sustainability

- Corner tightening (e.g. chicanes) before crossings
- Stone armoring
- Boulder pinch points
- Gated pinch points
- Option qualifiers to get onto a more severe braided trail
- Demarcation important for sustainability

## Trail Tread

- Constant camber or water shedding tread/features
- Install culverts where necessary
- Install necessary open ditches



## Construction Methodology

Strip and fill construction on slopes less than 7% gradient  
Bench cut when cross slope is greater than 7%

## Construction Materials

- Base/sub-base options (see Trail Design Sheet 01A – Surfacing)
- Wearing course options
- Bedrock available
- Causeway
- Stone pitching

## Maintenance

- Close trail for a bedding in period
- Know and work to the specified defect period
- Look at possibility of instructing a trail workshop to landowners/users
- Naturalisation and stabilisation period

## Construction Machinery

- 360° excavator
- Dumper
- Whackerplate
- Hand tools

## Health and Safety and Construction Design Management

The main health and safety issues to be addressed with relation to the construction activity will be: The presence of large machinery, manually moving heavy weights, communication when working in remote locations and protection of public and unofficial persons as well as staff on site. CDM regulations apply to any trail build project. If more than 500 person days or 30 working days on site are due to be completed the project will be notifiable to the Health and Safety Executive and a CDM coordinator will need to be appointed—Tel: HSE 0845 345 005



# Mountain Bike Trail Design Sheet 008 // TT: Pump Tracks



## Description

This type of trail is a relatively new phenomenon, consisting of a loop of berms, rollers and other trail features that are used to generate speed without pedaling (by a technique known as pumping). This type of track is not only fun to ride, but can also teach riders skills that can be applied to all mountain bike disciplines. Pump tracks are extremely versatile and can be tailored to your requirements, be it to compliment other trails, or to fit in small urban spaces.

## Technical Trail Features (TTFs)

Berms, rollers, roller doubles, triples, step ups, step downs

## Design Comments

Pump/rolling features only  
Gradient should be avoided

## Safety and Sustainability

- Minimum 45° batter on the back and sides of features in order to minimise erosion and injury
- Minimum 3m distance from fixed structures to correspond with ROSPA guidelines
- Demarcation may be required on corners <135°

## Trail Tread

- Constant camber or water shedding tread/features
- Install necessary culverts
- Install necessary open ditches

## Construction Methodology

Pump tracks work best when built on sites with very little gradient, preferably flat. If no leveling is needed then any organic material should be stripped beforehand. After leveling has been carried out, material should be placed in the line of trail. This is then shaped by machine/hand and compacted. The surface is then laid on top of this and compacted.

## Construction Materials

- Base/sub-base options (see Trail Design Sheet 01A – Surfacing)
- Wearing course options

## Maintenance

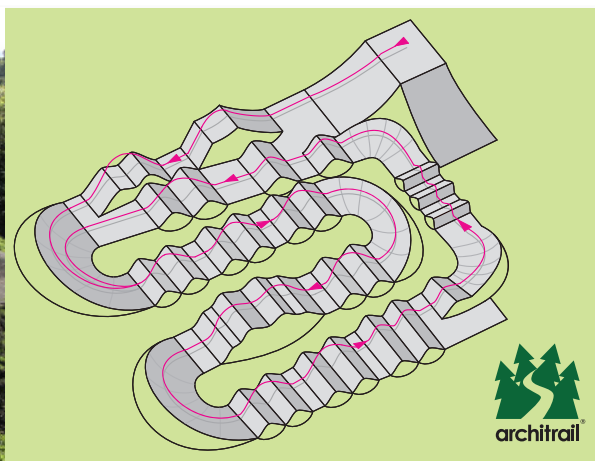
- Close trail for a bedding in period
- Know and work to the specified defect period
- Look at possibility of instructing a trail workshop to landowners/users
- Naturalisation and stabilisation period

## Construction Machinery

- 360° excavator
- Dumper
- Whackerplate
- Hand tools

## Health and Safety and Construction Design Management

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# Mountain Bike Trail Design Sheet 010 // TTF: Berm



## Description

A berm is a banked and curved cornering feature on a trail that provides support for the rider when turning a corner allowing them to turn in a smooth manner. A berm allows the user to maintain speed while cornering. The features are usually used on flat or downhill sections of trail. A blue graded berm will be generally open and shallow with more difficult berms encompassing tighter angles, steeper surfaces and higher entrance speeds. The speed at which a berm is ridden increases with rider skill and experience. Berms may also be used as trail feature in themselves, with a series of berms on a descent being a typical feature of modern bike trails.

## Design Comments

It is important to ensure that a berm is continued around a bend to a point where the rider is able to exit safely on the line of the trail. Riding the feature during construction will indicate the correct exit point much better than design sketches.

## Construction Methodology

Berms are created by either constructing a bank from earth or stone or identifying an existing bank/gradient that has suitable properties for the trail. A basic 20-45° bank should be formed in a rough semi-circle with an inverted dished face and a suitable turning angle for the grade of trail. An excavator should sit on top of the bank and distribute local stone into the face of the feature. A whacker plate may be used to compact the stone into the face of the berm, which should appear sealed when finished with no loose stone. An appropriate drainage area on the inside of the berm should be excavated to ensure water is shed successfully off the surface.

## Construction Materials

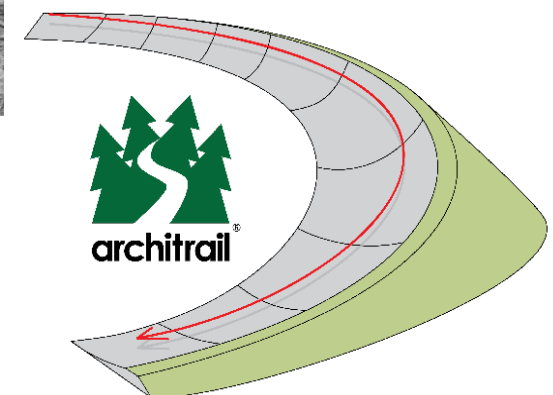
Locally won stone  
Local earth/soil

## Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whackerplate

## Health and Safety and Construction Design Management

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# Mountain Bike Trail Design Sheet 100 // TTF: Rollers



## Description

A roller is a trail feature where the trail surface rises then falls smoothly, which should be rideable without pedalling. As the name suggests, rollers are designed to be rolled over. Skillful riders can use rollers to gain speed and control by 'pumping' them. Rollers can occur on the trail singularly, or in series, depending on the grade of trail. On blue grade trails, rollers should generally be singular, although multiple rollers could be used if there is a minimum of a bike length (~1.5m) gap between them. Red grade rollers can occur in succession and are steeper, taller and spaced closer than blue grade. Black grade rollers should be technically challenging to ride, due to their steepness and height. In some cases on black trails, riders can jump from one roller to another.

## Construction Methodology

Rollers can be constructed from material on site or from imported material from local sources. Rollers can be built up on flat terrain, or use naturally occurring features. If built on flat terrain, a roller can be expected to use typically 0.5t of sub base. Machinery should be used to import and manipulate material into the appropriate spacing and heights. The shape of the rollers should then be refined using hand tools. The trail surface should be built according to specifications.

### Construction Materials

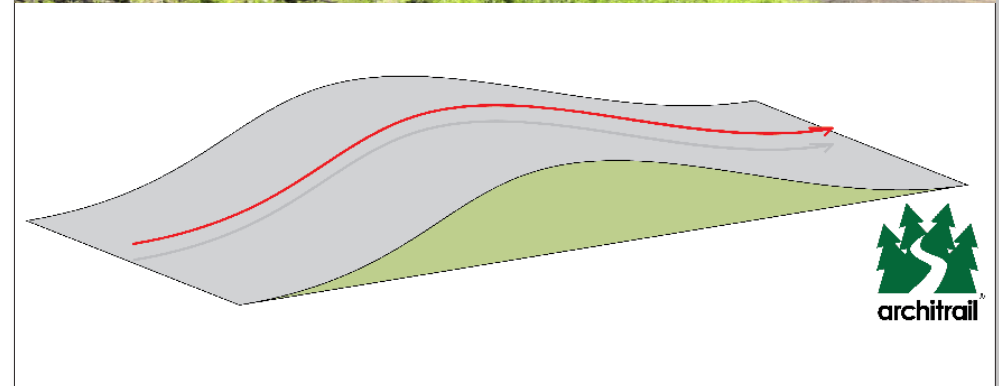
Locally won stone  
Local earth/soil

### Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whacker Plate

## Health and Safety and Construction Design Management

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# Mountain Bike Trail Design Sheet 101 // TTF: Jump



## Description

A jump is an exciting trail feature allowing riders to take off from the ground and land safely using their momentum. The larger the feature, the more severe the grade of jump. The entrance to and exit from a ramp is usually long which provides a safe environment within which to gain momentum, undertake the feature and land safely. Jumps may be constructed on all gradients, making them ideal trail features.

## Design Comments

Poorly constructed jumps are dangerous. Focus should be on creating the correct entrance and exit to the feature which will enable users to take the jump at different speeds requiring different skill levels.

## Construction Methodology

An excavator should construct a solid ramp out of local or imported earth or stone. Dumpers may import material and ramps may be shaped roughly by an excavator, before being finished by hand and compacted using whacker plates. Rocks and boulders may be installed on the lip of the ramp to allow users to drop off or roll out of the jump if the feature is not to be 'jumped'. Slabs or extra stone may be laid on the feature landing to reduce erosion caused by landing bikes. The route corridor at the entrance and exit to the jump should have a good line of sight.

## Construction Materials

Locally won stone

Local earth/soil

## Construction Machinery

Hand Tools

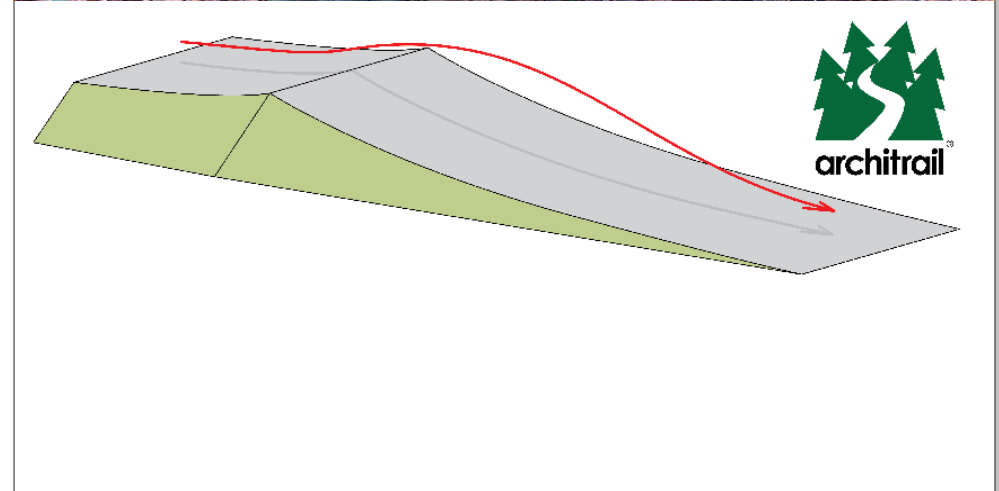
Dumper

360 Excavator

Whacker Plate

## Health and Safety and Construction Design Management

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# Mountain Bike Trail Design Sheet 102 // TTF: Tabletop



## Description

A tabletop is a jump feature that allows riders to experience jumps with a gap between the take off and landing in a safe and controlled manner. The feature is fundamentally a take off ramp with a flat top and a downslope. The advantage of using this type of jump is that the gap is not mandatory, allowing a rider to jump onto the flat top of the jump, working their way up to jumping to the downslope of the landing. The difference in tabletop design between the moderate (blue) and severe (black) grades of trail is focused on the gradient encountered on the up and down slopes, the height of ramp to be navigated and the overall length. Tabletops can be constructed out of earth or stone material. It should be noted that whilst tabletops allow riders of all abilities to attempt the jump, the lip of the take off is therefore more susceptible to erosion than jumps with mandatory gaps.

## Design Comments

Dividing the entry route into two will provide opportunity to offer users different approach options to the same feature (e.g. steeper and cambered options for more difficult grades).

## Construction Methodology

A tabletop feature is usually constructed from stone or earth that has been imported from appropriate local sources. An excavator should be used to form material into a flat topped mound of 2m-15m long which has a side batter of no more than 45°. A dumper may be used to bring material onto the site if appropriate. The excavator should be used to compact the material at regular intervals until a tabletop is achieved. A final stone surface should be installed within a tray on top of the feature and compacted with a whacker plate so that the surface appears sealed to the naked eye. Grass seeding may be required for landscaping purposes.

## Construction Materials

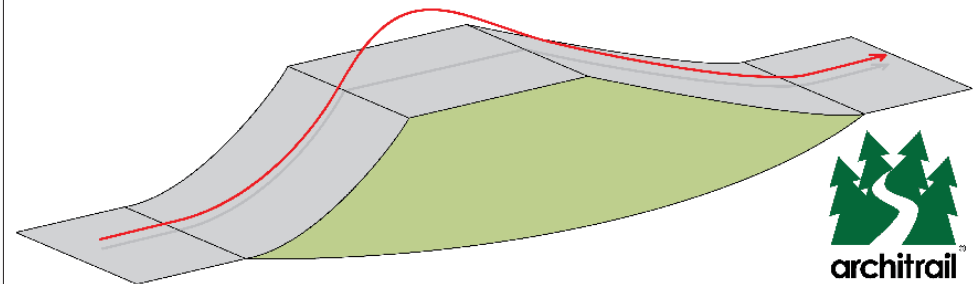
Locally won stone  
Local earth/soil

## Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whacker Plate

## Health and Safety and Construction Design Management

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# Mountain Bike Trail Design Sheet 104 // TTF: Roller Double



## Description

A roller double is a manmade jump feature with a smooth, shallow bowl between the take off and landing slopes. This allows the feature to be rolled over providing an inclusive feature with no opt out route necessary. The difference between a moderate (blue) roller double jump and more severe grades (red/black) is the length, height and angle of transition.

## Design Comments

Roller double jumps are good for trails requiring features to be included for a variety of skilled users. Less able users will be able to simply roll over the feature where as better riders can perform a large jump.

## Construction Methodology

A roller double jump may be constructed from stone or earth found on site or which has been imported from appropriate local sources. An excavator should be used to form local material into two ramps with a rollable center and side batter of no more than 45°. A wacker plate should be used to compact the material at regular intervals to a required height. A final stone surface should be installed in a tray on the top of the ramps and compacted with a whacker plate so that the surface appears sealed. The entry on the first ramp may be split into 2 to provide different angles of approach. The landing points on the downhill of the second ramp can be fortified with extra stone and should be elongated to provide a safe landing strip.

## Construction Materials

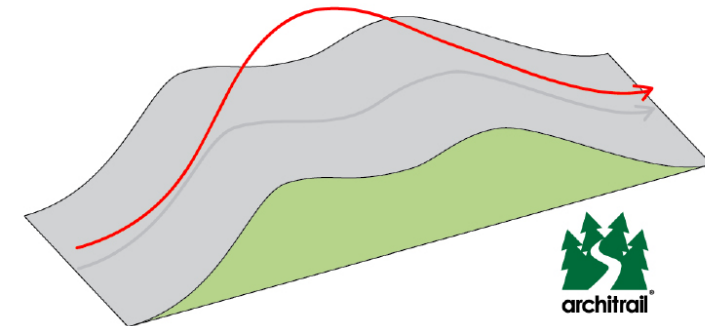
Locally won stone  
Local earth/soil

## Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whackerplate

## Health and Safety and Construction Design Management

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## Description

A drop off is a feature on the trail where the rider will undertake a step down from a high level to a lower level, defined by instantly losing vertical height over a trail edge. Commonly stone is used in drop offs features as it is not subject to rot or erosion and can take continual braking and impacts. At the moderate (blue) end of the scale, a drop off may be no more than a 10cm step down which will cause the rider a minor disturbance in the ride. At the severe (black) end of the scale the drop off may be several metres, which will require significant commitment to the feature and high levels of skill. It should be noted that a landing slope might be required for larger drop offs.

## Design Comments

Drop offs need to have a suitable landing area installed as part of the feature. This is dependent on the exit speed and next trail feature. This will prevent erosion of the trail surface immediately following the feature, which increases durability.

## Construction Methodology

A drop off may be constructed from boulders and large rocks /slabs found on site or have been imported from appropriate local sources. Natural rock features may also be adapted to create the features . Appropriate machinery should be used to move earth/stone to create desired levels for height differences and excavate a bed into the existing route surface into which boulders may be set. A dumper may be used to bring boulders on to the site and tip them in rough positions. Hand tools may be used by multiple labourers to align the boulders into final position. Boulders should be set with at least 30% of their mass within the ground to avoid movement.

## Construction Materials

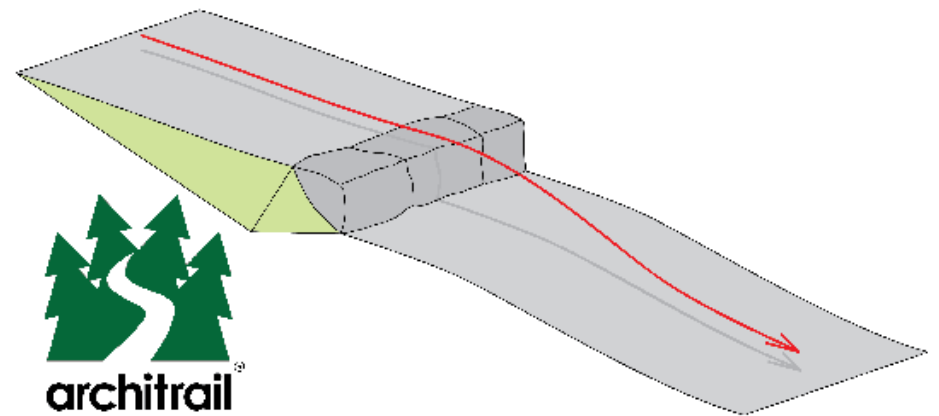
Locally won stone  
Local earth/soil

## Construction Machinery

Hand Tools  
Dumper  
360 Excavator

## Health and Safety and Construction Design Management

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## Description

A rock garden is a technical feature where rocks and small boulders are installed into the trail surface in close proximity to each other providing unavoidable small obstacles. This roughened surface is fun to ride as it tests bike handling skills as well as slowing riders down over the section of trail. The difference between moderate (blue) and severe (black) rock gardens may be down to gradient on which the rocks are set, the size of the rocks (height above ground) or the distance between the individual rocks, which limits navigable options.

## Design Comments

Some users may try and avoid the rock garden sections due to the uncomfortable nature of the ride. The use of larger boulders or timber at the edge of the trail will prevent users from diverting off the line of the trail.

## Construction Methodology

A rock garden should be constructed using locally won or imported rocks which are no bigger than 500 x 500mm. Rocks may be imported using a dumper or tracked wheelbarrow. The rocks should be installed to a shallow depth by hand in the existing trail surface. Rocks should be positioned in appropriate positions relating to the grade of trail. A surface/wearing course should then be installed over the rocks, which should be compacted down with hand tampers. The finished trail should be finished with at least 40% of the rock mass within the ground. This will prevent movement as bikes run over the rock sections.

## Construction Materials

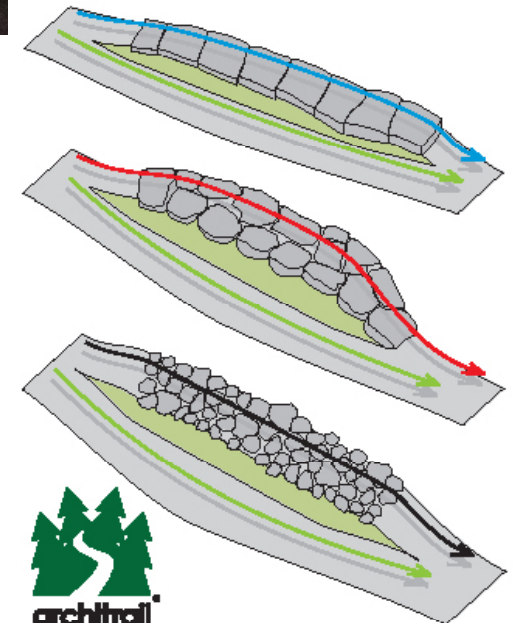
Locally won stone  
Local earth/soil

## Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whacker Plate

## Health and Safety and Construction Design Management

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## Description

Rock Causeway is simply a section of trail constructed from rock boulders rather than crushed stone. At the moderate (Blue) end of the scale, a causeway may be no more than flagstones, or large flat boulders and provide a change in surface. At the severe (Red and Black) end of the scale boulders will provide a more challenging technical feature for riders to overcome with greater momentum required to navigate the feature. This may feature small steps where a rear wheel lift is required or might include small drop-offs. Rock Causeways can be used in trail of any gradient and also in order to provide a shorter, more technical route as an overtaking braided feature. Causeways may also be used as a practical trail tool to overcome wet areas where standard trail section may not be sustainable. Causeways may also be used in areas of high usage where stone trail will become eroded quickly.

## Design Comments

Changes to the gaps and heights between the boulders can change the nature of the feature to a large extent. Minor changes can be used to challenge or encourage the user.

## Construction Methodology

A causeway may be constructed from boulders found on site or imported from appropriate local sources. An excavator should be used to clear a route corridor (if not already done) and excavate a bed into the surface which boulders may be set. A dumper may be used to bring boulders on to the site and tip them in rough positions. Hand tools may be used by multiple labourers to align the boulders into final position. Boulders should be set with at least 30% of their mass within the ground to avoid movement once in place. If being set into boggy ground allowance should be made for some downward movement within the first few weeks.

### Construction Materials

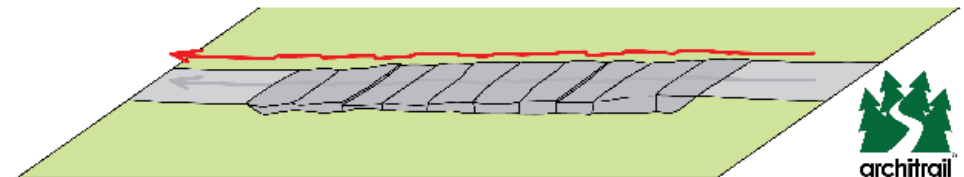
Locally won stone  
Local earth/soil

### Construction Machinery

Hand Tools  
Dumper  
360 Excavator

## Health and Safety and Construction Design Management

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## Description

These features are designed to create multiple line options where technical trail features are in parallel pairs to allow easier overtaking. Riders with more technical ability will be awarded with the chance to overtake slower riders on these features. Unless there is a suitable width or a different line available, then on most sections of trail it can be very difficult for a more skilled rider to gain enough of an advantage over one feature. These sections allow a small increase in technical skill, over a small distance, to be rewarded. The features can be any type of rock based TTF though a highly technical rock garden or causeway will have best results. See individual rock section or rock causeway TTF sheet for difficulty of each grade. A slow speed feature will show larger differentiation between more and less skilled riders. The key is to build them in an equal and parallel manner with care taken to make sure neither side has an advantage of line choice. This also means that the run in should be straight so as not to favor those coming around the inside of a corner. This allows a rider to use purely their technical skill to overtake.

## Design Comments

It is important to ensure that a dual TTF section is equal in technicality and sufficient testing during construction will be needed.

## Construction Methodology

Follow construction methodology for each individual TTF found within the section and repeat in parallel

### Construction Materials

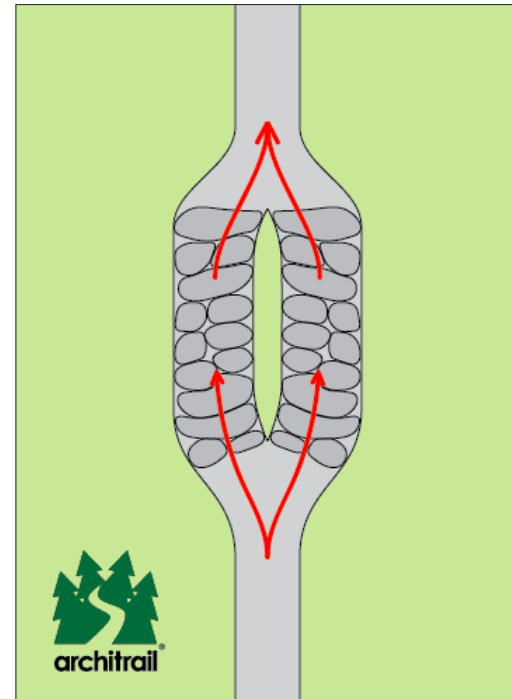
Locally won stone  
Local earth/soil

### Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whacker Plate

## Health and Safety and Construction Design Management

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## Mountain Bike Trail Design Sheet 207 // TTF: Rocky Inside Line



### Description

A rocky inside line is one that is designed to reward those with better corner and handling skills. It is a difficult skill to be able to turn on technical and challenging surface and terrain whilst keeping forward momentum and pedaling. This feature allows a user to pick an inside line which is shorter but more technical, allowing their handling skills to let them overtake, as long as they can ride it in a controlled but fast manner. The inside line is usually a difficulty grade above the trail which it cuts the corner of. See individual rock garden or rock causeway TTF sheet for grading.

### Design Comments

Riding the feature during construction will indicate the correct technicality of both corners.

### Construction Methodology

Construct a rock causeway from locally won stone or large flat boulders that have suitable properties for the desired inside line. Stone pitching may also be used. This is in addition to the corner, which it is inside of. Most shaping should be carried out by a 360 Excavator with multiple laborers finishing with hand tools. A whacker plate may be used to compact the stone, which should appear sealed when finished with no loose stone. An appropriate drainage plan to allow water to exit either side of the feature should be created to ensure water is shed successfully off the surface.

### Construction Materials

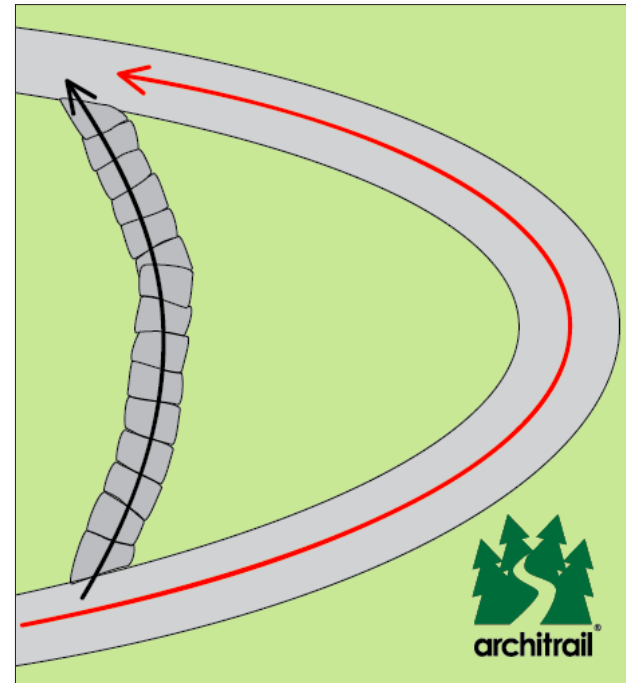
Locally won stone  
Local earth/soil

### Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whacker Plate

### Health and Safety and Construction Design Management

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## Description

Grade reversals are a feature that can be used when traversing a side slope where a full bench cut is needed. The feature helps to maintain trail flow, add interest, control speed and shed water at strategic points on a traverse, by reversing the trail gradient a number of times over a distance. The line of the trail can be descending, slightly ascending or flat. The gradient of grade reversals can vary hugely in length, height, gradient and frequency. Riders can gain speed by pumping the down sides of the reversals and carry momentum up the next incline before repeating. Grade reversals are also very useful for managing runoff on the trail surface, as water can be shed quickly from the troughs of the grade reversals. This avoids high volumes of water flowing on the trail surface and therefore reduces erosion. Grade reversals on a blue trail would typically have a wavelength of 15m-25m, red 10m-15m and black 5m-10m. Grade reversals on a blue trail are generally smooth and low, with more technical grade reversals encompassing shorter wavelengths, higher amplitudes and faster entrance speeds. The speed at which grade reversals are ridden, increases with rider skill and experience. For best practice, the trail gradient should always be less than half that of the side slope.

## Design Comments

The turning pad should be no less than 3m diameter in order to give the rider enough space to turn.

## Construction Methodology

Construction starts at the end of a bench cut trail where the direction needs to be reversed. The lower leg should come up to the pad in the form of an out-sloped ramp to shed water. Then the pad itself should be slightly domed in shape in order to shed water. Revetment can be used to secure the turning pad on the lower side. The upper leg of the trail coming out of the turn will be gently in-sloped for 10m-15m above the turning pad so that water will drain off the backside of the turn. Building all components of the feature together ensures that the lower half will be firmly tied into the upper half.

## Construction Materials

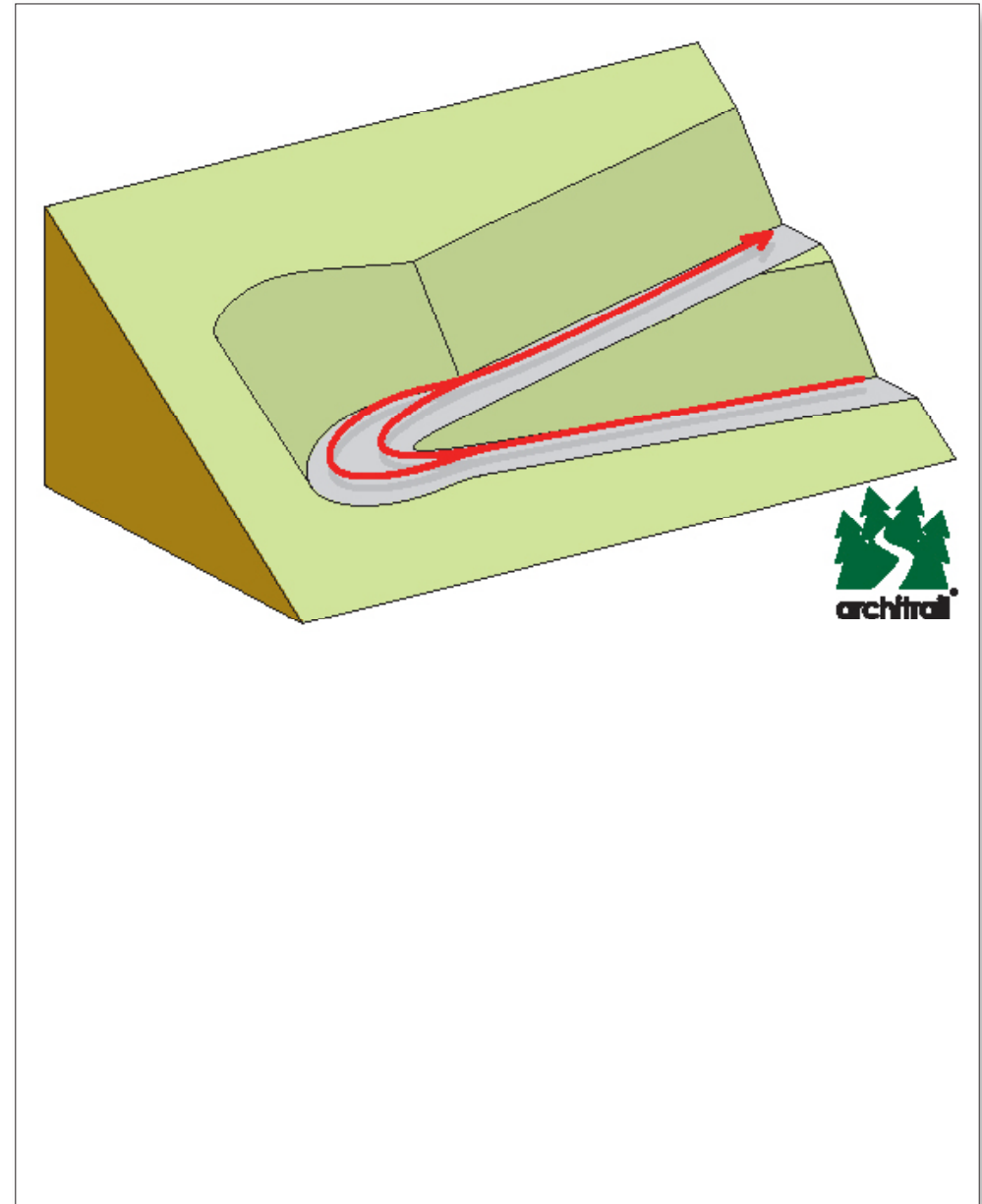
Locally won stone  
Local earth/soil

## Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whackerplate

## Health and Safety and Construction Design Management

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# Mountain Bike Trail Design Sheet 602 // TTF: Chicane



## Description

A chicane is used to force riders to slow down in a controlled manner by using two two tight corners. The chicane consists of a minimum of two boulders placed on the inside of two opposite tight corners.

## Design Comments

The trail should have a capacity more than 6m of straight trail before reaching the chicane, in order to avoid heavy braking and therefore erosion before the chicane. A small drop off may also be installed to further control speed, and can also dissuade users from entering the trail in the wrong direction. Location, entry speed and gradient will determine whether a pinch point is also required. In some cases it may be necessary to use additional boulders to block any potential desire lines avoiding the chicane that could occur.

## Construction Methodology

Large boulders (>200kg) set into the ground to a minimum depth of 400mm with a corner radius <4m. Boulders should be orientated so that they cannot be ridden over or used as a jump. Boulders should be secured in the ground and should not move.

## Construction Materials

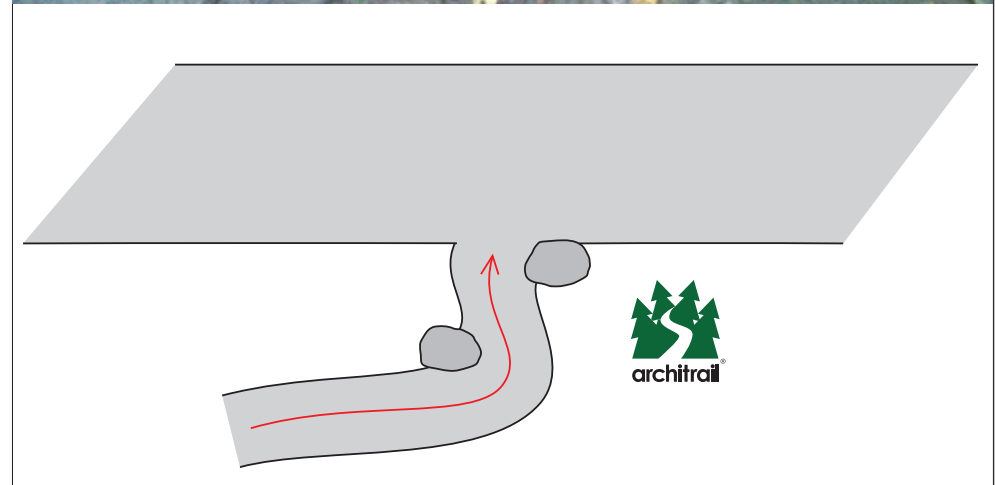
Locally won stone  
Local earth/soil  
Boulders

## Construction Machinery

Hand Tools  
Dumper  
360 Excavator  
Whacker Plate

## Health and Safety and Construction Design Management

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## Architrail TTF List

010\_Berm  
011\_Jerm  
012\_Pendulum\_Turn  
013\_Flat\_Turn  
014\_Insloped\_Descending\_Corner  
015\_Rainbow\_Berm  
100\_Rollers  
101\_Jump  
102\_Tabletop  
103\_Benedek\_Kicker  
104\_Roller\_Double  
105\_Double  
106\_Triple  
107\_Step\_Down  
108\_Step\_Up  
109\_Hip\_Jump  
110\_Grade\_Reversals  
111\_VCA  
112\_Whoops  
201\_Drop\_Off  
202\_Rock\_Garden  
203\_Rock\_Causeway  
204\_Natural\_Rock\_Roll  
205\_Wallride  
206\_Dual\_Rock\_Garden  
207\_Rocky\_Inside\_Line  
208\_Artificial\_Rock\_Roll  
209\_Exposed\_Bedrock  
301\_Bus\_Stop  
302\_Mogul\_Field  
303\_Off\_Camber\_High\_Line  
304\_Dual\_Slalom  
401\_Off\_Camber\_Climbing\_Turn  
402\_Terraced\_Inside\_Climb  
403\_Climbing\_Switchback  
404\_Insloped\_Climbing\_Turn  
405\_Terraced\_Climb  
501\_Root\_Section  
502\_Water\_Splash  
503\_Bridge\_Crossing  
504\_Boardwalk  
505\_Log\_Ride  
506\_Off\_Camber\_Inside\_Corners



Moor Valley  
Mosborough  
Sheffield  
S20 5BB  
Tel: 0114 248 5626  
Fax: 0114 248 6643  
info@biketrack.org

Fiona Thomson  
White Hall Outdoor Education Centre  
Manchester Rd  
Buxton  
Derbyshire  
SK17 6SX

11<sup>th</sup> July 2012

Dear Sir/Madam,

Please find enclosed our tender for works to construct a Mountain Bike Trail at White Hall Outdoor Education Centre as detailed in documents provided. We have enclosed examples of previous projects along with our quote value to show our level of expertise in this area of works.

If you require any further information please don't hesitate to contact us.

We hope we have met your requirements and look forward to hearing from you in the near future.

Yours faithfully

A handwritten signature in black ink, appearing to read "S. J. Taylor", with a long horizontal flourish extending to the right.

S, J, Taylor



Moor Valley  
Mosborough  
Sheffield  
S20 5BB  
Tel: 0114 248 5626  
Fax: 0114 248 6643  
info@biketrack.org

### **Quote details**

Our quotation is to create 2 no. Blue Grade Mountain Bike Trail loops including Technical Trail Features with opt in Red Grade Technical Trial Features alongside. Each loop with be approximately 500m in length.

Temporary fencing is to be installed and maintained where required during works.

We may require an area to use as a material transfer zone during the works. We have indicated a possible location for this area on the site plan attached.

We would require constant vehicle access for up to 8 wheel lorries (20 ton) during the works. We have shown the area required for vehicle access during the works on the site plan attached.

If possible we would require a constant water supply on site. We would be happy to pipe this from nearby if required.

All our onsite workers will be sufficiently qualified in the use of the plant machinery required for the track build. We currently have sufficient time in our work schedule to complete the works as well as the resources to do so.

During the construction process our onsite workers will be testing each element of the track as it is completed. We have many years riding experience throughout our work force and always test ride our tracks before completion.

Our quote value will be fixed for a period of 6 months, although the best will be done to keep any extra cost down following this period we may have to check for any increases imposed on us via our suppliers.



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### **Design Details**

Following our site visit and discussions with Fiona Thompson regarding the requirements and intended usage of the Trail on Thursday the 2<sup>nd</sup> of August we have created a Site Plan showing the Trail Line and Technical Trail Features to be included.

The Trail designed will be constructed to IMBA Standards for Blue Grade MTB Trails with the Opt in sections to Red Grade Standards.

We would be happy to set out the detailed trail onsite and run through each element with the centers instructors and make any alterations required following discussions prior to construction.

All Technical Trail Features Shown on the Site Plan will be detailed by our vastly experienced onsite employees during the build (details of employees attached). Additional features will be included wherever possible to increase flow, difficulty and interest in the Trail. These will again be detailed by our vastly experienced onsite employees and discussed with coaches/employee's of the centre before installation.

Best possible use will be made of existing land forms and features on site. All aspects of the trail will be integrated into the exiting land forms as much as possible.

We have included examples of Technical Trail Features in our proposal which will form part of the Blue and Red Trail sections. Additional features to these will be included wherever best suited.

### **Trail Description.**

This section of our proposal runs through the trail from a rider's point of view explaining each Technical Trail Feature as the Trail progresses.

Although both loops will be Blue Grade we feel the South Loop will be more difficult than the North Loop This is because of the natural of the slopes required to be negotiated as the South Loop will be a climb and descent with the climb being a lot longer length than any on the North Loop side.



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### North Loop (around the main lawn area)

Access to the Start Area is off the Main Access road to the centre and directly onto a hard standing Start/Finish Area for the Trail.

The fence to the pond area has been taken back to allow extra room for the riders around the activity area close by.

The Trail starts off on the flat and takes the riders to the left of the activity area near the start/finish area.

After negotiating the first right turn there is a opt in Red section to the right which climbs up a rock armored section onto the lawn level area. The main trail continues along the wall side while the Red opt in winds its way round before rising up over the old wall and rejoining the main Blue trail as it turns right into the woodland.

This section begins to steepen as it climbs through the woodland until it meets the main path on the top of the climb.

The first descent heads down towards the climbing nets. There are a few roots and a rock drop to negotiate at the top of the descent before dropping down and into an open right hand berm which allows riders the carry speed towards the next section.

Riders then have the option to continue on the main trail by the side of the wall or up the short steep climb to the skills area.

Following the skills area opt in the main trail begins to climb back towards the top of the area be snaking up the slope to be able to gain the height whilst staying in the Blue Grade parameters.

This section has another Red opt in line consisting of more difficult climb which is rock armored up the steep slope.

At the top of the climb the riders are faced with an exciting drop down appearing out on the north side of the main building. There is another Red opt in on this section which make use of the banking to the right hand side of the drop as a berm then crosses the path straight into a right hand berm before rejoining. As these two lines cross there will be a rock armored section which will become a feature to both the Red opt in and main Blue line whilst still help to control the natural speed gain from the drop. On the exit of this drop will be a right hander into a table top jump for the riders that have been able to carry sufficient speed.



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The trail then make its way onto the corner of the main lawn before nipping through a small clump of trees before dropping down and making it way round the lawn/football area.

The trail makes its way round the law area with a number of berms and other jump/obstacles to keep interest for the riders.

The final right hand corner of the trail takes the riders back towards the start finish area just before a small rock armored area to force the rider to lose any final speed before finishing.

#### South Loop (in front of the parking area)

The South Loop starts directly across the access road from the north loop. It begins to the left hand side of the recently installed land drain with the finish descent on the right.

The Trial begins with and easy climb winding its way through the trees in front of the car park area.

As the Trial gets to the denser woodland it begins to snake more severely to gain the height at sufficient grade. This includes the hairpin corner and continues past the pond and up to the top of the area.

It maybe difficult to include a separate Red opt in on this climb as there is not much width but if we feel there is a good position to do so it will be included.

At the top of the climb there is a level plateau for rider groups to collect before the descent back to the Start/Finish area.

The descent begins with a simple roll off into a right hand berm. There is then a Red opt in to the left which heads more direct down the slope with a kicker/double over the main track line before linking back onto the main trail.

After the Opt in choice the main line continues with a rock drop before a rock armored section and into a left hand berm. The Red line then crosses over as the main trail continues to snake its way gradually down the slope.

In between each of the corners there are different Technical Trail Features all adding interest to the Trail.





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There will be one more Red opt in section before the final right hand berm which has been placed in the bottom corner of the site with a flat exit rock armored section designed to kill the riders final speed prior to reaching the finish area.

#### Skills Area (accessed midway through North Loop)

This area will be constructed to aid instructors in determining the skills of riders before continuing on the main loop. This would be used either prior or during the main Northern Loop.

As many Technical Trail Features will be included that form part of the main trail so riders understand the features that they will be asked to negotiate through out each loop.

We have designed it in such a way that it could also be used as an additional Red opt in section for the more confident riders when using the Northern loop. This could mean the whole skills area or just the top line using the link path then rejoining the main trail through the exit.

On entering the Skill Area up the steep climb there are 2 rollers to help the rider gain a small amount of speed to rise up on to the start area which is around 1m in height.

From the start area the rider go into a right hand berm before a roller then into a left hand berm, a simple rock drop then another left hand berm. The next straight consists of a rock armored area with a route round for less confident riders before an option of riding back onto the start area or riding the right hand berm. This berm take riders over a roller then table top with a more difficult rock skinny by the side before a rock drop which leads the riders back onto the main trail



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## **Specification**

The Trial line will be set out using a clinometer to determine the slope stays within the trail grades required.

Track line to finish 1m wide. This will reduce over time as vegetation grows in and the riding line is determined.

Technical Trail Features will be included throughout the trail wherever possible, including berms (banked corners). These will be constructed to maintain Trail flow and increase interest in the trail. Too many features make the trail difficult to ride, too few means the trail will become boring quickly. There will be no limited number of Technical Trail Features we will include as many as the Trail requires using our vast experience to do so.

Top 100mm of topsoil will be removed from the trail line.

Drainage will be included in the trail where required to disperse water away from the track line.

Locally sourced 20mm to dust limestone will then be laid to a compacted depth of 100mm. This product will be small enough for the trail to feel reasonable smooth but large enough for the trail no to feel rough and slow the riders flow.

4mm to dust maybe used on areas of large wear such as berms and landings to extended the longevity of the trail without sanitizing the whole trail line.

Top soil removed from track line will be disbursed across area adjacent.

## **Employee's Details**

Steve Taylor - Proposed Designer and Project Lead

Founder member of Bike Track.

Steve has been working on Trail building projects for well over 12 years. From building and maintaining the local trails to designing and managing construction of International Standard BMX Race Tracks.



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His expertise originate from racing a range of cycling disciplines up to international level from XC racing to world cup MTB 4x to downhill mountain biking. Steve brings all his expertise together to create individually designed and built trails to meet the local user group requirements weather it be a basic trail with minimal Technical Trail Features suitable for coaching or a Downhill Track suitable to hold national events Steve and the Team can meet the requirements needed.

Jordan Gould - Proposed Designer, Team Leader and Machine Operative.

Founder member of Bike Track.

As well as managing the majority Bike Track's onsite activities Jordan is heavily involved in the design procedure which is signed off by him before construction is begun. As well as being a skilled machine operative Jordan makes all decisions required for tweaking the trails during the build phase onsite. If he feels the flow of a trail could be better or TTF should be altered he has the experience and know how to make the right decision first time. He has been involved in trail builds for almost 15 years from local trails to national race tracks.

Jordan has been racing and riding bikes all his life. He begun racing BMX at 9 years old and never looked back. He continues to compete at MTB 4x in national and international events as well as selected Gravity Enduro's and BMX at a national level.

David Gregory - Machine Operative

David had been working with Bike Track for over 2 years. He has over 20 years experience creating shapes with all sizes of 360 machines and is a very experienced Mountain Biker. Prior to joining Bike Track David spent many years Building and Maintaining trails in Wharnccliffe Woods on a volunteer basis. David is well known in the Sheffield biking scene for his Digger skills when it comes to adding new features to local tracks and trails.

Dave Taylor - Consultant Designer

Founder member of Bike Track.

Dave has been riding and racing bikes since the early 80s. Beginning with BMX racing which moved onto XC MTB then Downhill MTB. He has worked in the construction industry in Sheffield for almost 25 years and has been working on local Track and Trails for the majority of this time.



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He was instrumental in the creation of 'Wheelbase' in Sheffield, the only permanent indoor BMX Race Track facility in Europe of its time around 8 years ago. In recent years Dave continues visiting European and World BMX events to support his daughter, Abbie Taylor who is current World Junior Silver Medallist and competes full time on the British Cycling's Olympic programme as well as acting as a consultant for Bike Track.

### **Timescale**

We envisage proposed works to take 6 weeks in total to complete.

We intend on using 4 employee's onsite to complete the works. This maybe increased during key phases.

### **Guarantee**

We will guarantee our work form any construction defects for a period of 6 months but this does not account for any vandalism or adverse weather conditions that may damage the track surface.



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## **Mountain Bike Trail**

### **White Hall Outdoor Education Centre, Buxton.**

	<u>Total</u>
1km of Blue Grade MTB Trail including Technical Trail Features and Red Opt in Sections as detailed (approx length).	<u>£39,770</u>
<b>Total exc. vat</b>	£39,770.00
<b>vat @ 20%</b>	£7,954.00
<b>Total inc. vat</b>	£47,724.00
 <u>Breakdown of costs:</u>	
Preliminaries	£3,550
Labour	£19,220
Plant	£7,850
Materials	<u>£9,150</u>



# Design and Build of MTB Skills Loop

Prepared for Derbyshire County Council by



25<sup>th</sup> March 2012



***A submission by:***

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## **Quotation for Skills Loop**

Following recent discussions regarding the installation of a skills training mountain bike loop, we are delighted to provide our quotation for the design and construction of the mountain bike track.

Design and Construction of mountain bike skills loop 1km in length: **£40,000.00**

### **What is included in the price:**

- All trail design
- Any tree and ground clearance for trail corridor
- Moving material into position for the track layout and berms
- Crushed stone sub base
- Crushed stone dust wearing course / riding surface
- Compaction / shaping / testing
- Grading trackside batters / general landscaping of trail corridor
- Five no: Braided skill sections allowing for a more progressive trail design

### **What is not included in the price:**

- Trail signage or any perimeter fencing.

**Breakdown for Skills Loop:**

Item	Description	Total
<u>Labour</u>	Trail Design and Build Team	£13,100.00
-		
<u>Plant</u>	2.5 T excavator	£11,100.00
-	7.5 T Excavator	
-	Dumper	
-	Dumper	
-	Haulage	
-	Whacker Plate	
-	Diesel	
-		
<u>Materials</u>	Stone sub-base	£12,800.00
	Stone Tread	
	Timber for Features	
<u>Misc</u>	Preliminaries	£3,000.00
Total		<b>£40,000.00</b>

All prices quoted are excluding VAT. VAT to be added at current rate of 20%