APPALACHIAN MOUNTAIN BIKE CLUB CONTRACT GENERAL SPECIFICATIONS

Concord Park Ballfield Trail Expansion – A Knox County Park

Executive Director

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Note: in many instances the term "client" herein includes client's representative.

SECTION 1: PROJECT DESCRIPTION AND SCOPE

SECTION 1:General Project Description

AMBC maintains large trails systems throughout the City of Knoxville, Knox County, and the surrounding counties.

The Concord Park project demands a high standard-of-care during construction activities due to some steep slopes, thick vegetation, proximity to surface water, and current and future park activities.

The area is front country, with many areas of mobile phone coverage, and is located less than one half hour from emergency medical service.

1.1 Mountain Bike-Specific Singletrack

It cannot be more strongly emphasized that this project is for purpose-built mountain bike natural-surface trails. Desired characteristics include: cambered trail surfaces, insloped turns, rolling tread, incorporation of native features, and seamless transitions between trail types. Along segments intended for more skilled trail users, optional lines available only to more-skilled riders are desirable.

In partnership with the client, the contractor will be expected to maximize the potential of the landscape hosting the trail corridors. Creativity is encouraged.

1.2 Project Scope

The work outlined in this document shall be completed by June 7, 2024.

Overall, the project's scope of work includes, in part, approximately:

2.6 miles of new trail construction:

Culverts through water crossings: TBD

Armoring square footage: TBD

Rock retaining walls square footage: TBD

The contractor will also be expected to identify and coordinate with AMBC staff one trail project per trail for the Mega Volunteer Workdays on the first Saturday in February and May. It will be expected that the contractor provides personnel to lead their project.

The Trail Construction Specifications Notes and Sections 2 through 4 in the General Specifications may differ in details and guidelines. If discrepancies arise, default to the stronger of the two and bring it to the client's attention for further instructions.

1.3 Additions and Deletions

No extras or additional work will be allowed or paid for unless such extras or additional work are ordered in writing by the client, and the price fixed and agreed upon before such work is performed. The client will not accept any overruns, nor will it pay any quantities beyond those specified.

The client shall have the right, without invalidating the contract, to make additions to or deductions from the work defined in this document, and in case such deductions or additions are made, an equitable adjustment of the addition to or deduction in cost shall be made between the client and the contractor but must be agreed to in writing.

1.4 Discrepancies

Should the contractor discover discrepancies in this and/or related documents (e.g., project details or specifications), the matter shall at once be brought to the attention of the client, and the discrepancies corrected before proceeding further.

Concord Park

Trail Construction Map

2024 Ballfield Trails Expansion

11813 S Northshore Dr.
Knoxville, TN 37922

Legend:

- Existing Trails
- New Trail Alignment: Beginner/Easy
- New Trail Alignment: Intermediate
- 103 — New Trail Alignment: Trail ID
- Trail Intersection/Hub
- Parking Area
- Construction Access Routes
- Construction Access Point
- 20' Contour
- 5' Contour

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Concord Park Ballfield Expansion Trail Schedule

Trail Number	Proposed Name	Trail Style	Trail Difficulty Rating	Direction	Tread Width	Length (ft)	Length (mi)	Average Grade	Max Grade	Feature Frequency	aMTB Ready?	Minimum Turn Radius	# of Turns in Segment	Status	Flagging Color	Trail Description	Special Considerations
101	"Slow Pitch"	MTB-Optimized Singletrack	Green/Beginner	Directional,Downhill-Only	48"+	2109'	0.4	3-7%	15%	High	Yes	15'	4	Flagged	Purple	Easy new-school singletrack starting at hub Q and ending at hub R. Trail should be beginner and aMTB-friendly with many entry-level features and options for more-advanced skill-building alternate lines. Trail should use the undulating and "lumpy" terrain to keep trail fun and "pumpy".	Mellow side slopes in some areas will require borrow pits and raised tread trail construction to maintain positive drainage and enhance flow.
102	"Infield Fly"	MTB-Optimized Directional "Flow" Trail	Blue/Intermediate	Directional, Downhill-Only	36"+	1563'	0.3	5-12%	25%+*	High	No	10'	1	Flagged	Pink	Intermediate, flowy directional downhill-only trail from hub S to hub R. Starts with a quick bermed turn onto mellow sideslopes with some interesting rolling and bumpy terrain. Some short rocky sections and mellow side slopes. Trail dives into a big gully for an exciting hip jump feature near bottom.	Lots of dead trees on ground in some sections may require significant sawyering and brush clearing. Mellow side slopes in some areas will require borrow pits and raised tread construction to maintain positive drainage and enhance flow.
103	"Seventh Inning Stretch"	"New-School" MTB-Optimized Singletrack	Blue/Intermediate	Bidirectional	36"+	3820'	0.72	5-12%	25%+*	High	No	10'	5	Flagged	Yellow	Intermediate, "new-school" feature-rich singletrack from hub P to hub T. Trail initially drops elevation and sweeps along side of ridgeline. Drops off of ridge onto mellow sideslopes and into a sinkhole area with some rock features. Slope steepens and exits quarry with lots of rock features. Provde alternate lines if necessary through rocky sections. Chicane near end of trail to scrub speed before intersection Full Count/Lago trail.	Trail should utilize as many rock features as possible to provide challenge and alternate lines. Some mellow side slopes will require borrow pits and raised tread trail construction to maintain positive drainage and enhance flow.
104	"Double Play"	"Old-School" Traditional Singletrack	Blue/Intermediate	Bidirectional	24"+	4619'	0.87	5-12%	25%+*	Low	No	8'	5	Flagged	Blue	Intermediate, "old-school" traditional rolling-contour trail construction connecting hub P to hub J. Mellow side slopes near top traversing towards old roadbed and cut bank above ballfields. Maintain a tight tread and corridor where possible to provide traditional singletrack feel.	Mellow side slopes near top will require some borrow pits and raised-tread construction to maintain positive drainage and enhance flow. Trail traverses existing cut bank above ballfields through significant thorny vegetation. Uses existing trail bed for last 100' of trail.
105	"Stolen Base"	MTB-Optimized Directional "Jump" Trail	Green/Beginner	Directional, Downhill-Only	48"+	1267'	0.24	5-12%	25%+*	Medium	Yes	15'	1	Flagged	Orange	Entry-level, "Jump" trail from hub M to hub L designed to provide an introduction to beginner-level jumping. It features a good mix of mini-berms, mini-tabletops, mini-step-up's, rollers, and flowy features spaced for beginner MTB riders.	Mellow side slopes throughout will require significant borrow-pitting and raised tread construction to promote positive drainage and enhance flow.

*Trail grades greater than 25% should consist of hardened trail tread surface or be less than 10' long.
**All trail tread should consist of natural materials.
***No fabricated wooden trail features are specified.

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Trail Specifications
2024 Ballfield Trails Expansion

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Trail Construction Specifications Notes

All trail work shall be done according to the specifications included in this document. When field conditions do not pertain to specifications provided, approval of the Owner's Representative and Designer is required for work outside of specifications.

1.1 Trail Alignment
Trail alignments have been designed and flagged in the field by Trailbender Co. These flaglines represent the centerline of trail corridor and represent an approximate desired trail alignment and approved trail corridor that extends 25' feet on either side of flagline. The Designer may approve adjustments to the flagline or corridor to improve sustainability, improve the trail experience, reduce impact, and improve build efficiency. Material, such as stone, may be harvested within this corridor as long as that harvesting does not negatively impact the trail experience or stability. Trail Contractor shall create an exact final alignment and location for each trail segment built. The alignment, location, design, and construction of each individual trail shall conform to the specifications, intent, character, and description for that specific trail as described in these specifications. If conflicts arise in trail alignments, features, armoring, or other items, the Trail Contractor shall immediately contact the Owner's Representative and Designer before proceeding. The Trail Contractor shall work with the Owner's Representative and Designer to identify the need to further refine or adjust construction notes, location or types of trails or features, and make minor adjustments as identified by the contractor.

1.2 Turns
Turns on the trail system shall be cambered/banked/bermed as necessary according to the intended riding experience, trail flow, trail speed, and difficulty. Turns shall be constructed according to industry standard design and sustainability guidelines and be built with proper drainage and grade reversals before and after the turn.

1.3 Vertical Features
Trails shall have vertical undulations such as rollers, jumps, grade reversals, pumps, and dips as necessary for the intended riding experience, trail flow, trail speed, and difficulty.

1.4 Trail Drainage
All finished tread must provide positive drainage off of the trail tread. Drainage shall promote sheet flow off of the trail tread. Where necessary, Trail Contractor will construct shallow stormwater infiltration areas and swales adjacent to the trail to maintain and manage surface water drainage from trail tread and to minimize sediment delivery downstream. These stormwater management features shall be constructed in an appropriate manner as such that they do not create a hazard to trail users.

1.5 Grade Reversals/Drains
A designed grade reversal or constructed drain shall occur at least every 100-125 feet along the trail alignment. More frequent grade reversals and drains are preferred, given that they do not interfere with the intended riding experience. Grade reversals and drains shall have cross slopes that promote positive drainage off trail (minimum 6%).

1.6 Trail Style and Riding Experience
Creativity in trail building is encouraged. Trail style is a strong suggestion, but terrain and natural features should be enhanced as they are uncovered during the build. Unique trail experience is preferred to standardized trail experience where possible.

1.7 Fill Material
Fill needed for trail construction, berms, rollers, or other features may be generated during trail excavation, or borrowed from surrounding landscape where appropriate ("borrow pits") Fill material shall be uncontaminated and free of organic material, trash, noxious weeds/seeds, and other objects.

1.8 Trail Finished Condition
Finish and grading of backslope, down slope spoils, and drainage features shall leave surface that matches the texture of the surrounding forest floor. Finished tread shall be compacted and provide positive drainage off trail. Finished tread shall incorporate fixed natural and native roots and rocks dependant on designed trail experience and difficulty rating. Cross slopes may vary, but water must exit the trail in sheet flow without causing erosion of or puddling on trail tread.

1.9 Spoils
All excavated materials not used in the trail tread or other trail structures must be stabilized and shall not be placed in drainages, swales, ephemeral streams, wetlands, or any area known to convey water during wet weather events. When possible, spoils should be mulched with native materials to discourage erosion. Any downslope spoils must be distributed to encourage drainage off the trail. Any woody debris not used in trail closure should be arranged to blend into the landscape.

1.10 Corridor Clearing
The finished trail corridor shall be clear of hazardous protrusions within a reasonable range of the trail tread such as to facilitate an enjoyable user experience. Any stumps resulting from corridor clearing should be excavated and removed if within trail tread or flush cut if within trail corridor. Stumps not removed from trail corridor should not pose an unreasonable risk.

1.11 Test Riding
Trail Contractor shall thoroughly test ride all trails and trail features, by bike with appropriately skilled rider, to ensure the specified riding experience, design, flow, rhythym, character, difficulty, and specifications are met. Trails and features shall be modified and corrected as necessary until performance specifications are met.

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Construction Notes
2024 Ballfield Trails Expansion

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SECTION 2: FINISHED TRAIL CONSTRUCTION AND MAINTENANCE GUIDELINES

2.1 Trail Design

Design of any new segments or reroutes must be guided by the sustainable trail principles circulated by accepted resources such as the current editions of the Trail Solutions; IMBA's Guide to Building Sweet Singletrack, Managing Mountain Biking; IMBA's Guide to Providing Great Riding, Bike Parks; IMBA's Guide to New School Trails, and the USDA's Trail Construction and Maintenance Notebook.

2.2 Bike-Specific Trail Flow

All trails constructed as part of this project shall be natural surface singletrack trail that is purpose-built for mountain bicyclists, commonly referred to as flow trails. A subset of the larger family of rolling contour trails, flow trails share the following basic characteristics:

Synergy with the landscape: Making the most of what the natural terrain provides by using the trail to explore the topography and features (rocks, trees, waterways) present.

Opposition to user forces: Flow trails maximize the efficiencies afforded by using a bicycle and are designed to counteract forces that direct a user off the trail. Bermed turns and cambered tread surfaces, for example, promote traction, safety, sustainability, and enjoyment.

Conservation of momentum: The ideal trail avoids "flow killers" such as sharp turns, incongruent features, and disjointed climbs and descents. Instead, it utilizes undulations and cambered turns to rewards smooth, deliberate riding and maximize forward motion. A flow trail encourages a better understanding of the bicyclist/bicycle interface, allowing riders to reach that unique sensation of floating through the landscape.

Leading the user forward: A sense of discovery, combined with a design that maximizes a rider's forward momentum, helps to draw the user forward. The trail is never repetitive or predictable, nor is it "awkward", with variety and innovation combining to create an intuitive feel.

2.3 Trail Construction Best Practices

To satisfy erosion and sediment control requirements, the trail must be finished as the project advances. Ideally, all roughed-in corridor will be finished the same day. Any segments requiring delayed finishing must be approved in advance by client.

2.4 Corridor Clearing

Corridor clearing shall be confined to within five (5) feet of trail and backslope edges. Refer to section 5.2 for new construction clearing specifications.

No restriction on cutting of trees four (4) inch diameter at breast height (dbh). Anything larger must be communicated with the project manager before cutting.

Any hazard trees must be identified and removed during construction.

2.5 Debris

Cut and scatter all branches and brush cut as part of the trail development. No debris shall be left within fifteen (15) feet of the trail. Butt-ends of any sawed limbs must face away from trail.

2.6 Tread

All tread should be constructed as full bench whenever possible. If fill is required, it should be supported by a stone retaining wall sufficient to support the proposed use.

Specific tread widths are a function of their location in the system. Specific values are enumerated in the attached Concord Park Trails Experience Construction Guidelines. Narrower gateways through natural obstacles (trees, rock outcrops) are encouraged. Tread widths in areas of dynamic flow, jump landings, and insloped turns, for example, may be wider to accommodate the full range of riding experiences. Significant deviations from these examples require approval of the client.

2.7 Rocks

Maximum size rock material to be left in the trail is a function of its location in the system. Specific values are enumerated in the attached Concord Park Trails Experience Construction Guidelines.

All rock embedded in the trail surface should be stable. When used in structures, care will be taken to match rock to the immediate surroundings; grain patterns, lichen growth, etc. Excess tool marks on rocks should be limited as much as possible. Non-native rock may be imported into a work area with approval of client.

2.8 Woody Material

Woody material such as stumps, logs, and brush shall be removed from the trail tread. No stumps less than ten (10) inches in diameter shall be left within five (5) feet of the trail tread.

2.9 Fall Zone Clearing

Areas adjacent to dynamic trail segments where visitors have a greater potential to exit the immediate trail corridor will be cleared of impact focusers; butt-end branches, stumps, and rocks under six (6) inches in diameter.

2.10 Backslope

Backslope of trail should be graded to three-to-one (3:1) slope or until it matches the existing slope. In areas where the backslope has the potential to become part of the active tread it must be finished to trail tread specifications.

2.11 Trail, Finished Condition

Hand finishing and grading of the trail tread, backslope, down-slope spoils, and drainage features shall result in a surface that matches the texture of the surrounding forest floor while enabling water to drain off the trail.

2.12 Spoils Stabilization

All excavated materials not used in the trail tread or other trail structures must be stabilized. Spoils shall be distributed in a thin layer adjacent to the trail tread. Spoils may not be placed in drainages or swales. When possible, spoils should be mulched with native materials to discourage erosion while native seed stocks reestablish. In certain circumstances, installation of formal erosion control measures may be required.

At all times, spoils stabilization must satisfy the terms of the project approval and local regulations.

2.13 Turns

All turns are insloped ("bermed"). Acceptable values for turn radii and grades across the turns are enumerated in the attached Concord Park trails Experience Construction Guidelines. Insloped turns should be constructed to have good flow for wheeled trail users. All turns must include an entrance and exit rolling grade dip. If conditions warrant, a traditional rolling crown switchback may be constructed with prior approval of client.

2.14 Grade Reversals

A designed grade reversal or constructed rolling grade dip should occur at least every sixty (60) feet and preferably more frequently. Any grade reversal must be strongly anchored to discourage short cutting.

In mountain bike-specific trails, grade reversals also double as flow elements: rollers, jumps, and pump/rhythm sections. In this context grade reversal shape, size, and placement should reflect its placement within the system. Specific details will be determined by the contractor in partnership with the client.

2.15 Above-Grade Earthen Structures

Any portion of trail rising above the grade of its surroundings must be composed of mineral soil. If soil is scarce, a rock core may be used so long as it provides less than fifty percent (50%) of the total volume of the structure. Use of organic materials, duff, woody materials, etc, is prohibited.

Fill structures must have a fill slope of at least two-to-one (2:1) or the angle of repose of the local soil, whichever is greater. A retaining wall may be substituted for a fill slope with permission of the client. Fill structures must be completely stabilized and compacted. Acceptable techniques include track-packing or compaction via a dedicated tamping unit. Hand tamping is not acceptable. Raw soil faces that do not become tread must be mulched and seeded in the same fashion as spoils and satisfy the terms of the project erosion control methodologies.

Examples of above-grade earthen structures include aggressive grade reversals ("rollers", "jumps") and turn pads on insloped switchbacks.

2.16 Water Diversions

The majority of the tread should be outsloped at five percent (5%). When not possible or desirable due to purpose-built insloping, resource concerns, or obstruction, water can be directed down the trail for up to six (6) feet before a water diversion location.

2.17 Invasive Species

To reduce the spread of invasive plant species the following protocols are required:

All hand tools and mechanized equipment must be free of invasive seeds and clean of any dirt and mud when entering a project site.

Immediately after removing machines from the site they shall be cleaned in such a manner as to remove seeds. These likely means a high-pressure wash at a commercial facility that drains wastewater to a municipal system. Proof of such cleaning may be required for payment for work performed.

2.18 Filter Strips

Filter strips are vegetated areas downslope of the trail corridor intended to treat sheet flows coming off the tread. Filter strips function by slowing down flow velocities, filtering out sediments, and providing an opportunity for infiltration into the underlying soils. Properly mulched spoils may be designated as part of the filter strip. Filter strips shall not be used as regular travel ways for equipment and materials. Areas with inadequate filter strip capacity above waterways may require installation of formal erosion control measures to satisfy erosion and sediment control methodologies.

2.19 Mechanized Equipment Best Practices

All track marks will be raked smooth. Affected area will be finished to have a nature shape, e.g., spoils piles rounded, smoothed and cleared of significant brush, blade edges blended, etc. **A spill kit suitable for five gallons of fluid will be onsite and within 200 yards of mechanized equipment whenever equipment is being operated.** Scarring of trees is to be avoided. Significant and repeated scarring may result in a financial penalty of $100 per tree over six (6) inches DBH (diameter breast height).

SECTION 3: UNIT DEFINITIONS AND DETAIL DRAWINGS

Any accompanying figures are for illustrative purposes only and do not relieve contractor of the need to satisfy written requirements.

3.1 Trail Flagging

Trail flagging encapsulates final trail design. Final design must reside within the approved corridor. Corridor is marked with purple, pink, yellow, blue, or orange hang and/or pin flags. Flags indicate centerline; the approved corridor is +/- 30 feet on either side of centerline. Placing the trail within the corridor does not alleviate the contractor from utilizing generally accepted practices for sustainable trail construction.

Some sections of the trail have been identified as "design-build" by the contractor. In these areas the contractor shall have the flexibility to build the trail in the most sustainable manner that meets the design goals of the project.

3.2 Trail Construction (figures 1 - 4)

Trail width guidelines apply to active tread only; backslope and any fill slopes are not included.

The trail corridor shall be cleared of all woody plants larger than four (4) inches DBH. The extent of corridor clearing will meet the requirements for the specific trail type. Any stumps resulting from the clearing should be excavated and removed. Any woody debris not used in trail closure should be removed from sight of the trail or arranged to blend into the landscape.

The trail tread shall consist of packed earth or rock. If not allowed by the trail design characteristics then all stumps and/or roots should be excavated and removed from the trail tread. Backslope dimensions are derived from surrounding area such that they satisfy the earlier stated three-to-one (3:1) definition. In areas where the backslope has the potential to become part of the active tread it must be finished to trail tread specifications.

The trail should contain frequent grade reversals. To encourage self-cleaning, the grade of the drains at the bottom of the grade reversals must be sloped to drain in an aggressive manner while simultaneously resisting user forces. In some cases this will require insloping with a drainage basin placed into the hillside. If grade reversals result in a fill slope, these slopes and the associated feature(s) will be finished to satisfy the above-grade earthen structure guidelines.

Any downslope spoils must be distributed such that no berm is present. Spoils must be stabilized with a covering of forest duff. In areas with insufficient duff, seed-free straw may be substituted for forest materials. Excess soil shall not be distributed into drainages or adjacent to streams.

If borrow pits are created in the course of trail construction they will be finished to satisfy the requirements of the trail and its surroundings: slopes graded to the local angle of repose, stumps and roots trimmed, spoils stabilized and covered with forest duff. Borrow pits may not form a potential injury hazard.

3.3 Armored Tread/Stone Pitching (figure 5)

Width of armored tread should be at least 1.5 times the width of the local trail specification to permit users to find their line as the trail matures, and at least two (2) times in areas where more variation is likely (e.g., jump landings, insloped turns).

Stone pitching must extend at least ten (10) inches deep with a minimum of two-thirds (2/3) of the rock buried below the surface of the surrounding grade. Stones should be stable and aligned perpendicular to the direction of travel. Each end of a pitched section shall be supported by larger "bookend" stones embedded in the ground. Stones used for armoring should be a

minimum of four (4) inches thick and a minimum of twenty-four (24) inches wide. Voids shall be filled with compacted native soil, crushed rock, and/or crusher fines. Client may require additional guide stones along the edges of the trail if the final surface of the trail appears more rugged than the adjacent landscape.

3.4 Armored Tread/Turf Block Pavers (figure 6)

Turf block pavers are an alternate armoring technique to stone pitching where it is difficult to source appropriate native stone. As turf block pavers allow a more predictable tread surface they are particularly appealing for easier trails or for flow elements where excessive tread variance is not desired (e.g., high-speed insloped turns, some constructed jump elements).

Width of armored tread should be at least 1.5 times the width of the local trail specification to permit users to find their line as the trail matures, and at least two (2) times in areas where more variation is likely (e.g., jump landings, insloped turns). Turf blocks pavers must be installed as directed by manufacturers instruction. Final installation should be nominally at-grade with the surrounding landscape. Individual paver blocks should be completely supported to reduce the chance of breakage. Height variance and joint spacing should both be less than one-half (0.5) inch. Blocks should be laid in a pattern to minimize joint lines parallel to the direction of travel. Paver voids are to be filled with local materials, compacted to reduce settling.

3.5 Rolling Grade Dip (figure 7)

The minimum length of the drain portion shall be six (6) feet and the ramp must be at least ten (10) feet long; the height differential between the bottom of the dip and the top of rise shall be approximately eight (8) inches to twenty-four (24) inches. The sides of the rise must have a slope of at least two-to-one (2:1) or the angle of repose of the local soil, whichever ratio is greater (e.g., whichever slope is more gentle).

To encourage self-cleaning, the grade of the drains at the bottom of the grade reversals must be sloped to drain in an aggressive manner while simultaneously resisting user forces. In some cases this will require insloping with a drainage basin placed into the hillside. If grade reversals result in a fill slope, these slopes and the associated feature(s) will be finished to satisfy the above-grade earthen structure guidelines.

Rolling grade dips must be sited at least twenty (20) feet uphill from significant turns in order to reduce the effects of unweighting on higher speed users. Exceptions on these dimensions and requirements may be made on a site-by-site basis to accommodate terrain constraints or to enhance the user experience. In certain locations the client may approve smaller structures reinforced with large rocks that fit the character of the trail to be an acceptable substitute.

3.6 Terrace (figure 8)

A terrace is a combination of landing, drain, retaining wall, and step useful for creating sustainable shared-use trails in steeper corridors than would be supported by the natural surface tread alone. Steps are used to accelerate the climb/descent while the use of landings between risers allows continued use by bicycles. Terraces may be incorporated in new trail construction or applied as a corrective maintenance measure.

Step risers should be constructed out of stone; rot-resistant wood may be substituted with the approval of the client. Maximum riser height is determined from the step height requirements of the trail segment. The riser shall be battered (sloped) in the direction of uphill travel. A riser may be assembled from multiple stones with the understanding it must withstand the dynamic loading of climbing and descending users.

The landing must have a minimum length of at least 1.5 times the stride or wheelbase of the longest users. Each landing must contain a drain off to the side, preferably to the downhill side; it is not acceptable for a landing to drain over its riser. The drain differential must be at least six (6) inches. The fill required to create the landing is considered part of this unit.

The downhill edge of the landing must be supported by a retaining wall of stone; rot resistant wood may be substituted with the approval of the client. The landing's retaining wall must satisfy all the requirements of a stand-alone wall (see 5.7).

3.7 Rock Retaining Wall (figure 9)

The measurement unit of a rock retaining wall is square feet, calculated from the exposed vertical face. Rock retaining walls should be stable and battered (inclined back into the slope) a minimum of fifteen percent (15%) from vertical. All walls should have rubble backfill of at least six (6) inches in depth behind the wall to allow for drainage and to prevent damage from frost heaves. The base of the wall should be placed on firm compacted mineral soil or rock outcroppings. Any small stones used to "chink" larger stones in place should be placed in the back of the wall. The top of the wall shall not be counted in the width of the trail tread. The top layer of stones shall be installed in a manner to avoid being accidentally dislodged by trail users. Deadmen (stones that extend from the wall into the slope) should be used to ensure integrity. There should one deadman for every half (0.5) square yard of wall.

3.8 Rock Armored Ford (figure 10)

Grade reversals will be created in the trail tread prior to the crossing on each bank. Maximum grade on each approach is thirty percent (30%) for a maximum distance of fifty (50) feet. Armored tread surface will extend through the stream and up the banks until a grade of less than fifteen percent (15%) can be achieved. The armored tread will be flush with the stream bottom to discourage failures from cavitation. Armoring will extend downstream one-half (1/2) the required maximum tread width of trail tread to discourage headcutting.

3.9 Constructed Turn/Insloped Turn (figure 11)

The insloped turn unit includes armoring and drainage features associated with the structure.

Each insloped turn requires a Grade Reversal or Rolling Grade Dip before and after; these shall not be counted as separate units for cost estimating or payment purposes. The dips for these drainage features should be a minimum of six (6) feet long. To encourage self-cleaning, the grade of the drains at the bottom of the grade reversals must be sloped to drain in an aggressive manner while simultaneously resisting user forces. In some cases this will require insloping with a drainage basin placed into the hillside. If grade reversals result in a fill slope, these slopes and the associated feature(s) will be finished to satisfy the above-grade earthen structure guidelines. The uphill dip should be sited to minimize unweighting effects for higher speed users except where warranted and desired on expert or advanced trails.

Specifications for radius and cross slope across the turn are enumerated in the attached Concord Park Trails Experience Construction Guidelines. Turning radii should be consistent. Turns with a running grade of twenty percent (20%) or greater in the apex should have a rock armored drain twenty-four (24) inches wide following the inside the turn. If multiple turns are required, they will be sited to minimize "stacking".

3.10 Constructed Turn/Insloped Switchback

The switchback unit includes any walls, armoring, and drainage features associated with the structure.

Each insloped switchback requires a Grade Reversal or Rolling Grade Dip before and after; these shall not be counted as separate units for cost estimating or payment purposes. The dips for these drainage features should be a minimum of six (6) feet long. To encourage self-cleaning, the grade of the drains at the bottom of the grade reversals must be sloped to drain in an aggressive manner while simultaneously resisting user forces. In some cases this will require insloping with a drainage basin placed into the hillside. If grade reversals result in a fill slope, these slopes and the associated feature(s) will be finished to satisfy the above-grade earthen structure guidelines. The

uphill dip should be sited to minimize unweighting effects for higher speed users except where warranted and desired on expert or advanced trails.

All switchbacks will be constructed with an insloped turnpad. Specifications for radius and cross slope across the turn are enumerated in the attached Concord Park Trails Experience Construction Guidelines. Turning radii should be consistent. Turns with a running grade of twenty percent (20%) or greater in the apex should have a rock armored drain twenty-four (24) inches wide following the inside of the turn. Interior of legs shall be anchored by and filled with large rocks and/or woody debris to discourage shortcutting.

Fill structure for turnpads will comply with composition, compaction, and fill slope requirements of an Above-Grade Earthen Structure. Client may require that a retaining wall be employed in place of a fill slope. Any retaining structures will be constructed of stone and comply with all Rock Retaining Wall specifications. If multiple switchbacks are required, they will be sited to minimize "stacking".

3.11 Technical Trail Feature Boardwalk (figure 12)

Detailed design of any Technical Trail Feature (TTF) will be a collaborative effort between the contractor and the client. Design specifications will be derived from the trail specifications of the host segment and adhere to current best practices for the design and construction of TTFs.

Wooden TTFs should be designed and constructed by an experienced professional. Rot-resistant materials must be employed. Manufactured materials should be rough-cut or finished with a slip-prevention coating to maximize traction. Fasteners must be intended for outdoor use and matched to the material to insure long-term integrity. Approaches and configuration of TTFs shall be adjusted to reduce the accumulation of organic material on the deck surface. A fall zone sufficient to accommodate the likely trajectory of a trail user accidentally leaving the TTF shall be cleared of all materials that could focus impact (e.g., stumps, sharp rocks, woody materials).

TTFs should have a playful and organic appearance to better match the natural environment. Recommendations include curved structures instead of straight lines or angles and trail decks that pitch, yaw, and vary in width.

3.12 Reconstruct Tread

Any tread reconstruction should match the new trail construction listed above.

3.13 Rock Riprap

Rock Riprap is a six (6) inch deep layer of placed stone intended to stabilize slopes with concentrated storm flow. Typically, this technique will be used to protect drains of rolling grade dips and drainage channels below an armored crossing. Individual stones should be gabion-class or equivalent. Rock Riprap is measured by the square yard.

3.14 Trail Closure (figure 13)

Existing compacted tread shall be scarified to encourage regrowth of native seed stock. Exposed soils will be covered with local leaf litter, duff, and/or imported material as deemed appropriate by the client. Trail tread will be disguised with woody debris if any is available. If trail is incised, check dams will be placed at a minimum of every twenty-five (25) feet to capture sediment. If the trail is actively eroding, grade reversals will be added to stem continued damage. The trail corridor will be erased via the placement of vertical debris if available. If the length of trail to be closed is greater than one hundred (100) feet, the vertical debris must extend a minimum of fifty (50) feet from each end.

3.15 Modifications

Modifications to the specifications may be allowed but must be made by the client in writing.

Figures

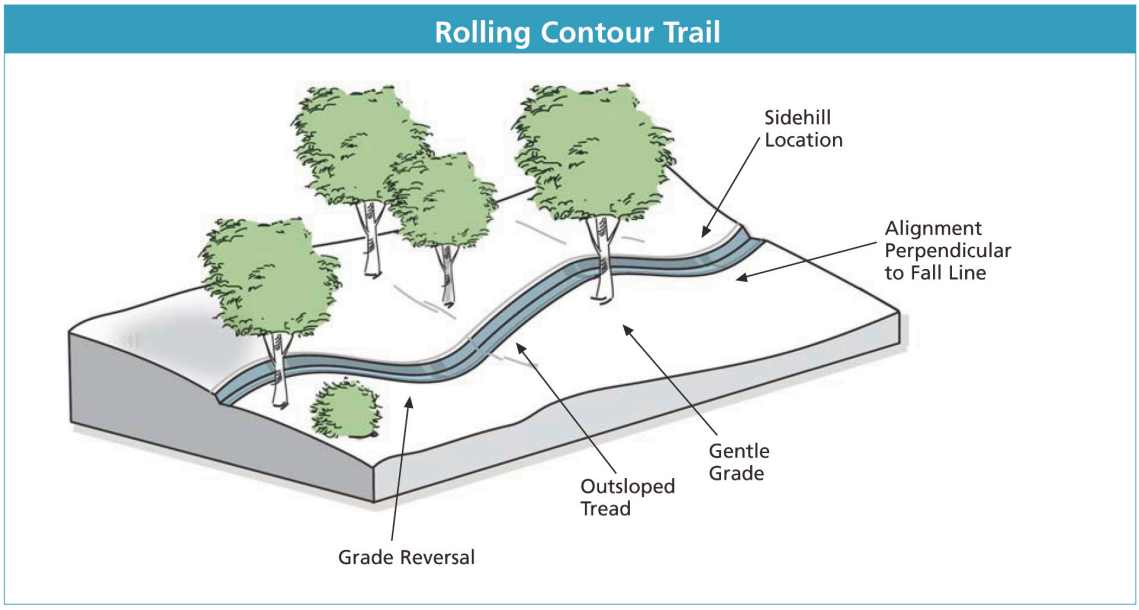


Figure 1: Rolling Contour Trail

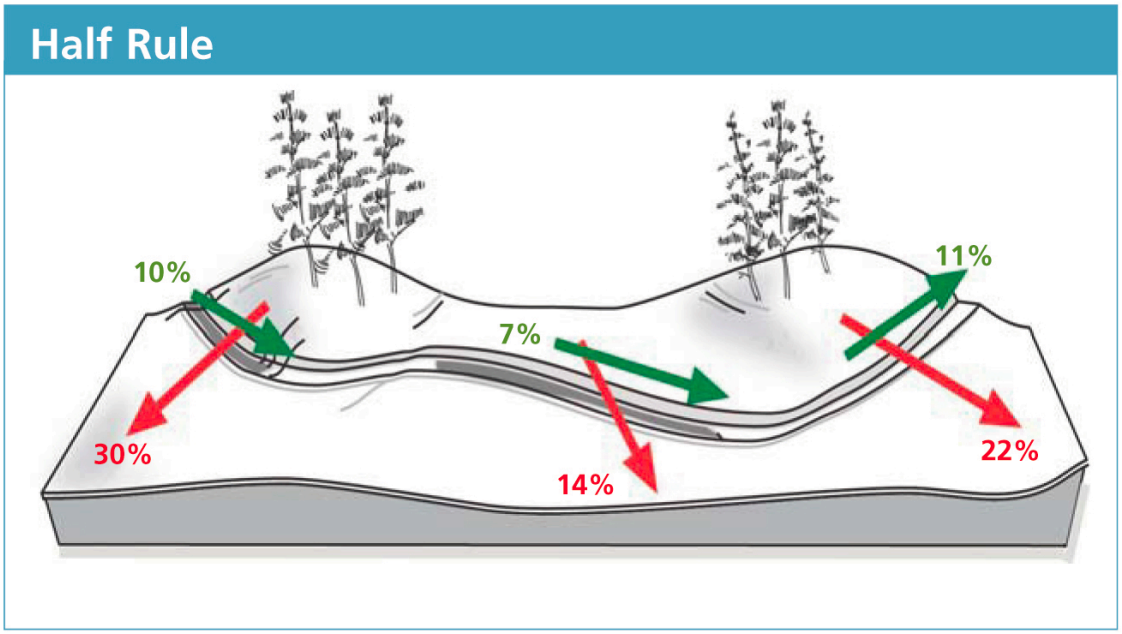


Figure 2: Illustration of The Half Rule

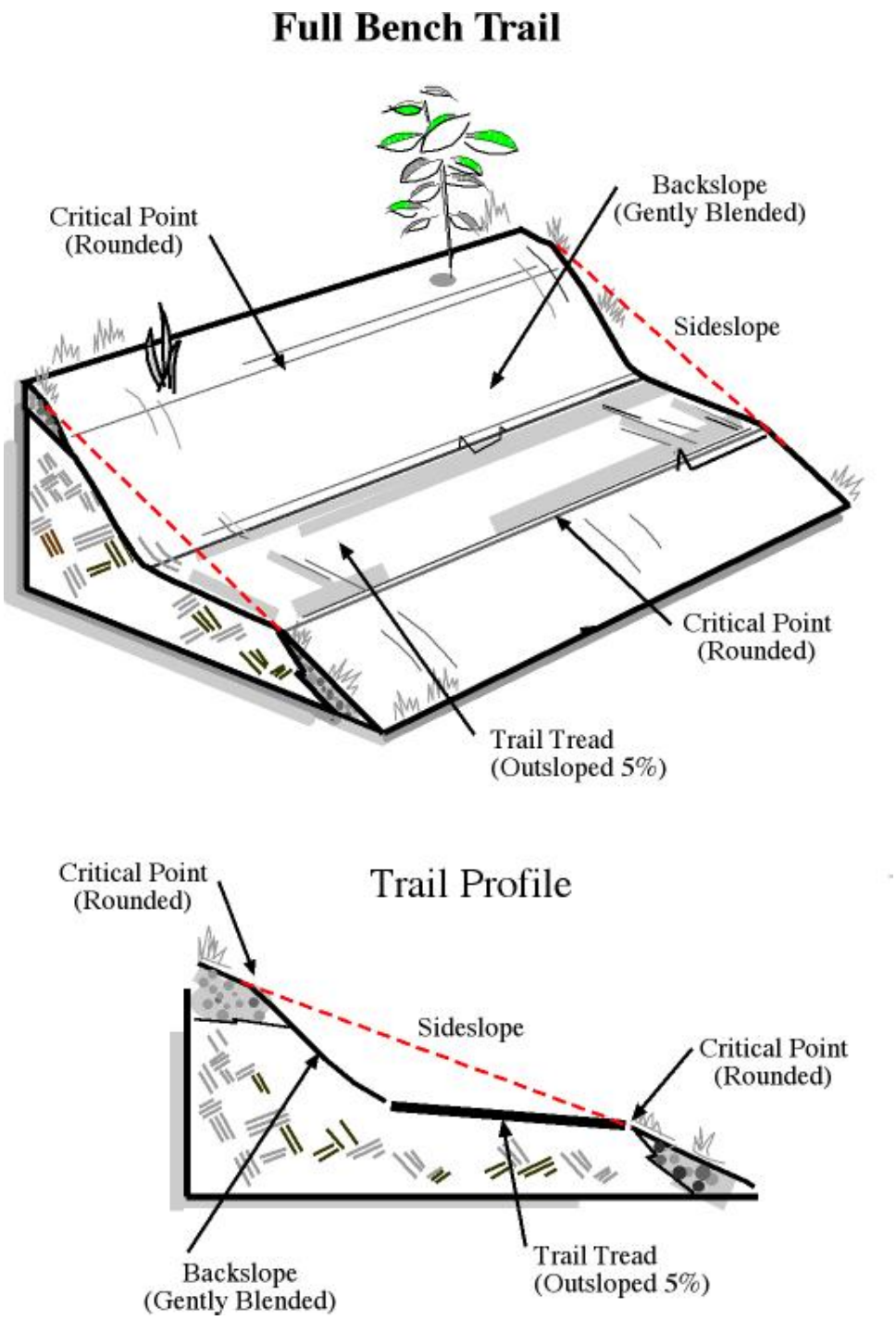
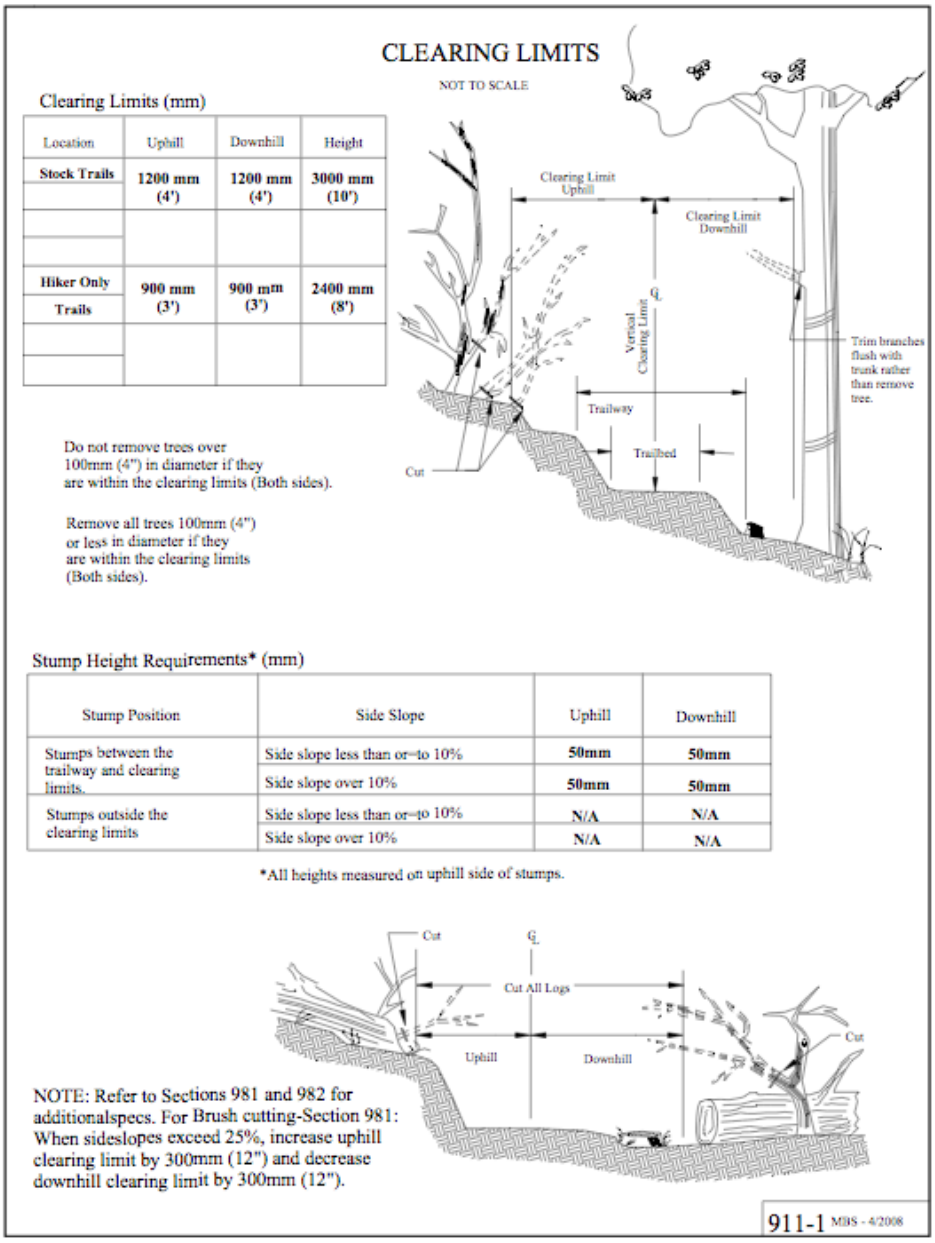


Figure 3: Full Bench Trail

Refer to Concord Park Trails Experience Construction Guidelines



CLEARING LIMITS

NOT TO SCALE

Clearing Limits (mm)

Location	Uphill	Downhill	Height
Stock Trails	**1200 mm (4')**	**1200 mm (4')**	**3000 mm (10')**
Hiker Only Trails	**900 mm (3')**	**900 mm (3')**	**2400 mm (8')**

Do not remove trees over 100mm (4") in diameter if they are within the clearing limits (Both sides).

Remove all trees 100mm (4") or less in diameter if they are within the clearing limits (Both sides).

Stump Height Requirements* (mm)

Stump Position	Side Slope	Uphill	Downhill
Stumps between the trailway and clearing limits.	Side slope less than or=to 10%	**50mm**	**50mm**
	Side slope over 10%	**50mm**	**50mm**
Stumps outside the clearing limits	Side slope less than or=to 10%	**N/A**	**N/A**
	Side slope over 10%	**N/A**	**N/A**

*All heights measured on uphill side of stumps.

NOTE: Refer to Sections 981 and 982 for additionalspecs. For Brush cutting-Section 981: When sideslopes exceed 25%, increase uphill clearing limit by 300mm (12") and decrease downhill clearing limit by 300mm (12").

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Figure 4: Clearing limits

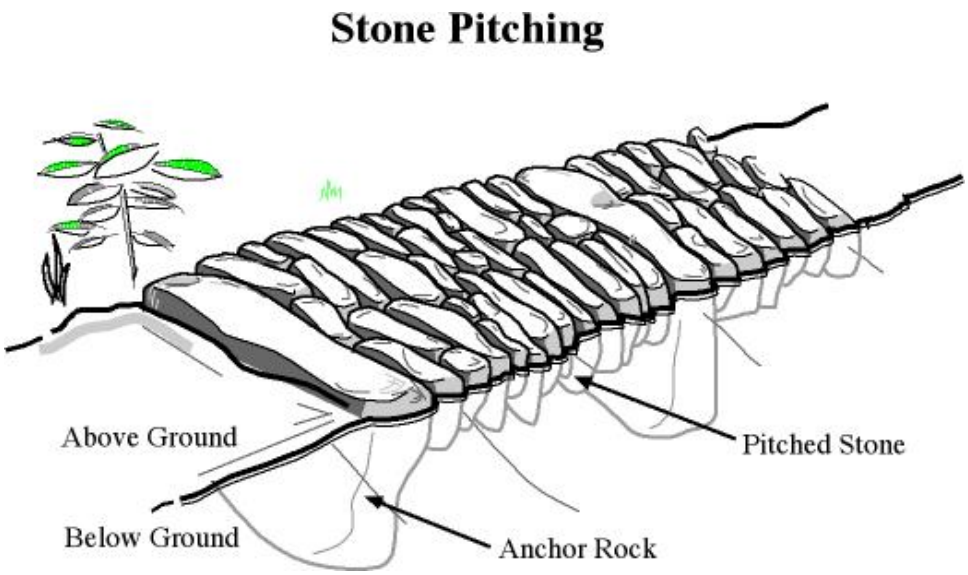


Figure 5: Stone Pitching

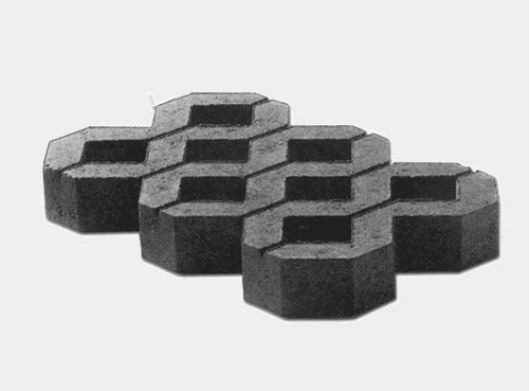


Figure 6: Turf Block Pavers

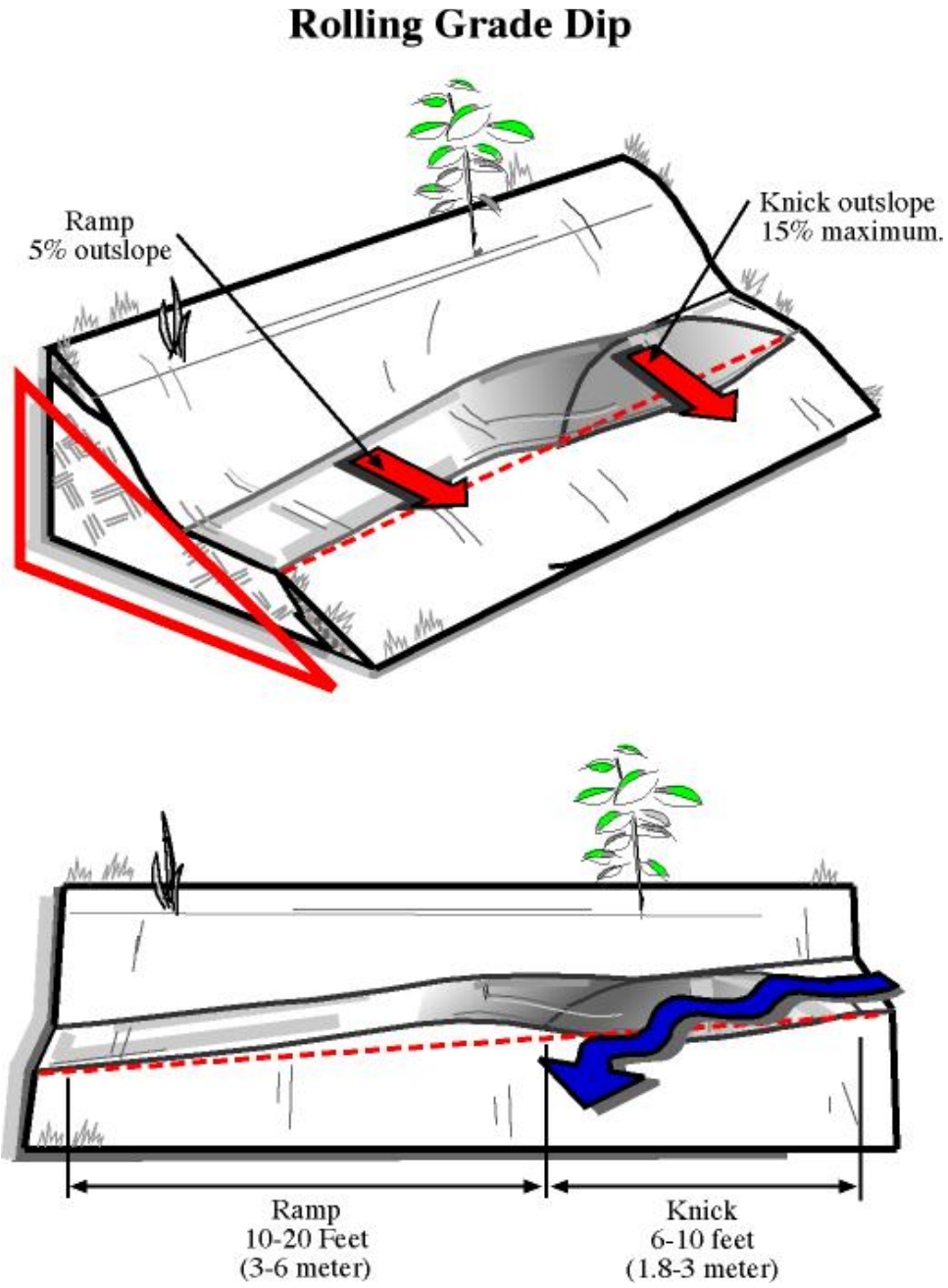


Figure 7: Rolling Grade Dip

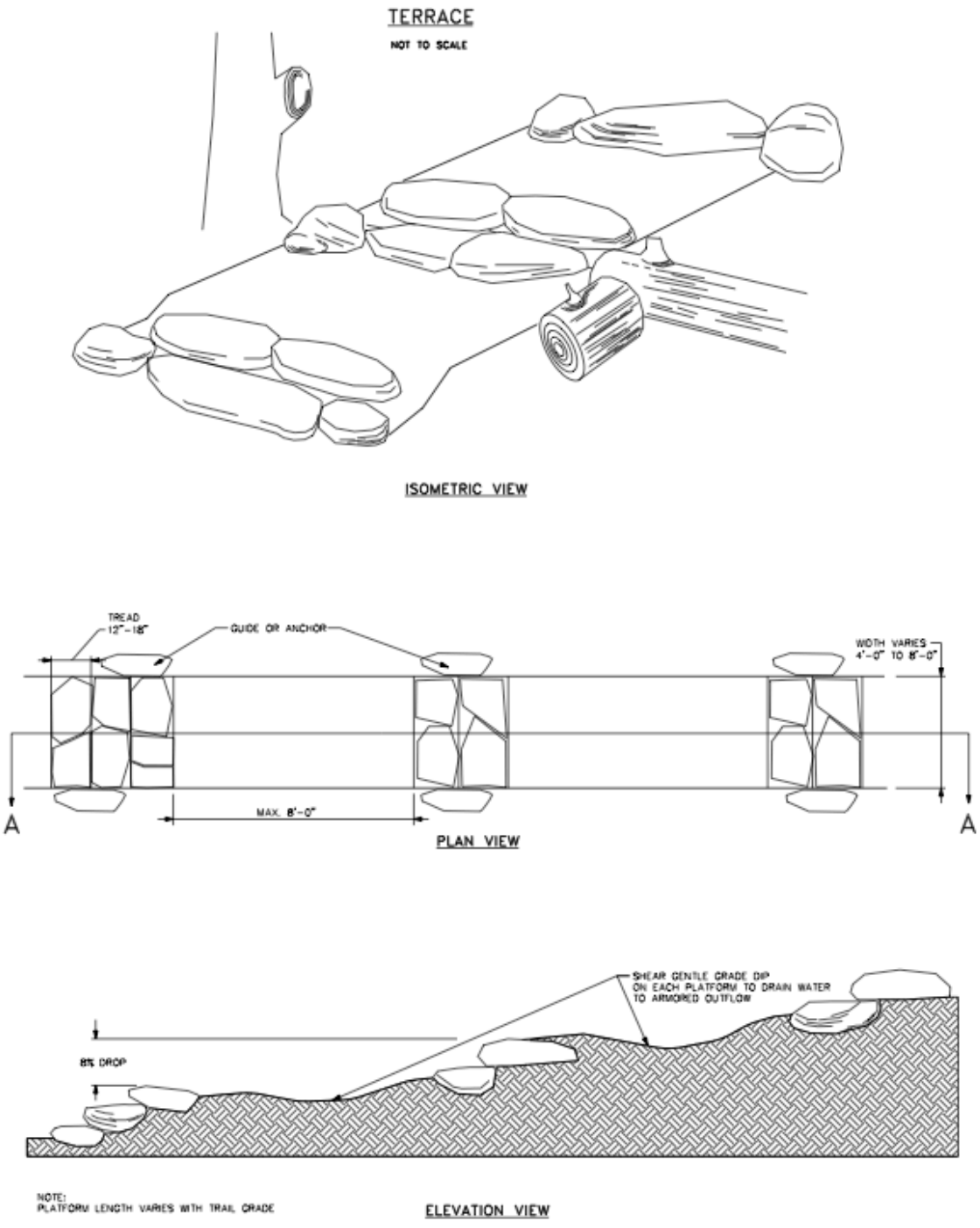
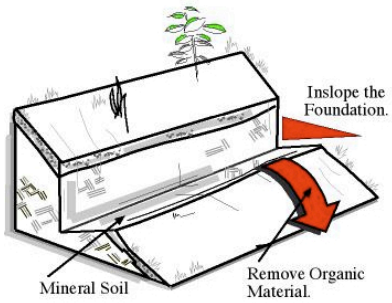
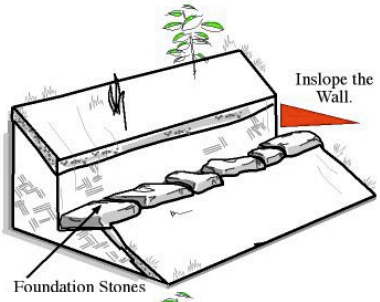
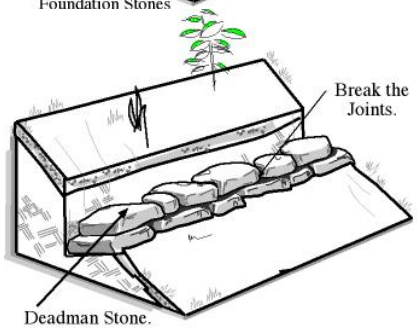


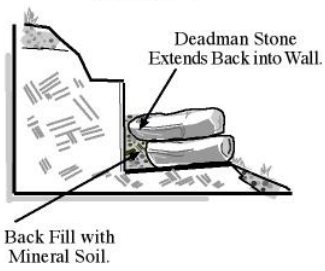
Figure 8: Terrace







Wall Profile



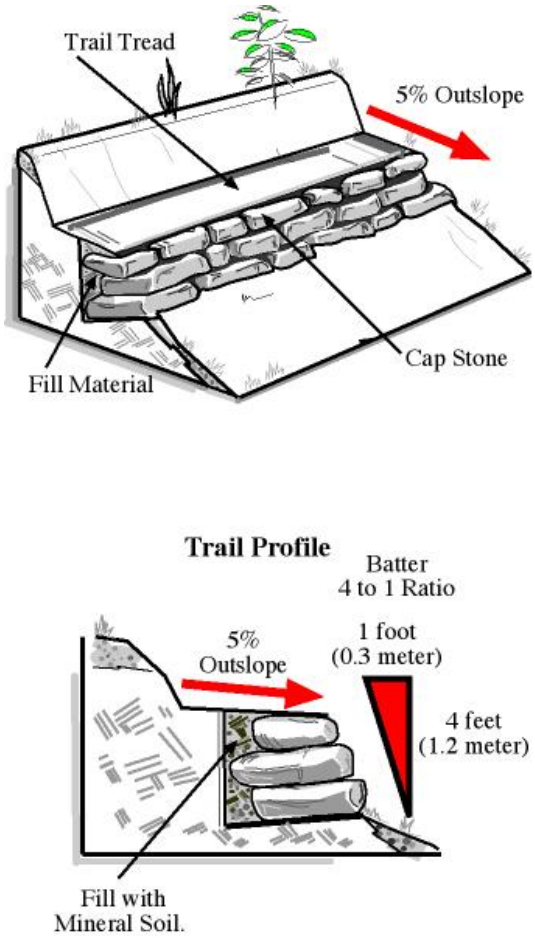


Figure 9: Rock Retaining Wall

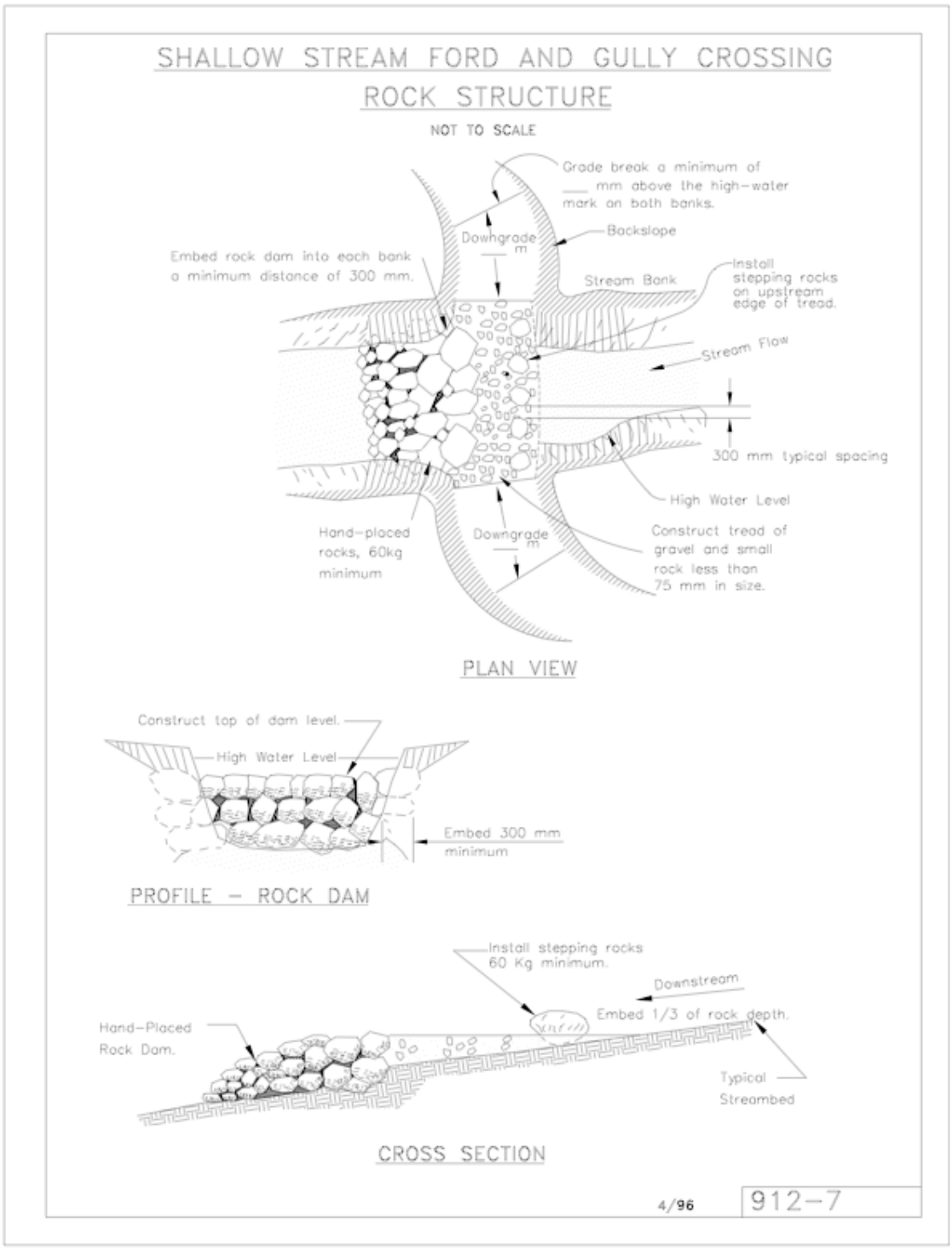


Figure 10: Rock Armored Ford

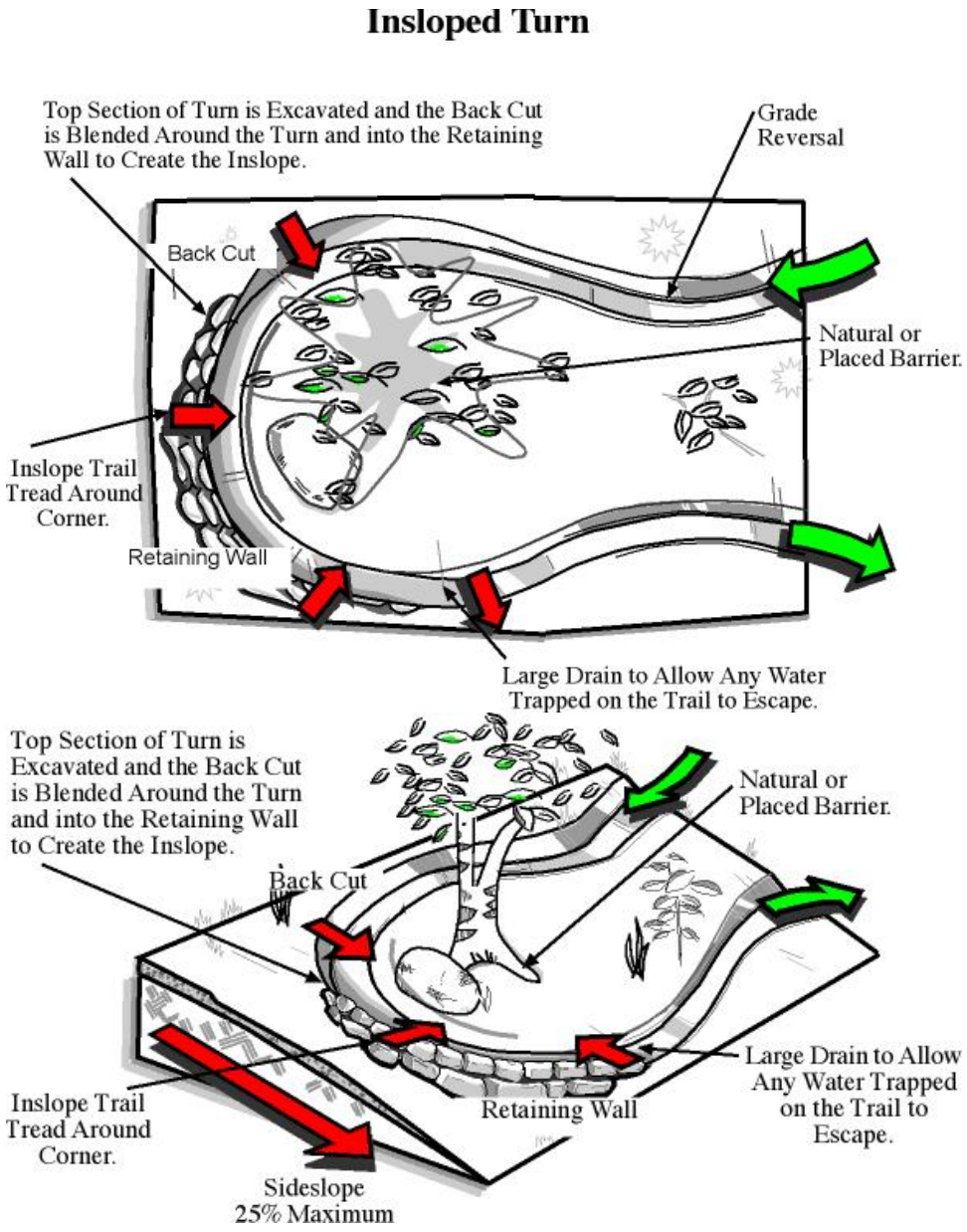


Figure 11: Insloped Turn

Figure 12: Technical Trail Feature Boardwalk

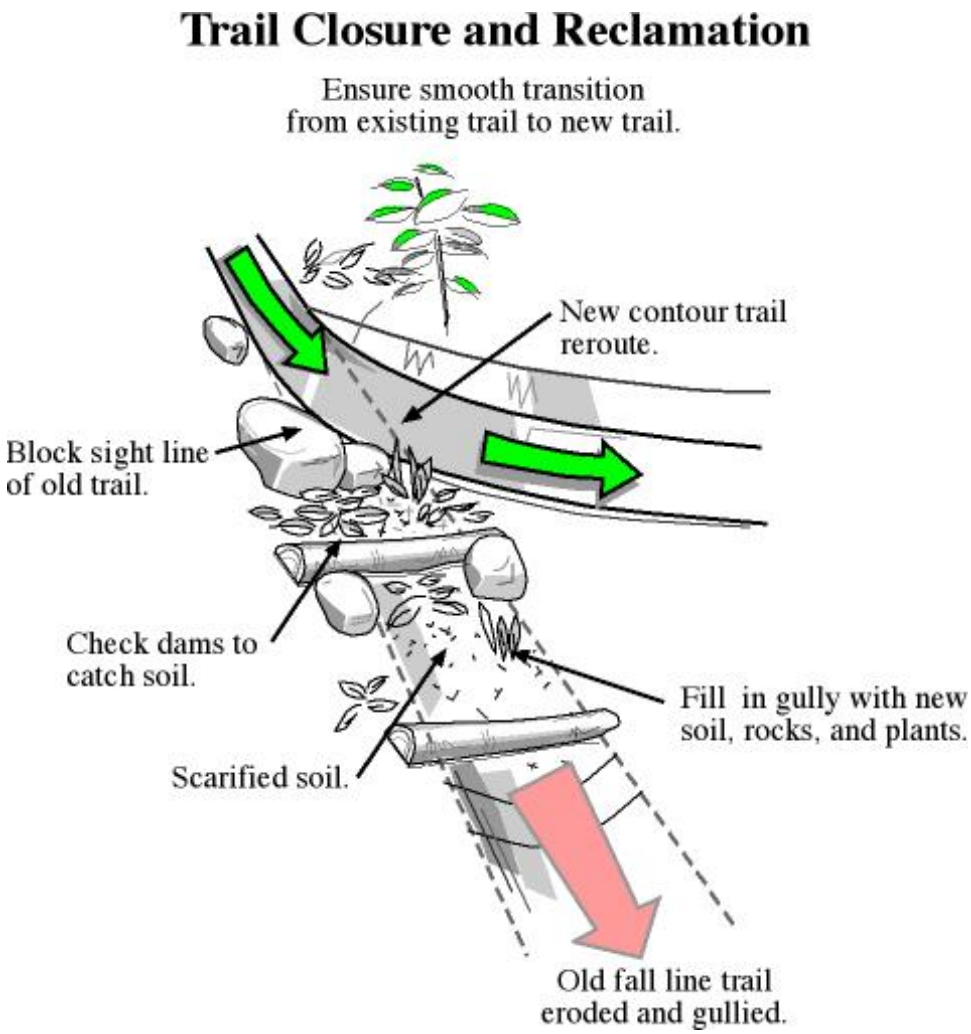


Figure 13: Trail Closure

SECTION 4: CONTRACTOR QUALIFICATIONS, REQUIREMENTS, AND RESPONSIBILITIES

4.1 Mountain Bike-Optimized Experience

This project is a mountain bike-optimized natural surface trail. Mountain bike-optimized trail is that which maximizes the fun and efficiency of the bicycling experience through the provision of trail features and macro- and micro-design techniques. Desired characteristics include: cambered trail surfaces to counter user forces, insloped turns, aggressively rolling terrain, incorporation of native rock features, and seamless transitions between trail types. Trail features and flow should progress as a user gets deeper into the system; larger, tighter, more narrow examples of similar elements moving from "green" (easier) to "blue" (more difficult) to "black" (most difficult) areas. Along segments intended for more skilled trail users, optional lines available only to more-skilled riders are highly desirable.

In partnership with the client, the contractor will be expected to maximize the potential of the landscape hosting the trail corridors. Creativity is encouraged. Client is the final arbiter of the correctness of completed work. Inspection of work will be both visual and dynamic. The client will validate the riding experience of each sub-project as a prerequisite to final approval. Sections that do not ride properly will be improved and/or rebuilt until they are deemed acceptable to client; contractor will not be paid for partial or incomplete work, or work that does not meet the requirements, implicit and explicit of this contract.

4.2 Tools

The contractor shall perform the required work using hand tools and/or small mechanized equipment. The various widths are referenced in the trail schedule. Some sites may not be suitable for equipment this large and other sites may not be suitable for any mechanized equipment regardless of size due to terrain constraints. Permanent modification of trail outside the scope of work to accommodate equipment access (e.g., widening of an existing trail or creation of a permanent access route) is not desirable and must be specifically approved by in advance by the client.

4.3 Mechanized Equipment

All mechanized equipment shall be in good mechanical condition, free of any fluid leaks, be equipped with spark arrestors if applicable, and have fire extinguishers mounted.

All equipment will be clean and free of debris before introduced to work site. Equipment is subject to inspection at the start and during the project.

Any equipment that appears to not meet these criteria shall be removed from the project site at the request of the client and at no additional cost to the client.

4.4 Backcountry Protocol

The Contractor's crew shall be familiar with backcountry operation and safety protocols as well as be familiar and adept at "leave no trace" practices.

4.5 Timetable

The contractor shall be ready to initiate the project in earnest within two weeks of the contract being finalized. The project is to be completed by June 7, 2024.

4.6 Meetings and Progress Reviews

The contractor shall meet with the client at the beginning of each workweek or as otherwise agreed upon by both parties to review progress and project expectations for the week.

4.7 What Contractor Provides

The contractor shall provide the necessary supervision, equipment, materials, and tools to perform specified trail maintenance and trail construction on identified trails and sites, including fuel for any mechanized equipment/tools and any and all personal protection and safety equipment.

4.8 Food and Water

The contractor shall be responsible for providing food and water for self and staff.

4.9 Public Safety

The contractor shall ensure that reasonable precautions are taken to protect the public at all times where work is being performed. This could include temporary fencing, signage, and physical trail closures.

4.10 Employee/Subcontractor Conduct

All of the contractor's employees and subcontractors shall conduct themselves in a proper manner at all times. Intoxication or any unsafe behavior by the contractor's employees while performing duties related to this contract is strictly prohibited. The contractor will be required to remove from the site any individual whose continued employment or retainer is deemed to be contrary to the public interest or inconsistent with the best interests of this trail construction project and will not use such individual to perform services under this contract.

4.11 Competence

The contractor may be required to immediately remove from the worksite any employee or subcontractor of the contractor who is incompetent or who endangers persons or property or whose physical or mental condition is such that it would impair the employee's/subcontractor's ability to satisfactorily perform the work. Notification to the contractor shall be made by telephone promptly and confirmed in writing as soon as possible. No such removal shall reduce the contractor's obligation to perform all work required under this contract.

4.12 Compliance with Modern Practices

All work shall be performed and completed in a thoroughly skillful, efficient, and professional manner in accordance with best modern practices, regardless of any omissions from the attached specifications and/or drawings.

4.13 Condition of Materials and Equipment

All materials and equipment incorporated into the trail shall be new or otherwise in good working order and shall comply with the applicable standard in every case where such a standard has been established for the particular type of material in question.

4.14 Disposal of Materials and Supplies Not Approved

Materials, supplies, etc., that have been delivered to the job but do not comply with specifications and have not been approved shall be immediately replaced by the contractor at the contractor's expense. The contractor shall replace goods with material, supplies, etc., in full accordance with the specifications.

4.15 Disposal of Materials and Supplies Not Used

Materials, supplies, etc., have been delivered to the job but are not used shall be removed from the site and properly disposed by the contractor at the contractor's expense.

4.16 Use of Premises – Storage

Contractor shall confine its apparatus, storage of materials, and operation of its employees/subcontractors to limits indicated by law, ordinance, permits, and/or directions of the client, and shall not unreasonably encumber the premises with it's materials. Before any work is undertaken the contractor shall consult with the client's representative and secure from client the use of such space as may be available for the storage of materials and/or equipment. Contractor will be held responsible for any damage done in connection with the use of this location for storage.

4.17 Trail Rehabilitation

The contractor shall rehabilitate sections of trail that will be closed as a result of trail realignment. Any travelways created as a result of construction and/or ingress/egress will be restored to their original condition.

4.18 Use of Subcontractors

The contractor shall be able to use subcontractors to complete the work provided the subcontractors are described in the bid submission. Use of subcontractors not described in the bid submission will only be allowed with written permission of the client.

4.19 Permits

The contractor shall be responsible for obtaining necessary permits. Necessary permit information will be provided by client.

SECTION 5:Concord Park Trails Experience Construction Guidelines

5.1 Overview

AMBC maintains large tracts of land for trail recreation. The trail network is intended to both provide recreational opportunities for local residents and to draw visitors to the area.

The project area is located near the ball fields off of S. Northshore Drive at Concord Park – A Knox County Park. Trail length is approximately 2.6 miles with a 3% - 12% average grade. The maximum elevation is approximately 950' and the minimum elevation is approximately 820'.

5.2 Desired Trail Experiences

The new Concord Park trails are targeted to the largest segment of mountain bikers: enthusiast riders with intermediate-level skills.

5.3 Primary Trail Experiences

Based on the desires identified by the community the primary trail experiences for the Concord Park trails shall be:

1) Play

Play is a defining characteristic between mountain biking and other non-motorized trail uses. The Concord Park trails should focus on the journey and not the destination, with alignments and features that encourage repeat use to maximize the enjoyment of riding the network. People should want to ride the trails primarily for the pleasure of riding.

2) Challenge

The trails should be technically stimulating for riders in either direction given the intermediate-level difficulty rating. Challenging trails reward skill and are in high demand for riders as they seek to improve their expertise. This is not to say that the trails should be hard; with intermediate-rated trails the challenge comes from incrementally improving one's skills over time to unlock the subtle efficiencies of flow and momentum. The trails should not be straight or contain extended constant grades as these decrease the skills needed to navigate the trail.

These characteristics will vary in primacy based on the landscape, terrain, trail density, proximity to developed facilities (e.g., roads), and other factors.

5.4 Difficulty Rating

The trails have been designed most appropriate for primarily intermediate-level riders ("blue square") as this will appeal to the broadest range of trail users. The blue square rating has the most variability within it and can appeal to children with moderate bicycle-handling skills as well as seasoned enthusiasts.

In addition, one beginner trail ("green circle") is planned to accommodate new riders.

5.5 Existing Conditions

Vegetation is typical of that seen in recently harvested southeast forests. Understory is a mix of shrubs, small trees, and various invasive species. Depending on the sideslope and historic vegetation populations the organic layer can vary greatly.

Surface soils are mostly clay loam with clay being found deeper for borrow pitting . These soils exhibit moderate compaction and adhesive capacity to withstand typical forces exerted on the trail tread by mountain bicycling (braking, turning, climbing).

5.6 Feasible Trails for the Landscape

Given the typical terrain, vegetation, and soils it is possible to develop bike-optimized singletrack trails that offer a wide range of experiences, including those that highlight the primary experience characteristics of Play and Challenge.

5.7 Alignment

The approved corridor is 30' from centerline (60' corridor width overall). Changes to the approved flag line must be approved by the Concord Park project manager.

5.8 Design Specifications

The physical characteristics of a trail combine to define the experiences that people will have on the trail. Play and Challenge will be achieved through a meandering tread with variable sinuosity. The trail will provide a consistently enjoyable experience for riders in either direction; some trails will be maximized for Play and Challenge in either an ascending or descending direction, but the trail will not be heavily manipulated in a manner commonly associated with "flow" trails.

Optional lines are allowed and encouraged for descending-direction riders if they do not impede bi-directional trail movement on the bi-directional trails.

5.9 Construction Specifications

Management of the organic layer must be taken into consideration during construction. Best management practices include stockpiling castings during construction and then dispersing the organic layer onto upper and lower shoulders of the tread footprint behind the tread excavation. Application of these spoils will speed the revegetation process and create a natural setting for the trail corridor versus a barren swath.

When possible, route trail onto uphill side of trees to avoid cutting roots, particularly on large trees. When possible, do not excavate tread above and immediately adjacent to large trees but rather fill over large roots. This will protect the health of the tree and provide a more "rustic" trail experience in line with both the Play and Challenge experiences.

Drainages will be crossed primarily using culverts. The trail approaches to a drainage must slope away from the drainage to minimize the risk of the drainage "jumping" onto the trail.

Trail Characteristic/Feature	Value	Description
Finished tread width, 0% - 20% sideslope	18" - 30"	
Finished tread width, 21% - 40% sideslope	24" - 36"	
Finished tread width, 40%+ sideslope	36" - 40"	
Clearance width	12" - 36"	Each side from edge of trail
Outslope	0% - 7%	Avoid aggressive outsloping for purposes of drainage; use grade reversals instead
Inslope	0% - 7%	Avoid aggressive insloping to avoid the sensation of a "flow trail".
Average grade, soil	7%	
Maximum grade, soil	20%	Maximum length of segment = 30'
Maximum grade, rock or armored, climbing	30%	Maximum length of segment = 15'
Maximum grade, rock or armored, descending	30%	Maximum length of segment = 15'
Maximum grade, soil, optional lines	20%	Maximum length of segment = 20'
Maximum grade, rock or armored, optional lines	20%	Maximum length of segment = unlimited
Grade reversal, frequency (trough-to-trough)	50'	More than outslope, grade reversals will be responsbile for draining the tread. Grade reversals should not make the trail feel "hyperkinetic" or resemble a pump track. Instead, the natural terrain should be "surfed" to take advantage of microtopography.
Turn radius	5' – 8'	"Switchberm" style turns with tighter radii and minimal berming necessary only to resist turning forces. Maximum berm height = 12". Backsides of berms must be filled at 1:2.
Roughness/texture	6"	Relief from surround typical soil-based tread
Roughness/texture, optional lines	12"	Relief from surround typical soil-based tread
Sightlines	Variable	Based on speed. If vegetation precludes good sightlines then the trail should be designed and built to control speed in a manner consistent with the available sightlines.
TTFs, natural, unavoidable	Allowed, encouraged	Encourage root- and rock-based TTFs to meet Challenge and Escape experiences. Must meet other criteria.
TTFs, natural, optional lines	Allowed, encouraged	Encourage root- and rock-based TTFs to meet Challenge and Escape experiences. May exceed criteria by 100%.
MTTFs, unavoidable	Not allowed	
MTTFs, optional lines	Not allowed	