



To: Chairman Clancy and Avon Planning and Zoning Commission
From: Matt Pielsticker, Planning Director
Date: August 8, 2016
RE: Town of Avon 2016 Recreational Trails Master Plan
Public Hearing on August 16, 2016

Summary

Attached is the *Town of Avon 2016 Recreational Trails Master Plan* (“*Trails Plan*”). At the direction of Town Council, the *Trails Plan* has been developed to evaluate potentials for additional trails within the Town boundaries, and to address the management, maintenance, and development of the new trails and the currently existing trails. The Town retained Olsson Associates, as planning consultant to the Town, and a Town Steering Committee oversaw the *Trails Plan* development to ensure it was developed as a comprehensive review of all Town-owned land for potential trail development or non-development, rules of etiquette and estimated costs for new trail development.

It is the responsibility of the Planning and Zoning Commission (“PZC”) to make a recommendation to the Town Council on a master plan adoption. As a courtesy to you and to the public, the *Trails Plan* is being released today to provide adequate time for public comment prior to the PZC meeting on August 16th. Consultant Alex Nees will attend the meeting.

No Recommendation on New Trail Development

The Town Council requested that the Colorado Parks and Wildlife (CPW) Division review the *Trails Plan* prior to a formulating a recommendation for new trail development. The CPW assessment was received by the Town in a letter dated July 21, 2016. The letter, which is provided as Appendix F, recommended:

- No development in the vicinity of Metcalf Creek. This means cutting ALL proposed P Trails with the exception of P6.
- No further development in the West Avon Preserve, so the P8 Wild West-Wyse Way connection would be out.
- Reduce the proposal for the East Avon Preserve to unspecified “trail development” until the easement is completed.
- No races on any trails.
- No commercial use on any trails.
- Sunrise-to-sunset use only; all Town trails closed after sunset.
- Recommend seasonal closure on all other trails (except P6) from December 1st to June 15th.

Upon receiving the CPW comments, the Steering Committee concluded the decision on new trail development, if any, was more appropriately a decision for the PZC, as a recommending body, and the Town Council. As a result, before the PZC is a determination on new trail development. The *Trails Plan* does provide possible options.

Public Comment

Citizen comments have been received prior to the *Trails Plan* completion and release today. All of the written public comments received to date and through this week will be collated and summarized on August 12, 2016. These comments will be available for review on the Town's website at www.avon.org/trails. Email communication and letters will continue to be accepted into the public record, at any time, by sending comments to Avon's Town Clerk Debbie Hoppe at dhoppe@avon.org.

Next Steps

- August 12, 2016: Staff Report to PZC on Comprehensive Plan process and review criteria for considering *Trails Plan*
- August 16, 2016: PZC Public Hearing at 5pm, Avon Council Chambers. Additional Public Hearing(s) will be held, if necessary, prior to a formal recommendation on the *Trails Plan* to Town Council.
- TBD: Avon Town Council will consider the plan after the PZC recommendation is received. Action to adopt the *Trails Plan* is by ordinance, first and second readings.

Ex Parte Communication

Notice for the PZC meeting was advertised in the *Vail Daily* on August 4, 2016. With the item now set for a public hearing, please be advised that any communication with the public since August 4, 2016 and until action by the PZC will be considered ex parte and must be disclosed prior to the beginning of the public hearing. It is recommended that you curtail individual conversations and encourage all persons to write a comment or attend the meeting.

Attachment

Town of Avon 2016 Recreational Trails Master Plan

2016 Recreational Trails Master Plan

Prepared for:

Town of Avon

1 Lake Street
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Prepared by:

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DRAFT FOR PUBLIC REVIEW



The Town of Avon

Thanks

The members of the Steering Committee for their time, interest and guidance in ensuring the Trails Master Plan was developed as a comprehensive review of all Town-owned land for potential trail development or non-development, rules of etiquette and estimated costs for new trail development.

Steering Committee Members

Fritz Bratschie

Markian Feduschak

Paula O’Leary

Charlie Sherwood

Peter Warren

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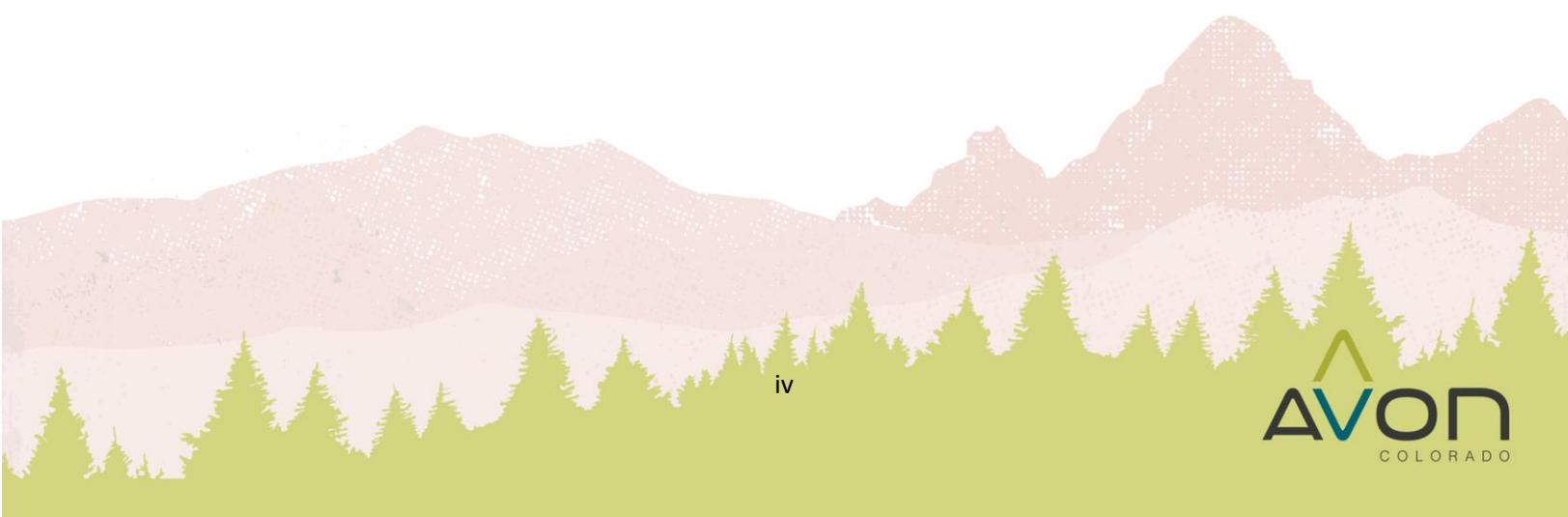
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PLAN SUMMARY

Purpose

The *2009 Town of Avon Recreational Trails Master Plan* (“2009 Trails Plan”) was developed in 2008 and adopted by the Avon Town Council in 2009. The Town of Avon (the “Town”) chose to update the 2009 Trails Plan to account for changes since its adoption, including the acquisition of the West Avon Preserve and the development of trails in that Preserve, the development of regional trail initiatives such as the ECO Trail, and the desire for a coherent planning document to guide trail development within the Town for the next 10-15 years.

At the direction of Town Council, this *2016 Recreational Trails Master Plan* (the “Plan”) has been developed to evaluate potentials for additional trails within the Town boundaries, and to address the management, maintenance, and development of the new trails and the currently existing trails.

Goals

The Plan is intended to accomplish the following goals:

- Increase the connectivity of the Town’s trail network, including connecting existing soft surface trails with additional singletrack, and also connecting the soft surface trails to the Town’s urban center and paved trail/sidewalk network.
- Increase the size of the recreational trail network inside Town boundaries, in response to feedback received from citizens and interest groups, and to distribute trail use that is currently concentrated on existing trails across a wider trail network.
- Provide robust protection for the natural setting, scenic beauty, and wildlife that draw people to live in Town.
- Provide a diversity of trail experiences that matches the diversity of citizen trail users, and that caters to the specific desires of hikers, mountain bikers, dog walkers, and downtown pedestrians.
- Solicit public input to the proposal via an extensive and inclusive process that creates an open space for all trail users and citizens to provide feedback, offer suggestions, and make their voices heard.

Process & Outcomes

- The Town initially identified the need to update the 2009 Trails Plan and conduct a well-considered planning process to guide future trail development.
- The Town established a Steering Committee to guide the development of proposals and evaluate ideas and feedback. The primary goal of the Steering Committee was to ensure that a wide and representative sample of citizens and stakeholders were consulted in the process. The Steering Committee was assembled from representatives of the following groups:
 - Town of Avon
 - The community of Wildridge
 - Avon Recreational Trails Advisory Group (ARTAG)
 - Village at Avon
- The Town has explored many potential trail development ideas in cooperation with the Steering Committee, identified stakeholder groups with particular interest and/or ownership of land being considered for trail development. Stakeholders that were consulted in the process of developing the draft Trails Master Plan include:
 - Eagle Valley Land Trust
 - Walking Mountains Science Center
 - Mountain Star
 - The Village at Avon
 - ARTAG
 - Residents of the Town
- The Town refined the original trail proposals based on various environmental factors which were evaluated and are presented in this Plan, and incorporated feedback from the Steering Committee and the stakeholder groups. These refined trail proposals are included in this document.
- The Town held a public meeting on June 15, 2016 and solicited comment on the trail proposals. Significant input was received from the citizens, and a number of modifications to the proposals were made to address concerns regarding privacy, wildlife, scenic views, desired trail experiences, and more. Several written comments have been received since the public meeting.
- Comments and recommendations from the Colorado Parks and Wildlife (CPW) were solicited based upon public concerns voiced with wildlife impacts. The resulting comments are included herein as **Appendix F**.

All existing and studied trails are shown in **Figure 1 Trail Network Overview**. Additional detailed maps, including aerial imagery, are provided in **Appendix A** and **Appendix B**. Details of all proposed trails and facilities are provided in **Figure 2 Studied Trails**, **Figure 3 Estimated Trail Construction & Maintenance Costs**, and **Figure 4 Proposed Facilities**.

Alternatives for Adoption of Proposed Trails & Facilities

The Steering Committee evaluated several additions to the Town's recreational trails and associated facilities. Through the course of their review and after evaluation of CPW and public comments, the Steering Committee offers the following options for inclusion in a final Trails Master Plan for a recommendation by the Town of Avon Planning and Zoning Commission and final action by the Avon Town Council:

Option 1: Construct no new trails or trail facilities. This option follows CPW's general observation that any new trails will impact the wildlife habitat in the upper Eagle Valley, which is already significantly fragmented by existing development.

Option 2: Remove all studied trails from consideration except M2 through M6 and P6. Adopt seasonal closure recommendations on M2-M6 between December 1st and June 15th with yearly inspections to evaluate earlier opening dates. No pets permitted. This option follows CPW's specific recommendation of no trails in the Upper Metcalf Drainage.

Option 3: Remove Trails P2, P3, and P4 from consideration; thereby reducing impacts to Metcalf Drainage by eliminating trails situated topographically "above" the primary "wildlife corridor" of Metcalf Creek. Adopt seasonal closure recommendations between December 1st and June 15th, with yearly inspections to evaluate earlier opening dates. No pets permitted. This option adopts CPW's recommendations to the extent possible while also providing connectivity to the USFS trail network north of Town.

Option 4: Remove Trails P2 and all but upper portion of P1 from consideration; thereby reducing impacts to the Metcalf Drainage by reducing trail density within the drainage. Adopt seasonal closure recommendations between December 1st and June 15th, with yearly inspections to evaluate earlier opening dates. No pets permitted. This option adopts CPW's recommendations to the extent possible while still allowing connectivity to West Avon Preserve trails via P4, expanding the soft surface singletrack trail network via P3, and creating regional connectivity to the USFS network north of Town via P7.

Option 5: Construct all trails in the Master Plan as outlined below and in the remainder of this document:

Proposed Trails and Facilities

All existing and proposed trails are shown in **Figure 1, Trail Network Overview**. Additional detailed maps, including aerial imagery, are provided in **Appendix A** and **Appendix B**. Details of all proposed trails and facilities are provided in **Figure 2, Proposed Trails, Figure 3, Estimated Trail Construction & Maintenance Costs, and Figure 4, Proposed Facilities**.

- In summary, the Plan proposes the following additions to the Town’s recreational trails and associated facilities: Four new Trail Zones in addition to the West Avon Preserve (**Figure 2**)
- Key facility upgrades and additions (**Figure 4**)
- Minor expansions to the paved trail network (**Figure 1**)

New Trail Zones: If all four trail Zones, are approved, and in addition to the existing West Avon Preserve the existing mileage of soft-surface trail in Town boundaries would more than double by adding approximately 14 miles of new trail, including 11.5 miles of new trail within Town boundaries. The new trail zones include:

- **The Upper Metcalf Loops:** This stacked loop system is the centerpiece of the new trail development. A parking lot and trailhead would be established on Metcalf Road at the truck turnaround. Access to the trailhead would also be possible from Town without driving via the newly completed Metcalf Road bicycle climbing lane. This trail zone would offer 4 trail segments, and would be intended to cater primarily to mountain bikers while also establishing hiker access to National Forest lands to the north of Town.
 - P1: the primary climbing trail, and open to bikers and hikers. It is intended to be relatively gentle and wide, and follows the west bank of Metcalf creek.
 - P2: a downhill-only, expert difficulty mountain bike trail intended to challenge and inspire experienced and capable riders.
 - P3: a downhill-only, intermediate difficulty mountain bike trail intended to provide a venue for riders to enjoy speed and flow.
 - P7: the multi-use access trail into the National Forest, this would generally follow an old road/trail alignment and would connect the Town’s trail networks to the Forest Service trails at the western terminus of the Nottingham Ridge trail. The development of this trail is speculative at this point, because it lies primarily on federal land and construction would be subject to the approval of the Forest Service.
- **The Wildridge Connector Trails:** These trails are intended to improve the connectivity between the West Avon Preserve, the Upper Metcalf Loops, and the urban setting in downtown and along Nottingham road. The goal is to provide a more enjoyable experience for hikers and bikers than traveling along the roads.
 - P4: an intermediate trail that encourages travel between the top of the West Avon Preserve and the Upper Metcalf Loops. This caters primarily to the desire of riders to be

able to link longer rides together including multiple trail networks while minimizing the time spent traveling on pavement.

- P6: an easy connector trail on the north side of Nottingham Road, designed to provide a soft surface trail alternative to the paved trail, and to encourage bikers to leave their vehicles in downtown Avon or at Nottingham road by improving access to the Metcalf climbing lane.
- West Avon Preserve Connector: The West Avon Preserve is generally considered to be fully developed, with approximately 11.5 miles of existing trails. However, the desire for a short 0.4 mile connector trail was identified through the public process. The P8 trail segment is a multi-use trail designed to provide additional loop options and connections between Wild West and Wyse Way trails. The lack of connectivity in this area has been demonstrated with increased demand and trespass from O’Neal Spur road to access Wild West. There is a stringent evaluation process administered by Eagle Valley Land Trust for any new trails that might be considered in the West Avon Preserve. The next phase of assessment required to entertain this trail would be for a certified wildlife biologist to conduct field work to help clarify impacts to the conservation values and suggest mitigation measures as required by the Conversation Easement for the property.
- **The Buffalo Ridge Loop:** A short 3-mile loop hike that is open only to hikers, comprised of an upper (M3) and lower (M2) bench trail. This loop is intended to provide a warm, sunny venue for casual use within walking distance of downtown Avon, and to take advantage of existing infrastructure in the area that is not currently utilized.
- **The East Avon Preserve:** A speculative development proposal for a parcel that is currently being annexed by the Town. Development restrictions and the limitations imposed by surrounding development will affect the range of potential for this parcel. However, this plan proposes to develop a beginner-level stacked loop trail system on the parcel, consisting of three trail segments (M4, M5, & M6). The intention is to provide a family-friendly learning environment for children, beginning mountain bikers, and other users.

Key Facility Upgrades:

- Construction of a Pump Track on a 0.27-acre lot between Nottingham Lake and the tennis courts. This facility is intended to cater primarily to young residents of Avon, and will be designed to offer a gentle progression of learning and challenge. A loop or series of small loop trails that have small jumps and banked turns designed for riders to push and pull their bicycle in a “pumping” maneuver through the bumps without pedaling.
- Construction of a trailhead and parking lot at the Upper Metcalf Loops, intended to provide an access point, staging area, and information stop for trail users.
- Improvements to the existing trailhead along Swift Gulch Road, to improve its function and visual attractiveness, and to better serve the proposed Buffalo Ridge Loop trail.
- Completion of several small extensions and connections within Town’s existing network of paved trails and bike lanes are proposed in this plan. All are displayed in **Figure 1**.

Figure 1. Trail Network Overview

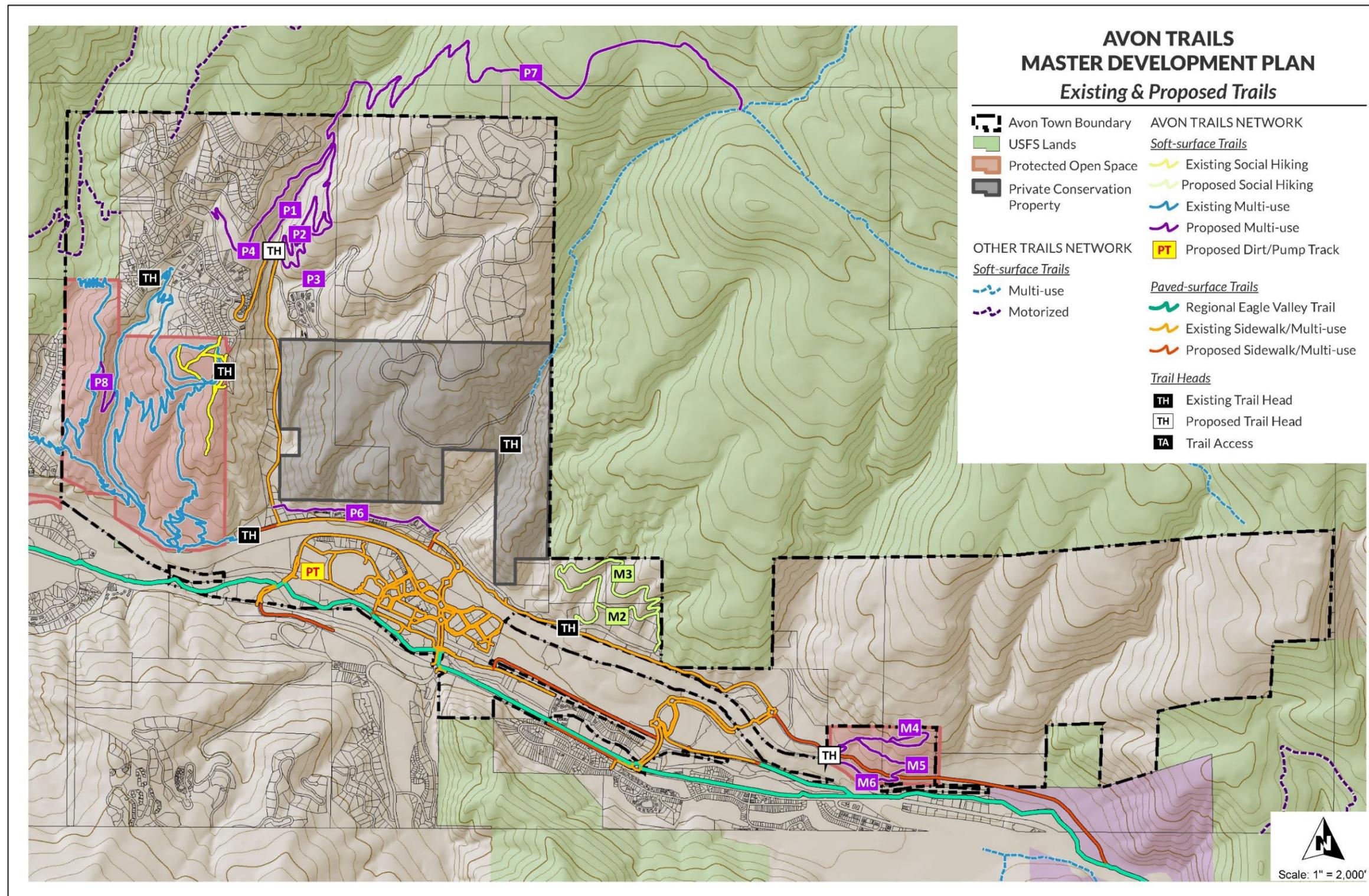


Figure 2. Studied Trails

Trail Zone	Trail #	Use Emphasis	Prioritization		Trail Surface	Trail Width	Construction Method		Constructability Challenges				Environmental Concerns				
			Level of Priority	Estimated Completion			Machine-Built	Hand-Built	Steep Slopes	Drainage crossings	Heavy Vegetation	Legal/Regulatory	Wetlands	Viewshed	Wildlife	Penstemon	
Upper Metcalf Loops	P1	MULTI-USE: Intermediate climbing emphasis trail to access the top of Metcalf Loops & National Forest	HIGH	Fall 2016	Dirt	36" - 24"	●	●		●	●		●				
	P2	MOUNTAIN BIKE ONLY: Expert downhill directional trail			Dirt	24"		●	●						●		
	P3	MOUNTAIN BIKE ONLY: Intermediate downhill directional trail			Dirt	24"		●							●	●	
	P7	MULTI-USE CONCEPTUAL: Intermediate National Forest access trail	LOW	Dependent on USFS capacity	Dirt	24"		●		●		●*	●		●		
Wildridge Connector Trails	P4	MULTI-USE: Intermediate access & connectivity trail	MEDIUM	2017	Dirt	24"		●	●					●			
	P6	MULTI-USE: Easy access and connectivity trail	LOW		Dirt	36"	●		●	●		●					
West Avon Preserve	P8	MULTI-USE, BIKE EMPHASIS: Intermediate connector trail	MEDIUM	2017-2018	Dirt	36"	●		●			●**		●			
Buffalo Ridge Loop	M2	HIKING ONLY: Dog walking and pedestrian loop	MEDIUM	2017-2018	Dirt	36"	●		●	●						●	
	M3	HIKING ONLY: Dog walking and pedestrian loop	MEDIUM		Dirt	36"	●										
East Avon Preserve	M4	MULTI-USE: Beginner & intermediate instructional loop	LOW	Within 5 years, pending progress of land development	Dirt	36"	●			●					●	●	
	M5	MULTI-USE: Beginner-friendly instructional loop			Dirt	36"	●			●							
	M6	MULTI-USE: Beginner-friendly instructional loop			Dirt	36"	●										

* Construction of any trails on Forest Service land is subject to comprehensive analysis and approval by the Forest Service as part of NEPA review.

** Construction of any new trails within West Avon Preserve is subject to Eagle Valley Land Trust review and approval, as governed by the property's conservation easement.

Figure 3. Estimated Trail Construction & Maintenance Costs

Trail Zone	Trail #	Use Emphasis	Trail Surface	Trail Width	Approximate Mileage	Elevation Change (ft)	Construction Cost Estimate	Annual Maintenance	Construction Cost Factors			
									Hand-Built	Bridges/Road Xing	Heavy Vegetation	Steep Slopes
Upper Metcalf Loops	P1	MULTI-USE: Intermediate climbing emphasis trail to access the top of Metcalf Loops & National Forest	Dirt	36" - 24"	1.2	560	\$63,000	\$3,150	●	●	●	●
	P2	MOUNTAIN BIKE ONLY: Expert downhill directional trail	Dirt	24"	1.1	490	\$56,000	\$2,800	●		●	
	P3	MOUNTAIN BIKE ONLY: Intermediate downhill directional trail	Dirt	24"	0.9	530	\$62,000	\$3,100	●			●
	P7	MULTI-USE CONCEPTUAL: Intermediate National Forest access trail	Dirt	24"	3.0	1400	--	--	CONCEPTUAL TRAIL CONNECTION - cost factors not analyzed			
Wildridge Connector Trails	P4	MULTI-USE: Intermediate access & connectivity trail	Dirt	24"	1.2	180	\$36,000	\$1,800	●	●		
	P6	MULTI-USE: Easy access and connectivity trail	Dirt	36"	2.0	465	\$26,000	\$1,300				
West Avon Preserve	P8	MULTI-USE, BIKE EMPHASIS: Intermediate connector trail	Dirt	36"	0.4	260	\$12,000	\$600				●
Buffalo Ridge Loop	M2	HIKING ONLY: Dog walking and pedestrian loop	Dirt	36"	1.5	150	\$10,000	\$500		●		
	M3	HIKING ONLY: Dog walking and pedestrian loop	Dirt	36"	1.5	230	\$36,000	\$1,800		●		
East Avon Preserve	M4	MULTI-USE: Beginner & intermediate instructional loop	Dirt	36"	0.8	340	\$24,000	\$1,200				
	M5	MULTI-USE: Beginner-friendly instructional loop	Dirt	36"	0.4	190	\$18,000	\$900		●		●
	M6	MULTI-USE: Beginner-friendly instructional loop	Dirt	36"	0.4	100	\$12,000	\$600				
TOTALS	12 NEW TRAILS IN 5 AREAS				14.2	4900	\$355,000	\$17,750				

Figure 4. Proposed Facilities

Facilities	Description	Amenities				Prioritization	Parking Area	Total Area	Construction Cost Estimate*	Annual Maintenance**
Upper Metcalf Loop Trailhead	Centralized trailhead serving the Metcalf Loops and the Avon Preserve					HIGH	6-10 spots	0.035 acres	\$90,000	\$3,850
Town Center Bike Park	Dirt pumptrack and bike park					MEDIUM	none (utilize existing)	0.27 acres	\$40,000	\$1,950
Nottingham Road - Buck Creek Connection	Paved sidewalk/multi-use trail providing access to Buck Creek					HIGH	--	215 linear feet	\$20,000	--
Additional Sidewalk Connections	Paved sidewalk/multi-use trails providing off-street access					MEDIUM	--	1.5 miles	\$250,000	\$500
Buffalo Ridge Trailhead Improvements	Improvements to existing trailhead: signage, road Xing					MEDIUM	8 spots (existing)	--	\$6,000	\$2,400
East Avon Preserve Trailhead	Centralized trailhead serving the East Avon area and Village at Avon					LOW, pending development	8-12 spots	TBD	\$115,000	\$3,850
TOTAL									\$521,000	\$6,750

*Construction estimates will be provided or refined by the Town Engineering Dept. when project-specific planning begins for these facilities.

**Maintenance estimates are provided based on current costs incurred by the Town for similar maintenance activities on existing facilities.

INTENDED TRAIL EXPERIENCES

Table 1. Permitted Trail User Groups

Trail Zone	Trail ID	Permitted Users
Upper Metcalf Loops	P1	Hikers* & Bikers**
	P2	Bikers Only
	P3	Bikers Only
	P7	Hikers & Bikers
Wildridge Connector Trails	P4	Hikers & Bikers
	P6	Hikers & Bikers
West Avon Preserve	P8	Hikers & Bikers
Buffalo Ridge Loop	M2	Hikers Only
	M3	Hikers Only
East Avon Preserve	M4	Hikers & Bikers
	M5	Hikers & Bikers
	M6	Hikers & Bikers
Paved Trails/Sidewalks	--	Hikers & Bikers
Pump Track	PT	Bikers Only
* The term “hikers” includes all pedestrians (trail runners, dog walkers), as well as winter pedestrian travel modes (snowshoes, cross-country skis) on trails that do not have seasonal closures.		
** The term “bikers” includes all non-motorized wheeled travel (mountain bikes, hand bikes), as well as winter travel on fat bikes for trails that do not have seasonal closures. Motorized vehicles, electric-assist vehicles, and e-bikes are not included.		

Multi-use Trails

The majority of trails within the Town, both currently existing and studied in this document, are multi-use trails that are intended to be shared by hikers, runners, dog walkers, mountain bikers, and snowshoers and cross-country skiers on trails that are not closed in the winter. Within the Town boundaries, “Multi-use” typically includes hiking and biking, but not equestrian or motorized travel.

Multi-use trails within the Town are designed to provide a desirable experience for all users, by promoting outdoor physical exertion, offering scenic views of the surrounding environment, creating a venue for interaction with the natural world, and being constructed in sustainable and environmentally conscious manner.

There are certain unavoidable conflicts between different user groups on shared multi-use trails. A trail that is open to multiple modes of transportation is inevitably a compromise among the desired trail characteristics of each user group. Hikers, bikers, snowshoers, etc. all have different preferences regarding a trail’s average grade and width, the amount of mileage needed to create an enjoyable experience, the interest in or tolerance of on-trail obstacles, and so forth.

The easiest way to create a very high-quality trail experience is to limit the trail to only one user-group and design the trail exactly to the desires of that group. “Flow trails” for mountain bikes are an example of this approach, where a carefully graded and bermed tread is given priority to the exclusion of all else. Even if they are permitted, hikers typically have very little interest in flow trails because the hiker’s desire for scenic views, narrow rough tread, and a feeling of solitude and purposeful travel are not accommodated by the trail.

However, trails devoted to a single user group are less efficient in a setting such as the Town’s open space, with limited area available for trails and a limited budget for construction. It is not feasible to develop extensive user-specific trail networks for all users within the constraints of the Town boundaries. Therefore, this Plan has generally elected to designate trails as multi-use, open to both hikers and bikers, in the interest of providing expanded trail access for all. Shared trails, and the social encounters that they create, also serve to foster a shared sense of identity and place among the citizens of Avon, regardless of their preferred method of recreational travel.

Multi-use trails can be built purposefully to avoid conflict. For example, obstacles such as rocks or tight corners may be added to slow down bike riders in order to provide a safer travel pathway for multiple user groups. International trail building guidelines, which allow for creativity and added trail features that provide unique user experiences, are encouraged for new trail construction.

Mountain Bike Trails

Two mountain bike-specific trails are proposed as the centerpiece of the Upper Metcalf Loops Trail Zone. P2 and P3 are both directional, downhill-only trails restricted to bike travel. They are intended to

offer a technical trail experience that is attractive to experienced mountain bikers, and that challenges riders' skill and equipment. Trails of this type have been prioritized in the plan due to the following factors:

- The demonstrated success and popularity of Lee's Way Down, a mountain bike emphasis directional trail in the West Avon Preserve.
- Clear feedback from the community that challenging mountain bike trails are desired as a recreational amenity.
- Known issues with socially established "downhill trails" in Town boundaries, which are an attempt to provide this type of trail experience, but are generally unsustainable and illegal in their current location. The development of approved and sustainable trails of this type is intended to shift the illegal trail use currently occurring onto legal trails.

Hikers Only Trails

At the time of the development of this Plan, the only hiking-specific trails within the Town are the unnamed "Social Trails" around Beaver Creek Point in the West Avon Preserve. Public outreach and comment from the hiking community of Avon residents indicated that the extent of social trails at Beaver Creek Point was sufficient for the use they received from the community, and that additional hiker trails in the West Avon Preserve were not needed. However, the Beaver Creek Point trails are not easily accessible from downtown Avon due to their location up in the Wildridge neighborhood.

Therefore, one additional hikers only trail loop is proposed along Swift Gulch Road (the "Buffalo Ridge Loop"). The Buffalo Ridge Loop consists of two trails, M2 & M3, which combined form a loop of approximately three miles. This loop is intended to provide a venue for hikers and dog walkers that is walking distance from downtown, and traverses rolling terrain, shallow basins, and steep slopes dominated by sagebrush. The location has several advantages:

- The usable season for the Buffalo Ridge Loop is likely to be significantly longer than other Avon trail zones due to their lower elevation and south-facing aspect. It is anticipated that there will be at least some portion of the year in early spring when the Beaver Creek Point trails and surrounding Forest Service trails are snow-covered or muddy, but the Buffalo Ridge Loop is dry and usable.
- The location offers the potential of impressive views southwards across Town to Beaver Creek and the York Range, at the cost of relatively low mileage, if M3 can be constructed high enough on the hillside. Impressive views and low mileage are attractive features for hikers looking for a low-commitment, "lunch break" type of outdoor experience.
- The location already has necessary infrastructure in place, which is currently underutilized because the only trail use currently occurring is informal social use of old two-track roads and utility alignments. A paved parking area and gated trailhead exists, as well as a striped and signed pedestrian walkway that connects the parking lot to the existing paved trail along the south side of Swift Gulch Road. Infrastructure is typically a significant component of the

construction cost for trail facilities. The fact that only minor improvements to signage and fencing would be required makes this trail zone an efficient choice from a financial perspective.

Hard Surface Trails

Avon already has an excellent and extensive network of paved trails and bike lanes, and continues to develop additional connections based on community input. For example, the bicycle climbing lane on Metcalf Road will significantly improve the experience of cyclists commuting between the Wildridge neighborhood and downtown, for work or recreation.

Several small additions to the network are proposed in this plan. All are displayed in the maps provided in **Appendix A**.

- A short connection from the intersection of Buck Creek Road and Nottingham Road to the existing paved trail that parallels Nottingham road. This would improve non-motorized travel from the downtown core to Buck Creek Road and the Buck Creek trailhead, as it would allow pedestrians and cyclists to reach Nottingham Road on paved trail from downtown Avon and the centralized recreational amenities at Nottingham Lake, without having to cross Avon Road.
- An extension of the paved trail on the south side of Swift Gulch Road, extending eastward from its current terminus at the intersection of Post Boulevard through the planned Village at Avon residential development and intersecting with the Regional Eagle Valley Trail. This is intended both to connect the new residential development to the downtown, and also to provide connectivity to the Eagle Valley Regional Trail and the up-valley towns of Eagle-Vail and Vail.
- A very short connection from the existing sidewalks at Riverfront Lane and Lake Street to the existing Regional Eagle Valley Trail along the river, which would improve the connectivity of the west end of Avon and the recreational amenities of Nottingham Park to the Eagle Valley Regional Trail. Any future trail connection in this area would be dependent upon final development plans and approval of the adjacent private land owners.
- A spur from the existing sidewalk along Hurd Lane that would cross the railroad tracks and parallel East Beaver Creek Boulevard. This is intended to provide improved non-motorized access to the planned Village at Avon development, and the specific alignment of this path would be dependent upon the specifics of that development plan.

Motorized Trails

No motorized trails currently exist within Town open space with the exception of motorized use of two existing motorized trailheads in Wildridge, and no motorized trails are proposed in this Plan. Motorized trail use is fundamentally incompatible with the front-country nature of all existing or proposed trail development, for the following reasons:

- All trails are relatively close to existing or planned residential development, and nuisance concerns related to noise and dust associated with motorized recreation cannot be reasonably mitigated.
- All trails in conservation easements (including the West Avon Preserve) are explicitly off-limits to motorized use, due to environmental concerns.
- The available parking or trailhead areas cannot reasonably be built large enough to accommodate the staging needs of motorized recreation (pull-through trailer parking).
- The extent of trails that are feasible within the Town's boundaries is not sufficient to create an attractive experience for motorized recreationalists, who are typically seeking trail experiences that are significantly longer than the 2-10 mile loops offered by the Town trail networks.
- There are extensive motorized recreation opportunities on the National Forest land surrounding the Town.
- Two trailheads exist within Town: June Creek and Metcalf Creek (USFS #779). Continued year-round motorized access to these trailheads is valued by the community.

USAGE & ETIQUETTE

Trail Difficulty

Proposed trails have been designed to provide a range of difficulty and technical challenge. This range of difficulty is intended to provide the diversity of trail experiences that is one of the primary goals of this Plan. Trail networks that provide a range of difficulty cater to the widest possible variety of users; some users will choose less difficult trails due to their inclination, their skill level, their level of fitness, their chosen equipment, or because they prioritize scenic views or mileage in their trail experience. Other users will choose more difficult trails due to an interest in technical challenges, improving skills, or competition. Most users will choose to utilize a variety of trail difficulties during a visit to a trail network, or over repeated visits. Trail centers that offer a full range of challenge are generally considered to be more attractive to users, and to provide the maximum value from a given mileage of trail.

In response to comments received from the biking community, “technical challenge” is in reference to the activity of mountain biking, and generally describes the extent of obstacles (such as rocks, roots, and tight corners) that exist on the trail and add challenge by impeding travel. Obstacles may be naturally occurring features, natural features modified by trail builders to be a more prominent trail component, or may be artificial constructed features. “Difficulty” applies more generally to all trail users, and is intended to convey the overall challenge of the trail, including not only technical obstacles but also aerobic difficulty, elevation, and distance. A technically challenging trail for a mountain biker may not pose many problems for a hiker to negotiate; however, in comparing a difficult trail to an intermediate trail, all users are likely to agree that the relative challenge posed by the first is greater than the second. Given that most of the proposed trails are multi-use, trails will be signed for their overall difficulty rather than their level of technical challenge. Two trails are proposed that are challenging, directional-travel, and mountain-bike emphasis with significant technical challenges (P2 & P3). These trails will have additional signage to reflect these characteristics and notify users.

Signage will use IMBA-standard symbology (Green Circle/Blue Square/Black Diamond) that has been adapted from ski resort rating systems. Not only is this symbology the standard for mountain bike trails, but it will have immediate crossover familiarity for a large portion of Avon’s citizens and visitors through their exposure to the system at ski resorts locally and elsewhere. Difficulty signage should be provided at trailheads by trail network maps, and at trail intersections by signposts.

The trail difficulty ratings provided in **Table 1** are estimates based on the terrain that the individual trail sections traverse and their intended level of challenge. Limitations associated with construction may require ratings to be adjusted upwards or downwards, either upon initial construction or following several seasons of use.

Table 2. Proposed Trail Difficulties

Trail Zone	Trail ID	Difficulty	
Upper Metcalf Loops	P1	Intermediate	
	P2	Very Difficult	
	P3	Intermediate	
	P7	Intermediate	
Wildridge Connector Trails	P4	Intermediate	
	P6	Easy	
West Avon Preserve	P8	Intermediate	
Buffalo Ridge Loop	M2	Easy	
	M3	Easy	
East Avon Preserve	M4	Intermediate	
	M5	Easy	
	M6	Easy	

Principles for Trail Use Regulations

The following regulations apply to all trails within the Town boundaries, and may be enforced by law enforcement officers or code enforcement officials as needed. The purpose of the regulations is to protect the trail users, the trails, and the environment of the Town. The Town will employ and direct code enforcement personnel to enforce rules throughout open space areas. Violators shall be cited.

- **Know the Rules:** Most trailheads include signage with applicable regulations. No smoking, marijuana, or alcohol is permitted either on trails or at trailheads. Please respect other trail users and know the Town Ordinances.
- **Leave No Trace:** Be sensitive to the dirt beneath you. Wet and muddy trails are more vulnerable to damage than dry ones. When the trail is soft, consider other options (example informational

signage is provided in **Appendix E**). This also means staying on existing trails and not creating new ones. Don't cut switchbacks. Be sure to pack out at least as much as you pack in.

- **Yield Appropriately:** Do your utmost to let your fellow trail users know you are coming — a friendly greeting or bell ring are good methods. Try to anticipate other trail users as you approach switchbacks. Bicyclists should always yield to other trail users, unless the trail is clearly signed for bike-only travel. Bicyclists and hikers traveling downhill should pull to the side and yield to ones headed uphill, unless the trail is clearly signed for one-way or downhill-only traffic (i.e. Lee's Way). Strive to make each pass a safe and courteous one. Stay to the right and pass on the left, sharing the trail with others while listening and watching.
- **Respect Trail and Road Closures:** Ask for clarification if you are uncertain about the status of a trail. Do not trespass on private land.
- **Never Scare Animals:** Animals are easily startled by an unannounced approach, a sudden movement or a loud noise. Give animals enough room and time to adjust to you. Disturbing wildlife is a serious offense.
- **Plan Ahead:** Know your equipment, your ability and the area in which you are riding or hiking and prepare accordingly. Strive to be self-sufficient: keep your equipment in good repair and carry necessary supplies for changes in weather or other conditions.
- **Manage Your Pets:** Four-legged best friends are allowed off-leash in Town Open Space (i.e. West Avon Preserve) but must be under voice control and the owner must have a leash in his or her possession. Recognize that your dog may make others apprehensive, and maintain close control of your dog when approaching other users. Dog owners must promptly remove fecal waste and deposit it in a proper trash container.
- **No Motorized Use:** No motorized vehicles, electric vehicles, e-bikes, drones, model planes & helicopters, or any other motorized recreational devices may be used in Town open space areas. Motorized use is limited to June Creek Trail and Metcalf Creek Road.
- **Respect Adjacent Private Property.** Be aware of the proximity to adjacent property and the privacy of others. Keep noise and loud chatter to a minimum for the sake of wildlife and neighbors ---in parking lots and on the trails.
- **Practice low-impact use.** Wet or muddy trails are vulnerable to damage –detour to another route. If a trail is muddy enough that you are leaving a tire rut or footprints deeper than ½", it is too wet to use and should be considered closed.
- **Respect Hours of Operation.** Some trails and trailheads are closed overnight. Do not enter closed areas during posted curfews for environmental and safety reasons.
- **Additional Regulations:**
 - No fires or fireworks
 - No hunting No discharge of weapons
 - No motorized or electrically assisted recreation

- No collection of artifacts
- No commercial activity
- No removal or collection of plants, animals, fungi, or rocks
- No hang-gliding
- No loud music
- No camping
- No overnight parking in trailhead parking areas
- No smoking

Seasonal Closures

Trail closures are the most important and effective tool to protect critical, undisturbed deer and elk winter range land as well as bald eagle roosting and foraging habitat. The intent is to avoid the disturbance caused by trail users during the times of year when animals rely most on the habitats where the trails are located. The primary wildlife concern is for winter range for deer and elk. Winter is a time of great stress on many animals. During the winter months, deer and elk rely on their fat reserves as energy stores to survive the cold. If humans or other animals (such as dogs) spook a deer during winter, it could spell the death of that animal during the next cold snap. Important winter range is generally found along the south facing lower elevation slopes on the north side of the valley, where animals can find respite from the deeper snowpack found in the rest of their range.

Seasonal closure dates will be developed and managed in consultation with CPW, and vary from one trail zone to another depending on habitat factors.

- **Paved Trails:** These trails are not subject to regular seasonal closure, but may be impassable or difficult to navigate at irregular intervals due to snow and ice conditions. The Town maintains the paved surface trails, including plowing on an as-needed basis.
- **Existing Trails in the West Avon Preserve:** All trails in the West Avon Preserve are closed to protect wildlife habitat between December 15th and April 15th, with the exception of the trails Our Backyard and PB&J. The lifting of the seasonal closure is determined on a year-to-year basis in coordination with the Eagle Valley Land Trust and CPW.
- **Proposed Trails in the West Avon Preserve:** The connector trail P8 is within the West Avon Preserve, and if constructed would be subject to the same seasonal closures as the other trails in the West Avon Preserve.
- **Upper Metcalf Loops:** All trails in the Upper Metcalf Drainage (P1, P2, P3) would be subject to seasonal wildlife closures between December 1st and June 15th. Trails could be opened earlier if determined acceptable by CPW after seasonal evaluation.
- **Proposed Trails in Wildridge:** The connector trail P4 would be subject to seasonal closures

consistent with those in the Upper Metcalf Loops.

- **Proposed Trails in east Avon (Buffalo Ridge Loop and the East Avon Preserve):** All trails in the East Avon Preserve and Buffalo ridge would be subject to seasonal closures between December 1st and June 15th. Trails in these could be opened earlier if determined acceptable by CPW after seasonal evaluation.

Enforcement of seasonal closures will be accomplished primarily by signage posted at trailheads, temporary barriers on closed trails, and through community outreach channels (Town website, social media, partner organizations). Violations of seasonal closures are serious offense, and violators will be cited by code enforcement officials.

No Commercial Use

The prohibition on commercial use applies to any for-profit use of the trails, including races, fundraisers, and other similar events. The Town reserves the right to deny applications for commercial use, and does not intend to emphasize or market the in-Town trail networks as a commercial venue, due to concerns regarding the privacy and quality of life of Town citizens.

Special Events

It is the policy of the Town that any organized activity that occurs on Town lands will require a Special Events Permit. Commercial racing events will not be entertained. Each special event will be reviewed on a case-by-case basis and will be reviewed with the following specific considerations:

- Duration of event.
- Specific location.
- Potential impacts to vegetation and wildlife.
- Potential impacts to soil stability.
- Potential impacts to adjacent landowners.
- Consistency with vision of open space purpose to provide passive recreational access.
- The extent to which the proposed use interferes with, compromises or diminishes the ability for others to use and enjoy the area.
- Potential increased management costs for the Town.
- Overall scope and scale of impacts to adjacent properties.

Enforcement

It is recognized with existing trails and trailheads that a lack of active enforcement by volunteer groups or Town employees has resulted in an increase in conflicts and unpermitted activities. The implementation of a program to manage all uses and activities with an enforcement program will be pursued. The focus of the program will be to emphasize the need to follow established regulations and educate trail users.

MAINTENANCE

It is the intention of Avon to provide for proper maintenance of all trails to achieve the following goals:

- Protect the quality of the trail user's experience
- Preserve the safety of the trails
- Prevent erosion
- Maintain the integrity of the soil and vegetation surrounding the trails
- Protect the financial investment in the construction of trails

Maintenance of Existing Trails & Facilities

The existing trails in the West Avon Preserve have already been through two cycles of yearly maintenance since their construction. In general, the Town's experience has been that professionally designed and constructed trails have fairly low maintenance requirements, despite the steep slopes, erosive soils, and challenging weather conditions on which the trails have been constructed. Minor erosion and tread maintenance is the predominant maintenance need.

Professional maintenance service is provided on a per-foot cost basis, and is most appropriate for significant and defined trail issues, such as gullied trails, major drainage problems, or constructed feature repair (bridges and berms). Volunteer maintenance under the direction of the Public Works Department has been sufficient in the past to address ongoing minor issues, such as tread repair, drainage maintenance, incipient trail braiding, and yearly vegetation clearance.

Extrapolating from previous years' maintenance budgets, it is anticipated that the real annual maintenance cost of trails within the Town will be approximately 5% of the trails' construction budget. This includes the value of maintenance provided by volunteers at no cost to the town. In the past, paid maintenance has only been required on the heavily used constructed trails, especially Lee's Way Down, and has been approximately \$3,500 annually. Assuming that volunteer labor continues to be available, this maintenance cost is likely to persist, or grow slightly as use of trails continues to increase.

In addition to trail maintenance, there are facility maintenance tasks that entrain costs to the Town. These include:

- Trash collection
- Paved trail and parking lot plowing in the winter
- Striping of parking lots
- Port-o-potty maintenance, cleaning, and waste disposal
- Dog waste station maintenance and stocking
- Patrolling and citations

In addition to ongoing maintenance of the trails in the West Avon Preserve, there are several one-time maintenance tasks that should be considered for the Beaver Creek Point portion of the West Avon Preserve. These tasks have the potential to improve the trail experience for all users, and should be considered in yearly maintenance planning as volunteer availability, maintenance staffing, and budgets allow:

- Add signage to make the social trails explicitly limited to hikers. They are generally functioning in this manner already, but signage will inform new users and help set expectations and behavior patterns. Mountain bike use at Beaver Creek Point can be confined to the designated and named trails, including Our Backyard, PB&J, and the other system trails.
- Establish signage or cairns to mark the hiking trails that will be maintained, and close and reclaim redundant trail spurs or connections. Social trail networks established without a planning process tend to spider web as users create shortest-path trail connections; closing redundant trails makes the network more functional, easier to comprehend and navigate, and minimizes erosion and environmental impacts.

Maintenance of Proposed Trails & Facilities

Cost estimates for the maintenance of the proposed trails has been provided previously in this document (**Figure 3**). Based on the Town's experience with maintenance costs for existing trails in the West Avon Preserve, a baseline estimate of 5% of construction cost has been applied to all proposed trails. The maintenance tasks represented by this cost are substantially similar to the ongoing maintenance in the West Avon Preserve, and it is assumed that a combination of paid and volunteer labor will be used to address erosion damage, vegetation clearance, drainage issues, and user impacts.

The maintenance costs for proposed facilities have also been provided previously in this document (**Figure 4**) and are extrapolated from the Town's current real costs to maintain currently existing facilities.

In summary, it is projected that the proposed trail and facility development will require annual maintenance funding from the Town of approximately \$30,000 annually. A significant portion of this is likely to be provided on a volunteer basis by the Town's partner groups.

ENVIRONMENTAL PROTECTION

The Town is committed to developing and maintaining a recreational trails network while preserving the natural setting and wildlife that draws so many citizens to Avon in first place. The construction and use of trails have unavoidable impacts on the natural environments, but the Town strives to mitigate those impacts by locating trails in less-sensitive habitats, applying seasonal closures as necessary and appropriate, and enforcing trail regulations that minimize user impact.

Existing Conditions & Concerns

The existing trails in the West Avon Preserve are managed in accordance with the conservation easement on that property, in cooperation between the Town and the Eagle Valley Land Trust. Prior to the development of trails on the property, a baseline environmental investigation was conducted to determine existing conditions and identify sensitive natural resources¹. The management plan under which the trails are permitted was based on the findings of this report, and trails were located as possible to avoid areas of concern.

The report identified the following primary concerns as occurring within the Preserve:

- Mule deer and elk winter range
- Bald eagle winter foraging habitat
- Occupied Harrington's penstemon habitat

In addition to avoiding the critical habitat areas where possible, a seasonal closure between December 15th and April 15th was established in cooperation with CPW to protect the winter habitat values and minimize disruption to wildlife during their most vulnerable period in the West Avon Preserve.

The experience of the Town and Eagle Valley Land Trust has been that this evaluation and management approach has been effective to protect the habitats, wildlife, and natural setting of the West Avon Preserve. No formal biological study has been completed to document changes in wildlife utilization of the Preserve, however anecdotal evidence and observations from trail users and Wildridge residents are that wildlife continue to use the property.

The referral comments received from CPW, based upon the review of the draft Trails Master Plan, are included as **Appendix F** for reference. Based upon new studies and recommendations from CPW, more restrictive closure periods (between December 1st and June 15th) are proposed for future trails in the

¹ Rare Earth Science, "Baseline Documentation Report – Eagle Valley Land Exchange, West Avon Parcel", prepared for Eagle Valley Land Trust, October 2012.

Upper Metcalf Drainage, Buffalo Ridge, and East Avon Preserve areas, with earlier openings possible based upon annual assessments (as previously mentioned).

Proposed Development Initial Evaluation

Based on the success of the West Avon Preserve environmental protection effort, a similar evaluation process is recommended for the additional trail development proposed in this Plan. All trail proposals were initially vetted under a multi-factor environmental analysis. The West Avon Preserve was not included in this analysis, as there is minimal planned development within the Preserve and there is a stringent existing evaluation process administered by Eagle Valley Land Trust for any new trails that might be considered in Preserve.

This initial desktop analysis evaluated the following datasets:

- The National Wetland Inventory from the US Army Corps of Engineers,
- All wildlife habitat mapping as provided by CPW,
- Known occurrences of Harrington’s penstemon,
- An estimation of likely penstemon habitat extrapolated from the location of known occurrences,
- An internal generated digital elevation model of slope steepness.

The datasets were refined at a local scale based on aerial imagery analysis and limited field investigation. Areas with multiple significant issues were mapped as “avoidance zones” (**Appendix D**) based on the initial conclusions that there were significant environmental risks associated with trail development in these areas. Proposed trails were modified to the extent possible to skirt around the avoidance zones, and in several cases were dropped from consideration altogether.

There are still proposed trails in avoidance zones, primarily M3 and M4. Given the limited land base available for trail development within the Town boundaries, and the many other competing factors including private property and viewshed concerns, it was not feasible to have no trails within avoidance zones while still proposing a functional trail network. Trails within avoidance zones can be built responsibly, but there are likely to be significant additional challenges that need to be planned for. However, it is the intention of this plan that no additional trails will be developed in avoidance zones for the lifetime of the plan, and that the avoidance zones would serve as protected open space and wildlife habitat for the future, as a buffer against further residential or recreational development within the Town boundaries.

Proposed Development Visual Impact

A viewshed analysis was prepared to determine the relative visibility of all proposed to trails to residents of Wildridge and Mountain Star. Results are presented in **Appendix C**. Viewshed analysis methodology is as follows:

- Virtual observers are placed standing at the middle of each of 278 properties in Wildridge and 40 properties in Mountain Star.
- Calculations are performed to determine how many of those virtual observers can see a given point on the map.
 - The model accounts for topography, but cannot account screening vegetation, and does not differentiate between areas that are visible close to the observer (foreground) vs. far from the observer (background).
- The heat map visualization indicates how many observers can see a given point.
 - Red signifies that a given point is “visible to many properties.”
 - Blue signifies that a given point is “visible to few properties.” However, blue areas on the map may be highly visible to those few observers who have lines of sight to that location.

In summary, some of the conclusions of the visual impact analysis are as follows:

- Upper Metcalf Loops: the ascent trail P1 is topographically screened from most viewers, as is the trailhead. P2 is shown as somewhat visible, but will be generally screened by vegetation including west facing aspen tree stands. Hand building and 24” trail width could help minimize visual impact.
- Wildridge Connectors: P4 is highly visible where it climbs above Wildridge road. Hand building and 24” width, along with minimal vegetation removal, would help to mitigate visual impacts.

Proposed Development Field Evaluation

The initial environmental assessment presented in **Appendix D** is necessarily speculative, based on the limitations of available datasets, and cannot serve as a final determination of environmental impact for any of the proposed trails. It is the intention of the Town that a rigorous, project-specific environmental investigation will be performed before any trail is constructed, and that this investigation will be founded on data collected in the field and on a detailed pedestrian survey of a flagged construction corridor.

This investigation will consider factors including the following, as applicable:

- Impacts to big game habitat
- Impacts to non-game wildlife
- Impacts to special status species, with special attention given to Harrington’s penstemon which is known to occur commonly in the area
- Impacts to wetlands, water courses, and riparian areas
- Risk factors associated with the soils, geological substrates, and slopes underlying the proposed trail
- Likely impacts on weed abundance and extent due to construction disturbance
- Potential impacts to historic or cultural features such as roads or dwellings.

This project-specific investigation will be completed and evaluated prior to any commitments towards funding or approving trail construction within Town boundaries.

Process for New Trail Construction

Based upon Town Staff experience with constructing trails, the following process is recommended for any new trail identified within this plan:

I. Planning

- Trail route(s) flagged in the field by ARTAG, VVMBA, or other trail advocacy group
- Route(s) GPS and Mapped for community review, with description of use - exclusive to bike riders or multi-user design
- Riparian Areas, if necessary, must be flagged as a first step by a qualified Environmental Resource professional, including review of Avon Municipal Code Section (AMC) 7.28.100, Natural Resource Protection, in order to confirm compliance with:
 - Identify Permitted Management Activities. AMC 7.28.100(G)
 - Bridge construction that minimizes disturbance and removal of vegetation. AMC 7.28.100(I)
 - Wildlife Baseline Report including recommendations for seasonal closures.
 - Route(s) modified, if necessary, based on Riparian study or other Wildlife Studies.
 - Parking Feasibility studied, if applicable.
 - Develop operations and maintenance plan

II. Public Review – 30-45 days

- Outreach with at least two Open Houses
- Modify Route(s) if necessary

III. Construction Options Identified and Evaluated

- Request for Proposals from qualified constructors to determine costs
- Review grant opportunities
- Present findings to Avon Town Council for consideration of private construction with or without grants vs. volunteer with or without grants
- Budget Appropriation, and Amendment, if necessary

IV. Bidding & Construction - depends on construction technique, terrain, length and cost estimate.

APPENDIX A – TRAIL MAPS

Overview Map - "Existing and Proposed Trails"

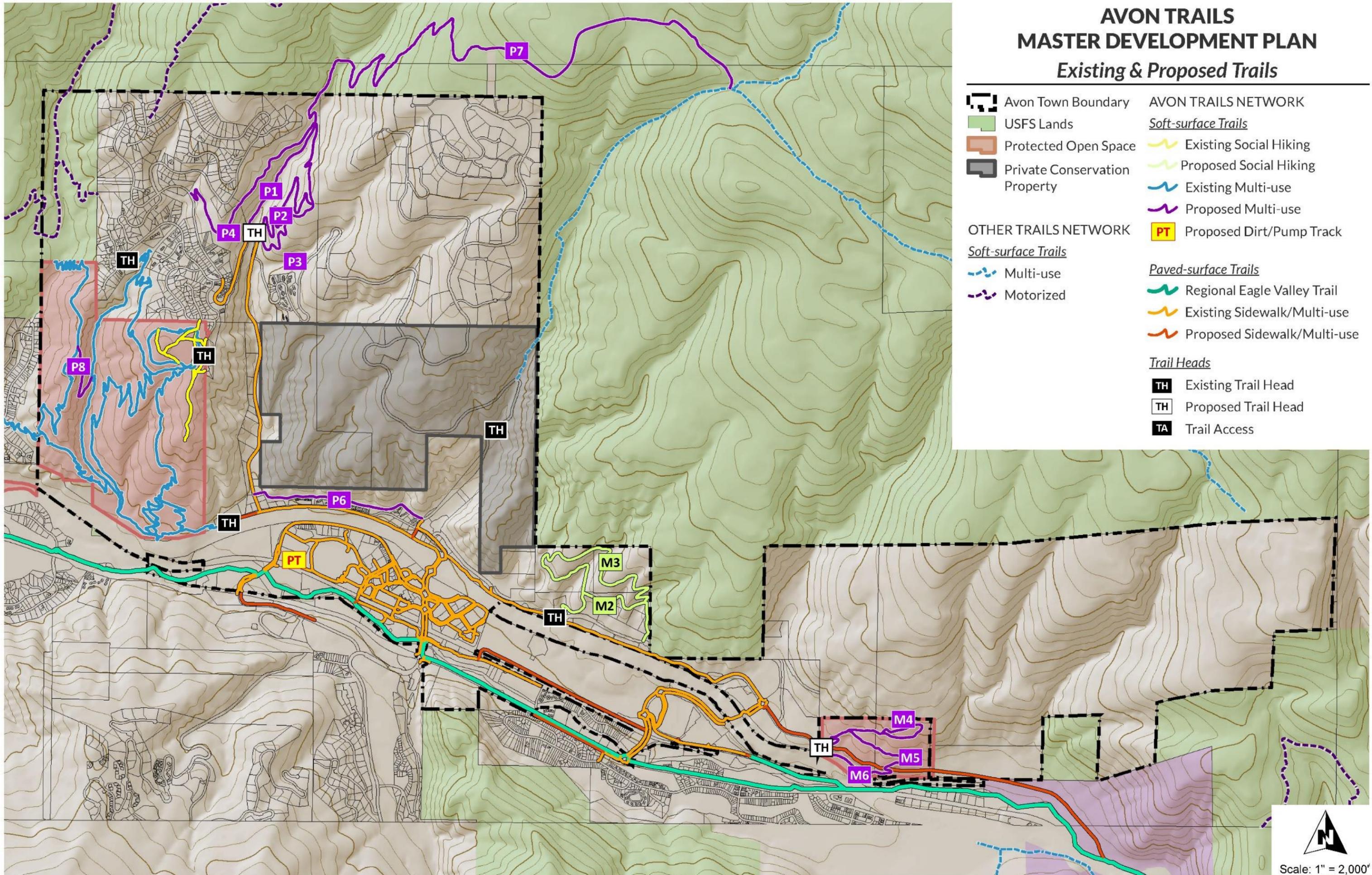
Detail Map - "P System Trails"

Detail Map - "M System Trails"

AVON TRAILS MASTER DEVELOPMENT PLAN

Existing & Proposed Trails

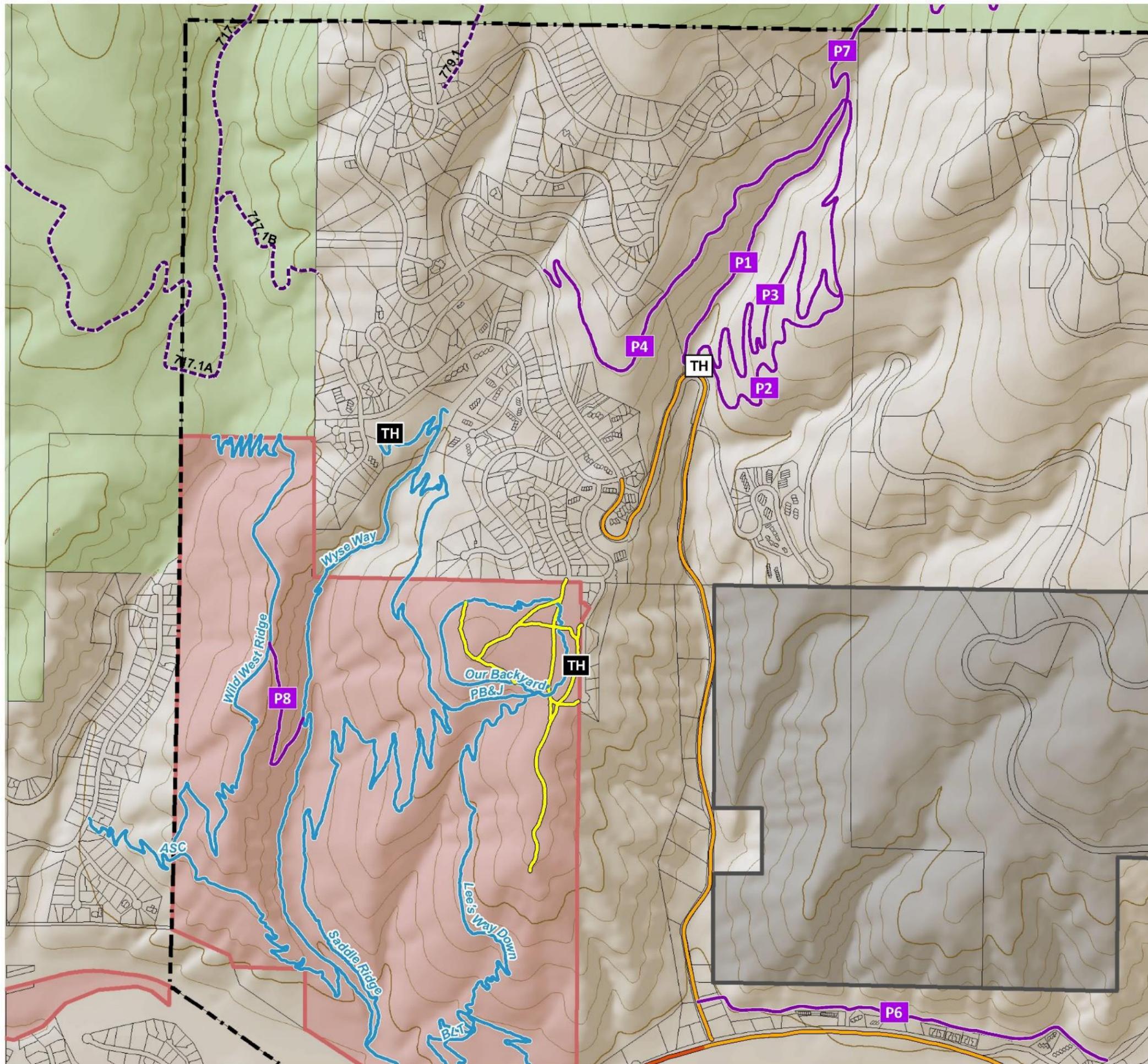
- | | |
|---|---|
|  Avon Town Boundary | AVON TRAILS NETWORK |
|  USFS Lands | <i>Soft-surface Trails</i> |
|  Protected Open Space |  Existing Social Hiking |
|  Private Conservation Property |  Proposed Social Hiking |
| |  Existing Multi-use |
| |  Proposed Multi-use |
| OTHER TRAILS NETWORK |  Proposed Dirt/Pump Track |
| <i>Soft-surface Trails</i> | |
|  Multi-use | <i>Paved-surface Trails</i> |
|  Motorized |  Regional Eagle Valley Trail |
| |  Existing Sidewalk/Multi-use |
| |  Proposed Sidewalk/Multi-use |
| | <i>Trail Heads</i> |
| |  Existing Trail Head |
| |  Proposed Trail Head |
| |  Trail Access |



AVON TRAILS MASTER DEVELOPMENT PLAN

Existing & Proposed Trails: P System Trails

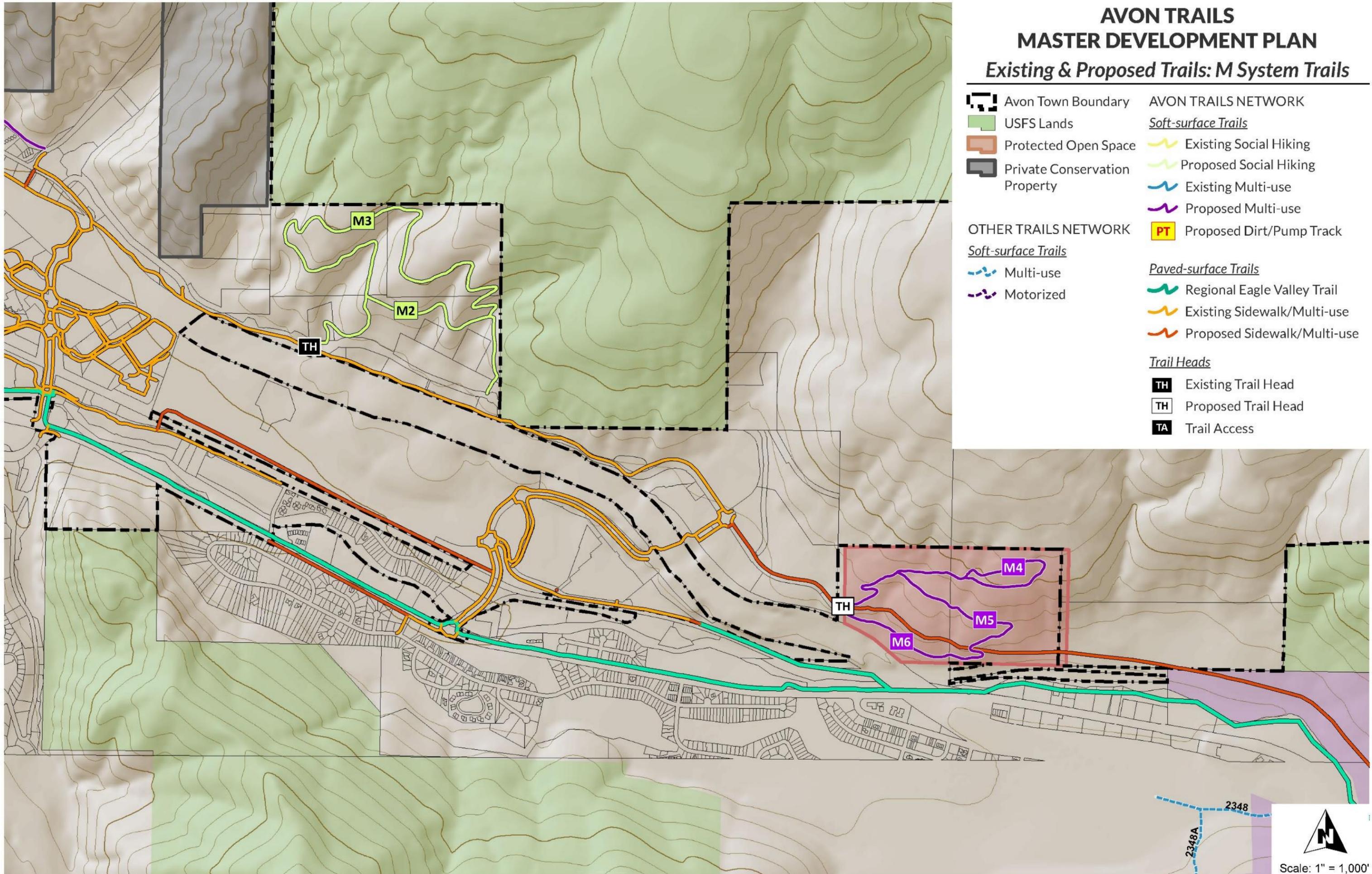
- | | |
|---|---|
|  Avon Town Boundary | AVON TRAILS NETWORK |
|  USFS Lands | <u>Soft-surface Trails</u> |
|  Protected Open Space |  Existing Social Hiking |
|  Private Conservation Property |  Proposed Social Hiking |
| |  Existing Multi-use |
| |  Proposed Multi-use |
| OTHER TRAILS NETWORK |  Proposed Dirt/Pump Track |
| <u>Soft-surface Trails</u> | |
|  Multi-use | <u>Paved-surface Trails</u> |
|  Motorized |  Regional Eagle Valley Trail |
| |  Existing Sidewalk/Multi-use |
| |  Proposed Sidewalk/Multi-use |
| | <u>Trail Heads</u> |
| |  Existing Trail Head |
| |  Proposed Trail Head |
| |  Trail Access |



AVON TRAILS MASTER DEVELOPMENT PLAN

Existing & Proposed Trails: M System Trails

- | | |
|---|---|
|  Avon Town Boundary | AVON TRAILS NETWORK |
|  USFS Lands | <i>Soft-surface Trails</i> |
|  Protected Open Space |  Existing Social Hiking |
|  Private Conservation Property |  Proposed Social Hiking |
| |  Existing Multi-use |
| |  Proposed Multi-use |
| OTHER TRAILS NETWORK |  Proposed Dirt/Pump Track |
| <i>Soft-surface Trails</i> | |
|  Multi-use | <i>Paved-surface Trails</i> |
|  Motorized |  Regional Eagle Valley Trail |
| |  Existing Sidewalk/Multi-use |
| |  Proposed Sidewalk/Multi-use |
| | <i>Trail Heads</i> |
| |  Existing Trail Head |
| |  Proposed Trail Head |
| |  Trail Access |



APPENDIX B – AERIAL IMAGERY TRAIL MAPS

Overview Map - "Existing and Proposed Trails"

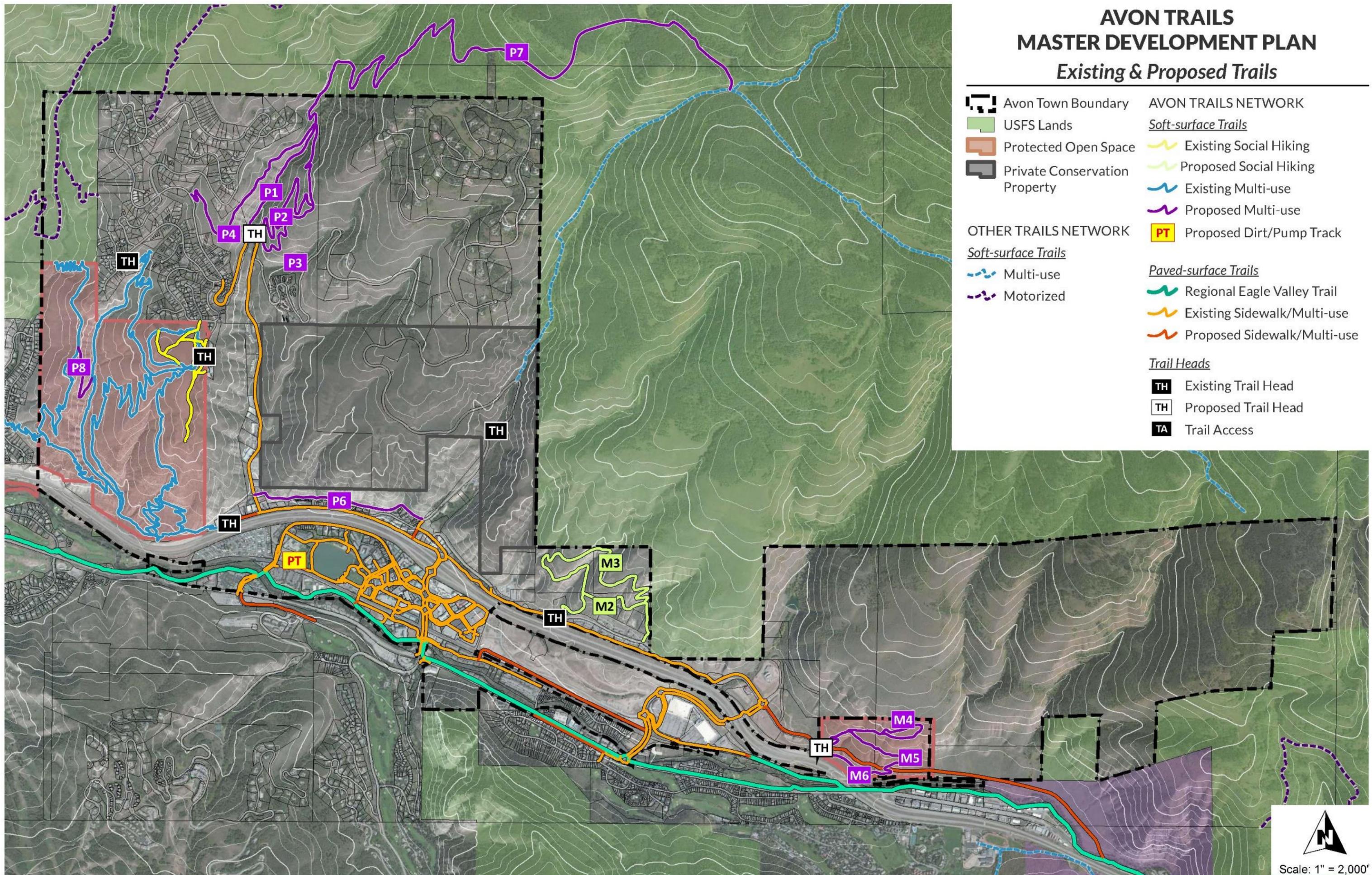
Detail Map - "P System Trails"

Detail Map - "M System Trails"

AVON TRAILS MASTER DEVELOPMENT PLAN

Existing & Proposed Trails

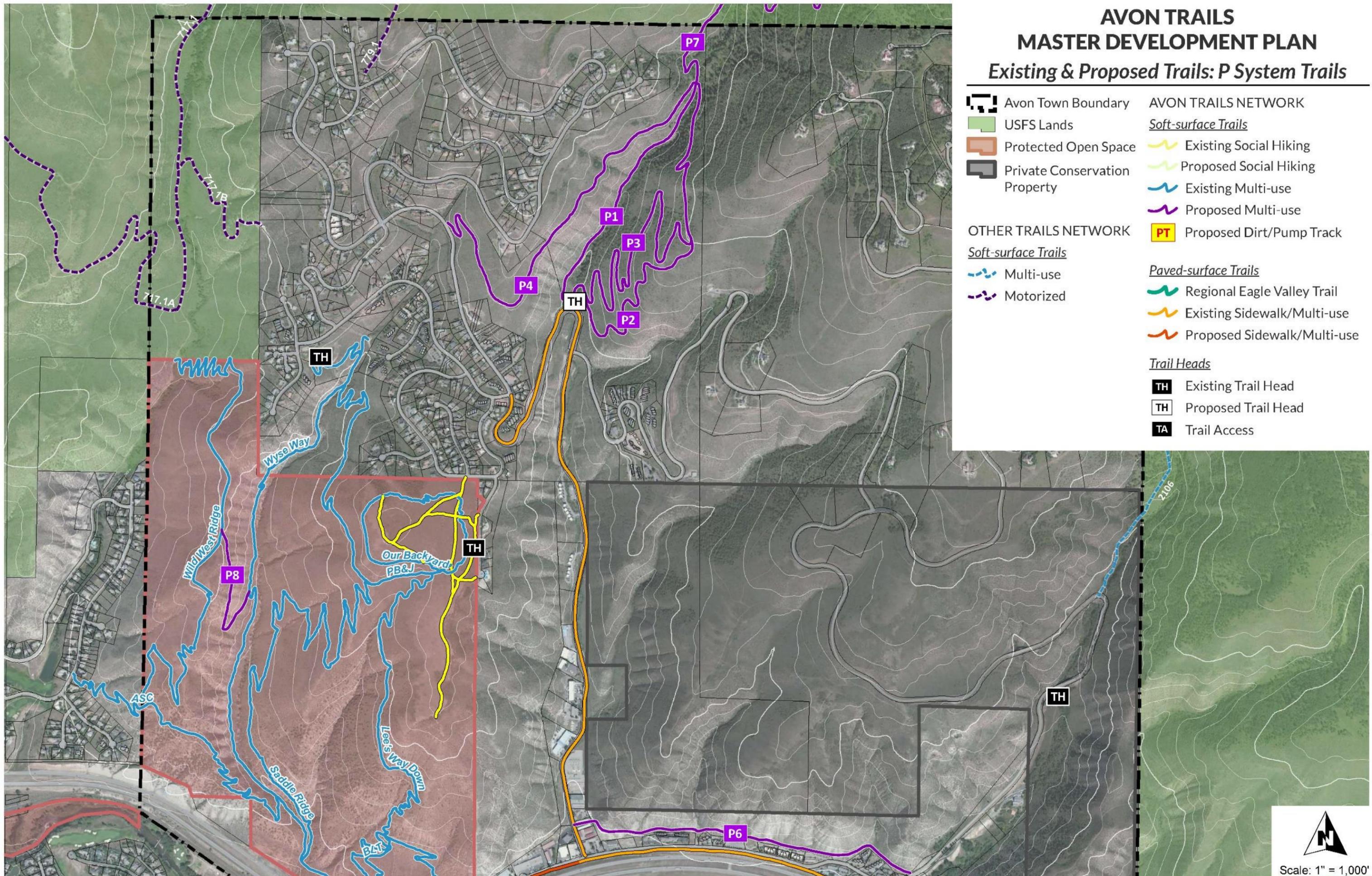
- | | |
|---|---|
|  Avon Town Boundary | AVON TRAILS NETWORK |
|  USFS Lands | <i>Soft-surface Trails</i> |
|  Protected Open Space |  Existing Social Hiking |
|  Private Conservation Property |  Proposed Social Hiking |
| |  Existing Multi-use |
| |  Proposed Multi-use |
| OTHER TRAILS NETWORK |  Proposed Dirt/Pump Track |
| <i>Soft-surface Trails</i> | |
|  Multi-use | <i>Paved-surface Trails</i> |
|  Motorized |  Regional Eagle Valley Trail |
| |  Existing Sidewalk/Multi-use |
| |  Proposed Sidewalk/Multi-use |
| | <i>Trail Heads</i> |
| |  Existing Trail Head |
| |  Proposed Trail Head |
| |  Trail Access |



AVON TRAILS MASTER DEVELOPMENT PLAN

Existing & Proposed Trails: P System Trails

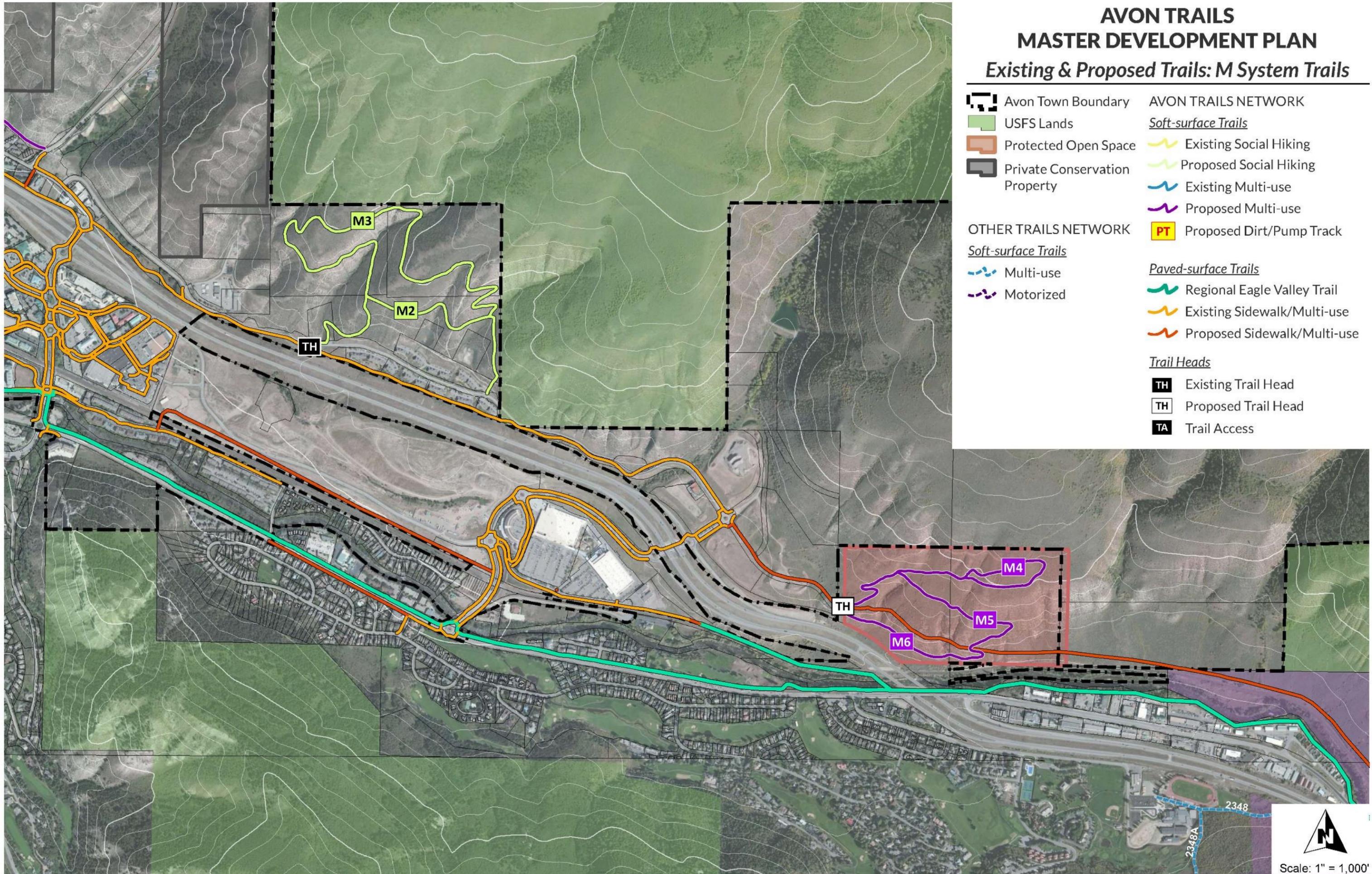
- | | |
|---|---|
|  Avon Town Boundary | AVON TRAILS NETWORK |
|  USFS Lands | <i>Soft-surface Trails</i> |
|  Protected Open Space |  Existing Social Hiking |
|  Private Conservation Property |  Proposed Social Hiking |
| |  Existing Multi-use |
| |  Proposed Multi-use |
| OTHER TRAILS NETWORK |  Proposed Dirt/Pump Track |
| <i>Soft-surface Trails</i> | |
|  Multi-use | <i>Paved-surface Trails</i> |
|  Motorized |  Regional Eagle Valley Trail |
| |  Existing Sidewalk/Multi-use |
| |  Proposed Sidewalk/Multi-use |
| | <i>Trail Heads</i> |
| |  Existing Trail Head |
| |  Proposed Trail Head |
| |  Trail Access |



AVON TRAILS MASTER DEVELOPMENT PLAN

Existing & Proposed Trails: M System Trails

- | | |
|---|---|
|  Avon Town Boundary | AVON TRAILS NETWORK |
|  USFS Lands | <i>Soft-surface Trails</i> |
|  Protected Open Space |  Existing Social Hiking |
|  Private Conservation Property |  Proposed Social Hiking |
| |  Existing Multi-use |
| |  Proposed Multi-use |
| OTHER TRAILS NETWORK |  Proposed Dirt/Pump Track |
| <i>Soft-surface Trails</i> | |
|  Multi-use | <i>Paved-surface Trails</i> |
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| |  Existing Sidewalk/Multi-use |
| |  Proposed Sidewalk/Multi-use |
| | <i>Trail Heads</i> |
| |  Existing Trail Head |
| |  Proposed Trail Head |
| |  Trail Access |



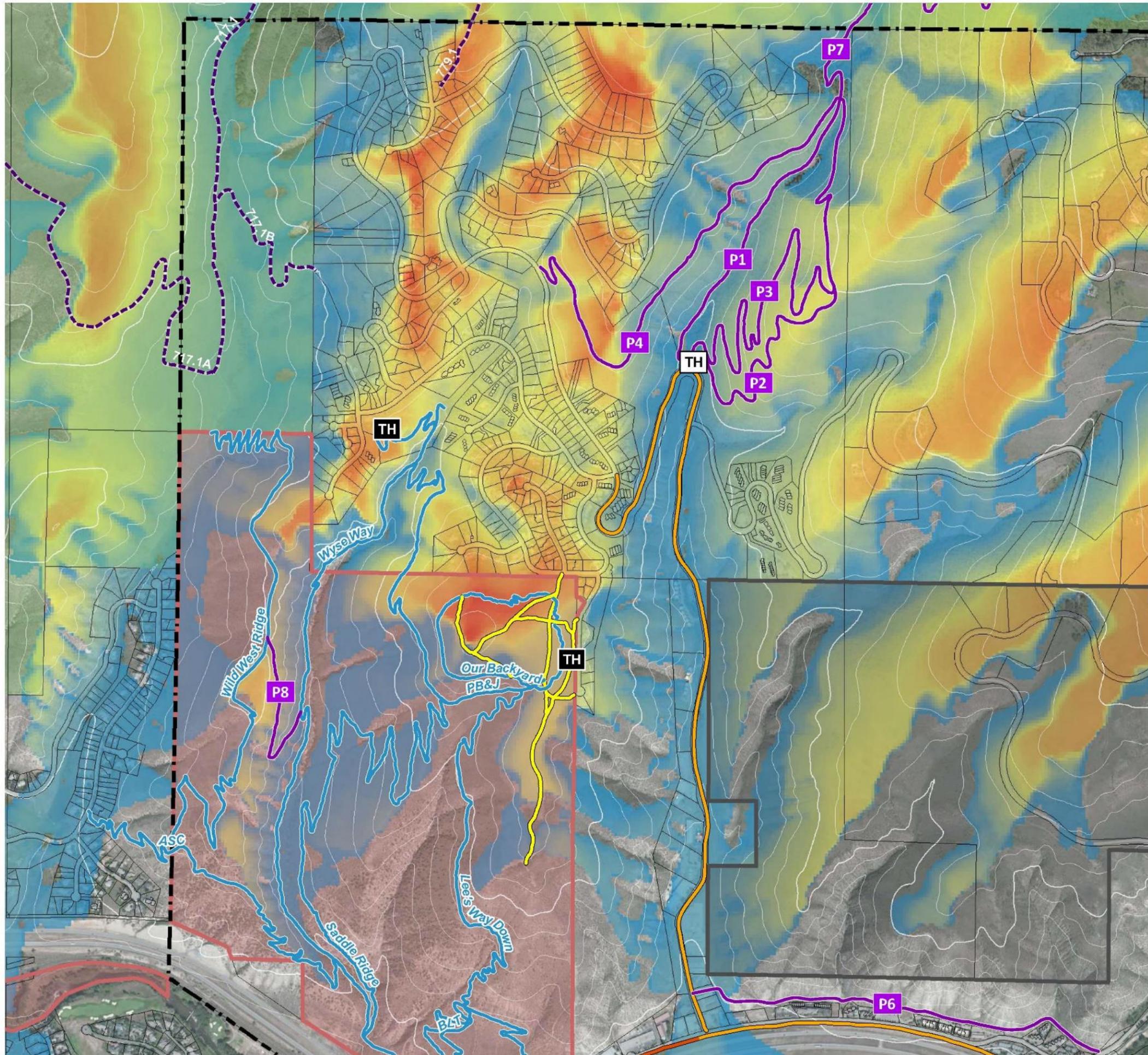
APPENDIX C – VISUAL IMPACT ANALYSIS MAPS

“Viewshed Impacts: From Wildridge”

“Viewshed Impacts: From Mountain Star”

AVON TRAILS MASTER DEVELOPMENT PLAN

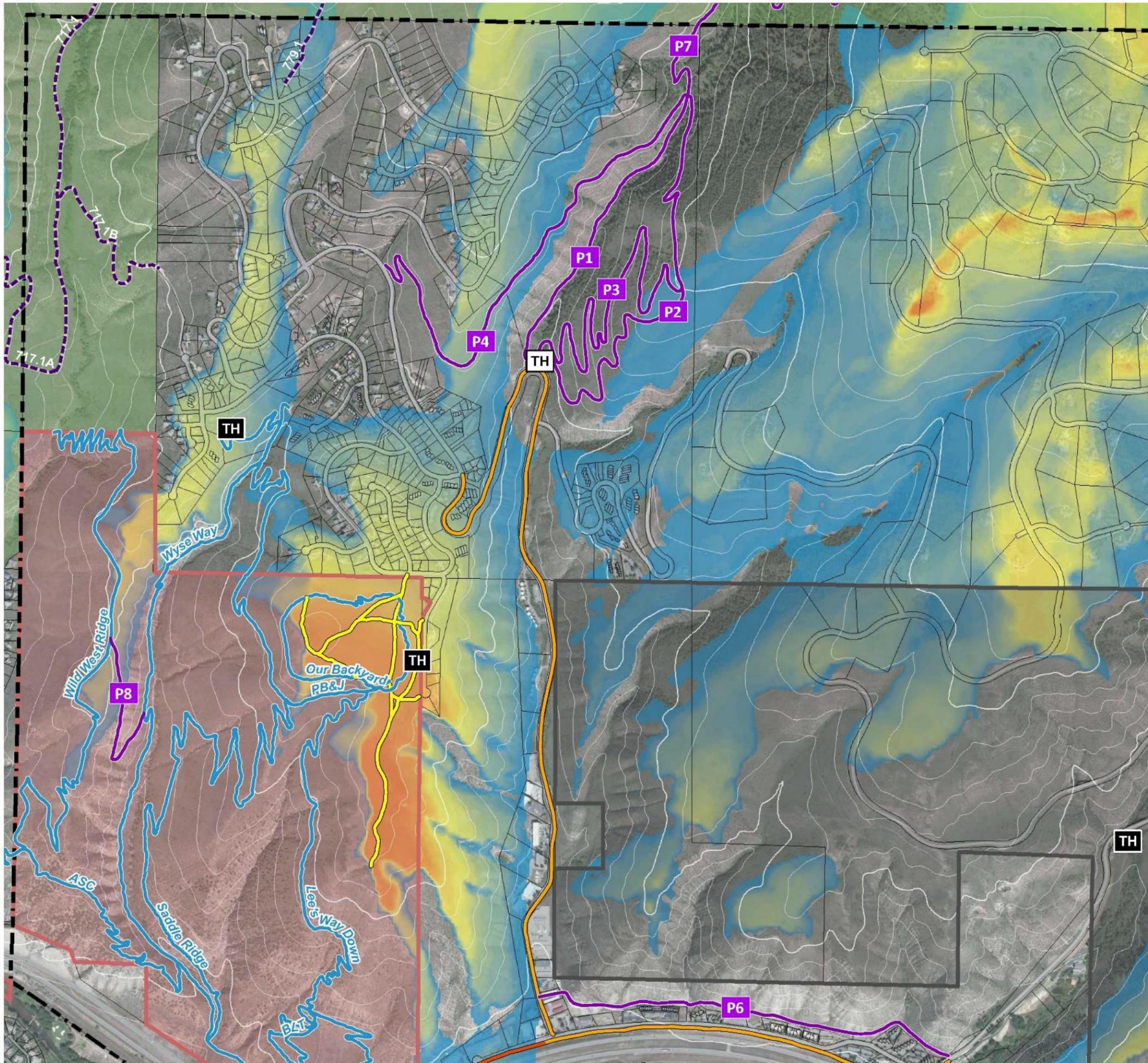
Viewshed Impacts: From Wildridge



Avon Town Boundary	AVON TRAILS NETWORK
USFS Lands	<i>Soft-surface Trails</i>
Protected Open Space	Existing Social Hiking
Private Conservation Property	Proposed Social Hiking
	Existing Multi-use
	Proposed Multi-use
OTHER TRAILS NETWORK	Proposed Dirt/Pump Track
<i>Soft-surface Trails</i>	
Multi-use	<i>Paved-surface Trails</i>
Motorized	Regional Eagle Valley Trail
	Existing Sidewalk/Multi-use
<i>Viewshed Impacts</i>	Proposed Sidewalk/Multi-use
Most Visible (Visible from 278 homes)	Trail Heads
	Existing Trail Head
	Proposed Trail Head
	Trail Access
	Least Visible (Visible from 1 home)

AVON TRAILS MASTER DEVELOPMENT PLAN

Viewshed Impacts: From Mountain Star



Avon Town Boundary	AVON TRAILS NETWORK
USFS Lands	<i>Soft-surface Trails</i>
Protected Open Space	Existing Social Hiking
Private Conservation Property	Proposed Social Hiking
	Existing Multi-use
	Proposed Multi-use
OTHER TRAILS NETWORK	Proposed Dirt/Pump Track
<i>Soft-surface Trails</i>	
Multi-use	<i>Paved-surface Trails</i>
Motorized	Regional Eagle Valley Trail
	Existing Sidewalk/Multi-use
<i>Viewshed Impacts</i>	Proposed Sidewalk/Multi-use
Most Visible (Visible from 40 homes)	<i>Trail Heads</i>
	Existing Trail Head
	Proposed Trail Head
	Trail Access
Least Visible (Visible from 1 home)	

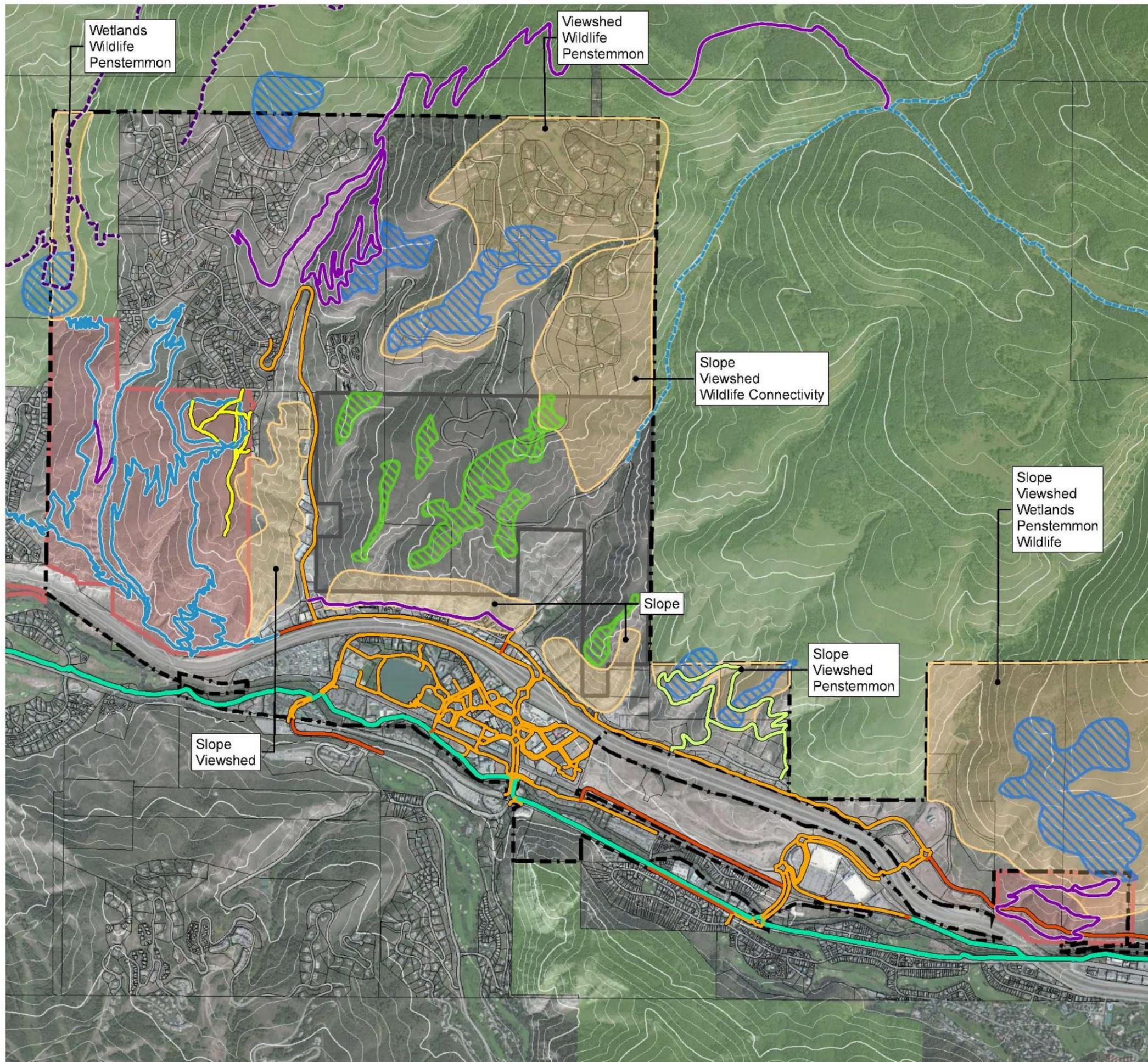
APPENDIX D – ENVIRONMENTAL & WILDLIFE MAP

“Trail Development Constraints”

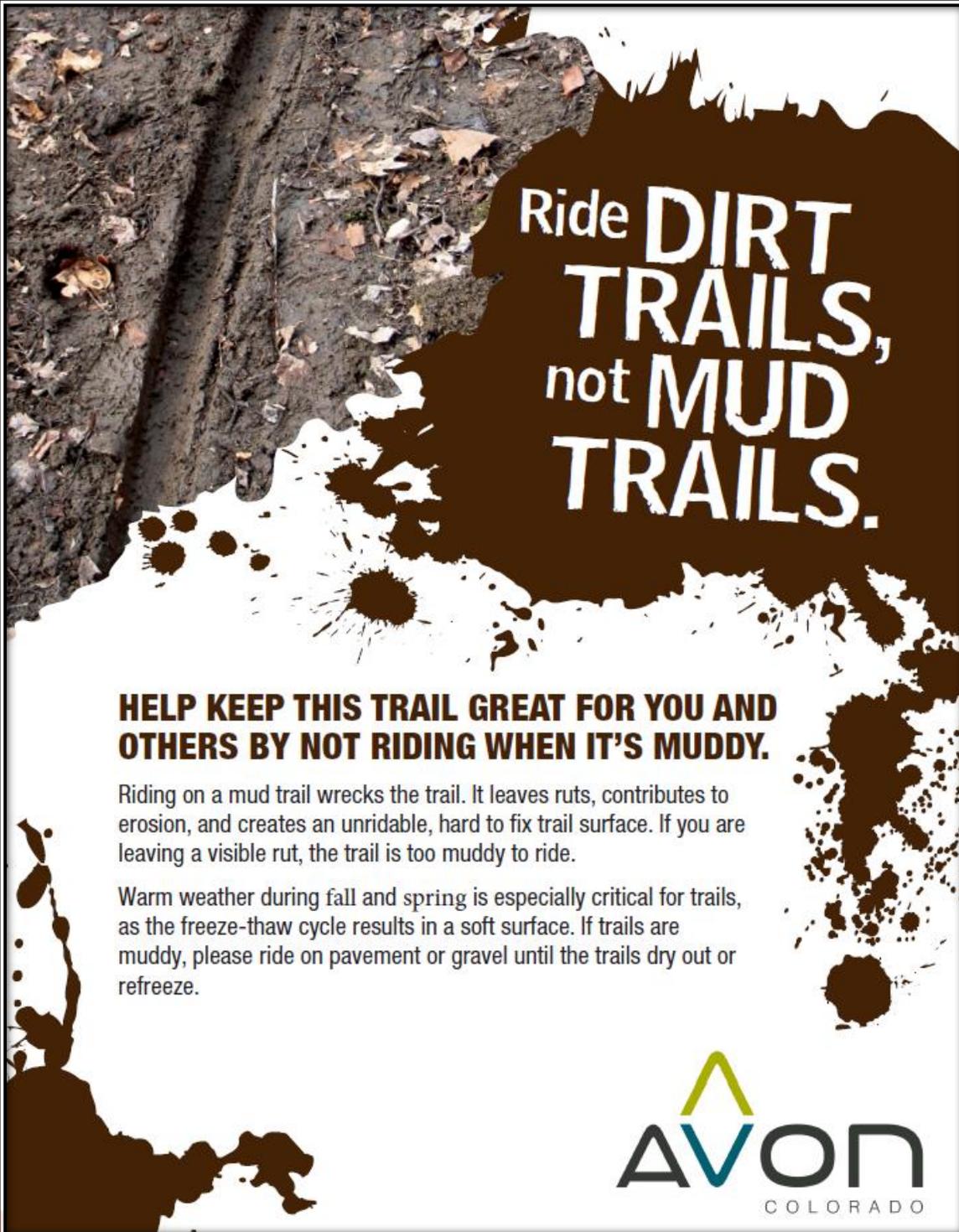
AVON TRAILS MASTER DEVELOPMENT PLAN

Trail Development Constraints

- | | |
|---|---|
|  Avon Town Boundary | AVON TRAILS NETWORK |
|  USFS Lands | <i>Soft-surface Trails</i> |
|  Protected Open Space |  Existing Social Hiking |
|  Private Conservation Property |  Proposed Social Hiking |
| |  Existing Multi-use |
| |  Proposed Multi-use |
| OTHER TRAILS NETWORK |  Proposed Dirt/Pump Track |
| <i>Soft-surface Trails</i> | |
|  Multi-use | <i>Paved-surface Trails</i> |
|  Motorized |  Regional Eagle Valley Trail |
| |  Existing Sidewalk/Multi-use |
|  Avoidance Zone |  Proposed Sidewalk/Multi-use |
| <i>Penstemon Harringtonii</i> | <i>Trail Heads</i> |
|  Mapped Habitat |  Existing Trail Head |
|  Potential Habitat |  Proposed Trail Head |
| |  Trail Access |



APPENDIX E – TRAIL ETIQUETTE FOR MUD SEASON



**Ride DIRT TRAILS,
not MUD TRAILS.**

HELP KEEP THIS TRAIL GREAT FOR YOU AND OTHERS BY NOT RIDING WHEN IT'S MUDDY.

Riding on a mud trail wrecks the trail. It leaves ruts, contributes to erosion, and creates an unridable, hard to fix trail surface. If you are leaving a visible rut, the trail is too muddy to ride.

Warm weather during fall and spring is especially critical for trails, as the freeze-thaw cycle results in a soft surface. If trails are muddy, please ride on pavement or gravel until the trails dry out or refreeze.

AVON
COLORADO

APPENDIX F – CPW COMMENTS





COLORADO

Parks and Wildlife

Department of Natural Resources

Glenwood Springs Service Center
0088 Wildlife Way
Glenwood Springs, CO 81601
P 970.947.2920 | F 970.947.2936

July 21, 2016

Town of Avon
Community Development
ATTN: Matt Pielsticker
PO Box 975
Avon, CO 81620

RE: Town of Avon Recreational Trails Master Plan update

Dear Mr. Pielsticker,

The Colorado Parks and Wildlife (CPW) has reviewed this project and we offer the following comments and mitigations for your consideration.

For many years, winter ranges were considered the most limiting component of ungulate environments. However, as our knowledge of ungulate physiology and behavior has increased, it has become apparent that weight gains and nutritional contributions of high quality summer range may be of equal or greater importance in determining winter survival and reproductive success (Canfield et al 1999).

In the past 20 years off road recreation (hiking, mountain biking, horseback riding and ATV) has significantly increased especially on public lands in areas surrounding resort communities. Research on possible impacts to wildlife has been slow to catch up. The majority of these projects focus on ungulates but there are some that look at recreational impacts to birds (Miller, Knight, Miller. 2001. Wildlife Response to Pedestrians and Dogs). Due to the limited research available for other species we have not specifically addressed impacts to them. However it would be prudent to realize that increased recreational levels will have impacts to the other species using these areas.

To differing extents, human activities taking place where animals are present have an impact on those animals. The amount of impact differs based on the activity and a series of factors described by Geist and reiterated by Knight et al. It was suggested that harassment was most damaging when animals were in poor condition (Geist 1970) and when disturbance was frequent and unpredictable. Wildlife responses to disturbance are shaped by six factors: type of activity; predictability of the activity; frequency and magnitude of the activity; timing (e. g., breeding seasons); relative location (e.g., above versus below on a slope); and the type of animal including: size, specialized versus generalized niche, group size, sex and age (Knight and Cole 1995). For several ungulate species, the greatest negative responses to recreational activities (either motorized or non-motorized) were measured for unpredictable or erratic occurrences (Canfield et. al. 1999).

Many of the research projects were designed to assess possible impacts on wildlife from general public recreational use. Most of these projects did not assess the impacts from highly concentrated uses and the



treatments were based on a set number of treatments twice in a day. While these research projects provide the baseline for documenting impacts to wildlife from off road recreation they often don't replicate the intense level of use observed on lands surrounding resort areas. The research studies also had clear constraints on what subjects could do during the treatments. The majority of the studies did not allow the subjects to stop to view or take pictures of wildlife nor were they allowed to follow wildlife. Due to these restrictions these studies may underestimate the actual impact to wildlife from off road recreation. In addition, there is a lack of information on impacts to wildlife from commercial or recreational race events or recreational activities at night.

Very often there is a misperception of what impacts to wildlife are. Most people would define an impact as the animal ran away. Unfortunately impacts to wildlife are often much less apparent. Several studies have been done using heart rate monitors or motion sensor within radio collars to detect travel, resting or feeding activity to determine at what point the animal starts to alert to the disturbance. All wildlife lives within a delicate balance of nutrition intake and energy output. Any additional activities that increase the energy output can have devastating impacts to the animal. When reviewing impacts to wildlife it is important to realize that subtle changes in time spent feeding, resting or travelling can have significant consequences for survival, growth and reproduction. Survival of both deer and elk is dependent upon non-activity. In studied wildlife populations, animals were in a resting state, lying down over 90% of their time. Energy expenditure, calories needed to survive, is conserved when animals utilize this strategy. The cost for a deer or elk to go from a lying position to a standing position is a 25% energy increase. This does not include any movement, just standing up. As common sense would dictate, there is a linear progression for increased energy consumption if that animal then walks up to a full running escape from the disturbance (Parker, et. Al. 1984 Energy Expenditures for locomotion for Mule Deer and Elk). Energy expended by elk increases significantly as they transition from lying to walking to running. Geist (1978) reported that energy expenditure caused by excitation can temporarily double the expenditure for maintenance. He offered as a rule, excitement increases an animal's metabolism about 25% more than that required for maintenance for long periods. Excited animals frequently also incur the cost of the locomotion if they leave the site of disturbance. Travel costs vary with distance moved, type of locomotion and amount of elevation gain. Hard running can exceed by 20 times the cost of basal metabolism, and climbing requires about 12 times more energy than travel over level terrain (Geist 1978). Energy costs of excitation and locomotion are very high compared to the relatively low daily food (energy) intake by ruminants, and exceedingly expensive if the fat stores are used to pay the cost of undue excitement. The undue excitement caused by human disturbance may be the difference between successful reproduction or not or between survival and death.

During the spring and summer deer and elk are trying to recover body condition from winter while still undergoing significant stress from lactation and antler development. Deer and elk must maximize feeding and resting periods to not only provide for their current needs but to also store sufficient fat to assist them in winter survival. Even such small detail of where the animal is in relation to the disturbance has an effect. Recreationists located above the wildlife elicited a stronger response than a recreationist located level with or below wildlife, (Taylor and Knight 2003).

When looking at wildlife impacts you must include behavioral changes. Wildlife behavior may take the form of avoidance, habituation or attraction (Knight and Temple 1995). Disturbance may modify an animal's behavior either positively or negatively through five mechanisms: home range changes, altered movement patterns, altered reproductive success, altered escape response and altered physiological state (Tromulak and Frissell 2000). Behavioral responses may be of short duration (temporary displacement) or long-term, such as abandonment of preferred foraging areas (Geist 1978). Mammals may respond to disturbances by humans by reducing activity to areas, habitats, and times of day where encounters with humans are minimal (Geist 1971). Avoidance or abandonment of harassment-prone areas may subsequently reduce the range of the population (Geist 1978). Disturbance from recreation may have both immediate and long-term effects on wildlife. The immediate response of many animals to disturbance is a change in behavior, such as cessation of foraging, fleeing, or altering reproductive behavior (Knight and Cole 1991). Over time, energetic losses from flight, decreased foraging time, or increased stress levels come at the cost of energy resources needed for an individual's survival, growth, and reproduction (Geist 1978).

Most research studies look at an "area of influence". These areas are described as areas where "wildlife may be displaced from otherwise suitable habitat due to human activities" (Taylor and Knight 2003). This displacement may not only be from suitable habitat but may also displace wildlife from high quality habitat to poor quality habitat that results in an overall loss of body condition. These areas of influence can be different for each species and each activity. The effects of disturbance on ungulates can be inferred by quantifying behavioral states and changes in time devoted to specific activities. If a disturbance causes ungulates to reduce foraging time and/or increase energy expenditure by moving away from disturbances, or simply by moving more, then they experience a net energy deficit attributable to disturbance avoidance. Stankowich (2008) reviewed the extensive literature on flight responses of ungulates (including elk) following disturbance and found broad evidence that human activity consistently evokes avoidance behavior in this group.

Stress is not always something people consider as it relates to impacts on wildlife. Studies measuring the levels of glucocorticoids stress hormones produced by the adrenal gland have shown that wildlife does indeed react to stress. It would be wrong to assume that the most responsive animals are those that are most vulnerable to disturbance... an animal that shows no behavioral response (fleeing) is estimated to have an (energy) cost of zero but this animal is much more likely to suffer stress related impacts; therefore, the estimated energy cost based on behavior are underestimated and although the energy cost is low does not mean that the impact of the stimulus is low. Stress may have a greater impact than an immediate response to disturbance. (Beale et al. 2007). In other words; if an animal does not show the behavior of fleeing this does not mean that there is not an impact to that animal of a higher degree than an animal that flees.

The loss of winter range within the Eagle Valley for both deer and elk has resulted in a decrease in population levels. When increased human population and recreational pressures are added to the loss of habitat, even trying to maintain the current deer and elk population is questionable.

The development of trails through intact habitat blocks does result in habitat fragmentation for many small mammals and birds. Trying to quantify these impacts is much more difficult. Whenever possible in areas that have already had significant fragmentation from housing development, roads and trails, any remaining blocks of intact habitat should be protected.

Few studies have examined how recreationists perceive their effects on wildlife, although this has implications for their behavior on public lands. A survey of 640 backcountry users on Antelope Island was completed to investigate their perceptions of the effects on recreation on wildlife. Approximately 50% of recreationists felt that recreation was not having a negative effect on wildlife. In general, survey respondents perceived that it was acceptable to approach wildlife more closely than our empirical data indicated wildlife would allow. Generally, recreationists held members of other user groups responsible for stress or negative impacts to wildlife rather than holding members of their own recreational user group responsible (Taylor and Knight 2003).

The attached maps (Figure 1 - 4) show deer and elk habitats and the area of influence associated with both the species and the recreational activity. Deer areas of influence are from Taylor and Knight 2003. Elk areas of influence are from Wisdom et.al 2005.

Figure 1) Mule Deer 100 meters on both sides of the trail for mountain bike and pedestrian.

This is based on recreation activities being limited to on the trail only.

Figure 2) Mule Deer 390 meters on both sides of the trail. This is based on recreational activities that may leave the trail in locations.

Figure 3) Elk 500 meters on both sides of the trail for pedestrian.

Figure 4) Elk 1500 meters both sides of the trail for mountain bikes.

Figure 5) Chart showing the acres for each habitat type and also the area of influence for the recreational activity.

When you look at the overall available habitat within the Town of Avon there are three areas that stand out.

- The Village at Avon
- Private conservation property
- Metcalf Creek

These three areas provide the majority of the intact wildlife habitat remaining in the town limits. The Village at Avon is already approved for development, leaving just 2 remaining undeveloped parcels. The private conservation property has its own restrictions on development.

Metcalf Creek provides a significant block of intact wildlife habitat and a corridor from within the town out to the USFS boundary that allows wildlife to utilize this drainage without having to cross roads or developed home sites. Developing the proposed trails within the Metcalf Creek drainage would negatively impact wildlife habitat and the ability of wildlife to use it as a movement corridor. As shown in Figure 1, the map for mule deer using the 100 meter area of influence on each side of the trail shows that the entire lower drainage of Metcalf Creek is impacted by these trails. When you include Figures 3

and 4 for elk you see that the entire Metcalf Creek drainage is impacted. The West Avon Parcel has the same scenario; the current density of trails impacts the entire parcel.

The CPW would recommend the following.

- No trails (P1, P2, P3, P4, P5, P7) are developed within Metcalf Creek.
- No additional trails (P8) are developed within the West Avon Parcel.
- P6 be developed, no closure required.
- Trails M2 and M3 be developed but closed in for winter season Dec 1 to June 15.
- Trails M4-6 not be planned until the conservation easement for East Avon Preserve is completed. These trails may have limited wildlife impacts depending on the final development of the Village at Avon.
- Trails should avoid drainages and riparian areas whether the creek is year round or seasonal. These areas are natural movement corridors for wildlife and provide runoff filtration to prevent sediment loading in the creek.
- Complete a raptor survey to determine if there are active raptor nests within 100 meters of the trails. If raptor nests are located the trail should be closed until the young fledge.
- No commercial use
- No race events
- Use between sunrise and sunset; only

Mitigation measures:

Seasonal closures: These can be somewhat tailored to the area. The Avon trails are within deer and elk winter range and the deer migration corridor. The winter period has been in the past described as Nov 30 to April 15. Clearly this does not fit all winters and the occurrence of late spring storms can easily move animals back to winter range areas. These dates were based on a period when deer and elk would be expected to start moving to transitional range directly above the winter range areas. This was also prior to the dramatic increase in mud season recreational activities and development of western slope. In order for a seasonal closure to be effective it must extend until the adjoining transitional range is melted out enough to meet the nutritional requirements for wildlife. Since deer and elk are in their third trimester adequate nutrition is critical to provide the female with enough energy for not only her survival but also enough for the fawn/calf development and enough to start lactation at birth. Lactation is the most energetically expensive activity for any mammal. Having areas open during migration and fawning could increase fawn predation and impacts on nesting birds.

Because the proposed project is within the deer migration corridor it is important to consider the timing for the peak of spring migration. The peak of the deer migration thru the Mud Springs underpass at Dowd Jct is approximately May 26 to June 12. (Alldredge and Phillips 2000, unpublished report).

Based on the research studies documenting the importance of spring and summer nutrition, the impacts from change in behavior patterns we now are recommending winter closure dates of Dec 1 to June 15.

Elk:

The impact from human disturbance during elk calving (Phillips, Alldredge, 2000, et. al.) has been documented. Closure periods for elk calving should be May 1 to June 30. Winter closure for elk should be December 1 to June 15

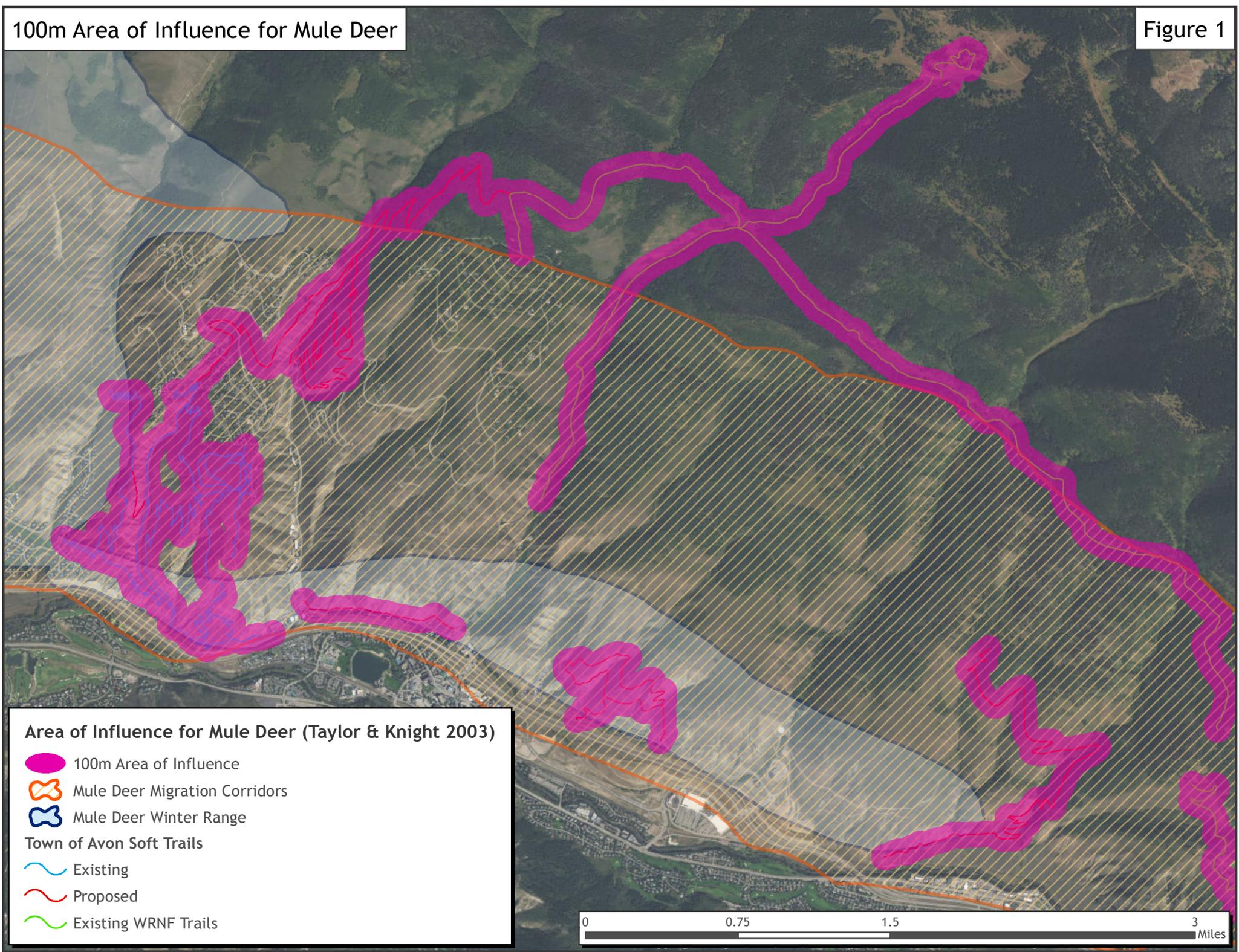
Thank you for the opportunity to provide these comments. The CPW looks forward to providing additional comments if this project proceeds. If you have questions please contact DWM Bill Andree at 970-328-6563.

Sincerely,



Perry Will
Area Wildlife Manager

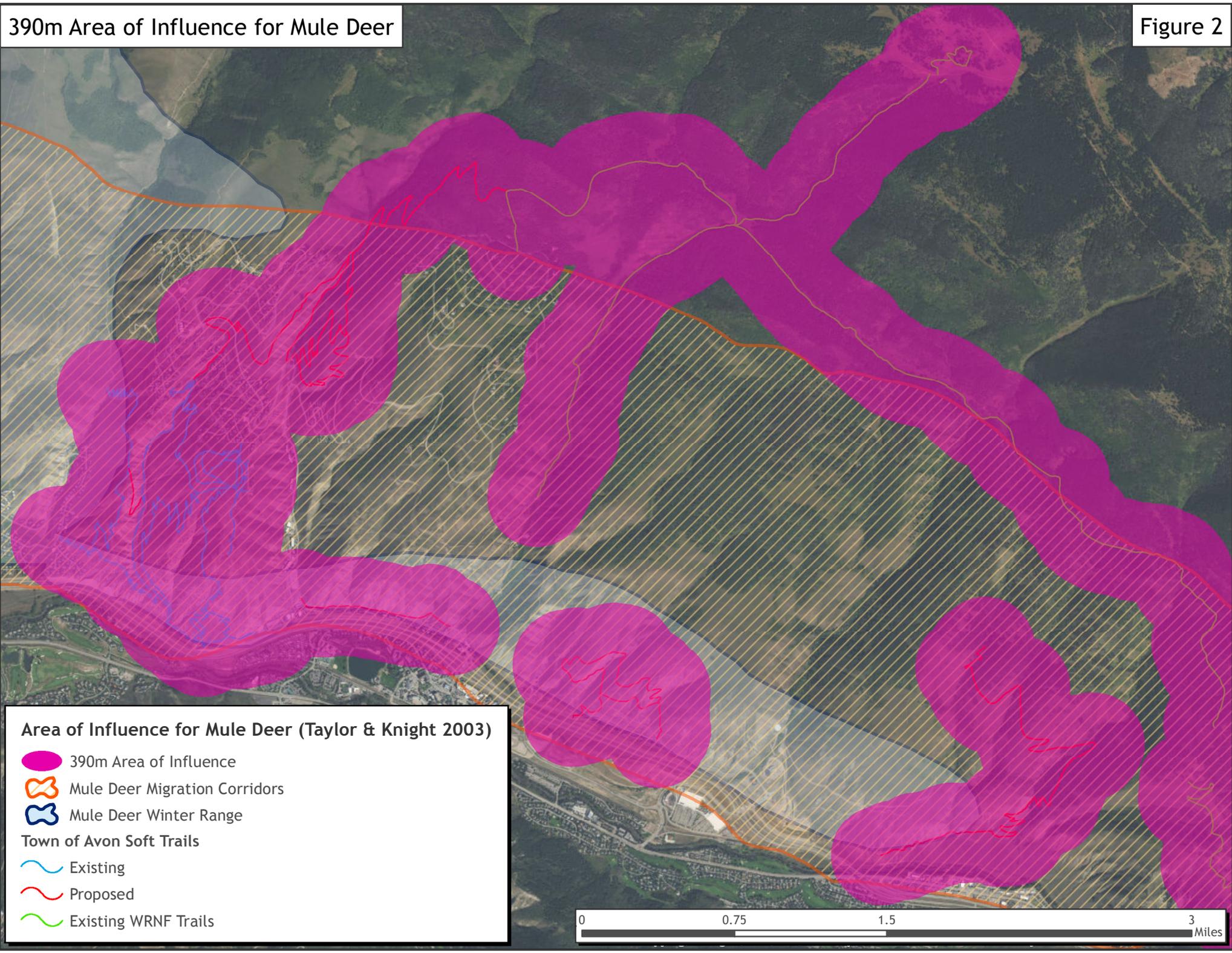
cc: R.Velarde, B.Andree, file



Area of Influence for Mule Deer (Taylor & Knight 2003)

- 100m Area of Influence
- Mule Deer Migration Corridors
- Mule Deer Winter Range
- Town of Avon Soft Trails
- Existing
- Proposed
- Existing WRNF Trails

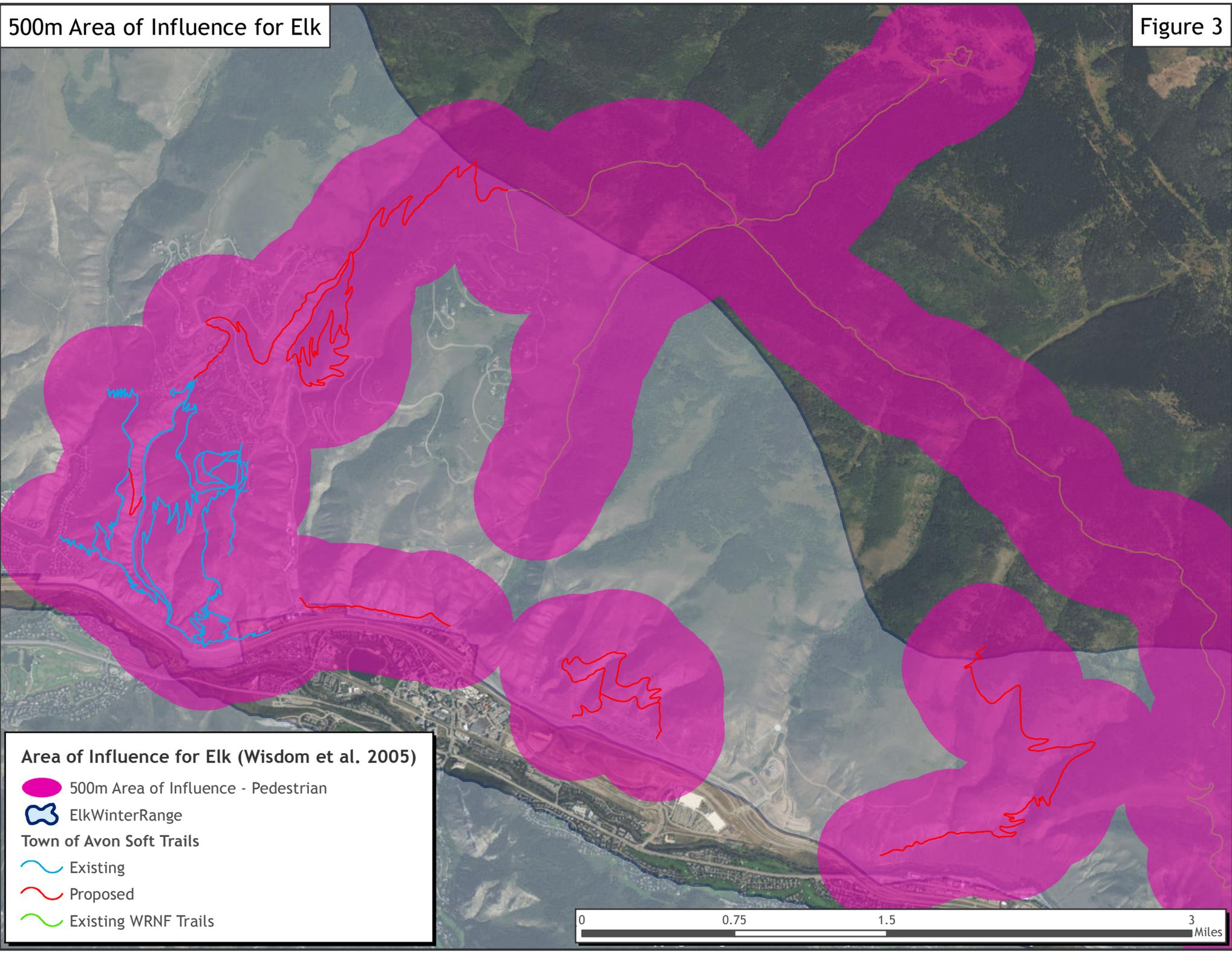
0 0.75 1.5 3 Miles



Area of Influence for Mule Deer (Taylor & Knight 2003)

-  390m Area of Influence
-  Mule Deer Migration Corridors
-  Mule Deer Winter Range
- Town of Avon Soft Trails**
-  Existing
-  Proposed
-  Existing WRNF Trails

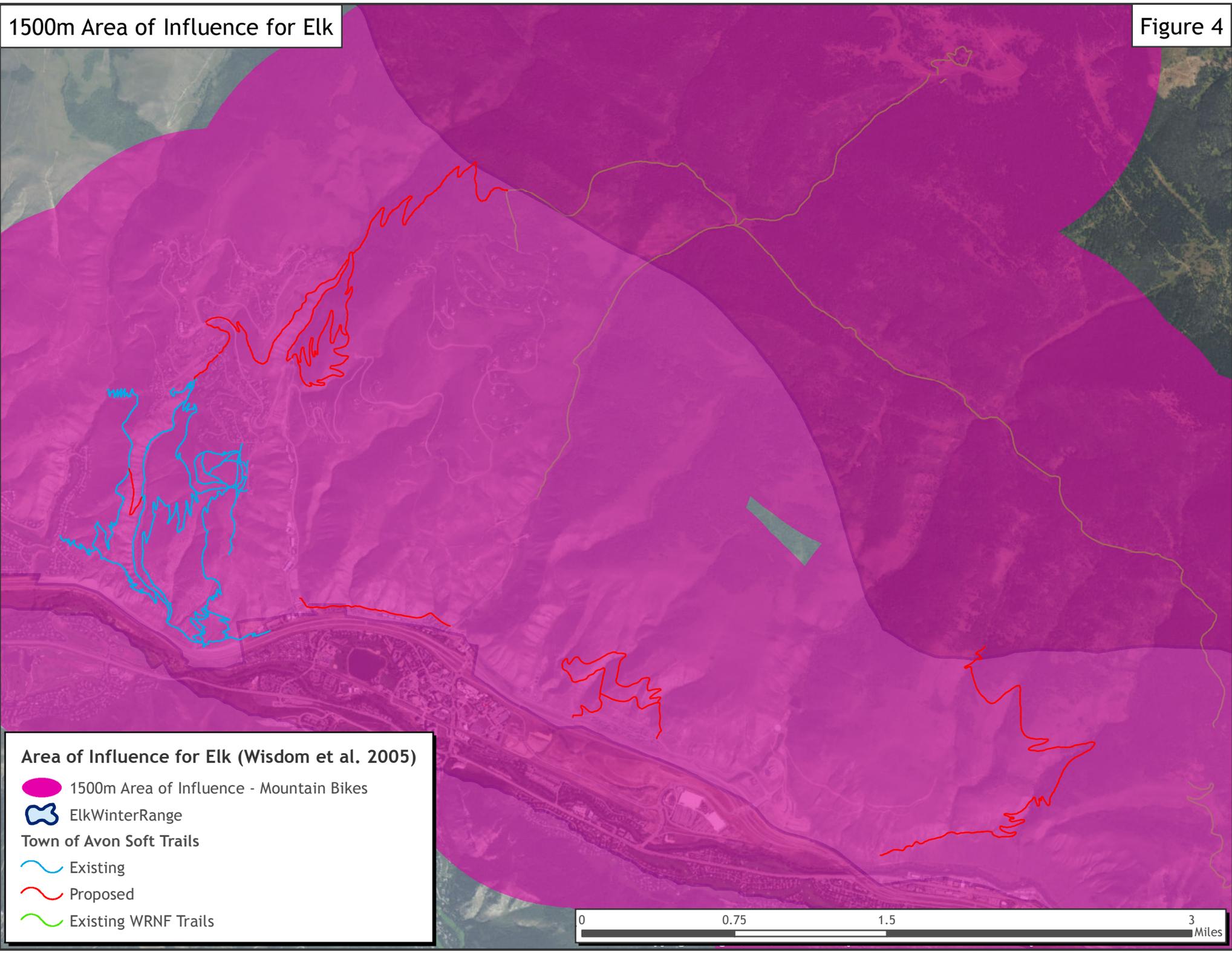




Area of Influence for Elk (Wisdom et al. 2005)

-  500m Area of Influence - Pedestrian
-  ElkWinterRange
- Town of Avon Soft Trails**
-  Existing
-  Proposed
-  Existing WRNF Trails





Area of Influence for Elk (Wisdom et al. 2005)

-  1500m Area of Influence - Mountain Bikes
-  Elk Winter Range
- Town of Avon Soft Trails**
-  Existing
-  Proposed
-  Existing WRNF Trails



Figure 5

<i>Acreage Categories:</i>	Within TOA	% of TOA	Trail Areas of Influence (AOI) from Literature:							
			100m AOI	%	390m AOI	%	500m AOI	%	1500m AOI	%
Total Acreages	5436.04	100%	1081.00	20%	2579.80	47%	3059.79	56%	5180.06	95%
Elk Winter Range	4505.22	83%	1046.23	23%	2312.91	51%	2691.33	60%	4411.47	98%
Deer Winter Range	1027.97	19%	308.03	30%	632.55	62%	722.21	70%	1027.97	100%
Deer Migration Corridor	4735.72	87%	1070.79	23%	2438.29	51%	2825.70	60%	4624.48	98%

Example: Of the 1027.97 acres of MD winter range habitat within the Town of Avon, 308.03 acres or 30% is indirectly impacted by proposed and existing trails when a 100 meter buffer is applied.