

Dragoon Gulch Trails Master Plan

Sonora, CA

Prepared for



City of Sonora

and



Tuolumne County Transportation Council

by



and



May 2013

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1 INTRODUCTION

1.1 PROJECT OVERVIEW AND VISION

This master plan describes the proposed build-out of the Dragoon Gulch Recreational Area, which is owned and operated by the City of Sonora (City). Approximately 35 acres were previously developed with a network of natural surface trails. Building on this successful precedent, the plan guides extension of the existing trail network throughout an additional 67 acres recently purchased through a Roberti-Z'Berg-Harris Non-urbanized Area Grant (RZH).

Planning efforts have been funded by a Community Transformation Grant administered through Tuolumne County. The Dragoon Gulch Master Plan, including providing safe routes to schools, is a key objective of the grant, as proximity and access to recreational areas is a key factor in health of communities.

To guide the planning process, community meetings were held to provide input and direction to the future expansion. The process culminated with the City's Parks, Recreation, and Beautification Committee's recommendation to the City Council to approve the preferred alternative, and the City Council's vote to approve the preferred alternative, enabling completion of the master plan.

This plan envisions additional natural surface trails, along with short sections of potentially paved multi-use trails (for cycling and pedestrian use) to extend the current trail network to a total of nearly 10 miles. This length would place approximately .1 mile of trail per acre, allowing the majority of the 100 acre site to remain relatively untouched. Approximately ten miles provides a significant trail experience, creating a destination to draw walkers, hikers, and cyclists from the local region, providing ancillary revenue through sales, tourism, and increased property values.

To accommodate trail expansion, a new 20-stall parking lot and other amenities are proposed. Existing topographic features and buildings have been considered for adaptive reuse. A proposed trail head located off Racetrack Road may ultimately be used as a gathering and staging area for groups of runners, walkers, hikers, nature lovers, bird-watchers, and cyclists.

Setbacks from existing residences, seasonal waterways, and historical or natural resources have been identified and incorporated. The plan also includes connections to and from adjacent neighborhoods and destinations such as Sonora High School, providing healthy transportation options. Planning for functional use and recreational use supports the City's "Get Up, Get Going, Get Healthy Sonora" program.

1.2 EXISTING CONDITIONS

Dragoon Gulch is a seasonal waterway, with headwaters approximately 2,000' North of Racetrack Road (North boundary of the project area). The existing Dragoon Gulch trail area includes the following parcels: APN's 001-120-25, 034-100-04 and 034-090-07 (2020 Sonora General Plan, pg. 335). The recently purchased area includes APN's 034-090-04 and 034-010-03. Surrounding zoning includes primarily residential and some commercial uses.

The currently undeveloped area lies on the westerly side of the Dragoon Gulch ravine. Within the expanded area are some westerly-facing slopes abutting the City/County line at the westerly boundary of the project, but predominately easterly-facing slopes. Three distinct summits afford views of the surrounding area not currently accessible via the existing trail network, and are a key visual resource.

The Dragoon Gulch area has a notable history which has been previously documented¹. Remnants of mining activities, including benched (graded) areas for water troughs and tailing piles, are evident.

The area is densely overgrown with underbrush, primarily manzanita and poison oak. Oak Woodlands and Oak Chaparral ecotypes predominate. Clearing for trail access and fire control is needed. Fuel removal can be accomplished by thinning and limbing up manzanita, and by removing dead brush near the trail, though sensitivity to views and preservation of the natural context is paramount.

1.3 PLANNING CONTEXT

Documents reviewed and policies incorporated include the City of Sonora General Plan, the Tuolumne County Bikeways and Trails Plan, and the Tuolumne County Trails Paths to Health and Prosperity.

City of Sonora General Plan

Applicable Policies:

- *4.E.f Provide Access to Waterways which Respects Private Property and Conserves Sensitive Resources*
- *11.A.14 Protect, maintain, and enhance wildlife and trail corridors through Sonora including Sonora Creek, Woods Creek and Dragoon Gulch.*
- *12.A.h Promote Shared Use to Expand the Variety and Quantity of Available Facilities and Distribute Costs and Manpower to Acquire and Maintain Facilities*
 - *Cooperatively developing the Dragoon Gulch Park and Trail with the Mother Lode Adventist Junior Academy to provide vital linkages through the school site between Dragoon Gulch Trail and the proposed Woods Creek Trail while developing educational and interpretive opportunities within the trail system for local schools (e.g., biological studies of natural resources within the trail/park system, study examples of California Gold Rush history located throughout the trail system)*
- *12.B.b Establish a Trail System Integrated with Regionally-Planned Facilities Located Within the City's Sphere of Influence*

Further Discussion:

Trails: These linear parks are more frequently being rated at or near the top of desirable recreational facilities in local, state and community recreation surveys. These facilities provide opportunities for quiet observation (e.g., nature study, bird watching), hiking through natural lands within an urban setting, protecting natural resources (e.g., creeks), conserving cultural resources (e.g., miner's ditches), attracting visitors, non-motorized transportation (e.g., bicycle, pedestrian, equestrian use²), and other benefits. While numerous standards exist to guide trail widths, few standards exist for trail length. Current standards recommend at least one regional trail system per community. The recently-acquired Dragoon Gulch trail parcel within the city is one example (pg. 427).

Tuolumne County Trails Paths to Health and Prosperity

¹ <http://www.sonoraca.com/visitsonora/Dragoon/History.pdf>

² No equestrian uses are proposed within Dragoon Gulch, consistent with current management practices.

While the existing Dragoon Gulch trail is defined as an “Urban Trail” (pg. 9), the expanded Dragoon Gulch area is most akin to a “Purpose Built Trail,” that will “foster recreation and economic development.” Goals for the Dragoon Gulch area outlined in this document are to:

1. Extend the existing Dragoon Gulch trail network as planned.
2. Plan for a bike park/skills progression area as part of the acreage.
3. Deliver Economic Development through Purpose-Built trails.

Tuolumne County Bicycle and Trails Plan

As a key destination, additional planning is needed to connect Dragoon Gulch to the larger community and to provide continuous non-vehicular routes. Through the development of an additional trailhead in the northern portion of the site, this plan creates significant opportunity to connect Dragoon Gulch with the larger region via development and expansion of Racetrack Road with Class I or II bicycle lanes and sidewalks.

Additional Context:

In addition to specific documents noted above, this plan furthers the following planning and community development efforts:

- Preserve views from state designated scenic highways (49 and 108) – by designating and preserving open space.
- Implement and Support activities related to “Tree City USA” designation – by protecting extensive natural areas adjacent to downtown.
- Sonora Historic Resources Inventory – by preserving and providing opportunity for interpretation of historic artifacts in the Dragoon Gulch area.

Dragoon Gulch is recognized as a key destination and attraction for the city, and may be better connected to the downtown core in the future by a signage program, property acquisition, or improvements (sidewalks) within the existing right-of way.

1.4 SAFE ROUTES TO SCHOOL

The expanded trail area provides an important link in the overall community. Students attending Sonora High School who may live in the neighborhoods east of the project are currently limited to Racetrack Road, a narrow, two-lane road with few stops signs, and no pedestrian accommodation. By providing an alternative route off of Racetrack Road at the earliest opportunity to the existing City right-of-way, this project will enhance pedestrian safety.

Pedestrians entering the project off Racetrack Road may walk to Sonora High School through the project by exiting at the Alpine Lane Trailhead, and continuing along the designated striped pathway along West Bonanza Road to the sidewalk at the corner of West Bonanza Road and Snell Street, and continuing east along the sidewalk at Snell Street to Sonora High School.

During the public outreach process, many students attended the community meetings and provided valuable feedback. In addition, a separate student-led presentation was held at the Sonora High School Leadership class. This format allowed students greater expression than in the general public meetings, and provided the feedback detailed in section 2.5.

To quantify the current number of students walking along Racetrack Road and likely to use the project instead of the current unimproved road, a pedestrian survey was performed after school on April 17, 2013. This was a regular hour school day with fair weather, during testing week, which was most likely to yield the maximum attendance. Seventeen pedestrians were counted Snell and West Bonanza Road during an approximate one hour period. Six pedestrians (all students)

continued north along Snell (which turns into Racetrack at the county line) and would be likely to use the project instead of the street (refer to the Appendix, item 5.7).

No current Safe Routes to School activities are currently performed at Sonora High School. An outreach program including a discussion of healthy transportation options is included in the Appendix, Item 5.8. This project presents a significant opportunity to promote a healthy lifestyle at local schools, including healthy and safe transportation options, by using the trail as a catalyst. Accommodating multiple user groups (from walking and jogging to casual and advanced downhill cycling) broadens the appeal of the trail and encourages students of all ages to be active. Students who are already engaged in cycling, walking, or jogging are more likely to use healthy transportation options than to switch modes and use a vehicle. Further, by incorporating interpretive signage and adequate facilities for school trips, this plan provides for the use of the trail for field trips and athletics, engendering a lifelong appreciation for nature and healthy activities.

2 COMMUNITY OUTREACH

2.1 COMMUNITY OUTREACH OVERVIEW

The master planning effort used a community based approach with an emphasis on public outreach. The outcome of this effort is a locally preferred alternative for trail development that fits the context of local area, including surrounding neighborhoods, and meets the needs and desires of the overall community. The public outreach efforts included:

- Targeted mailings to nearby property owners (including County and City)
- Informational meeting with neighboring residents.
- Two project-focused public meetings:
 - One visioning session focused on use and feedback of the existing trail and desired use and outcome of the expanded trail area.
 - One session to review and discuss four alternatives, each representing different trail uses, configuration, slope, and density. This session resulted in broad consensus on one alternative.
- Outreach to the Sonora High School Leadership Class, including a current use questionnaire and activity survey
- Parks, Recreation, and Beautification Committee³ presentation of the preferred alternative and public comment, resulting in unanimous recommendation for approval to the City Council
- City Council presentation of the preferred alternative, culminating in unanimous approval to move forward to complete the master plan base on the preferred alternative.

2.2 INITIAL NEIGHBORHOOD MEETING

City staff conducted an informal meeting on November 8, 2012 with neighboring residents. This meeting served to introduce the project to nearby residents in the County, and to introduce City staff associated with the project.

During this meeting, City staff heard concerns regarding privacy (the potential for views into private property) and nuisance. Many noted that the juncture of Leland Drive and Redbud lane is currently used as an illegal entrance to the Dragoon Gulch area and adjacent large residential parcels. Comments received during the meeting were relayed to the consultant team, and informed the design of the four trail alternatives. A record of these comments is included in the appendix, Item 5.1.

³ A stakeholder's group was determined by city staff to be adequately represented by the Parks, Recreation, and Beautification Committee.

2.3 COMMUNITY MEETING #1

To develop a basis for design based on the real needs and desires of the community, the first community meeting held on November 15, 2012 included a broad discussion covering the following major topics:

1. General context, character, and features of the existing and proposed trail areas.
2. Existing trail area uses, likes and dislikes.
3. Ideas for improvement.
4. Desired uses and character.

To provide context to the discussion, the following map (Figure 1: Existing Conditions Exhibit) was used as a talking point to review the relative size, adjacency and features of the overall area:

EXISTING CONDITIONS

DRAGON GULCH TRAIL AREA

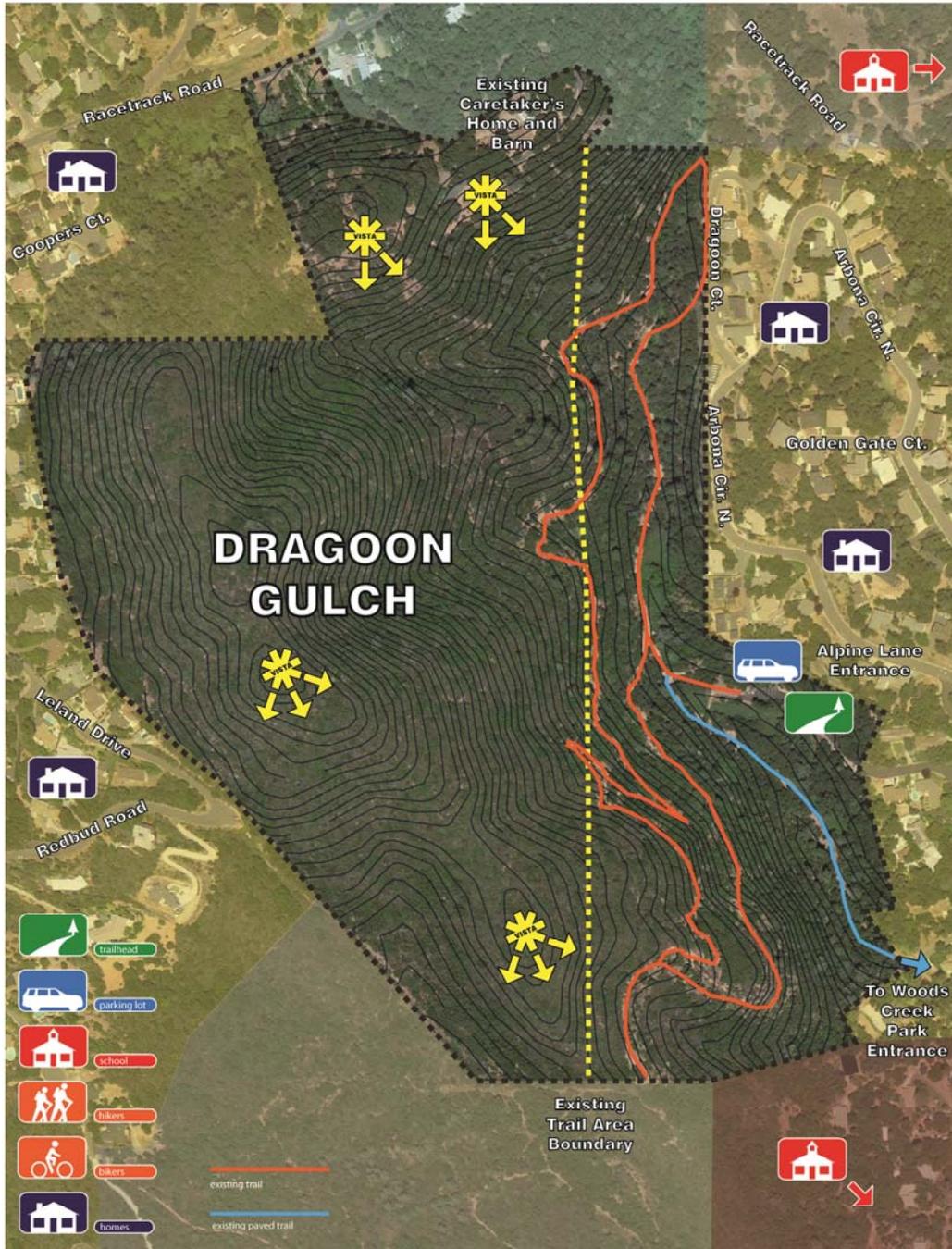


Figure 1: Existing Conditions Exhibit

Following this review of the existing conditions, a general discussion of pros and cons of the existing area, as well as desires and expected outcomes of the expansion, was held. A full list of comments received is included in the appendix, item 5.2. Representative comments include:

“I like having multiple paths to take.”

“Be sensitive to the land and prevent scarring.”

“A ten mile loop for runners would be great – roads are dangerous!”

“Make sure some areas are smooth or paved for handicapped people.”

“Parking needs to be sized right – too much or too little is bad.”

“I’d like to have a drinking fountain at the trailhead.”

To establish the user group for the expanded trail network, an activity survey quantified relative interest for a broad range of activities. Participants were asked to circle their top three activities for the trail area. The following graph (Figure 2: Activity Preferences) demonstrates the popularity of the top 10 responses:

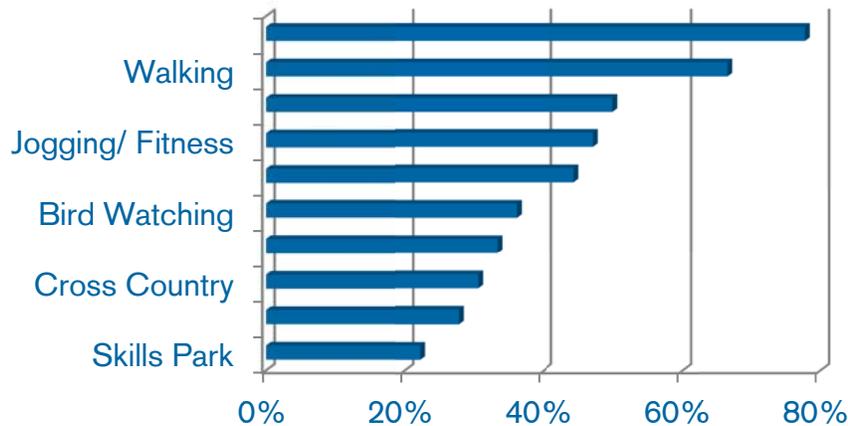


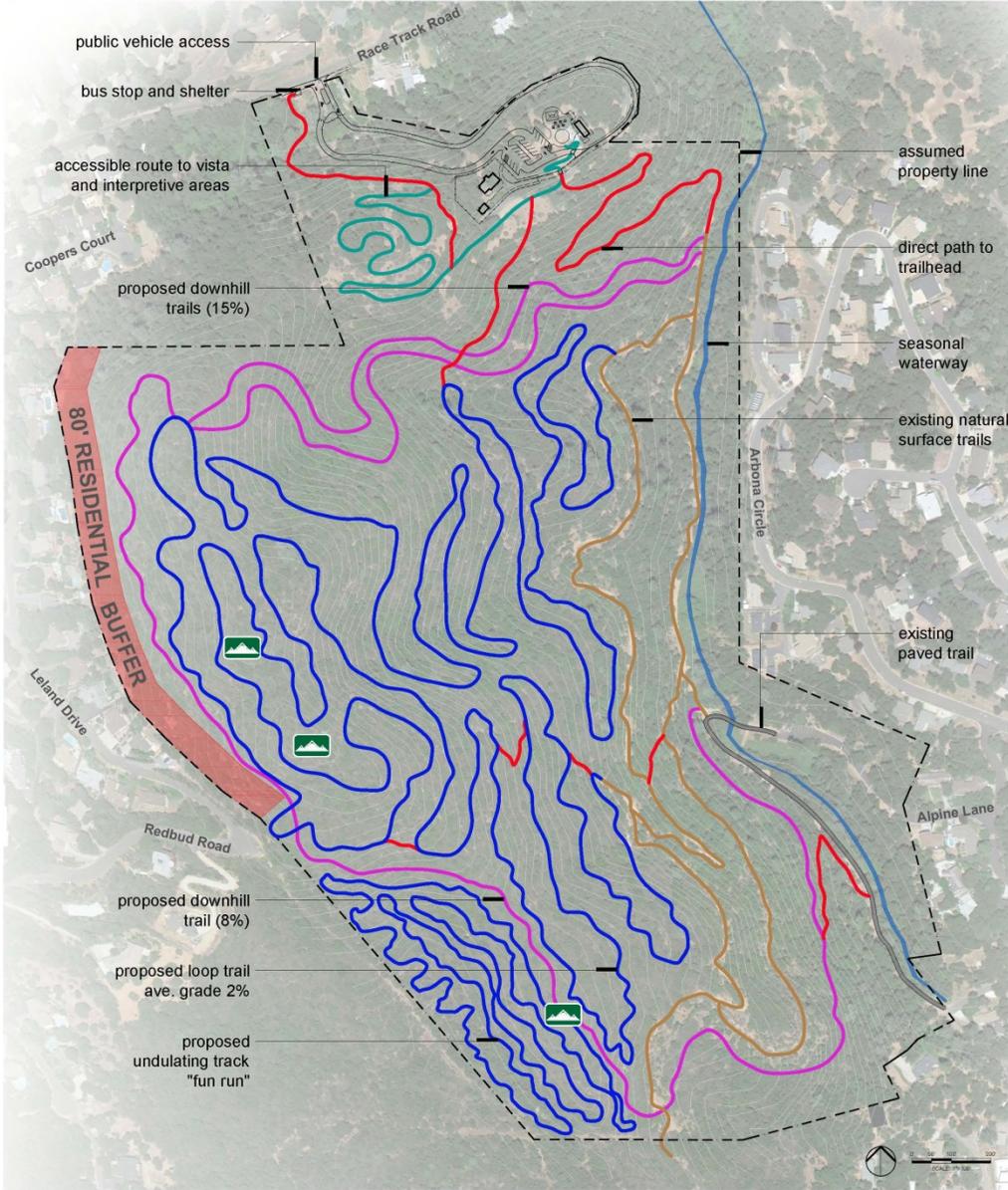
Figure 2: Activity Preferences

This meeting provided valuable insight into the various uses, desires, and preferences of current trail-goers. A highlight of the meeting was a common realization that not only do diverse groups (walkers, bikers, etc.) use the trail, but they enjoy the diversity. This contrasts with many other trail projects where diverse users prefer to separate uses (i.e., separate areas for hikers vs. bicyclists, etc.). The fact that the existing Dagoon Gulch area serves as a common thread for the community was recognized, and many participants expressed a desire to see the multi-use character of the existing trail network continued.

2.4 COMMUNITY MEETING #2

Based on the information gathered and results of the first meeting, four alternative plans for trail alignment were developed and presented during the second community meeting on December 13, 2012. These included a variety of proposed trail densities, uses, and configurations. These are shown in the following: Figure 3: Trail Alignment Option A, Figure 4: Trail Alignment Option B, Figure 5: Trail Alignment Option C, and Figure 6: Trail Alignment Option D. Figure 7: Proposed Amenities is common to all trail alignment options.

Option A maximizes diverse experiences. Different trail sections are custom designed for hikers, bikers, and walkers. Two summit paths are included, perimeter downhill sections with steeper grades accommodate serious bikers, and a "fun run" - a looped undulating trail section - is great for cardiac training, running, or biking.



length: 6.4 mi. | central trail ave. grade: 2% | downhill: 15% & 8%

TRAIL MASTER PLAN | OPTION A

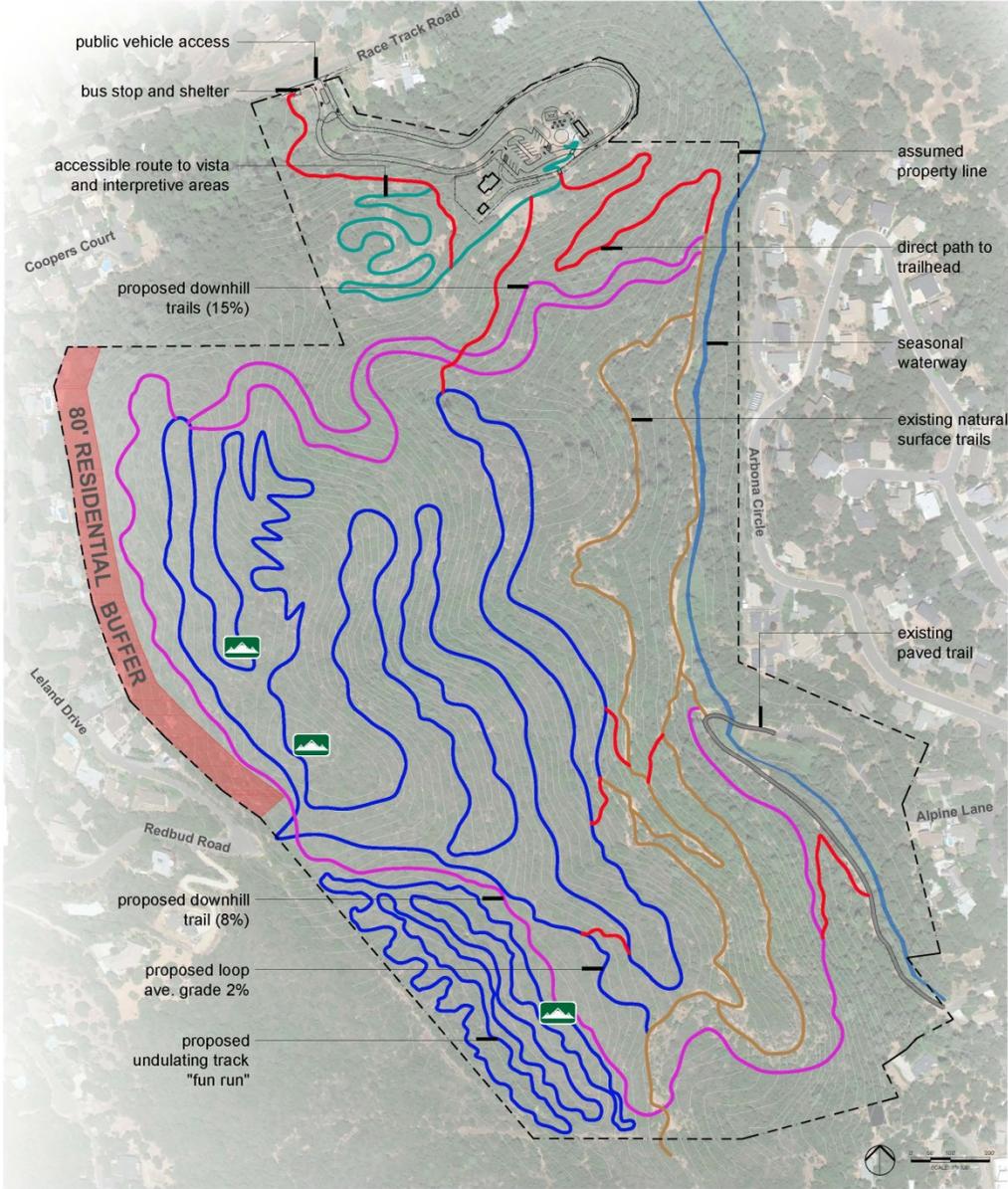




DRAGON GULCH

Figure 3: Trail Alignment Option A

Option B maximizes diverse experiences, but lessens the density and length of trail, providing the least impact to the natural area of all options. Different trail sections still accommodate various uses, but only one summit path is included. The "fun run" can be included or omitted.



length: 5.3 mi. | central trail ave. grade: 2% | downhill: 15% & 8%

TRAIL MASTER PLAN | OPTION B

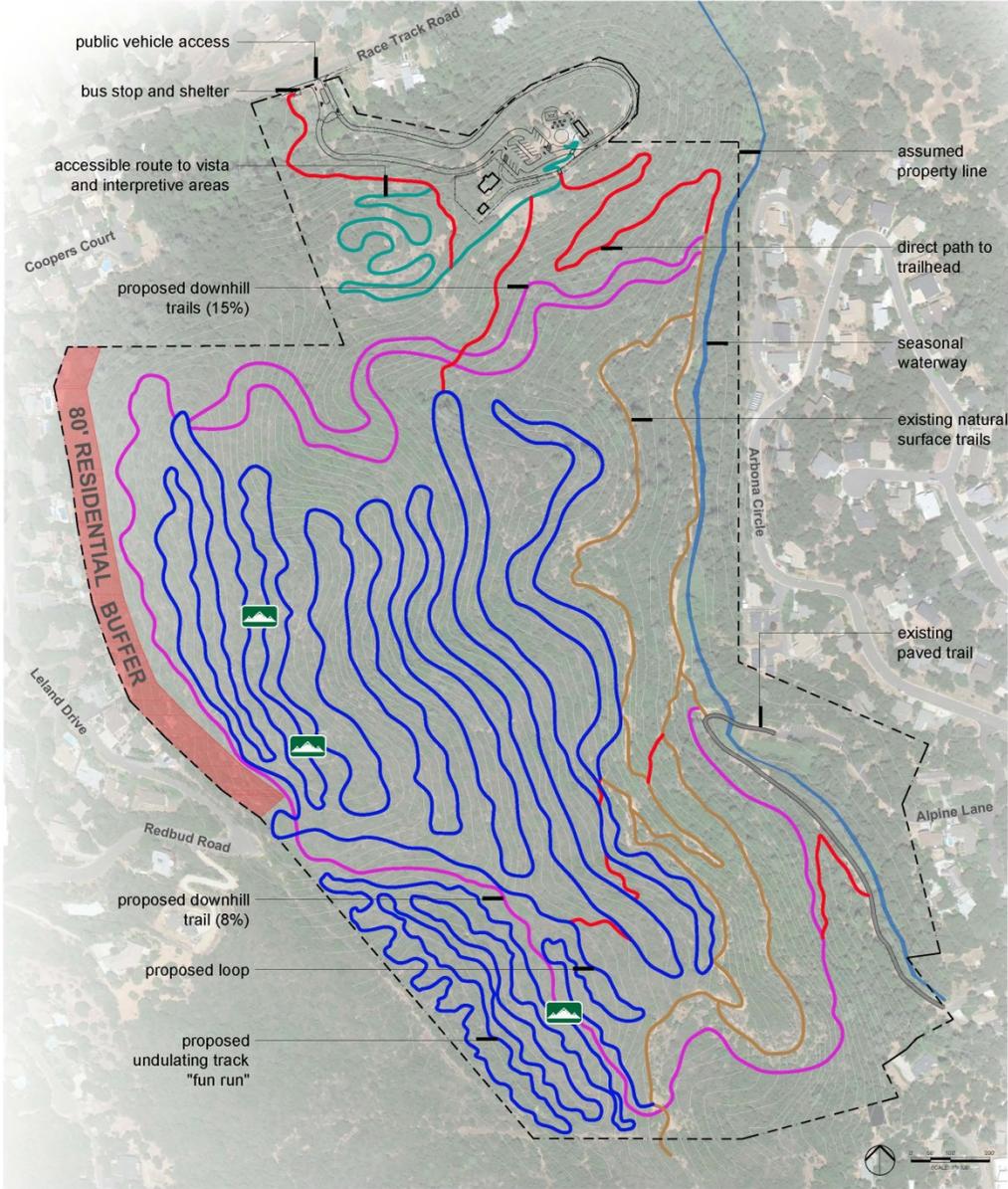




DRAGOON GULCH

Figure 4: Trail Alignment Option B

Option C maximizes the length of trail, while accommodating different uses, by switchbacking the central trail up the ravine to a single summit. To increase length, more turns density are needed. At the perimeter, different trail sections accommodate various uses, and the "fun run" can be included or omitted.



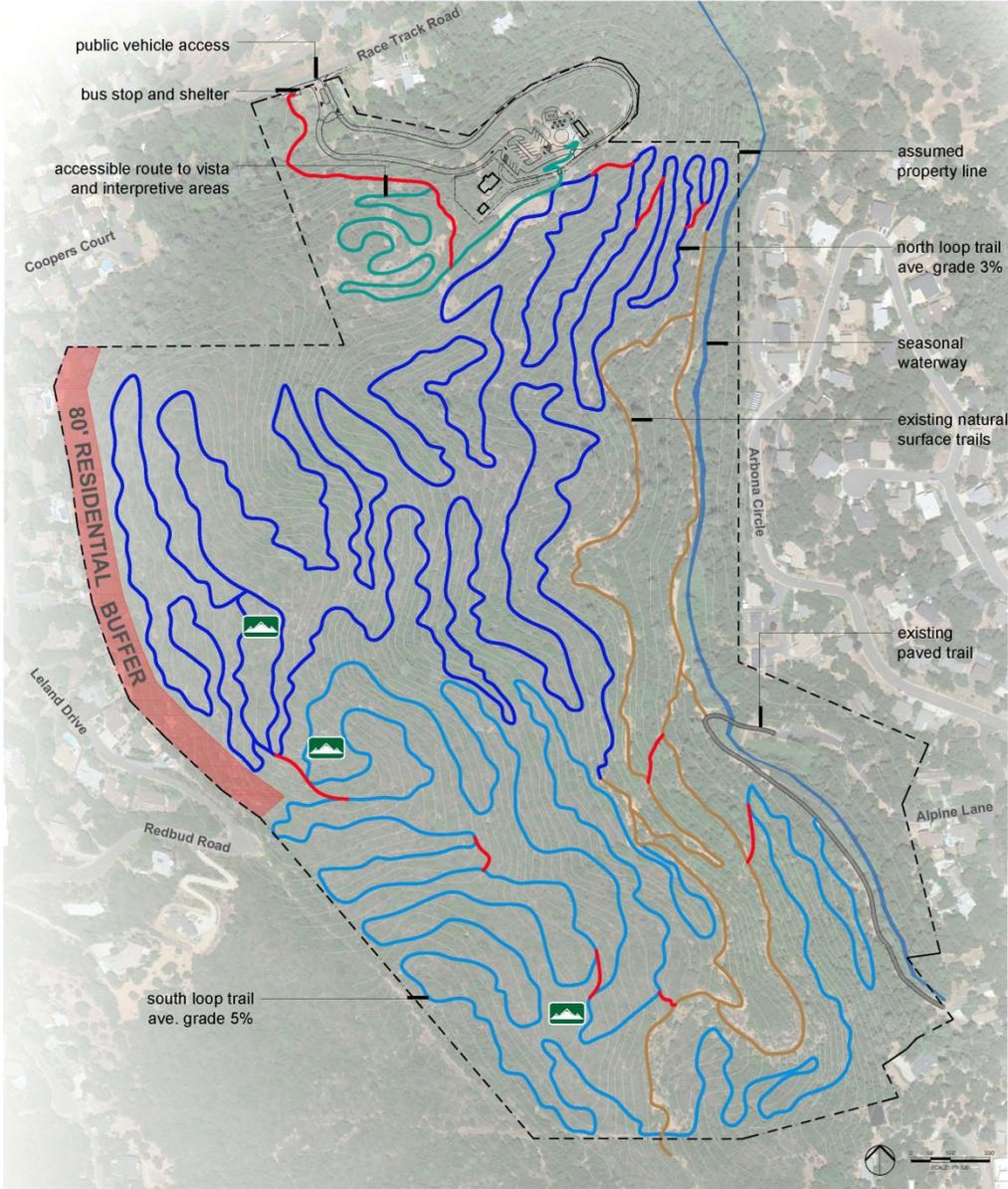
length: 7.0 mi. | central trail ave. grade: 2% | downhill: 15% & 8%

TRAIL MASTER PLAN | OPTION C

DRAGOON GULCH

Figure 5: Trail Alignment Option C

Option D traverses three separate summits and is simpler to navigate. Two separate 4 mile loops can be traversed individually or together, but without doubling back. This option maximizes the length of the trail for general use, but excludes segments optimized for downhill mountain biking.



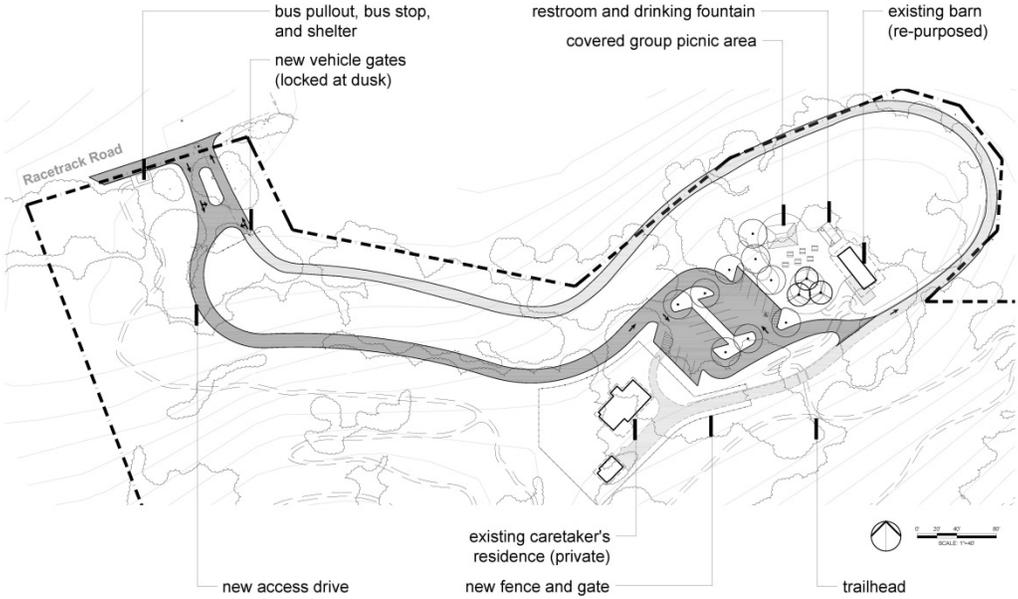
length: 8.0 mi. | north loop ave. grade: 3% south loop ave. grade: 5%

TRAIL MASTER PLAN | OPTION D

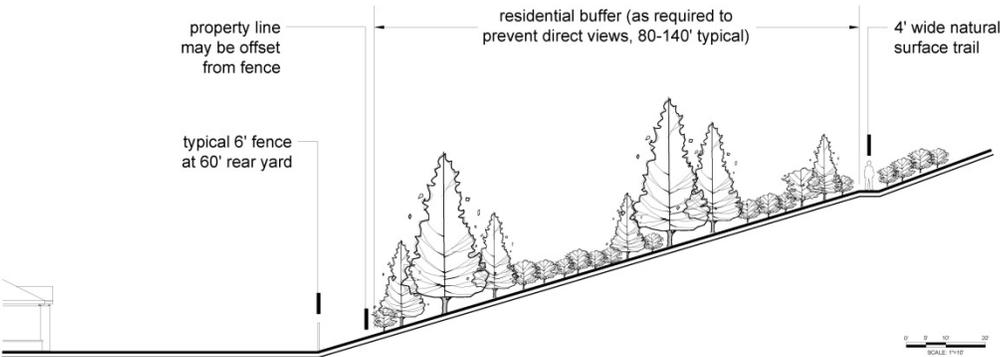
DRAGOON GULCH

Figure 6: Trail Alignment Option D

Parking may include up to 20 stalls (one van accessible) at a new lot off Racetrack Road. This lot would primarily serve active trail users. Locating the lot near an existing residence and barn would facilitate amenities such as public restrooms, a group gathering, or playground.



Section at westerly residential buffer



TRAIL MASTER PLAN | AMENITIES

Figure 7: Proposed Amenities

During the meeting, a strong consensus emerged based on the density and attributes of Option A. This option includes two separate paths to summits, and differing experiences (meandering trails with moderate slopes, and more direct trails with steeper slopes). Commenters responded that this option provided a balanced density of trail – preserving a very natural experience, though creating enough trail to provide a true “destination” experience. (A full description of the preferred alternative is in part 3, “Physical Plan,” page 16).” A full record of all comments is included in the Appendix, Item 5.3. Comments received during the meeting include:

“I like the lower density options – feels right.”

“If someone wants more mileage, they’ll do the loop twice.”

“I like how the current trails combine users and I don’t want that to change.”

“The “whoo-hoo” trail sounds fun!”

“Keep an adequate buffer – it’s in the best interest of neighbors and trail users.”

“Is a playground needed? There are others nearby.”

A significant concern voiced during the meeting was the proximity of the proposed trails to adjacent residential lots to the west. Homeowners in this area have enjoyed an almost completely natural surrounding and expressed a desire to maintain that experience. While this was anticipated by a residential buffer shown on all four options, community discussion refined this point by identifying the desired result: protection of privacy and prevention of direct views rather than the establishment of an arbitrary distance. This resulted in the widening of the buffer to

2.5 SONORA HIGH SCHOOL LEADERSHIP CLASS

A special presentation was made to the student leadership class of Sonora High School on January 29, 2013. During the presentation, an informal use and preference survey, similar to that conducted at the first community outreach meeting, was conducted with the following results (Figure 8: Activity Preferences (Sonora High School)):

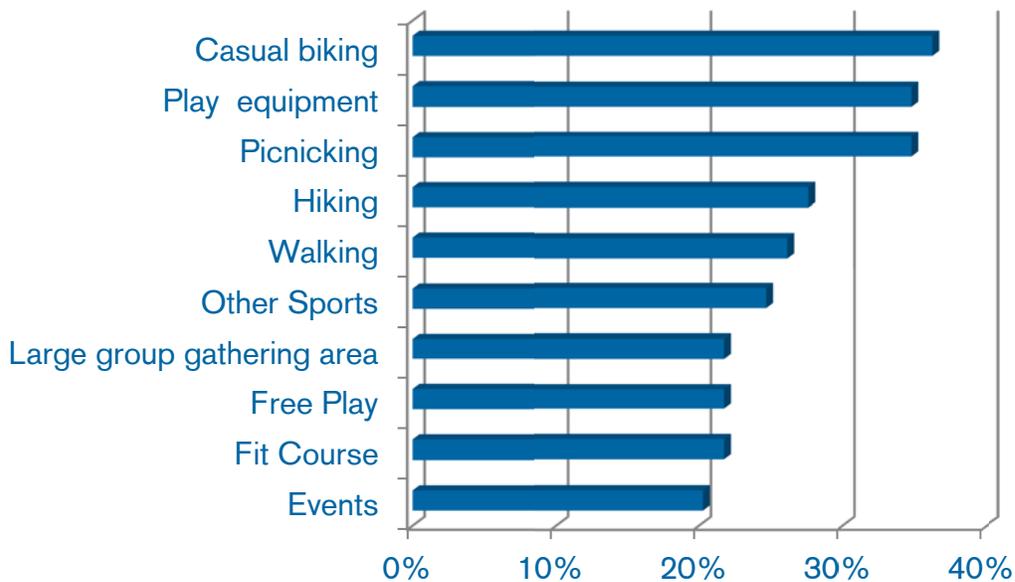


Figure 8: Activity Preferences (Sonora High School)

These results demonstrate a preference for group activities. Other than Play Equipment, which was determined to already be adequately provided at nearby Woods Creek Park, all preferred activities have been provided for in the Master Plan.

2.6 PARKS, RECREATION, AND BEAUTIFICATION COMMITTEE MEETING

During the Parks, Recreation, and Beautification Committee (PRBC) Meeting on January 31 2013, the community participation process to date and the preferred alternative were presented. Public comments during the meeting included support for the trail, as well as concerns regarding privacy and views expressed primarily by neighbors to the west. Two committee members stated their support of the process and trail, and the preferred alternative was unanimously recommended for approval to City Council.

2.7 CITY COUNCIL MEETING

During the City Council meeting on March 4, 2013, the process and preferred alternative were again presented. Public comments were largely supportive of the trail. One community member again voiced concern about the privacy and views, though also commented that those concerns seemed to have been addressed by the plan. The City Council unanimously approved the preferred alternative, enabling the master planning process to continue towards finalization.

2.8 COMMUNITY PARTICIPATION SUMMARY AND FURTHER DESIGN

The community participation process identified needs and desires, included multiple alternative designs, and ultimately resulted in a consensus-based plan. This plan addresses the needs of the overall group and individual concerns. The concerns that were raised remain an important part of the overall process and resulted in positive changes that allow the master plan to accommodate multiple needs. For example, the “residential buffer” to the west was revised from an original 80’ minimum to a planned 140’⁴ to ensure that an adequate visual buffer was maintained from adjacent residential uses.

Following the community participation process, the trail alignments shown in the preferred alternative were “ground-truthed” by walking in field to verify actual site conditions and topography. This ensured that the designed experience envisioned can be constructed based on actual field conditions. Minor adjustments were made to accommodate existing topography and other conditions. These alignments were flagged in field⁵, tracked via GPS, and are shown in the final master plan.

30% improvement plans, a phasing plan, and cost estimate have been prepared. These are summarized in the following sections and included in the appendix.

⁴ The final in-field alignment actually is much farther than 140’ due to existing topography. In order to provide a good downhill experience at about 15% average grade from the summit, the trail was located further upslope (away from residential properties) than shown in the alternatives presented during the public outreach process.

⁵ In-field flags denote the general alignment of the trail corridor. The final trail should be constructed to minimize natural disturbance by avoiding trees and maximizing the radius of turns to avoid overcutting.

3 PHYSICAL PLAN

3.1 TRAIL NETWORK

This master plan proposes expansion of the existing 2.5 mile trail network by about 7.2 miles, resulting in a total of 9.7 miles of trail. This will expand the user experience by affording greater distances of natural surface trails, providing access to summits and vistas, and offering a range of experiences by providing trails of various overall slopes.

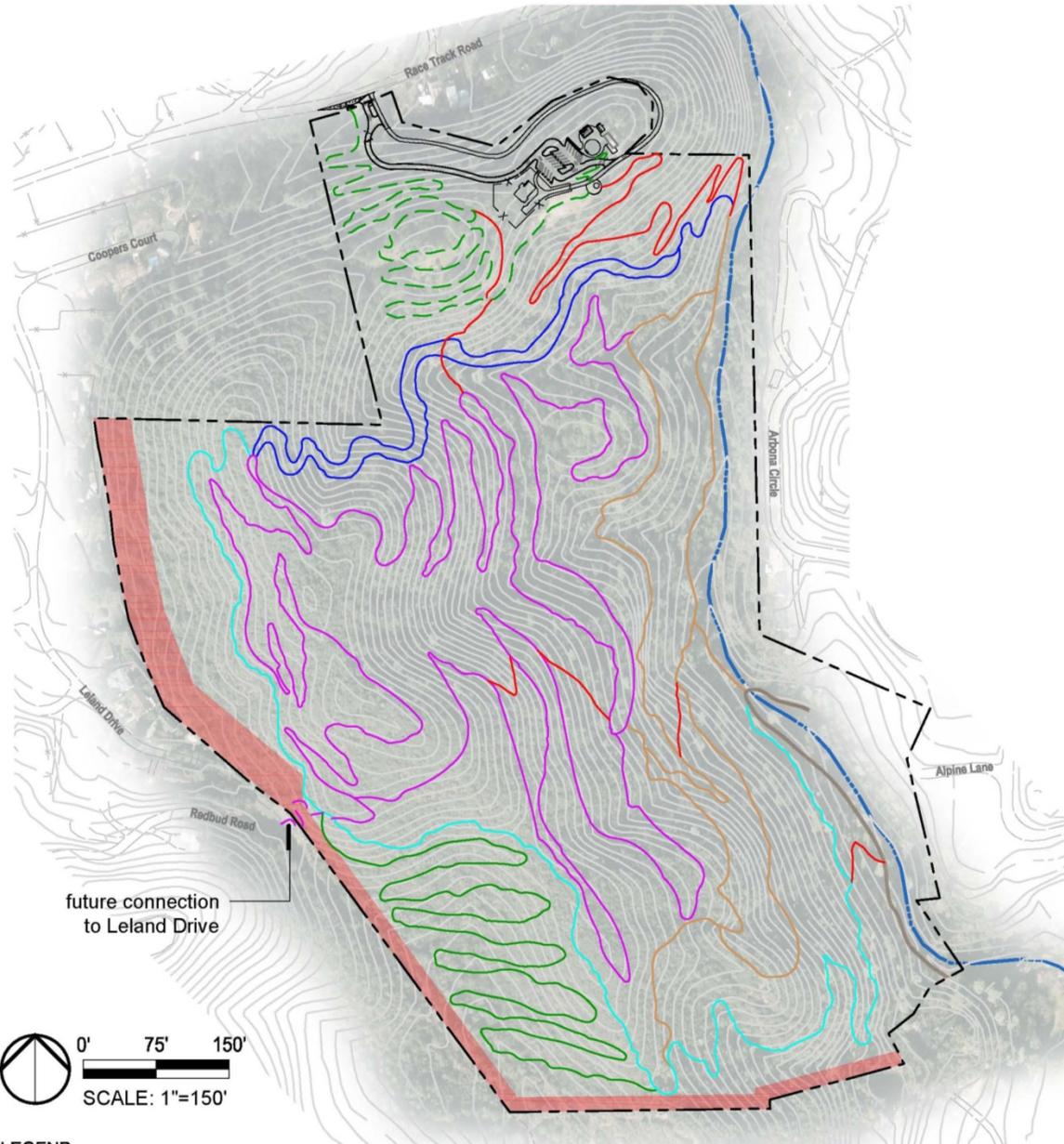
The proposed natural surface trail network (Figure 9: Trail Type Exhibit) includes a primary loop with two routes to the summits, approximately 3 miles (shown in **purple**). These two trails have an average grade of 2-3%, which is approximately the same as the existing natural surface trails. From the summits, three separate downhill trails are proposed around the perimeter. These are envisioned as fun downhill biking, or a more challenging uphill walk, run, or jog, and total approximately 1.8 miles. To the north, parallel tracks will run from the north west of the site at about 15% (shown in **dark blue**), connecting to the current end of the existing trail system. To the south, a longer route with a milder 8% average grade (shown in **teal**) will connect to the existing trail system near the current Alpine lane entrance.

At the north of the property, another trail (shown in **dashed dark green**) will wind around the northern summit, providing an accessible route to a vista and extending the current trail experience for people of limited mobility. This trail will have a 2% average grade, but not exceeding 5% in any section, and is approximately .8 miles long. Stabilized decomposed granite may be added to this trail section to provide a more stable surface. As it will be accessible and near the future trailhead, this area is ideal for interpretive signage. Signs may include references to local history, artifacts (including an abandoned water tank foundation and the graded bench of a mining aqueduct), visible points of interest, native plants, and wildlife.

Throughout the trail network, short connector segments (shown in **red**) will facilitate direct movement throughout the entire 102 acre area. These provide convenient routes for walkers, bikers, or runners using the trails to get to other locations. To provide for through pedestrian movement and to provide a safe route to Sonora High School, a direct trail from the central trailhead (proposed near the existing caretaker's residence) to the driveway entrance off of Racetrack Road, and a trail from the trailhead downslope to connect to the existing north end of the current trail network, are also proposed. These connector segments add .6 miles to the overall trail network.

At the southwest corner of the added 67 acre parcel, an undulating trail with rapid succession of uphill and downhill will provide a more intense experience for bicycle and fitness enthusiasts. This section of trail will be slightly denser, and total approximately 1 mile. Depending on the ultimate use, construction may include any of the following: natural surface trails, a pump-track (constructed earthen berms), or constructed skill elements, including low skinnys, rock gardens, rollers, small drops, chicanes, a fake root web, and boulders. These elements are ideal not only for building bicycle skills, but also for cross-fit style exercises.

Pedestrian-only access from Leland Drive to the new trail network is proposed, but is not possible at this time as there is no direct connection between the public right of way and the Dragoon Gulch area. A small strip of private property separates the two and the rights to access this area and access will need to be provided.



LEGEND

- | | | | |
|---------|---------------------------|---|--|
| ----- | Approximate Property Line | — | Downhill Trails ($\pm 15\%$) |
| — | Existing Trails | — | Undulating Track "Fun Run" |
| — | Existing Paved Trail | — | Accessible Route to Vista and Interpretive Areas |
| - - - - | Seasonal Waterway | — | Future Pedestrian Connection to Redbud Road |
| — | Main Trails | — | Downhill Trails ($\pm 8\%$) |
| — | Short-Cuts | | |



DRAGON GULCH TRAIL MASTER PLAN | TRAIL TYPES



Figure 9: Trail Type Exhibit

3.2 TRAIL CHARACTER

All proposed trails will be approximately 4' wide. This width is similar to the narrowest sections of the existing trail network, and allows for two people to walk side-by-side or for adequate room to pass. This width also allows efficient construction with specialized trail-building equipment, and is relatively standard for natural surface trail construction. This will also facilitate emergency access via all-terrain-vehicle to all sections of the trail.

Construction of the trail will result in slope disturbance above and below the trail. Disturbed areas will naturally fill in over time, resulting in the desired width. Repeated use of the trail by multiple activities (running, walking, and biking) helps stabilize the trail by compacting all areas of the trail. This is an improvement over single-use trails, on which erosion can be increased due to repeated gouging of a single track.

The trail alignment shown on the master plan is accurate to within 30.' Experienced trail builders or supervision by experienced trail builders is required to create an artful flow and movement of the trail. Meandering the alignment of the trail accomplishes several goals:

- Maximizing experience and views as the user's perspective is directed from vista to scenery, instead of fixed in a straight line.
- Creating a sense of discovery by blocking direct and monotonous sightlines behind gentle curves in the trail.
- Providing a varied experience and avoiding fatigue by engaging climbing and descending muscles in succession.
- Allowing water to naturally drain off the trail surface by jogging the trail downslope at frequent intervals to avoid concentration and erosion.
- Avoiding additional cost and environmental damage by routing the trail around existing trees.

3.3 FIRE PROTECTION

During the trail construction process, fuel load reduction should be performed. This means removing accumulated amounts of fuels (wood) from the area adjacent to use areas and structures to be protected. This is a substitute for the natural process of wildfire. Preventing the natural process of wildfire and regeneration allows an accumulation of fuel that must be removed artificially.

During trail construction, dead wood and other litter should be removed from the forest floor within 30' of the trail. Limbing up of existing manzanita stands, in a naturalistic fashion, would moderate the amount of ladder fuels, helping to prevent the rapid spread of fire.

A 30' minimum defensible space should also be created (if not already existing) by property owners adjacent the Dragoon Gulch area. These proactive steps will improve the existing condition, but as in any natural area, will not guarantee fire protection.

3.4 AMENITIES

To support increased use of the trail, a parking lot of up to twenty stalls is proposed near the existing caretaker's residence. The proposed parking lot is situated on a previously cleared horse coral, and will use the existing paved driveway for egress. The existing driveway, and proposed access and parking lot will support small passenger vehicles and trucks, but will not support school buses, trailers, or other longer-wheelbase vehicles, as ample accommodation for these is already provided at the Woods Creek Park Trailhead.

Access will be provided by a new paved driveway, approximately 800' long and 12' wide. Construction for this access will require grading a new bench in the existing slope above the existing driveway, and may include short sections of gabion retaining structures, no greater than 6' high (4'

exposed), to minimize the extent of the impacted area. The existing driveway entrance off Racetrack will be expanded to a two-way driveway, and may ultimately include a pull-out lane and/or bus pullout and pad with a transit shelter. These improvements may require a ROW dedication to the County to facilitate the ultimate street section, and should be setback accordingly. The driveway entrance will include a median to preserve existing trees and allow turn-around movements prior to gates that control vehicle access to the rest of the property.

Adjacent to the proposed parking lot, the ultimate build-out includes a pre-manufactured public restroom of up to 160sf, and a group picnic area with overhead structure, picnic tables, and demonstration planting areas. The existing barn may be re-purposed to include storage or other activities.

As the length and exertion of the trail network is being expanded, a drinking fountain should be provided, and is most economically included with the restroom structure.

3.5 ACCESSIBILITY

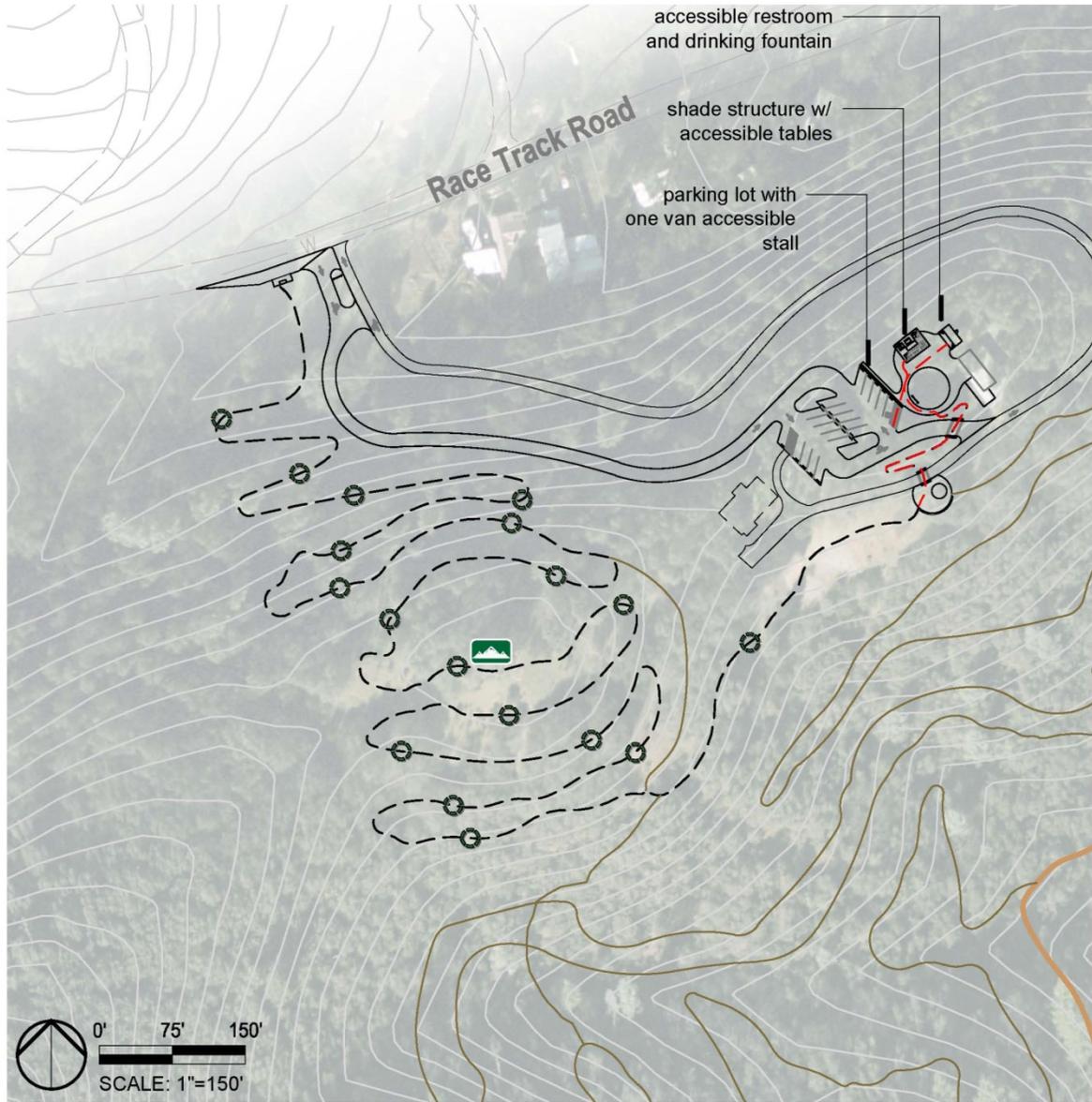
The new Dragoon Gulch area provides an incredible opportunity to experience beautiful vistas and to learn about the area's history, as well as native plants and wildlife. To provide this opportunity to users of all abilities, a significant portion of the proposed trails (which provide an equivalent experience to the area as a whole) meets accessible codes and guidelines for natural areas, including:

- California Building Code Section 1132 B
- Draft Final Guidelines for Outdoor Developed Areas published by the United States Access Board (as a guideline to meeting the intent of the 1990 Americans with Disabilities Act)
- California State Park Accessibility Guidelines (2009)

The accessible portion of the trails includes a summit opportunity and a path at less than 5% grade to the public right of way along Racetrack Road. Rest areas (minimum 5' x 5' wide) should be provided at 200' maximum intervals to allow for passing and intermittent stops. Benches are suggested at intervals no greater than 600.'

Surfacing of the accessible portion may be considered but is not required. Compacted decomposed granite (with binder), resin-based materials (Resin-Pave), or an aggregate base with road oil would facilitate movement by persons with limited mobility.

One new accessible parking stall is provided within the 20-stall parking lot. An accessible path of travel must be provided to all facilities, include the restroom, picnic area, and trailhead. Amenities, such as the drinking fountain and a percentage of tables, must be accessible as well.



LEGEND

- Accessible Route to Vista and Interpretive Areas
- Accessible Path of Travel
- Existing Trails
- Proposed Trails
- Summit Location
- Level Rest Point on Accessible Trail (spaced every 200', 5' x 5' minimum)



DRAGOON GULCH TRAIL MASTER PLAN | ACCESSIBILITY



Figure 10: Accessibility Exhibit

3.6 SIGNAGE

A clear and concise signage program is essential to ensuring that maximum use of the trails. Signage should be consistent, easy to interpret, visible at a distance, and convey information only as needed. Signage can be categorized into three areas based on use: wayfinding (directional), interpretive (informational), and managerial (rules, boundaries, etc.). Suggested placement of signs is shown in Figure 13: Signage Location Exhibit.

Wayfinding signs should be included with the expanded trail network, and a diagram of suggested locations is below. The existing trail network includes such signage, however, from direct observation and public comment, new signage should be made more clear. Wayfinding signage should follow these principles:

- At the trailhead, clearly identify and separately name multiple destinations and routes
- For each route, describe the destination and user's experience along the route (length, grade, etc.).
- At each juncture, provide one direction to each destination. Provide a physical separation between destinations (current signage is difficult to interpret, as the destinations are often crowded together making directional arrows unclear).
- At "shortcuts" provide separately identifiable signage that identifies the path as a shortcut, but part of the same route.



Figure 11: Existing Wayfinding Signage

Interpretive (Informational) signs may be added to the expanded trail network. The existing trailhead includes abundant information about local history and wildlife. This information could be expanded and located along the trail to provide timely information coinciding with the user's experience. Topics for further development include: local history, geology, flora, and fauna.

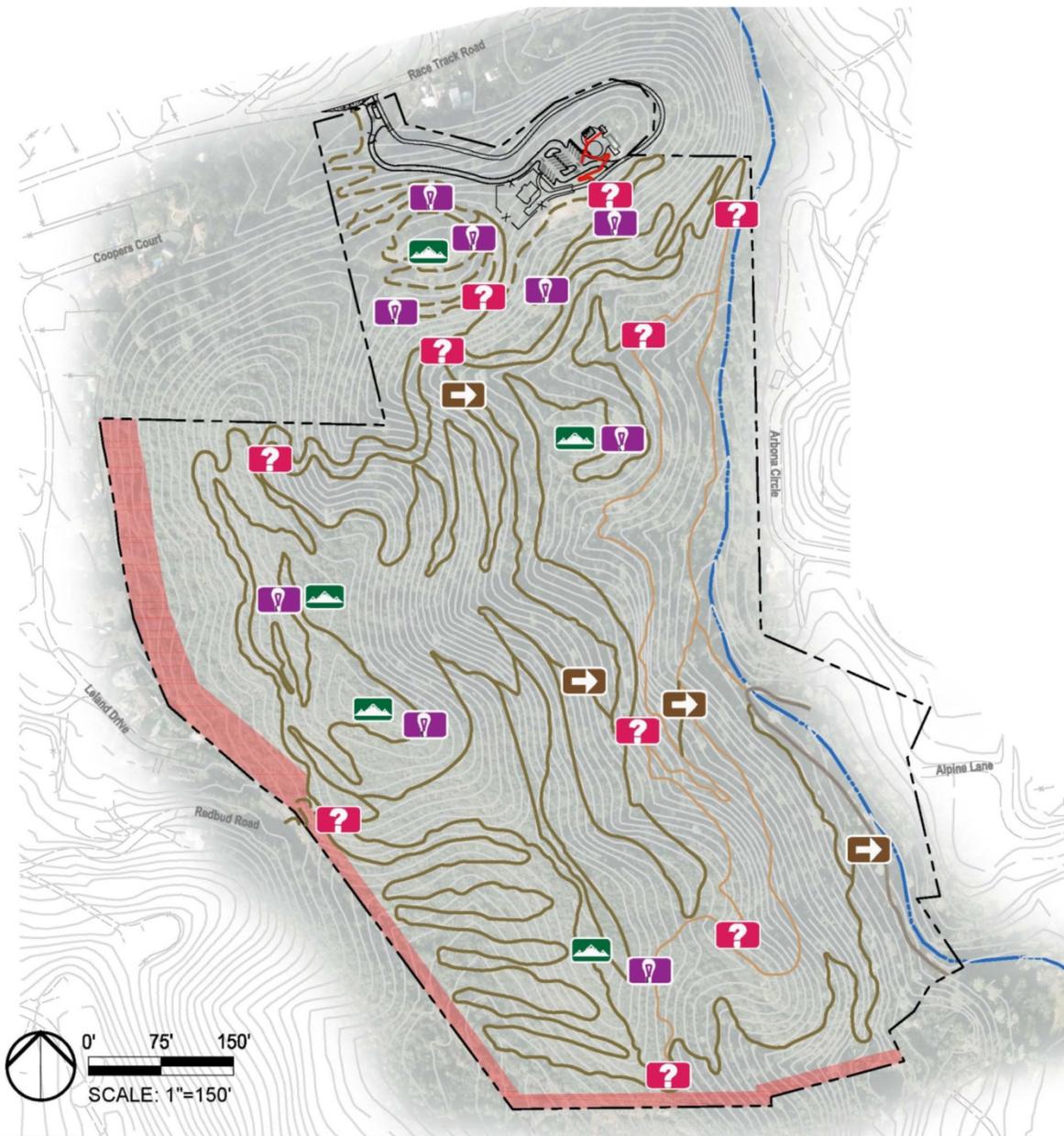
An interpretive signage program, including analysis of user groups, display mode (visual, tactile, etc.), and content (including correlation with state curriculum) would maximize the impact of any future signage program, and provide a learning-based incentive for field trips from area schools to the Dragoon Gulch area.

Ancillary uniform management signs (end of trail, no trespassing, area closed, etc.) are not considered here and should be used as management practices and conditions warrant. Signs should follow common guidelines for text and graphics, such as ANSI (American National Standard Institute).

At a minimum, signs governing use and other rules should be placed at each new trailhead and gathering area. Where trail crossings occur, warning signs should be placed in advance. Notification of multiple uses (ie, walking, jogging, and cycling), along with order of use (cyclists yielding to walkers or joggers) should also be placed at trailheads and where significant crossings occur. Posting standards for use not only assists with enforcement, but also diffuses potential user conflict in the first place.



Figure 12: Existing Interpretive Signage



LEGEND

- Approximate Property Line
- Existing Trails
- Existing Paved Trail
- Proposed Trails
- Seasonal Waterway
-  Summit Location
-  Way Finding Signage
-  Shortcut Way Finding Signage at Ends of Trail
-  Interpretive Signage



DRAGON GULCH TRAIL MASTER PLAN | SIGNAGE



Figure 13: Signage Location Exhibit

3.7 PROJECTED CAPITAL COSTS

The following table summarizes anticipated construction costs by phase. Costs are reported in 2013 dollars and are extrapolated from similar projects. For line item costs, refer to the rough estimate of probable costs provided in the appendix, Item 5.9.

CONSTRUCTION COSTS				PHASE 1	PHASE 2	PHASE 3	PHASE 4
1	SITE PREPARATION AND GRADING	LS	LUMP SUM	0	0	0	44,800
2	SITE UTILITIES	LS	LUMP SUM	0	0	22,374	22,374
3	SITE CONSTRUCTION	LS	LUMP SUM	25,800	96,000	28,600	526,275
SUBTOTAL				25,800	96,000	50,974	593,449
4	CONTINGENCY (15%)	LS	LUMP SUM	2,580	14,400	7,700	89,100
TOTAL				28,380	110,400	58,674	682,549

DESIGN AND ADMINISTRATIVE COSTS							
5	DESIGN FEES (SMALL PROJECT @ 8%)	LS	LUMP SUM	2,580	9,600	5,100	59,400
6	BUILDING PERMIT FEE (1%)	LS	LUMP SUM	258	960	510	5,934
7	PUBLIC WORKS PLAN CHECK FEE (1%)	LS	LUMP SUM	258	960	510	5,934
8	CITY PROJECT MANAGEMENT FEE (2%)	LS	LUMP SUM	516	1,920	1,019	11,869
9	INSPECTION AND TESTING FEE (1%)	LS	LUMP SUM	258	960	510	5,934
TOTAL				3,870	14,400	7,649	89,072

OTHER COSTS							
10	SWPPP NOI FEE (1%)	LS	LUMP SUM	0	0	0	59,345
11	MISC. (CITY PRINTING, ETC.)	LS	LUMP SUM	300	300	300	600
TOTAL				2,880	9,900	5,397	59,945

GRAND TOTAL (CONSTRUCTION)				\$32,000	\$116,000	\$62,000	\$713,000
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3.8 PROJECTED MAINTENANCE COSTS

Assumed maintenance costs are summarized below. Costs are provided based on an annualized basis (total costs/30 year design life) and reported in 2013 dollars. Actual maintenance practices should be based on specific conditions experienced.

MAINTENANCE (30 YEAR PERIOD)				PHASE 1	PHASE 2	PHASE 3	PHASE 4
12	TRAIL MONITORING/BRUSH TRIMMING/MINOR MAINTENANCE (MONTHLY)	LS	LUMP SUM	142,560	492,480	142,560	155,520
13	TRAIL REGRADING/COMPACTING (EVERY 10 YEARS)	LS	LUMP SUM	20,909	72,230	20,909	22,810
14	INDICENTAL REPAIR: SIGNAGE/TRAIL (\$150/MI/YR.)	LS	LUMP SUM	6,600	22,800	6,600	7,200
15	INDICENTAL REPAIR: AMENITIES (\$2,000/YR.)	LS	LUMP SUM	0	0	0	60,000
16	PUMPING SERVICE (\$4000/YR. X 30 YEARS)	LS	LUMP SUM	0	0	0	120,000
17	RESTOCKING AND JANITORIAL SERVICES (\$300/MO. X 30 YEARS)	LS	LUMP SUM	0	0	0	108,000
18	ASPHALT CRACK REPAIR (EVERY 2 YEARS)	SF	38,476	0	0	0	259,713
19	ASPHALT OVERLAY (EVERY 10 YEARS)	SF	38,476	0	0	0	178,913
SUBTOTAL (MAINTENANCE OVER 30 YEARS)				170,069	587,510	170,069	912,156
TOTAL (MAINTENANCE, ANNUALLY)				\$15,000	\$49,000	\$15,000	\$77,000

4 NEXT STEPS

4.1 ENVIRONMENTAL PERMITTING

This master plan anticipates, but does not include, environmental permitting. Potential environmental impacts have been minimized to the extent possible by:

- Locating trails away from waterways or other known protected areas, including no new proposed crossings of Dragoon Gulch;
- Locating amenities (parking lot, restroom, etc.) on previously graded and disturbed areas;
- Avoidance of known or obvious cultural or historical artifacts, including mining tailings;
- An initial review of the California Natural Diversity Database (CNDDDB) which indicated no previously identified endangered species in the subject quadrangle.

A biological resources study will be needed to evaluate potential impacts. This report may warrant minor changes in the proposed alignment based on critical or protected habitat. Recommendations should be provided to minimize short-term and long-term impacts on biological resources that occur in the project area, and to minimize the cost of potential mitigation. A cultural resources study will also be needed to ascertain the existence and location of cultural artifacts. These may include mining aqueduct remnants (including graded aqueduct benches), mine air holes, and mine tailings.

Dragoon Gulch itself is classified by the US Geological Service as an intermittent stream. Fish and Game code section 1602 therefore applies to this waterway. This plan proposes no new crossings or streambed alterations and a California Department of Fish and Wildlife 1602 permit is not required.

A categorical exemption for an initial phase, consisting only of a natural surface trail for maintenance purposes, without impacts to biological or cultural resources, may be allowable under CEQA (title 14, chapter 3, Article 19, Section 15304). The Lead Agency (City of Sonora) would need to provide this determination. Additional phases, including the proposed parking, public facilities, and other amenities, would require an EIR/Negative Declaration.

However, the overall project presents an opportunity to develop a comprehensive permitting and conservation strategy. Developing such a strategy would not only make the project more likely to receive grant funding, but may also identify opportunities to create a conservation bank, enabling use of this area for mitigation of other City projects that require habitat compensation.

4.2 DESIGN

Once environmental permitting is completed, natural surface portions of the trail may be constructed using the field-verified alignments. This allows the City to move forward quickly to sustain progress towards build-out.

Development of the amenity areas will require additional design. 30% improvement plans have been prepared that show the general character of the proposed improvements, and were used to generate the rough order of magnitude estimate. During the development of these plans, the need for a boundary survey was evidenced by the apparent mis-alignment of the property lines and existing driveway relative to in-field supplemental topographic survey of the existing driveway and buildings.⁶

⁶ Topography provided by the City of Sonora appears to have been generated from aerial photography. The origin of parcel lines is not clear and may not be accurate for final design. Recorded boundaries of the subject parcels do not mathematically close. Minor supplemental

This line work should not be relied upon for final design purposes. Prior to final or design engineering commencement, a proper field survey, right-of-way verification, and boundary solution should be performed. In addition, the existing topographic mapping and the final boundary solution should be mathematically tied together.

4.3 PHASING

Ultimate phasing of the project will be determined based on secured funding. However, the following four phases are suggested as an incremental approach to construction that will allow an immediate impact to continue momentum and support, demonstrate success, and achieve measureable results. Refer to Figure 14: Phasing Exhibit, for the following areas:

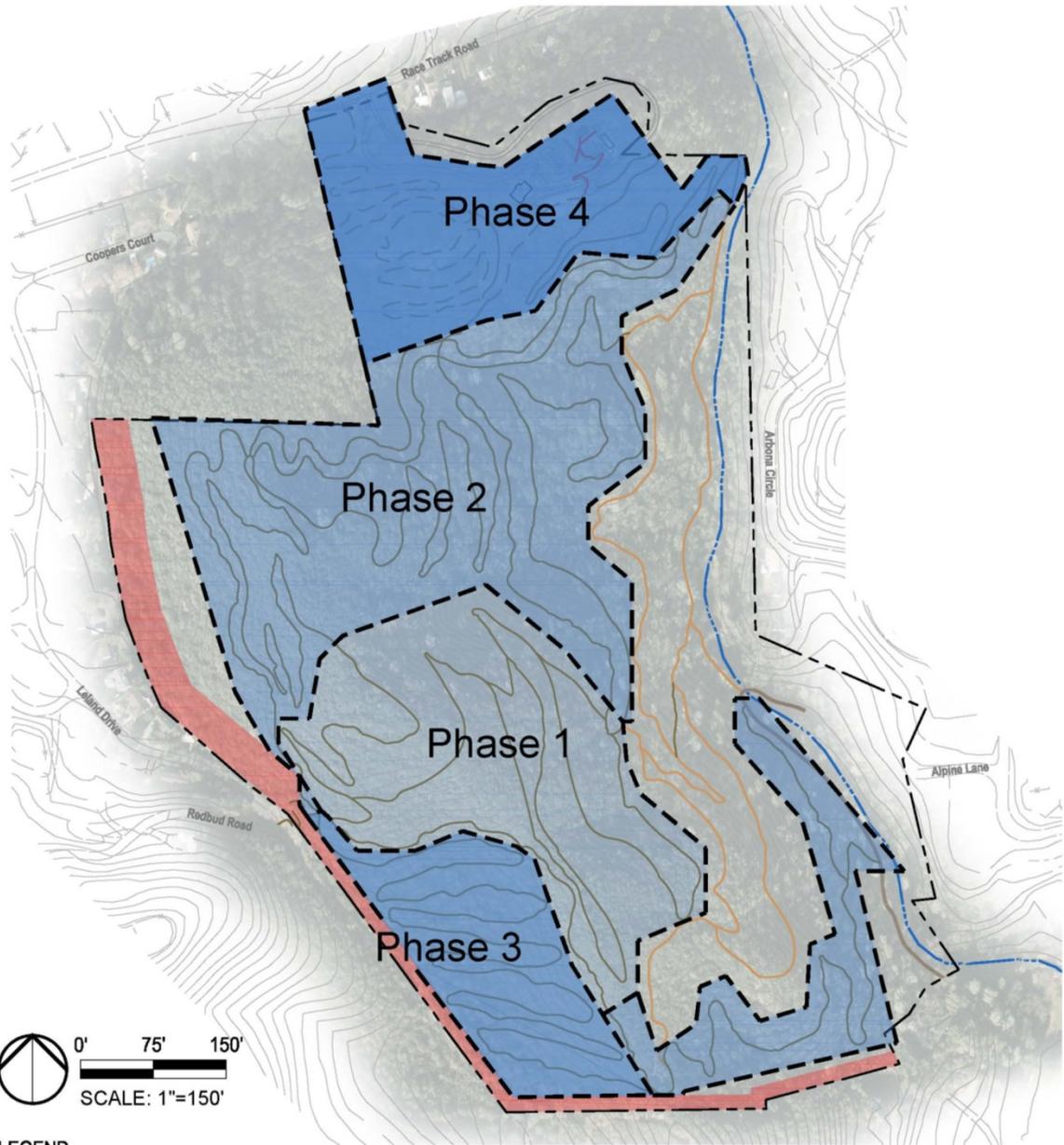
Phase 1 – Initial expansion: This phase consists of a portion of the new trail extending from the existing trail network a summit. This phase incurs minimal cost and will provide access to the newly expanded area to garner enthusiasm and support for the overall plan.

Phase 2 – Main trail build out: This phase includes the remainder of the trail network, including natural surface trail construction and signage.

Phase 3 – “Fun-Run”: This phase is only the undulating portion at the southwest area of the project, and is separated out because it is ideal for engaging a volunteer or community group to construct.

Phase 4 – Amenities and Parking: The most intensive and costly phase, this will complete build-out of the master plan. Postponing this phase allows time for fundraising and to identify funding sources.

survey of existing conditions was performed prior to receipt of the aerial topography to locate existing structures and improvements, and does not include a measured tie to the aerial topography.



- LEGEND**
- Approximate Property Line
 - Existing Trails
 - Existing Paved Trails
 - - - Seasonal Waterway
 - Proposed Trails
 - ■ ■ Phasing Boundary



DRAGOON GULCH TRAIL MASTER PLAN | PHASING



Figure 14: Phasing Exhibit

4.4 FUNDING

Funding for construction may be available through a variety of federal and local sources:

- The “Moving Ahead for Progress in the 21st Century” (MAP-21) reauthorized the Recreational Trails Program (RTP) administered by the Federal Highway Administration (FHWA) for fiscal years 2013 and 2014.
- Other grant opportunities (Healthy communities, etc.)
- Local fundraising efforts, including campaigns, donations for benches and other amenities
- Volunteer efforts or low-cost labor including California Conservation Corps
- Private Grants (i.e. IMBA, REI⁷)

Additional funding may become available through the Active Transportation Program in the proposed 2013-2014 California state budget. This program would consolidate federal and state Safe Routes to School programs.

4.5 OPERATION

Through discussions with City staff and throughout the community participation process, the current hours of operation and maintenance will apply to the expanded trail area. Signage indicating these uses and restrictions should be placed at each trail entrance and trailhead to set expectations and aid enforcement. These include:

- Hours: dusk to dawn
- Prohibition of motorized vehicles and equestrians
- Prohibitions: glass containers, smoking, alcohol, etc.
- Responsible pet owner’s rules

Over time, the Dragoon Gulch trail area is designed to facilitate group events, such as bicycle clinics, nature hikes, fitness classes, or other groups. The city may elect to charge for facility rental, including the proposed large group picnic area.

Special interest groups (bicycle groups, etc.) may be an ideal fit for the “Fun-Run” area in the south westerly portion. This area could include a bicycle skills or progression park, including a series of obstacles for developing off-road bicycle skills in a controlled environment.⁸ This feature would provide a low-risk area to develop essential skills, and would be ideal for teaching skills clinics.

4.6 RISK MANAGEMENT

There are inherent risks with any outdoor activity that can never be fully prevented, but that can be minimized. Risk Management is a systemized approach to minimizing risk – including prevention of injuries and damage in the first place, and providing defensibility in court.

During an initial meeting with City staff, the overall magnitude of the project was discussed. During this meeting, ideas such as overhead ski-type lifts for downhill bicycle runs were deemed incompatible with the surrounding uses and desired outcomes. This discussion was instrumental in

⁷ See: <http://www.imba.com/resources/grants>, and <http://www.rei.com/stewardship/community/non-profit-partnerships-and-grants.html>

⁸ For more information about developing a skills park, see <http://www.imba.com/resources/freeriding/developing-bike-skills-parks>

“bookending” the project and avoiding significantly increasing liability exposure relative to operation of the existing trail network.

The California Recreational Use Statute (California Civil Code §846) generally protects property owners from claims arising from recreational use. This statute limits the liability of property owners from incidents arising from recreational use of an user’s own volition. Invited, organized, or sponsored events should include a waiver of liability, additional insurance, or other measures.

The city may further limit liability by:

1. Conducting a review of other similar facilities and operations, identify and document management and risk management practices, and then implement an equal or better standard of care.
2. Engaging a consultant to review and recommend best practices for facility signage, operation, and maintenance.
3. Developing a written maintenance policy (i.e., quarterly inspections of all trails to identify specific and defined hazards), and document compliance.⁹

4.7 ECONOMIC BENEFIT ANALYSIS

Performing an economic benefit projection of trails to a community is an inexact process at best. However, the *least* accurate model is to assume there’s no increased value to the local economy from the addition of a significant trail system. A significant body of research points to consistent community benefits including increased property values, decreased time-on-market for real estate transactions, and increased economic activity from direct and ancillary spending.

These studies are typically conducted long after the trail is constructed, using prior economic data as a historical baseline. However, to *anticipate* economic benefit to the overall community, we can look at direct monetary gains in the form of tax revenue in these areas:

1. The increased value of real estate within .25, .5 and 1 mile radius of from the trail. Based on assigned market premiums for similar or lesser benefits in new home valuations, we believe it is reasonable to assume a 1% to 4% increase in value as a result of these trails depending on distance. This increase in real estate value will only be realized as revenue to the city as the real estate is sold and the taxable value is re-appraised based on the sale price. The increased real estate tax revenue to the city over ten years is projected to be \$450,530.
2. We also estimate from the 2012 baseline of 14,243 room rentals in Sonora that those numbers might increase gradually to an average increase of 5% per year based on increased trips, tourism, and the potential for hosted events such as track meets, competitive medium- or long-distance sponsored events, or special events such as “Tough Mudder.” The increased revenue from transient occupancy taxes is projected to be \$37,488 over ten years.
3. Applying the above assumption of increased room rentals, we can also evaluate revenue based on ancillary spending (transportation, food, gifts, etc.) by using a \$100 per person average (toward the high end of a \$85-\$105 per person range provided by “Visit California” in 2009). The increased revenue from sales tax on ancillary spending is projected to be \$7,364 over ten years.

Together, these projected revenues total \$495,381 over ten years. Refer to “Revenue Projections” in the Appendix, Item 5.6, for these calculations.

⁹ Additional references and resources are available through the National Trails Training Partnership: <http://www.americantrails.org/resources/safety/risktrails05.html>, and IMBA: <http://www.imba.com/resources/risk-management/trail-design>.

Additionally, the management and operation of the trails will play an important role in revenue generation. This plan anticipates the possibility of non-profit run skills clinics, group events, sports events, and other activities.

The most important variable to achieving benefit is how the trails are promoted. We suggest that a fairly active social media program be initiated to make Sonora synonymous with high quality local trails and an active, healthy lifestyle.

If the trails are effectively marketed we think it is reasonable to think these projections are conservative and attainable. The table below is a summary of the popularity of trails at a resort that indicates 93% of people considered trails the most important amenity. More important than ocean beaches!

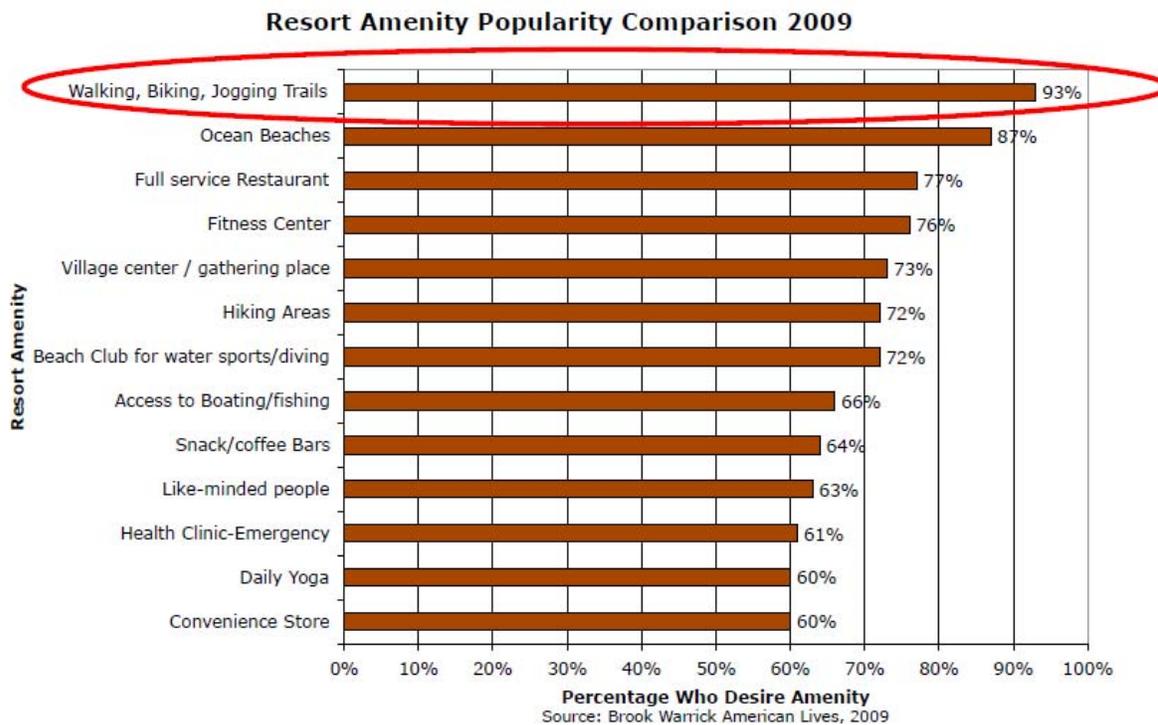


Figure 15: Amenity Preference

Numerous other benefits are anticipated but are not immediately quantifiable. These include ancillary spending from non-overnight visitors, increased community health, providing positive outdoor activities for all ages, lower health care costs and secondary effects from increased physical activity, increased human connections and relationships, less vagrancy due to more eyes on the property and positive activity, community pride, lowered youth delinquency, and the potential to reduce accidents and injuries by providing safe routes to schools, and safe exercise venues for track, cross country, and other team exercises. Having connected community trails have been demonstrated to improve health, quality of life, and community interaction. These benefits, though qualitative, have been demonstrated in numerous studies of similar projects and should not be ignored.¹⁰

¹⁰ Evidence of the positive impact of trails on communities and individuals is almost universal in academic studies. For three examples, see:

Evaluation of The Burke-Gilman Trail's Effect On Property Values And Crime. May 1987
www.broward.org/Greenways/Documents/burkegilman.pdf (referenced April 2013); found that a nearby 12 mile trail had no impact on crime and was frequently used as a selling point in real estate transactions.

Schenectady County Department of Planning. The Mohawk-Hudson Bike-Hike Trail: Its Impact on Adjoining Residential Properties. Schenectady, New York, 1997;
[www.cdtcmpto.org/bike/residential .pdf](http://www.cdtcmpto.org/bike/residential.pdf) (referenced April 2013). A survey of residents adjacent a 35-mile mixed use trail showed that 86% or higher use the trail, were satisfied or neutral about the trail as a neighbor, felt that the trail increased or had no effect on their ability to sell their homes, and felt the trail did not pose a risk to their own or their family's safety.

Moore, Roger L., et al. The Impacts of Rail-Trails: A Study of Users and Nearby Property Owners from Three Trails. Washington, DC: National Park Service, 1992,
http://www.brucefreemanrailtrail.org/pdf/1_Exec_summ_contents.pdf (referenced April 2013); a study of three trails shows that users of the trail were demographically similar to residents, having no motor vehicles was an asset to the real and perceived safety and use of the trail, users reported no serious complaints, and all three trails provided significant economic benefit to their communities.

5 APPENDIX

5.1 LELAND DRIVE NEIGHBORHOOD MEETING NOTES

5.2 COMMUNITY MEETING #1 NOTES

5.3 COMMUNITY MEETING #2 NOTES

5.4 SONORA HIGH SCHOOL LEADERSHIP CLASS PRESENTATION OUTLINE

5.5 SONORA HIGH SCHOOL LEADERSHIP CLASS TRAIL SURVEY RESULTS

5.6 INCOME PROJECTIONS

5.7 PEDESTRIAN COUNT

(Includes students walking from Sonora High School who would be able to use the project as an alternative route.)

5.8 EDUCATIONAL PROGRAM OUTLINE

5.9 ROUGH ORDER OF MAGNITUDE COST ESTIMATE

5.10 30% IMPROVEMENT PLANS