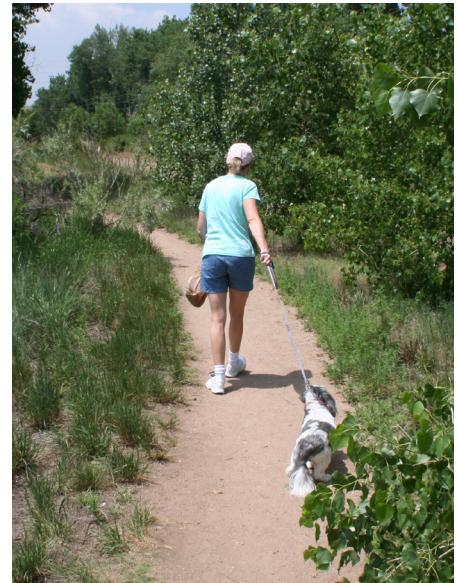


EASTERN FREMONT COUNTY TRAILS, OPEN SPACE & RIVER CORRIDOR

MASTER PLAN



April 2015



“Trails have multiple values and their benefits reach far beyond recreation. Trails can enrich the quality of life for individuals, make communities more livable, and protect, nurture, and showcase America’s grandeur by traversing areas of natural beauty, distinctive geography, historic significance, and ecological diversity. Trails are important for the nation’s health, economy, resource protection and education.”

*—AMERICAN TRAILS, *Trails for All Americans* report, 1990*

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Fremont County

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City of Cañon City

Doug Dotson – City Administrator

Rex Brady – Director of Parks and Facilities

Adam Lancaster – City Engineer

City of Florence

Mike Patterson – City Manager

Wade Broadhead – City Planner

Charlette Henager – Florence City Council

WKRP (Whitewater Kayak and Recreation Park)

Warren Hart – Whitewater Kayak Recreation Park

Will Colon – Whitewater Kayak Recreation Park

FAR (Fremont Adventure Recreation)

Brian Ledoux - FAR / LAMBA

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CHAPTER ONE:

Introduction

Mission Statement

Purpose of this Document

Study Area and Existing Conditions

Planning Elements

Planning Process and Community Engagement



E A S T E R N

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C O U N T Y



Mission Statement

Create a visionary and realizable master plan for a wide range of recreational opportunities and resource conservation throughout Eastern Fremont County. This plan should clearly articulate a future and legacy for the river corridor, trails, and associated open space areas.

Purpose of this Document

This document puts forth a master plan for the Arkansas River Corridor, surrounding trail systems and open space areas within Eastern Fremont County. The plan includes specific feasible alignments for trails, identifies open spaces for conservation, identifies opportunities and constraints within the study area, cost estimates and phasing suggestions suitable for raising funds and support for future implementation.

It is intended to guide, step-by-step, the creation of a trail and "greenway" network along the 16-mile river corridor between the Royal Gorge and the Blue Heron Park, just east of the City of Florence, along with connections and a network of trails through the open spaces and developed areas of Eastern Fremont County. Destinations will include the Royal Gorge, Centennial Park, John Griffith Park, Pathfinder Park, Florence River Park, the downtown business areas in Cañon City and Florence, the "Coal Towns", Dawson Ranch, and the hogbacks. It also strives to access scenic and more rural agricultural areas proximate to the river corridor.

With its ability to provide communal access to vital locales, the Arkansas Riverwalk and connecting trails network will be a very substantial investment and asset, serving residents of the Eastern Fremont County area, visitors, tourists, and the wider Fremont County region. This project offers unique potential on a number of levels.

- It will provide a safe, reliable, outdoor, non-motorized avenue for users to travel throughout the corridor as well as accessing adjacent residential areas, schools and other amenities.
- It will provide trail access to scenic landscapes rich in history, geology, and interpretive value.
- It will promote business development as well as enhance community development as a distinct amenity.
- It will provide access to destination and recreational opportunities outside of the river corridor.
- It will offer an alternative for walkers, runners, cyclists, river users and other users to avoid having to use automobiles.

- It will increase property values for adjoining properties, promote business development and enhancement and assist Eastern Fremont County in attracting visitors and relevancy as a mountain town destination.
- It will promote better community health through fitness and regular physical activity.
- This plan also proposes to promote (through increased public awareness and cooperative planning with adjacent landowners) the stewardship, clean-up and enhancement of the river corridor environment, especially the scenic character, as well as the flora, fauna, and habitat values.

The vision for the Eastern Fremont County Trails, Open Space and River Corridor Master Plan grew out of a coordinated effort by Cañon City Area Recreation and Park District, Fremont County, the cities of Cañon City and Florence, towns of Brookside, Williamsburg, Rockvale, and Coalcreek, community members and activists. The master plan was previously outlined in 1997 and a number of the parts of that plan have been implemented and completed including new sections of the existing Arkansas Riverwalk Trail, open space projects, new parks and recreational river features.



Technical Working Group Review Meeting

Key Objectives

1. Effective Community and Stakeholder Engagement:

Identify and work with, in a productive and timely manner, leadership from the communities, local and state agencies, property owners, businesses, user groups, and others with an interest in the outcome of this plan.

2. Resource Legacy and Stewardship:

Identify open space, river corridor, trail assets and challenges to develop a resource optimization plan that integrates: community stewardship, scenic values, river ecology, integration of land use and property owners' needs and objectives, trail standards, alignment and alternatives that are sustainable, environmentally sensitive and promote the river, trail and open space stewardship.

Promote outdoor education for youth and opportunities for community volunteer projects and engagement.



Improve and repair river and associated corridor ecology by identifying opportunities / priorities for improvement and strategies for success.



3. Trail Recreation Opportunities:

Assess existing and planned trail routes throughout the study area. Assess and develop potential new trail alignments and design standards (See Chapter 3) that facilitate corridor access for walking, bicycling, paddling and other appropriate non-motorized recreational opportunities.

Promote a system of trails that provides access to a wide variety of recreational opportunities and experiences within Eastern Fremont County.

Identify opportunities for promoting / expanding in-river recreational opportunities, including expansion of Whitewater Kayak and Recreation Park (W.K.R.P) extended rafting and fishing, etc.

4. Community Health Wellness and Quality of Life:

Facilitate recreational enjoyment throughout the community to promote community health, wellness, and improved quality of life. Promote youth participation in outdoor activities.

5. Corridor Access and Amenities:

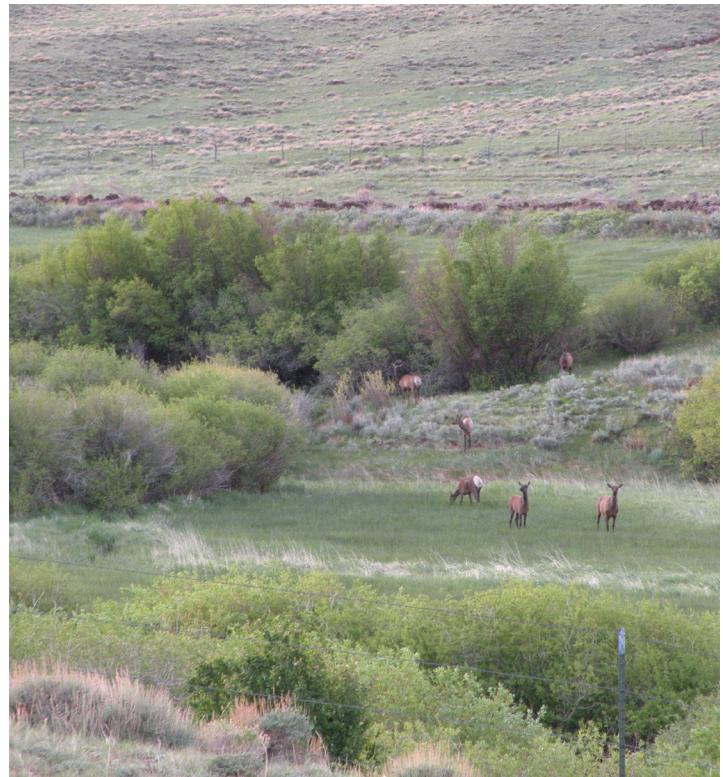
Identify appropriate and strategic locations for public access to the trail network including potential trail heads, feature areas and sites such as, but not limited to: Chandler Creek, Ecology Park, Section 13 Mountain Bike Park, the Hogbacks, and the Royal Gorge.

6. Implementation:

Identify practical steps, strategies and phasing that will facilitate realization of the project vision including catalytic projects, institutional structures, funding sources, and leadership with help from the local municipalities and agencies.



7. Resource Conservation: Protection and conservation of natural resources such as wildlife habitat, wetland & riparian ecosystems, view corridors, scenic landscapes, water quality and important geologic features. Also preservation of the floodplain of the Arkansas River is a key objective.



8. Economic Development: Contribute to the economic development of the project area that will attract and retain visitors to Eastern Fremont County, Cañon City and Florence.

Provide a regional recreational destination unique in Colorado that achieves the designation of a major attraction and reason to visit Eastern Fremont County, Cañon City and Florence.

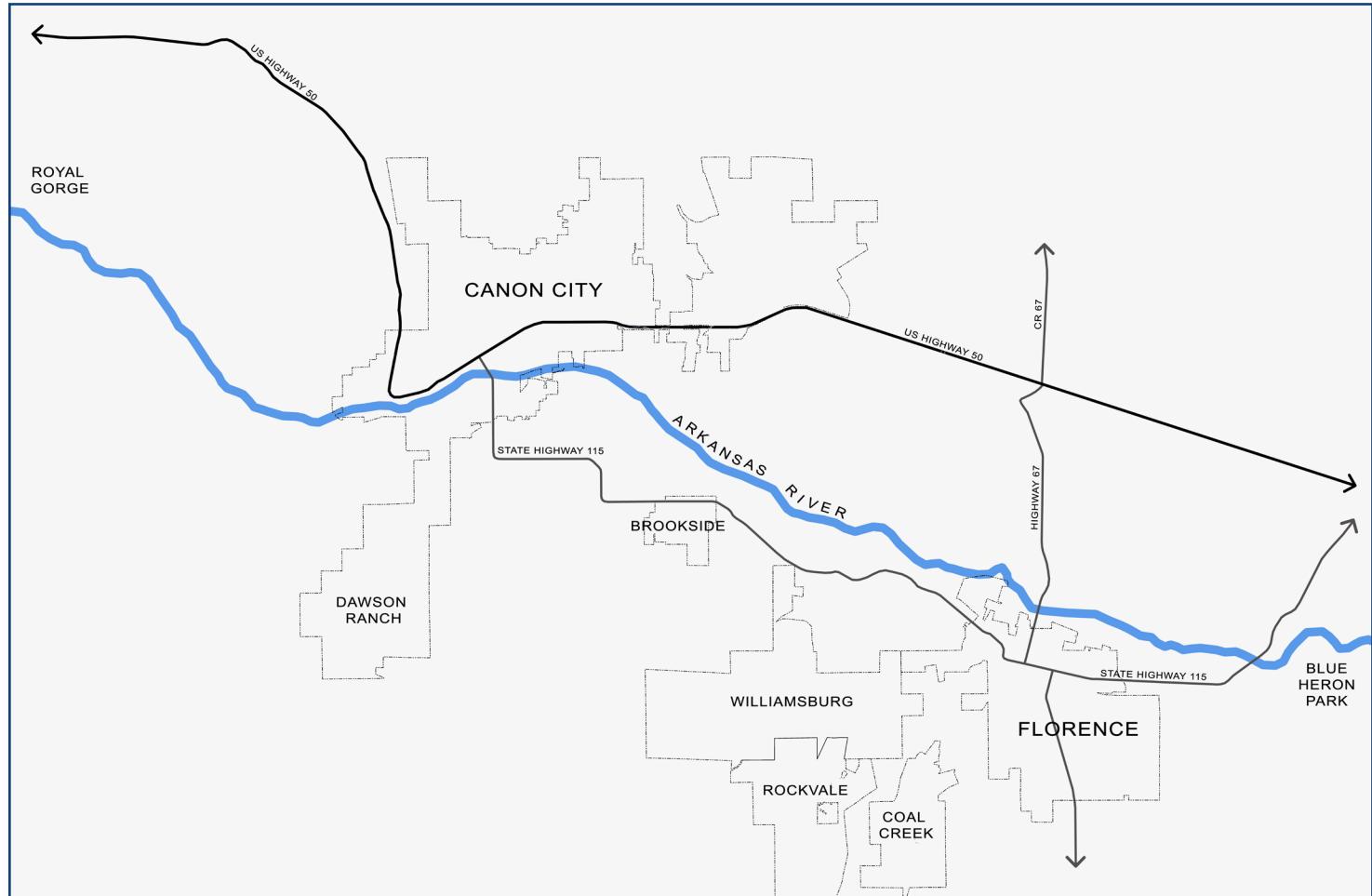
Consider the effect of land use along the river corridor and identify key opportunities for redevelopment and other uses that promote regional travel along the corridor and enhance it as a regional attraction.

9. Cultural and Historic Values: Identify cultural & heritage interpretation opportunities along major trails, particularly the river corridor.



Study Area and Existing Conditions

The study area encompasses roughly 16 miles of the Arkansas River corridor along with adjacent large open spaces, agricultural lands and developed areas. From the western boundary of the project area, the river flows southeast from the Royal Gorge Park through the cities of Cañon City and Florence to the Blue Heron Park Open Space Area. The northern project boundary extends to the north edge of the City of Cañon City south to the Town of Rockvale, south of the City of Florence.



Study Area Map



Arkansas River Near Florence

Land-use

Active land uses within Fremont County include: mining and mineral processing, commercial trade, agriculture and cattle ranching, manufacturing, and recreation/tourism.

The Arkansas River

The Arkansas River Basin is Colorado's largest river basin. The river starts about 120 miles upstream of the study area, near the Continental Divide, and eventually empties into the Mississippi River. Major tributaries to the river within the study area include Grape, Fourmile, Oak and Eightmile Creeks. The river is heavily used for recreation and irrigation in Eastern Fremont County and is the primary source of municipal domestic water in the region.

The Royal Gorge

The Royal Gorge Park is a roughly 5,000 acre property owned by the City of Canon City forming the west boundary of the study area and an important tourist and recreation destination. Currently about 300 acres of the park are actively used and leased by the Royal Gorge Company of Colorado. Within the 300 acres is the Royal Gorge Bridge, a new visitors center, tram, zipline, Skycoaster swing and associated buildings. The June 2013 wildfire destroyed most of the facilities in the leased area of the park. Also within the 300 acres is the Incline Railway, which is inoperable for the foreseeable future due to damage sustained in the 2013 wildfire.

In April of 2014, the City Council and members of the community created a new vision for the park that included; Canon City as a wealth of opportunity, investment in city-

Geologic formations date to over 1.8 billion years in age and are displayed in a variety of settings. Geologic features include:

- The Royal Gorge- a narrow 10-mile long canyon formed when the Arkansas River carved through the granite of Fremont Peak after the Rocky Mountains rose from the surrounding plains roughly 3 million years ago.
- Garden Park Fossil Area- Late Jurassic dinosaur remains occur from bottom to top of the Morrison Formation.
- Skyline Drive- Cretaceous-aged dinosaur footprints present.
- Indian Springs- Unique collection of trace fossils, body fossils, and sedimentary structures.
- Temple Canyon- Result of shifting. Dinosaur footprints are also present.



owned land, provide a wide range of authentic western experiences (hiking, biking, mountain bike trails, nature trails, etc.) for families, tourists, empty nesters, retirees and a broad cross section of the traveling market. The vision also included improving the entrance image for the park and developing a master plan for the entire city-owned land.

Landscape and Geology

Fremont County covers a wide variety of topographic conditions. Land characteristics include mountain summits, rugged hillsides, forested areas, deep canyons, rivers, ditches, and riparian landscapes. The Arkansas River has carved steep canyons, dominating the western part of the county, while the foothills are characterized by coniferous woodlands, hogbacks and cuestas in areas of sedimentary bedrock. Unique rock outcroppings are found in the nearby mountain parks.

- Red Cañon Park- Red sandstone formations uplifted from the ancestral Rocky Mountains.
- Twin Mountains- Result of folding and faulting of the Rocky Mountain uplift.
- Mineral Resources in the area include: Sand and Gravel, Oil, Gas, Coal, Placer Mining – gold, industrial minerals.

Wildlife

Fremont County is home to a tremendous diversity and concentration of wildlife. The river corridor is habitat to water foul, mammals, reptiles, and aquatic species. Wildlife populations are largely located in the eastern part of the County within the agricultural lands and along the Arkansas River. The Arkansas River is a fly fisherman's haven, with countless species of fish. Great Blue Heron and Bald Eagles can be found nesting

among the trees along the river bank. White-tailed Deer, Elk, Mule Deer, Big Horn Sheep, are commonly seen grazing within nearby open spaces. The county also provides excellent habitat for coyotes, bobcats, mountain lions, rattle snakes, turkeys, and bears.

Vegetation

Vegetation patterns are based on and subject to the elevation, slope, aspect, and soil type of the area. Due to the diversity of these factors, the study area consists of a variety of landscape types including; rolling hills, high desert, steep canyons with pinyon-juniper, perennial grasslands, Ponderosa Pine forest, and riparian forest. The dominant form of vegetation near the Royal Gorge area and higher elevations along Skyline Drive are comprised of intermittent sagebrush-pinyon-juniper community interspersed among rock outcroppings. The riparian areas and ravine habitats consist mostly of scrub oak and narrowleaf cottonwood. The river soils allow for areas to be dominated by grasses and sedges. Endangered, threatened and candidate plant species within public lands are managed by the BLM.

Agriculture

Eastern Fremont County has plentiful farmland. Currently established are areas used for crop production, rangeland, as well as irrigated areas and those designated as agricultural zoning. There are a number of irrigation canals that roughly parallel the river corridor. The major diversions are: Hydraulic Diversion, Oil Creek Diversion, Fremont Ditch, Minnequa Dam, and Lester Atterbury Diversion Ditch. Safe passage and diversion is the primary concern for public use. Currently there is one dam (the Minnequa Dam) that poses a hazard to river users, restricts fish migration, and may prompt river users to trespass on adjacent private properties when portaging around the dam.



Wildfires

Colorado's fire season is typically May through September. Increasing tree densities and more continuous forest canopies have resulted in widespread insect-caused tree mortality and created conditions favorable to more frequent and severe wildfires in the region. In 2013, Colorado had one of its worst wildfire seasons. The Royal Gorge wildfire started on June 11, 2013 and burned over 3,000 acres by the time it was contained five days later. Buildings on either side of the gorge

were destroyed, yet there were only minor damages to the famous Royal Gorge Bridge. Burn scarring is noticeable in the park today.

Trails

Currently, the Arkansas Riverwalk contains 7 miles of built trail including paved and crushed gravel surfaces. There are multiple trailheads along the Riverwalk, some of which include parking, as well as three riverside parks: John Griffin, Centennial Park, and Pathfinder Park.

The County also has hundreds of miles of trail, with a variety of uses (hike, bike, horse riding, etc.). Federal and State Public Lands occupy nearly half of Fremont County and are managed by the Bureau of Land Management, U.S. Forest Service, or the Colorado Parks and Wildlife. The City of Cañon City is currently working with RNL Design to develop a specific master plan for the Royal Gorge that will address trails and improvements within the park that are not included in this plan.

Parks

Public parks are important contributions to the community's quality of life. They can offer passive and active recreational opportunities for both locals and tourists. Park types range from open space and natural mountain parks, to developed river front recreation parks, from regional parks to neighborhood and pocket parks. Fremont County has a number of public parks, some of the most visited include: Royal Gorge Park, John Griffin Park, Pathfinder Park, Arkansas Riverwalk Dog Park, Community Garden, Veterans Park, Spring Creek Park, and Florence River Park. Centennial Park and the River Station in Cañon City are the main riverside parks with parking.

River Recreation

The Arkansas River is a popular destination for river recreation. Rafting, kayaking, surfing, paddle boarding and fishing are only a few of the common activities seen on the river. Access into the river is provided by a number of public "put-in/take out" ramps, terraced sandstone steps, beaches and accessible fishing piers. Fishing holes can be found along the river near 9th Street and whitewater features create a playful splash for boaters in downtown Cañon City at Centennial Park. The river is fragmented due to the Minnequa Dam. Getting from the Royal Gorge to Florence River Park in one float is impossible due to the dam.

Highways, Roads, Streets, Utilities and other Corridors

The hierarchy of roads accessing the area includes major arterials along US Highway 50 and State Highways 115 and 67. In addition, there is a network of County roads that service the area. Most of these are graded gravel. Finally there are localized street networks servicing neighborhoods in both Cañon City and Florence. By and large, road access to the river within the study area is limited with only 7 crossings of the river- 1st Street, 4th Street, 9th Street (Highway 115), Raynolds Avenue, MacKenzie Avenue, Pikes Peak Avenue (Highway 67) and Highway 115 east to Florence.

Planning Elements

The plan analyzes existing conditions, defines the limits of the river corridor, and identifies locations for opportunities to preserve or acquire (with receptive landowners) open space, scenic and historical sites, wildlife habitat and view corridors.

In addition, the plan identifies locations for developing trails, parks, and recreational sites. As a first step toward providing public access to the Arkansas River corridor, it specifies points of access in appropriate places.

The plan strives to preserve and enhance an irreplaceable legacy and offer new places for recreation, learning, fitness and tranquility, benefiting residents and visitors to Fremont County.

In addition to promoting a better quality of life for its residents, the plan also aims to promote continued economic growth with the Arkansas Valley's agricultural and ranching heritage, ideally integrating working landscapes with the resources and open space vistas. The plan also aims to help support a transportation network for watercraft, bicycle, and pedestrian travel promoting health and fitness by providing more rafting, walking and bicycle trips as an alternative to automobile travel.

In pursuit of this vision the Cañon City Area Recreation and Park District, City of Cañon City, City of Florence, Fremont County, FAR, and WKRP applied for and received a planning grant from Great Outdoors Colorado in 2014 with the help of a number of individuals and agencies who stepped forward with matching funds and services. This plan is the result of that grant and marks a first major step in the realization of the Eastern Fremont County trails, open space, and river corridor vision.

This plan is intended to be a "roadmap" for achieving a better future for the open spaces, trails, and river corridor in Eastern Fremont County. The plan identifies improvements, funding sources, implementation strategies, and management of resources and related amenities. It is also intended to help guide comprehensive and long-range planning and development.

The planning area was divided into projects defined by logical connections to local destinations. Chapter Three identifies open space conservation, river enhancements, recreation, trail and access opportunities for each project area.

Planning Process and Community Engagement

The planning process is intended to be inclusive, participatory and comprehensive. Anyone with an interest or stake in this trail, open space and river corridor plan is invited to become part of the process to create and refine this master plan.

The planning process included eight key steps:

1. Direct Outreach:

Initiate the planning effort with a coordinated outreach to landowners, residents, ranchers, farmers, ditch operators, utilities, and other business interests in eastern Fremont County.

2. Resources, Opportunities and Challenges Assessment:

Inventory, map, and analyze existing conditions for floodplain location, ecological characteristics, view corridors, farmland, existing roads, and others. Consult with technical work group committee and user groups.

3. Planning Area Limits:

Define the study area limits for planning purposes, include key recreation areas as well as habitat, ecologically sensitive areas and view corridors.

4. Broad Public Engagement:

Conduct a series of "open houses" where residents, business people, landowners and other interested parties meet to learn about the plan and share aspirations, ideas and concerns.



Community Open House In Cañon City

5. Resource Legacy, Open Space and Conservation Actions:

Identify locations to preserve or acquire open space, scenic vistas, archaeological sites, geological significant sites, wildlife habitat, riparian and view corridors. This includes buffer areas around and adjacent to sensitive landscapes.

6. Recreation and Access to the River and Surrounding Open Spaces:

Recommend specific recreational improvements including locations for developing trails, parks, outdoor classrooms, and access points. Pursue continuous trail connectivity along the corridor, connecting to adjacent communities. Trail alignments and other recreation improvements must offer a unique user experience, be sustainable, environmentally sensitive, and promote integration of land uses considering property owners needs and objectives.

7. Sustainable Management Strategies:

Evaluate effective and cost-effective mechanisms to hold and manage conservation lands and recreational amenities.

8. Implementation Strategies:

Identify leadership, practical steps and potential funding opportunities to implement the plan in a timely manner—ideally where Eastern Fremont County can quickly respond with “shovel ready” projects to potential funding opportunities.

The process included five Technical Workgroup Meetings, three Public Open House Meetings and thirteen Stakeholder & User Group Meetings with participatory review of all draft materials. A strong emphasis was placed on making this plan a representative document that embraced and responded to the aspirations, goals and concerns of all parties with a stake in, or potentially affected by the project.

To accomplish the plan, the project partners assembled a team of specialists including: landscape architects and engineers all familiar with the corridor. Staff and elected officials from Cañon City, Florence, Eastern Fremont County, Cañon City Area Recreation and Park District, and other interest groups also engaged. In addition, a Technical Working Group consisting of partner and stakeholder representatives was assembled and the group reviewed the process and planning products at key intervals.



Meeting With The Equestrian User Group



Meeting With The Lamba And Far User Groups

CHAPTER TWO:

Guiding Principles and Components

Guiding Principles

Trail Types, Components and Cross Sections



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With its character, central location and proximity to residential, commercial and agricultural districts, the Arkansas River Corridor, surrounding trails network and vast open spaces will be a substantial asset for present and future generations. The trail network will provide a reliable, efficient, scenic, non-motorized alternative for traveling around Eastern Fremont County.

To fully benefit from the opportunities afforded by this network of trails and open spaces (the trails themselves, improvements, scenic areas and commercial destinations), the project must result in a net improvement to the setting. The improvements should enhance the character of the study area, offer an outstanding user experience and continue to promote the beneficial use and enjoyment of the river and surrounding open spaces. The ethic of leaving it better than we found it should prevail throughout the process.

Trails must be developed in a manner that meets the intended outcome and objectives that range from safe and convenient to those offering reasonable risk and challenge. It must also be affordable to build and maintain. The guiding principles, components, and design standards presented below are benchmarks used to achieve these goals. These principles grew out of consultation with citizens, property and business owners, user groups, and governmental agencies in concert with the technical expertise and experience of the planning and design team.

Guiding Principles

The guiding principles and goals of this plan are intended to provide background on the importance and purpose of the Master Plan's components, strategies and action steps. The principles identified in this plan support the over-arching Mission Statement: "Create a visionary and realizable master plan for a wide range of recreational opportunities and resource conservation throughout Eastern Fremont County. This plan should clearly articulate a future and legacy for the river, trail corridors and associated open space areas."

The Guiding Principles include:

1. Partnerships and Regional Coordination
2. Outdoor Recreation Opportunities Provision
3. Outdoor Education and Youth Engagement
4. Natural Resource (including floodplain) and Wildlife Habitat Protection
5. Trail Connectivity
6. Agricultural Conservation



Guiding Principle 1: Partnerships and Regional Coordination

- Encourage coordination between agencies within Eastern Fremont County including stakeholders, city officials, outside agencies, and landowners.
- Pursue joint conservation efforts between the cities of Cañon City and Florence, as well as Cañon City Area Recreation and Park District and the neighboring towns within Eastern Fremont County to save resource dollars and provide more efficient conservation of open spaces and development of trails that cross municipal boundaries.

Guiding Principle 2: Outdoor Recreation Opportunities Provision

- Optimize river corridor and open space recreational amenities and public access.
- Offer a diverse range of recreational uses such as hiking, biking, paddling, bird and wildlife watching, hunting, camping and picnicking.
- Create a continuous bicycling and walking corridor along the entire length of the river corridor—or via associated nearby routes—from Cañon City to Florence and eventually through Fremont County and connecting to adjoining counties.
- Provide attractive trail connections from the river to surrounding communities along ditches, tributaries and other suitable routes.
- Provide a range of trail types and lengths such as paved bike paths, dirt walking trails, equestrian paths, single-track trails/single-track parks.
- Design trails and other improvements to minimize conflicts among users and with adjacent properties.
- Offer a range of outing lengths from a 20-minute workout to an all-day trail or paddling outing.
- Provide convenient points of access and egress (such as trailheads, boat put-ins and take-outs) with adequate frequency along the length of the corridor and throughout the trails network.
- Create improvements that are affordable to build and maintain.

Guiding Principle 3: Outdoor Education and Youth Engagement

- Provide environmental education and interpretation to help the community learn about and appreciate the County's abundance of natural and historic resources.
- Educate users of parks, trails and open space in order to minimize environmental impacts.
- Enhance and promote the river corridor and surrounding landscapes as an educational resource through interpretation, outdoor classrooms, school activities and volunteer/stewardship projects.
- Inspire and encourage youth to be active outdoors. Engage youth in volunteer and stewardship efforts.



Guiding Principle 4: Natural Resource (including floodplain) and Wildlife Habitat Protection

- Reduce flood and erosion damage by preserving lands in the 100-year flood plain (free of buildings or obstructions) along the Arkansas River and its tributaries.
- Allow adequate corridor width and channel management to optimize the ability of the river to more naturally meander and transport and deposit sediment—and minimize river bottom incising and degradation (healthy fluvial geomorphology).
- Use only proper aesthetically acceptable stream bank stabilization where necessary, such as buried rock riprap. Prevent/remove improper "stabilization" such as broken concrete, and other debris.
- Protect and enhance a healthy functioning, inter-connected landscape (such as river aquatic environment, healthy riparian habitat, flora, fauna, and human impact mitigation). Maintain connectivity for wildlife movement along entire length of river corridor and throughout adjacent open spaces.
- Minimize channelization of the river and impacts that require confinement of the channel including river corridor constriction by road and utility crossings.



Existing Arkansas Riverwalk West Of Raynolds Ave.

- Set aside and preserve adequate buffer zones along the edges of riparian and wetland areas—typically at least three tree canopies wide (approx. 150').
- Minimize dams and other obstructions of the river. Notch dams with “stair step” passages for boating and fish migration. Where possible, create whitewater features at existing water diversions, design these diversion/whitewater features to improve the river’s sediment transfer and deposit functions.
- Preserve/restore stepped/terraced river corridor cross section for healthy ecological function
- Preserve/protect/enhance sensitive areas for plants and wildlife including leaving 20'-100' vegetated fringes along the riverbanks in tact (this includes managing cattle access to the river to minimize trampling of river edge vegetation). Pay special attention to protecting sensitive and productive wildlife areas such as confluences, wetlands, and riparian forests.
- Provide buffer zones of adequate width to protect the healthy function of sensitive and productive river landscapes.
- Protect water supplies, aquifer recharge and water quality by preventing contaminated run-off from reaching the river channel or associated aquifers and habitat with best management practices.
- Minimize degradation of resources due to trails and other improvements by careful placement to avoid sensitive areas. Avoid removal of riparian vegetation.
- Promote visibility/public awareness of the river with views and identification signage at crossings.
- Preserve and enhance river corridor scenic vistas and landscapes both from the river and toward the river corridor from popular vantage points—especially future trails, parks and roads.
- Remove invasive species.

Guiding Principle 5: Trail Connectivity

- Preserve and enhance the river as a major east-west spine of an intercommunity trail system. This should include riverside trails, and interconnecting trails to outlying destinations.
- Assure community and visitor awareness and enjoyment by providing and maintaining an easy-to-find and easy-to-use wayfinding system (both on-line and in the field) leading users through the community trails network as well as other locales in Eastern Fremont County.
- Provide better trail and visitor access to residential areas, connecting people to schools, work places, parks and other destinations (non-motorized alternative transportation). Promote health and fitness by providing opportunities for short workouts (20 minutes) up to all day excursions.

Guiding Principle 6: Agricultural Conservation

- Promote and preserve working landscapes such as ranches and farms along the river corridor.
- Promote a healthy river corridor economy through agriculture, hunting, tourism, and quality development by fostering land uses and business that are compatible with ecological, scenic, flood hazard reduction and recreational benefits.
- Make this region an attractive place to live and do business with a quality river corridor and open space element.
- Consolidate land conservation to avoid fragmentation of agricultural practices and conflict of urban and rural activities.



Trail Types, Components and Cross Sections

Components

This includes the basic building blocks of the master plan. There are two key categories: river corridor stewardship and built improvements. The river corridor stewardship elements include standards or management and envisioned cross sections for an optimal healthy river environment. The built improvements include: trails, paddle facilities, access points, furnishings and other elements that enable and facilitate public access and enjoyment of the corridor.

Trail Types

Each of the trail types, components, and cross sections apply to specific project areas, each with a desired experience and outcome. Chapter 3 begins to describe the types of trails and components recommended for each of the projects identified in this plan.

Built Improvements

Trail Types, Components and Cross Sections

Trail access to the river corridor and other scenic open space or recreational destinations are a primary objective of this plan. Ultimately, a continuous multi-use, non-motorized trail is envisioned along the entire length of the Arkansas River corridor. In addition, access trails from communities, (local trail loops, soft surface walking paths, and single-track "mountain biking" venues) are also desired. In the shorter term, the objective is to build a usable trails network and other improvements as described above as right-of-way and financial resources permit.

Following are several key elements that can function as building blocks for the overall trail system. The list of components was generated considering field conditions, the ideas expressed at community meetings and other input. The descriptions, plans, and drawings below specify, in general, the recommended elements.

It is important to note that these are for planning and budgeting purposes and they do not constitute site-specific design/ engineering drawings. Specific designs, specifications and detailing will occur during future design and construction phase*.

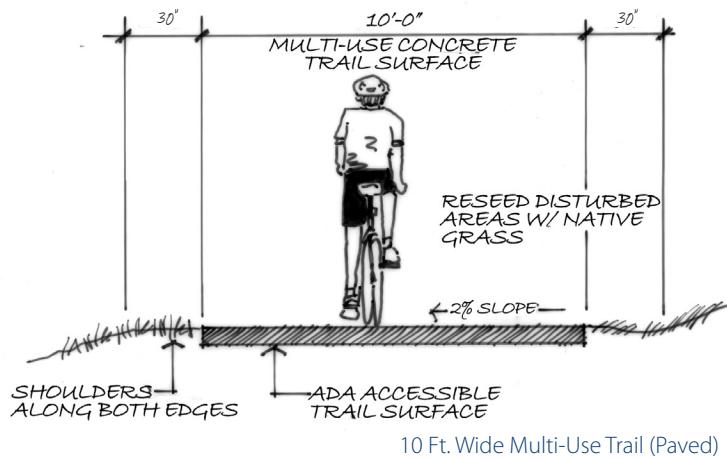
Multi-Use – Paved Trail

There are two paved trail surface options—asphalt and concrete. Typically, for cost and other reasons, asphalt has been the surface of choice in many communities in Colorado. However, it should be noted that because of its durability and lower maintenance requirements, concrete has certain advantages for trail projects. This is particularly true for improvements in the Arkansas River floodplain where concrete is recommended for areas subject to frequent inundation or erosion such as along the river.

Paved trail surfaces accommodate pedestrian, bicycles, skates, and wheelchairs. The paved surface is at least 10'-wide and designed to national engineering (AASHTO for Bicycles) and (Americans with Disability Act) accessibility standards. There is a graded trail edge on either side between 30" and 5'-wide with 5' preferred. This shoulder area should be mowed and kept free of debris, though the width of the mowed area may undulate for improved aesthetics. Typically, grades do not exceed 5% with up to 10% for very short distances. For purposes of this plan, the shared-use path, when adjacent to a roadway, includes a 5' to 10'-wide landscaped buffer between the trail and the adjacent road. There should be a 30" minimum buffer between the trail edge and adjacent fences, walls or other obstructions.

Management Considerations

Sweeping, repair surface and infrastructure—7 years life on asphalt, 15-20 on concrete, edge vegetation management, litter and debris removal, patrol.



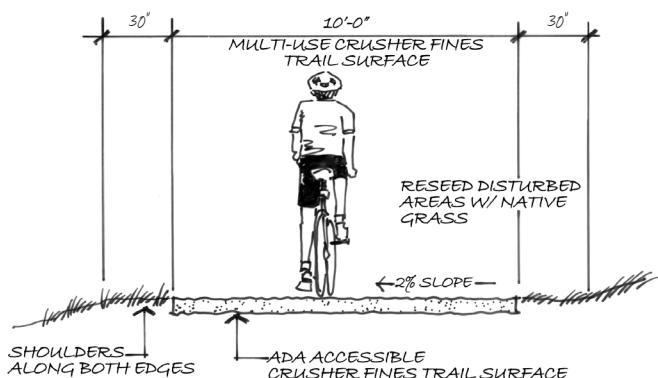
* For more details, standards and design references see: Guide for the Development of Bicycle Facilities, American Association of State Highway and Transportation Officials (AASHTO); Trails for The 21st Century, Rails to Trails Conservancy and Island Press; and www.americantrails.org; CDOT Roadway Design Guide, Chapter 14, Bicycle & Pedestrian Facilities; See also Manual of Uniform Traffic Control Devices (MUTCD) U.S. FHWA, mutcd.fhwa.dot.gov (for signage and other traffic regulation-related features for both automobile and bicycle facilities). Note too that, as of late 2009, new guidelines for accessibility per the Americans with Disabilities Act were in the process of update see www.access-board.gov NACTO guidelines (<http://nacto.org/cities-for-cycling/design-guide/>) For mountain bikes see IMBA Design Guides at www.imba.com. For equestrian facilities see Equestrian Design Guidebook for Trails, Trailheads, and Campgrounds published by the U.S Forest Service. (http://www.fhwa.dot.gov/environment/recreational_trails/publications/fs_publications/07232816/page37.cfm)

Multi-Use – Crushed Gravel (Crusher Fine) Trail

In some instances where a softer surface multi-use trail is desired, a crusher fine trail may be appropriate. This is a groomed, granular stone surface designed for most bikes and for walking including accommodating wheelchairs. Note that while typically less costly than paved surfaces, this type of trail is not recommended in areas prone to flooding or erosion. Typically this trail type has a 10'-width though this may vary depending on use levels or other conditions. It accommodates wheelchairs. This trail should also meet national bike path (AASHTO for Bicycles) standards but should be posted as having a granular surface. Typically grades do not exceed 5%. For purposes of this project this trail also has a deep strength base designed to better accommodate heavier vehicles, such as utility maintenance trucks, that may occasionally use the trail as authorized.

Management Considerations

Repair ruts and washouts and smooth surface annually, edge vegetation management, litter and debris removal, patrol.



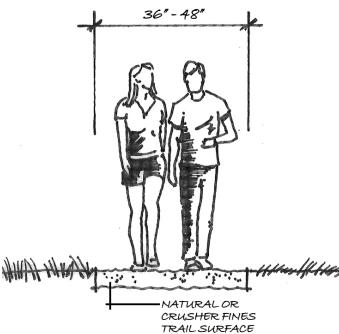
10 Ft. Wide Multi-Use Trail (Crusher Fines)

Natural Surface Trail

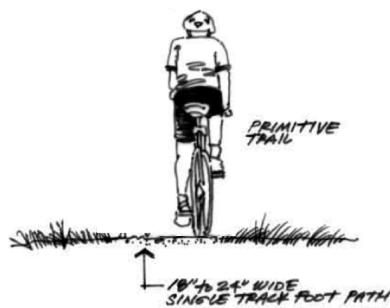
Natural surface trails may be appropriate for local trail loops, for single track "mountain biking" venues and routes and possibly for interim longer distance trails through open spaces. Natural surface trails consist of a graded dirt surface with appropriate erosion control and stabilization. Width may vary from 18" to 72". Depending on desired experience and permitted use, this trail accommodates hikers, mountain bikes, all-terrain wheelchairs, and equestrians. It does not meet national (AASHTO) standards for bicycles. For moderate surface (36"-48" wide) trails, typical grades do not exceed 5% with 12.5% the maximum for short distances. For single track (18"-24" wide) trails, grades could exceed 10% and greater.

Management Considerations

Repair ruts and washouts, repair infrastructure, edge vegetation management, litter and debris removal, patrol.



Moderate Surface Trail
(Concept only - refer to the US Forest Services trail accessibility guidelines for specific trail construction)



Back Country - Single Track Trail
(Concept only - refer to the US Forest Services trail accessibility guidelines for specific trail construction)

**More detailed guidelines, standards and advice for single track biking facilities can be found in Trail Solutions: IMBA's Guide to Building Sweet Single Track, published by the International Mountain Biking Association (www.imba.com).

Youth Adventure Trail

Extensive studies have shown that spending time in nature in unstructured play is incredibly important for childhood development. Healthy active lifestyles are also becoming increasingly important at an early age to combat the obesity epidemic that is plaguing our nation. Trails that attract and excite children are an excellent conduit to getting kids outside spending time outdoors and exercising. To attract and engage youth there needs to be narrow, winding trails close to home that offer adventure and intimacy with nature. They need to be narrow with ups and downs along with opportunities for self-chosen challenge and skill progression. These narrow adventure trails would have skills features that blend with the natural setting spread throughout that are designed so they are safe and challenging. Careful design should avoid conflicts with other users of the park and not detract from passive recreation outings. An informal example of this already exists at John Griffin Park which is always a popular choice for little ones. The idea would be to slightly expand on the existing network but do it with purpose to minimize conflicts and maximize benefits. Given the proximity to neighborhoods and the placement in the community John Griffin Park would be an ideal place to provide these types of trails and experiences to engage youth in nature and exercise. Other locations for Youth Adventure Trails may include Ecology Park, Section 13, Pathfinder Park and the Hogbacks. Below are examples of skill progressions and engaging trails for youth.

Management Considerations

Repair ruts and washouts, repair infrastructure, edge vegetation management, litter and debris removal, patrol.



Example Of Skills Progression Using Native Materials



Fun Challenge For Youth And Adults Allowing Them To Build Skills And Confidence



Example Of An Engaging Trail With A Narrower Corridor, Twists And Turns, And Ups And Downs



Example Of Skills Progression Using Native Materials

Equestrian Trails and Facilities

Equestrians might share some of the back country and moderate trails (with governing agency approval) and trailheads. In addition there may be a desire for facilities along the corridor designed specifically to accommodate horseback riding. Typically, stable dirt or sand surfaces are considered excellent for horses while other surfaces including paved surfaces and sometimes crusher fine surfaces are considered uncomfortable. Generally a minimum trail width of 3-6 ft. with an overall clearing of obstructions such as branches of 9 to 12 ft. is desired***.

Management Considerations

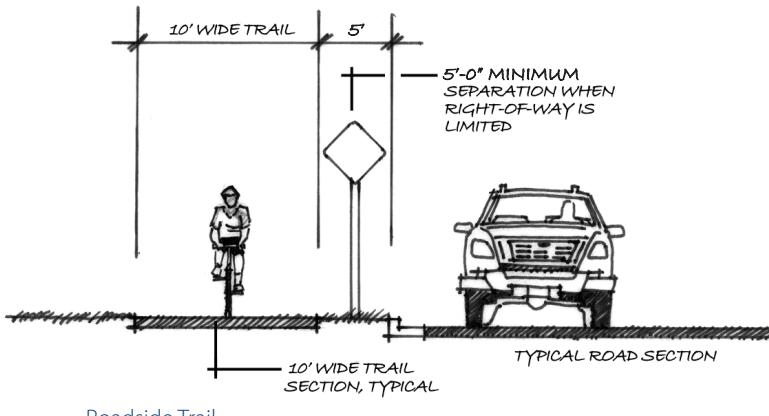
Repair ruts and washouts, repair infrastructure, edge vegetation management, litter and debris removal, patrol.

Roadside (Shared-Use) Trail

Typically this consists of a 10'-wide "paved" surface with a vegetated or landscaped buffer (5' minimum width) between the edge of the road and the trail. The trail allows for two-way bicycle and pedestrian traffic. If a 5'-wide buffer can not be achieved then a minimum 42"-high safety barrier should be provided per AASHTO guidelines. Currently this trail type is not identified in the Master Plan, but is preferred to on-street if right-of-way can be acquired to accommodate a separate roadside trail.

Management Considerations

Includes sweeping, surface repair and infrastructure upkeep with median vegetation management, litter and debris removal, patrol.



Roadside Trail

***See Equestrian Design Guidebook for Trails, Trailheads, and Campgrounds published by the U.S Forest Service.
http://www.fhwa.dot.gov/environment/recreational_trails/publications/fs_publications/07232816/page37.cfm

Rail Trail

Potentially there may be opportunities for trails along abandoned rail corridors. Trail construction standards would be similar to multi-use trails (paved or crusher fines)

Management Considerations

Sweeping, repair surface and infrastructure—7 years life on asphalt, 15-20 on concrete, edge vegetation management, litter and debris removal, patrol.



Rail Trail Opportunity

On-Road/On-Street Shared-Use Routes

There are significant on-street routes (low volume / low speed 25mph or less) within Eastern Fremont County that provide shared-use with automobiles and bicyclists. The majority of the on-street routes suggested in this plan are paved. Where street R.O.W. or width prohibits the use of designated bike lanes, sharrows, and "share the road" signs should be used.

Some of the potential back roads have graded gravel surfaces most of which have rough surfaces less than optimal even for "fat tire/mountain" bikes or walks. With appropriate grading for a smoother surface these (where traffic and speeds are low) could potentially be suitable for some bikes and walking. In addition to surface maintenance, there should be "share-the-road" yellow diamond caution signs with a bicycle symbol and placards that "spell out" "share the road". (per the U.S. Manual of Uniform Traffic Control Devices) and distinct wayfinding "mile markers" that help guide users from point-to-point. It would be helpful to place the mile markers with a 1/2-mile spacing in both directions and/or at least at any key decision points such as where the road forks and other intersections.

Management Considerations

Sweeping, repair surface and infrastructure, regarding gravel roads. Maintain safety and wayfinding signage.



On-Road/On-Street Shared-Use

Pedestrian Bridges, Decks and Trail Underpasses, and Tunnels

Bridges will vary depending on location, and intended user experience ie: primitive versus multi-use trail. Bridge spans for multi-use trails must meet the following criteria:

They should be able to carry weight of maintenance and emergency vehicles (12,000 pounds) unless alternative access is available. They should be wide enough to accommodate both trail traffic and people who may want to linger on the span to enjoy the view. Absolute minimum width should be 10' but 12' is preferable both to accommodate those who linger and possible future trail widening. All railings should be at least 44" high (54" on highly elevated decks and bridges). It is recommended that only clear-span crossings be utilized for pedestrian spans to minimize obstructions in the river and hazards to boaters.



Prefabricated Bridge Along Multi-Use Trail



Example Of A Timber Bridge

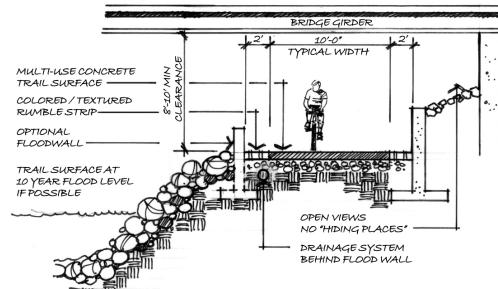


Example Of A Narrow Bridge On A Single Track Trail

Clear spans should be placed above the 100-year flood level wherever possible, but in some instances may be lower, provided the structure will not raise the 100-year flood level (A hydraulic engineer should be consulted). In many locations along backcountry trails, a more primitive timber or log bridge may be appropriate (see U.S. Forest Service Trail Construction and Maintenance Notebook)

All floodplain regulations must be followed when planning for bridge crossings.

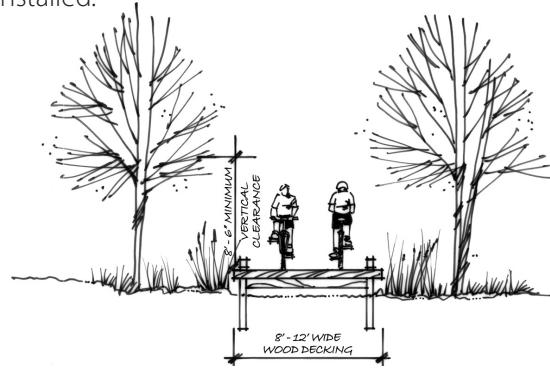
In some locations, the trail will go under bridges or through low areas subject to flooding. In these cases, the trail should be substantially anchored (with concrete, rock, Geowebtm or similar system) and armored with rock to prevent wash out. A hydraulic engineer should be consulted to ensure the underpass is durable and will not adversely impact flood conveyance.



Tunnels and underpasses must meet the following criteria: Adequate lines of sight upon approaching and passing through the underpass. (See AASHTO standards).

Provide appropriate safety signage and cautions per the Manual of Uniform Traffic Control Devices MUTCD. Provide lane striping where appropriate.

In some instances such as through wetlands or areas with unstable soils, decking might be appropriate. Decks should be durable, ideally using recycled plastic, stable and non-slippery. If height of the deck requires it, appropriate handrail should be installed.



Open, wider underpasses and tunnels are preferred to narrower box-culvert type facilities. In no instance should the dimensions of the underpass be less than 10' high by 12' wide unless flood levels prohibit. In this instance 8'-6" is the minimum head clearance with an alternative route provided for equestrians.

- Generally design underpasses to be above the 5-year flood level, but design to minimize need for at-grade street crossings during high water. Design at-grade crossings to minimize hazards including warning signage to motorists, barriers to dangerous crossings and leading trail users to safe intersections to cross.

Alternate routes for use during high water should be provided. These include ramps and alternative on-street routes that allow trail users to safely detour. Ramps and on-street routes should meet ADA criteria for universal accessibility, utilize routes and crossings suitable for bicycle and pedestrian travel and keep users away from potentially hazardous situations such as unsafe crossings of high volume streets or highways.

- Have clear, easy-to-follow signage depicting alternative routes and how to follow them to trail destinations.
- Have appropriately engineered intersections with the main trail that avoid traffic conflicts.
- Consult a hydraulic engineer to minimize risks to users during high water and storm events. Provide escape routes ADA accessible and warning signs where appropriate. Avoid any unseen or dangerous storm water outlets impacting the trail.
- Provide floodwalls where high water requires it to allow minimum head clearance. Provide drainage for nuisance water that may collect in the underpass.
- Provide decorative, attractive headwalls on entries into tunnels and underpasses.

Management Considerations

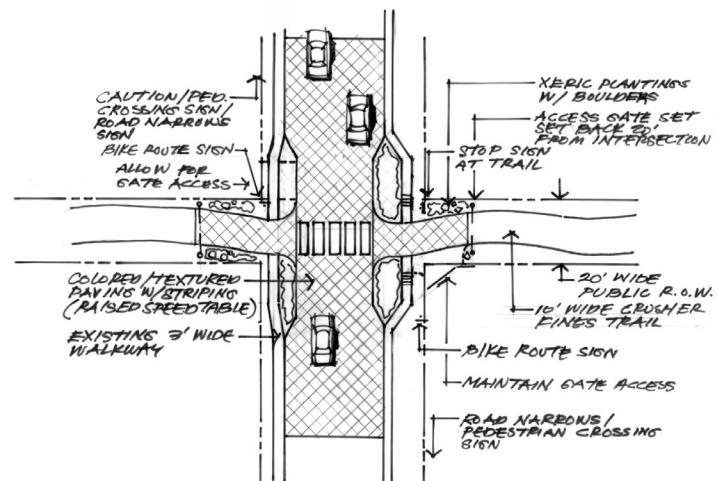
Inspection, repair, long-term care 50 years or longer life cycle.

Where the crossing will serve only pedestrians, passive or active RRFB technology might be substantially less costly and more appropriate for the conditions. HAWK facilities have been installed in a number of communities including Fort Collins, CO and Centennial, CO. Examples and technical information about the "HAWK" pedestrian crossing system can be viewed on the Web.

In these instances, particularly mid-block, an enhanced layout that promotes a safe interaction for both bike and pedestrian trail users should be provided. This consists of warning signs and striped crossing markings on the pavement per the *Manual of Uniform Traffic Control Devices* MUTCD, a neck down that narrows the traffic lane, special texturing of both the street and the trail approach and/or possibly a raised pavement "speed bump" or "speed table" to alert and slow motorists.

Management Considerations

Inspection, repair, long term care 50 years or longer life cycle.



Handrailings, Guardrails and Fences

Handrailing and/or bike guardrails will be required in a number of locations including bridges and decks as well as places where a drop-off or other hazard exists and adequate shoulders cannot be provided. Handrailing and bike guardrails should meet the following criteria (See also AASHTO guide):

The handrailing/bike guardrail should be 44" (54" on highly elevated decks and bridges) high if there is a drop-off in excess of 18" or other hazards. Openings on the rail should not be able to pass a 4" sphere. (Confirm if necessary with local codes).

To reduce costs, consider using woven wire mesh with vinyl coating combined with wood railings.

At Grade Street Crossings and "Traffic Calming" Street/Trail Intersection

There may be several instances where the trail system will cross streets at grade- perhaps at intersections controlled by either a traffic light or by stop signs. In the instances of busier road crossings these should be traffic-light controlled, with a pedestrian activated signal for trail users. Accessible curb ramps (meeting ADA) should be provided.

Access Gates

Access gates restrict automobile entry to trail corridors. The gate is designed with a lock and is hinged for easy entry by authorized personnel. Typically the gate is set back from the adjoining street with enough clearance to allow authorized vehicles to safely pull off the street to open the gate. The gate is substantial enough to discourage removal or damage. A gap is left in the gateway that allows a bicyclist or pedestrian to pass through, but not a motor vehicle. Safety and regulatory signage, in compliance with the Manual of Uniform Traffic Control Devices (MUTCD), used on the street, alerts motorists just as similar signage on the trail alerts trail users to the gateway. Signage is placed an adequate distance ahead to allow response time and is designed per the MUTCD. In some cases removable bollards could be used in place of a gate. Reflective tape should be added to the bollard to make it more visible to bicyclist.

Management Considerations

Regular inspection, repair.



Example Of An Access Gate At Trailhead



Example Of A Removable Bollard To Restrict Vehicle Access

Trailheads and Entry Features

Intermodal trailheads should be strategically located where users might logically want to access the corridor by automobile and park to bike or hike. Typically these could accommodate 15-to-50 automobiles and could have a paved or gravel surface. Trailheads should also include an entry monument or sign that includes a trail system map, with "you are here" marker, and applicable user courtesy/regulations and other information. These locations could also include restrooms, shade structures and drinking water. All facilities should be designed to be accessible to all users. Each trailhead design will be unique depending on its location and setting.

In some instances entry points might be more elaborately improved to enhance trail visibility to the public. These entry features might include special landscaping, trim elements, shade structures, and sculptural elements. Generally, all types of access points should include access control that admits maintenance and emergency vehicles but not other motorized vehicles.

In other instances the trail entry point might not offer parking, serving rather as a "walk-up" or "bike-up" point of entry. These should include an accessible ramp from the street where applicable and neighborhood-appropriate signs or small pylons indicate the entry point. A small system map at these locations will also help with wayfinding. Benches and trash receptacles may be included.

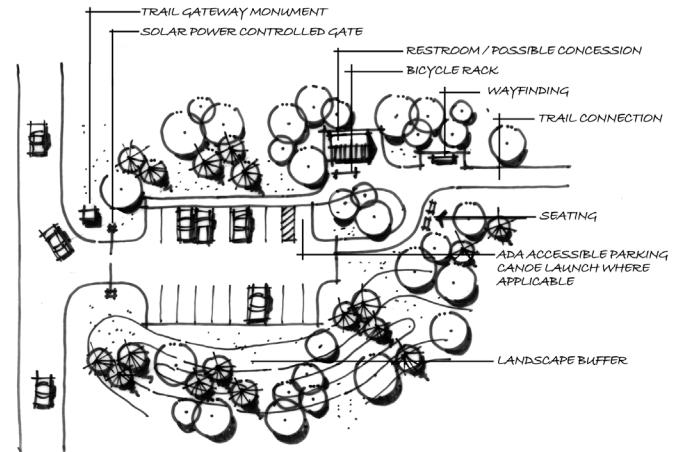
Typically, trailheads, entry features, and other points where people can park or congregate, should not be placed proximate to residences. A gate that closes the area at night can be provided. A number of communities have used solar-activated automatic gates that close at sunset preventing access after dark.

Management Considerations

Regular inspection, repair. Patrol, nighttime closure might be warranted.



Example Of A Walk-Up Trailhead



Signage—Safety, Courtesy, Interpretive and Wayfinding System

The informational system includes: entry monuments, gateway signs, signs with maps, directional signs, wayfinding, traffic and safety signage, mile markers, interpretive signs, displays, artistic/sculptural elements and artifacts. The informational system should have the following qualities:

- A consistent style and information system should be provided for all greenways, trails and open spaces throughout the community. There may be several signage systems depending on location and setting (ie: Arkansas Riverwalk, downtown on-street routes, and more primitive locations on BLM or Forest Service Lands). Refer to the BLM/Forest Service standards for signage.
- The signage and way-finding system should be an attractive, distinct, uniform system of signs, displays and possibly artistic elements that guides and informs both local and out-of-town users with respect to trails corridor and other amenities.
- Bicycle and traffic signage should conform to the Federal Manual of Uniform Traffic Control Devices (MUTCD) guidelines.



Example Of Existing Wayfinding Along The Arkansas River

- Key gateway signs should be provided at major entry points that include: a map of the system, accessibility information, estimated travel time, user safety guidelines, emergency contact and user feedback telephone numbers/Web sites, leave no trace information, code of conduct and other pertinent information.
- Structures should be designed for easy repair and maintenance.
- Mile markers and street address indicators should be provided every $\frac{1}{4}$ mile for user guidance, maintenance and emergency reporting.
- Signs and other structures should be set back from the trail at least 30" (verify with local and MUTCD codes)—or properly marked or protected when setback is not feasible, to avoid hazards to trail users.
- Text and content should be kept current and updated.
- Detailed records should be kept of maintenance, safety and security conditions and remedies.
- Informational and interpretive displays are encouraged along the trail. Important themes including the Fremont County history, geology, and ecology should be addressed. Displays could include waysides, sculptural elements and artifacts.
- Sign areas prone to flash flooding and post user safety advisories.
- Consider placing emergency call boxes especially in cell phone "dead zones".
- A number of informational, educational, interpretive and way-finding devices are recommended for the trail corridor.

These include:

Safety Signs—These signs and/or pavement markings address or promote trail user and bicycle safety. For ease of understanding, these signs should follow standard formats for traffic control devices (See Manual of Uniform Traffic Control Devices). Signs address both bicycle and automobile traffic signage with respect to both trails and shared on-street routes.



MUTCD W11-2



MUTCD W11-15

Wayfinding/Directional Signs—include signs and markers, some with maps showing trail users how to reach their destinations, distance from a destination, and location signs such as mile markers, and street signs placed on bridges to identify cross streets. The wayfinding system should include overview signs and maps used at major entries. The system map should also be readily accessible on the Web. They address comprehensive issues such as system-wide trail maps, location of rest areas, degree of difficulty, accessibility and system trail rules and regulations. Due to the amount and importance of the information conveyed on system signs, it is best to place them in locations where users are encouraged to safely stop and review the information represented. Markers may have a specific logo, or they may be as simple as blaze, using pieces of brightly colored tape attached to sign posts to indicate the corridor (used extensively in France and other places).

Credit Signs—provide information about those who contributed to the development of the trail and/or amenities along the trail.

Interpretive Signs and Displays—address natural and/or cultural features. Important topics include ecological and geophysical interpretation and history.

Management Considerations

Regular inspection, repair.



Example Of Interpretive Display

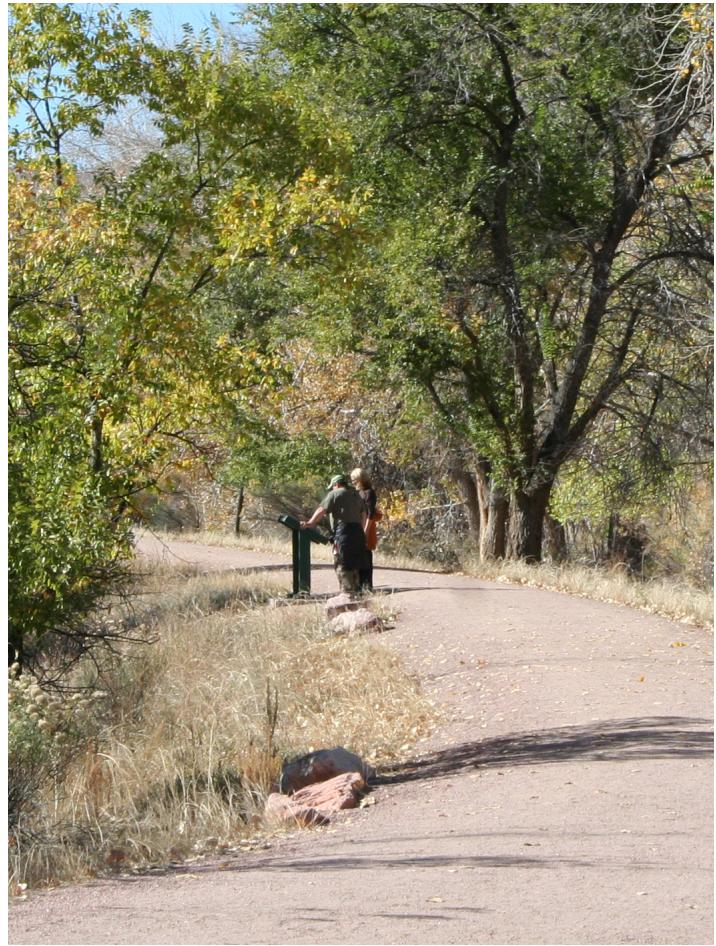
Drinking Water and Toilets

Except possibly in populated areas, drinking water facilities are not recommended due to cost and maintenance concerns.

Toilet facilities should be placed at strategic points such as trailheads where there is access for servicing and maintenance. Due to cost and maintenance considerations, plumbed toilets are not recommended. Rather, available portable chemical facilities should be provided and operated by a commercial service (Alternatively, self-composting vaulted toilets could be considered but these are more costly). For aesthetic purposes especially in more heavily used areas an architectural shell can be placed around the portable toilet for screening. The design and type of facility will be dependant upon location and setting. Facilities should accommodate wheelchairs.

Management Considerations

Contracted servicing of chemical toilets, regular inspection, repair as needed.



Example Of Interpretive Signage Along Trail

Rest Areas and Overlooks

The trail system should include strategically placed rest areas and overlooks. This might consist of a single bench or more improved sites with restrooms and other amenities. Generally these should be available within a mile of any point on the trail. Rest areas and overlooks should be provided at regular intervals along trails. Several kinds of rest areas could be offered including rest pads, standard rest areas, overlooks, and trail pavilions. All rest areas and overlooks should be designed to move users off the main trail to eliminate any possible traffic hazard. Each rest area or overlook design will be unique depending on its location and setting.

- Rest pads can consist of a 10'x 10' (minimum 5'x5') stopping point just off the trail with a simple bench and perhaps informational or donor credit signage. These should be located every 1/4 to 1/2 mile depending on grade.
- Standard rest areas should be located every one-to-two miles and should include a crushed stone or concrete pad with benches, an informal bike rack, informational signage and, perhaps, a drinking fountain.
- An overlook is a special kind of rest area tied to a view of special interest such as a wildlife area. In addition to the standard rest area features, an overlook would likely include interpretive signage describing the area being viewed.
- Consider storm shelters and sunshade structures appropriately grounded for lightning.

Management Considerations

Regular inspection, repair.



Overlook From Existing Hogback Trail



Existing Rest Area Along The Arkansas River



Example Of Overlook With Interpretive Display



Example Of Rest Area With Stone Bench

Right-of-Way Requirements

Right-of-way needs will vary depending on the type of trail, land ownership, and site constraints. In some cases right-of-way will be donated or dedicated as part of the subdivision process or as part of a cooperative agreement of mutual benefit such as along an irrigation canal or utility corridor.

While widths for landscaping, resource conservation, and protection of privacy for adjacent properties will vary, minimum width requirements for trails are as follows:

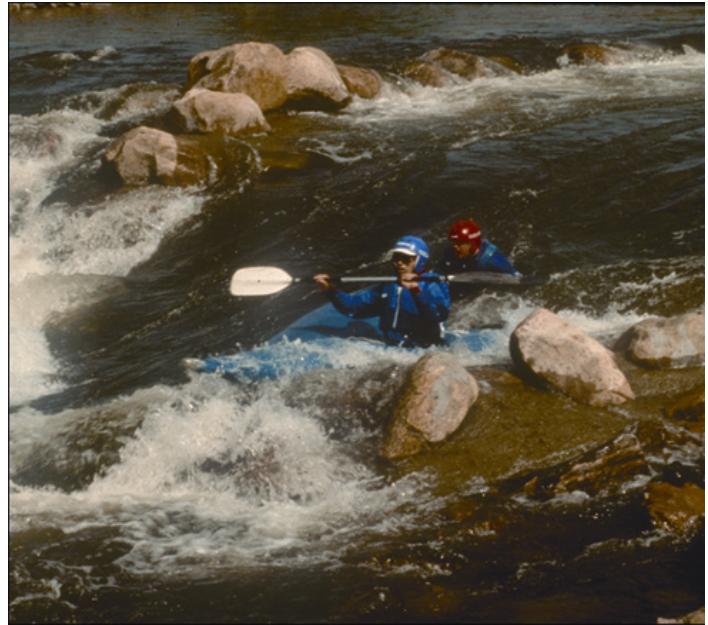
- **Multi-Use trail surface:** minimum 10'-wide surface, upgradable to 12' with a shoulder that is a minimum 30" wide (60"-wide preferred). A total minimum right-of-way width of 30' is preferred.
- **For roadside trails:** minimum 5' setback from curb unless a railing is provided and minimum 36" setback from land uses such as parking lots or buildings. Avoid conflict with overhang from parked vehicles. Please note that these are minimum trail criteria and do not include requirements for landscaping—please see City standards.
- **For Single Track, Primitive Trails and All-Terrain Trails:** minimum 8'-wide, optimal 14'-wide right-of-way width.

Right of way acquisition might be in the form of a fee simple acquisition, by easement or license agreement or dedication depending on the circumstances that best suit the parties to the agreement. These acquisitions are subject to negotiations with the appropriate land owners and management tools available to the respective agencies.

Paddleway Facilities

Paddleway trails are waterways suitable for canoeing, kayaking, and rafting. Improvements include modification of hazardous obstacles such as diversion structures to promote safe water recreation. This can be accomplished by placing "stairsteps" using rock pools to gradually step boaters down from the top to the bottom of the dam.

Provide well-marked put-ins and landings with support facilities such as informational signage, boat and raft unloading areas, toilets and parking. Signage should be provided at entry points with "trail" map, accessibility, user responsibility, safety and interpretive information.



Facilities should be readily accessible to local users including, wherever feasible, meeting standards under the Americans with Disabilities Act (ADA). Conflicts with anglers especially in popular fishing areas should be avoided and conflicts with sensitive wildlife or private property areas should also be avoided.



Canoe Landing—South Platte River In Denver

Management Guidelines

Paddleways should be managed by public agency or possibly a boating association or commercial interest. There should be policies in place to maintain optimal flows for boating without adversely impacting fishing. Structures should be kept in good repair and the corridor should be managed to ensure user safety and security and privacy of adjacent properties. Records should be kept of maintenance, safety and security problems.

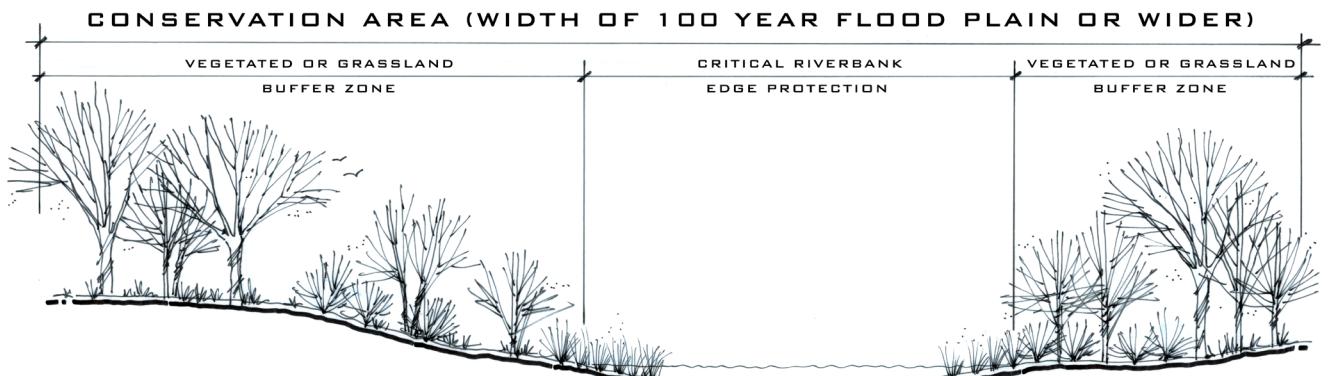
River Corridor Stewardship

The long term care and stewardship of rivers lies at the heart of this plan. For purposes of this plan the “river corridor” refers to the actual river channel including the water in the river and the aquatic habitat (home to minnows, amphibians, etc.) it supports, the areas associated with the river system including the 100 year floodplain and the associated landscapes and vistas. It also takes into account the associated tributary streams, wetlands and canals. The components, expressed as cross sections below, suggest ways to achieve optimal stewardship of the river and river corridor.

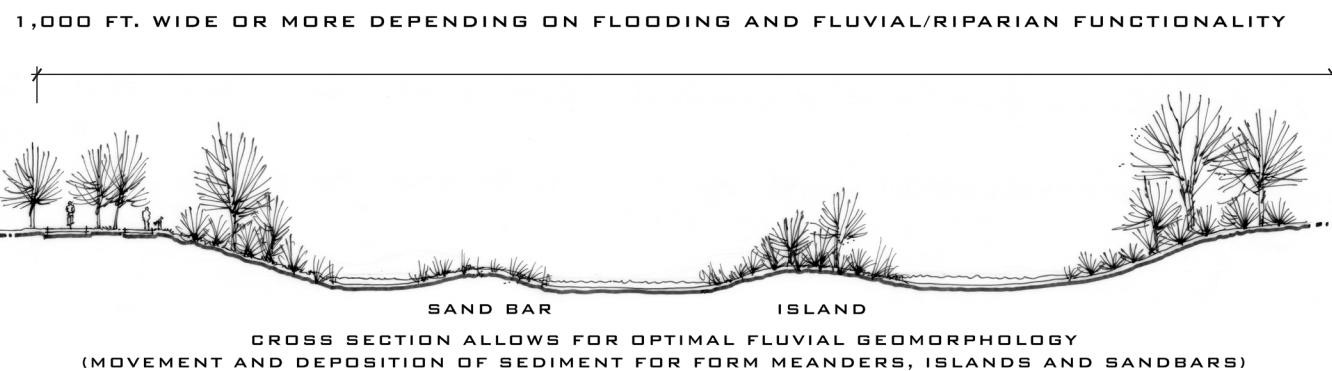
Optimal Rural Conservation Corridor

These cross sections strive for the optimal protection of the Arkansas River and tributaries. It includes the 100-year floodplain and associated riparian and buffer lands. All activities proposed for this area should be carefully reviewed by planning and management agencies to ensure compatibility with managing agency plans and policies. Along with the river channel itself, it strives to protect and expand riparian (primarily cottonwood) forested areas. Wherever feasible and dictated by the river geomorphology, preservation of sandbar and island areas is an objective. Use natural-appearing drop structures instead of a concrete or rock channel bottom to create a more natural appearing/meandering low-flow channel.

The goals are to protect water quality, reduce flood and erosion hazards, provide both core habitat and interconnected wildlife movement corridors and create an attractive landscape. Generally the trail and any other built improvements stay to the outer edge of this area though the trail may enter in places to offer a more diverse experience and provide interpretive opportunities.



Optimal Rural Conservation Corridor



Management Considerations

If owned by others, oversight to assure goals and standards of resource protection are maintained. If publicly owned, or by a land trust, management to address litter, dumping, pests and other open space stewardship functions. In general there should be cooperation and review of policies and regulatory measures to assure continued sustainability of the corridor as a healthy functioning riparian space. Patrol where necessary and appropriate. Maintain infrastructure such as firebreaks, erosion control devices, check dams, etc. Promote indigenous trees and plants such as cottonwood, willow and other appropriate species. A plant ecologist or biologist should be consulted in the selection of plant species for planting and when trees are thinned for flood hazard reduction. Promote a citizen volunteer program to annually plant, clean up and restore creek banks.

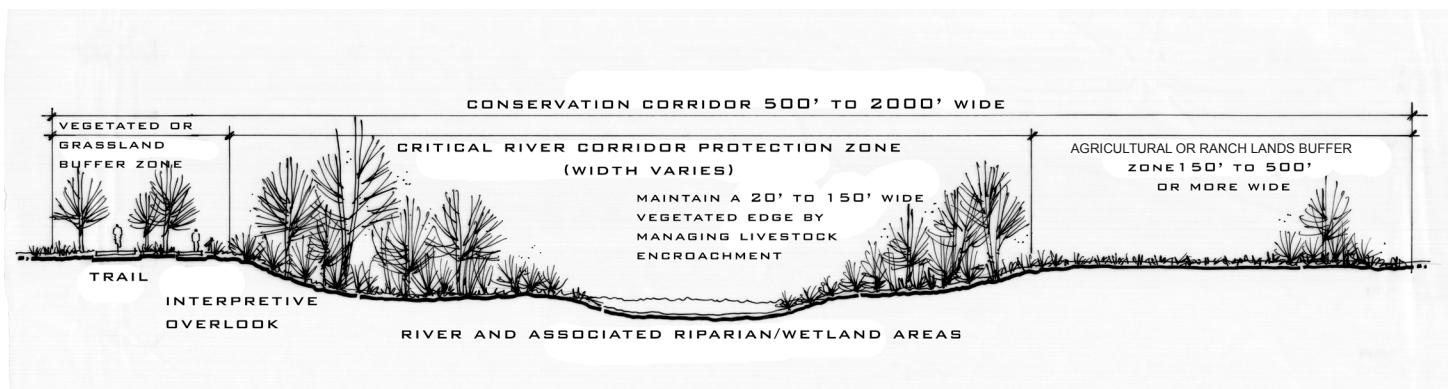
Consider engaging nearby university resources to study opportunities for wildlife, assess impacts of recreation, oil and gas extraction, agriculture and development along the corridor for optimal buffer areas and other treatments.

River Corridor With Adjacent Working Landscapes

Recognize that there is a range of activities along the river corridor including: ranching, farming and other activities. This plan strives to optimize the interface of these uses with the health of the river. The goal is to work with private property owners, farmers, and ranchers and others to achieve an optimal cooperative working relationship that protects healthy river corridor function.

Management Considerations

There needs to be cooperative oversight between river corridor advocates and public agencies to engage owners and business operators along the river and assure goals and standards of resource protection are maintained. This includes periodic site visits, review and cooperative promotion.



River Corridor With Adjacent Working Landscapes

Interface of Trails and Public Access with The River Corridor

Public access and trails where appropriate are a key goal of this plan. The following sections suggest optimal ways to achieve this while working to protect resources and land owner values such as privacy and security along the river. Primarily, it suggests integrating trails and access points along the outer fringes of sensitive areas. This is done to minimize disturbance of wildlife and also to reduce maintenance costs associated with flooding of trails. While trails and other improvements such as overlooks and trailheads tend to stay on the edge of riparian areas, there are places where the trail and other improvements come up to the river's edge. This creates a variety of experiences along the river corridor. Where conditions dictate, terracing of the riverbank is always recommended for better riparian health, rather than building a single embankment where trails are constructed closer to the channel. In more developed areas, windowless walls, unscreened outdoor storage, loading docks, trash receptacles and other incompatible uses along the edge are avoided. Except in the populated areas, developed parks encroach minimally—in general stay 150' back from sensitive areas. It should be noted that paddling is permitted with landings and access points carefully placed at locations—with land owner approval—where impacts are minimal.

The state does allow dispersed camping along the river corridor. There is a desire to provide camping along the river corridor. This should be considered during specific detailed planning for project areas.

Management Considerations

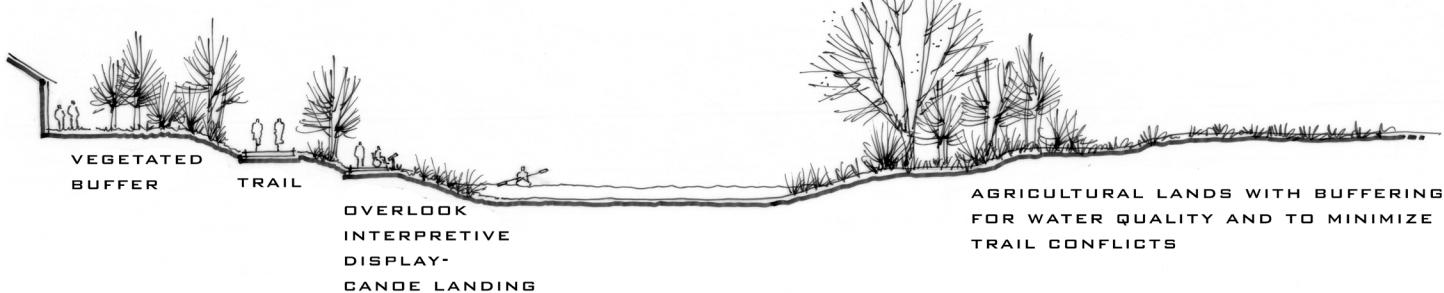
Work with future trail, access points and trail developers to assure compliance with these standards. Patrol and maintain trails and associated landscaping to minimize adverse impacts such as dumping, litter and invasive species. Enforce (or alter for more effective control) existing regulations to control dumping, litter, and invasive species.

Edge Treatments

The following concepts apply to the riparian edges in general. This includes maintaining aquatic habitat for minnows and other fish with keeping overhanging vegetation, protecting the rivers from contaminates from road and property run-off and monitoring the condition of the rivers. Extra care must be taken to avoid sediment from getting into water during construction. In addition it is important to maintain rough edges along the channel banks with nooks and crannies for wildlife and fish and creating small wetland areas to capture and "polish" small tributary flows and drains entering the rivers.

Management Considerations

Monitor bank stabilization and other projects affecting river edges to promote these kinds of best management practices. Consider regulations dictating edge treatments.



River Corridor With Public Access - Concept 1



CHAPTER THREE:

Recommended Improvements, Layout & Alignment



The Recommended Improvements – An Overview

Open Space Conservation - (Preservation, Outdoor Education and Youth Engagement)

Trail Connectivity - (Non-Motorized Transportation, Outdoor Recreation and Health Benefits)

River Enhancements - (Recreation and Resource Protection)

The Recommended Layouts and Alignments

Project Areas



E A S T E R N

F R E M O N T

C O U N T Y



The Recommended Improvements - An Overview

This chapter lays out the specific recommended improvements depicting the physical locations and alignments in the field as well as strategies for preservation and community engagement. Derived from the guiding principles articulated in Chapter 2 and the input from participants in the planning process—including the user groups, public and landowners—the recommendations focus on the following key elements:

1. **Open Space Conservation**- (Preservation, Outdoor Education and Youth Engagement)
2. **Trail Connectivity**- (Non-Motorized Transportation, Outdoor Recreation and Health Benefits)
3. **River Enhancements**- (Recreation and Resource Protection)

1. Open Space Conservation- (Preservation, Outdoor Education and Youth Engagement)

- **Delineate and protect fluvial, aquatic and riparian systems:** This includes the river itself, islands, and the area primarily defined by the 100-year floodplain. The goal is to protect this unique and vital resource from adverse effects such as erosion, flood damage, adverse livestock impacts and insufficient low flows.
- **Protect and Interpret Key Valued Places:** This includes places essential, unique and valued such as wetlands, ponds, nesting sites, historic, archeological, paleontological, geological and interpretive/educational opportunities. Part of this scenario includes wherever feasible, buffer areas to help protect the integrity of sensitive areas.



Royal Gorge

- **Protect and Enhance Important Vegetation Groupings:** This includes riparian forests (cottonwood and willow), grasslands, upland juniper forest and areas that provide food and cover for wildlife.
- **Preserve Views and Iconic Landscapes:** This encompasses unspoiled views along the river, vistas of the Royal Gorge, open farmlands and unique geological features such as the Skyline Drive Hogbacks.
- **Preservation of Agricultural Lands:** This suggests the promotion of continued family farming and livestock grazing consistent with the traditional rural landscape of the area.

- **Opportunities for Outdoor Education and Youth Engagement:** With each project, consider opportunities for "outdoor" classrooms for learning and community service. These are opportunities for creating positive life-long experiences, while teaching respect and stewardship of the environment. In addition to the health benefits, trail corridors and open space parks can become outdoor learning environments where youth can observe and learn about their natural, historical and cultural environment. Volunteer programs are excellent ways to engage youth in building trails, park facilities and managing open spaces. Programs such as the Youth Conservation Corps, Americorps and Volunteers for Outdoor Colorado teach the importance of natural resources while nurturing possible careers in land management or parks and recreation.

Recent studies have shown that youth engaged in recreational or volunteer activities are less apt to drop out of school, abuse drugs, or suffer depression. Youth instead have better self-esteem, better social skills, and become better leaders.



Youth Volunteers For VOC
Photo By Jerry Severns, Volunteers For Outdoor Colorado

"You can't assume that just because they're kids they can't take on a challenge and make a difference," states Fletcher Jacobs, VOC Youth Manager. VOC encourages youth to participate in public lands stewardship at all levels, and in ways that they find interesting. The result...hundreds of young people with more confidence, leadership and teamwork skills, and a growing environmental stewardship ethic.

2. Trail Connectivity- (Non-motorized Transportation, Outdoor Recreation and Health Benefits)

- **Community:** The community of Eastern Fremont County desires to expand and enhance the local trail system for a number of reasons. Providing high quality trail experiences close to people's homes not only enhances the quality of lives for the residents, it also encourages active and healthy life styles and encourages active youth to go outdoors in a natural setting. This also has an added benefit of the potential to attract new young residents with families that have an entrepreneurial spirit and are willing to further invest in the community. Trails also mean potential for expanding the tourism based economy. To do this there needs to be a high volume of trails that provide a variety of high quality experiences that are readily accessible from town and are accompanied by appropriate support facilities, businesses and events. Given the climate of the region, Easter Fremont County would greatly benefit by going after the Front Range shoulder season and winter recreation market.
- The master plan for John Griffin Regional Park should be reviewed for the concept of developing additional trails in the future for a more challenging and stimulating bicycling experience.
- **Provide Trails and Related Infrastructure:** This includes a main bicycle and walking trail corridor (10'-wide with paved and/or crushed gravel surfaces) running the length of the river from the Royal Gorge, through Cañon City to Florence—though not always adjacent to the river. This core trail is referred to in the plan as The Arkansas Riverwalk. In several places, the main trail will follow existing roadways (shared use). The plan also envisions a network of trails or on-street routes providing connectivity to an number of local destinations including the hogbacks, Royal Gorge, Blue Heron Park, downtown Cañon City and Florence, schools, etc., each with a unique and different recreational experience.

The trail network provides non-motorized transportation and access for commuters, recreationalists and tourists to destinations throughout Eastern Fremont County. Other types of trails are also recommended—back country soft surface paths (single-track mountain bike paths) and moderate trails (36" to 48" width soft surface).

- **Provide Trailheads and Access Points:** These are places to access the trail system, open spaces and river. Some trailhead facilities will provide parking, shelters, restroom and other amenities. In other cases the trailhead may simply be a walk-up point of entry to the system. The trails system also includes, in places, access pathways that link to populated areas. Access points also include places to launch and take out rafts and other paddle craft, typically with parking and means to launch. Facilities should be accessible to users of all abilities.

- **Provide a Wide Variety of Recreation and Open Space Experiences:** Each trail within the plan can offer a unique experience, such as a leisurely walk along the Arkansas River to more physically challenging hiking or mountain biking in nearby scenic backcountry areas such as Temple Canyon Park and the Grape Creek Wilderness Area. Trails are places to commute to work and school, walk your dog, improve physical and mental health, be with family, meet new people and experience the beautiful landscape of Eastern Fremont County. Trails provide convenient, safe, non-motorized travel throughout the community. Trails can reduce crime and illegal activity through regular use and high visibility of users. Trails also provide affordable exercise and recreational opportunities within the community.

- **Health Benefits of Trails:** Trails can improve a person's mental and physical well-being. Trails provide access to natural areas that cause people to actually want to engage in physical activity.

"The most important prescriptions for creating effective preventative care are regular exercise and a moderate diet. According to the 1990 Healthy People 2000 report, there is increasing evidence that light to moderate physical activity, often associated with recreation behavior, can have significant health benefits. The report recommends several appropriate actions, including significant investments in recreation resources, such as areas for hiking, biking and swimming."

Other health benefits from regular physical activity such as bicycling or walking include: decreased risk of heart disease, colon cancer, diabetes, high blood pressure and hypertension.

A recent survey by the Outdoor Industry Foundation found that human-powered outdoor activities are popular and span age and gender. The longevity of outdoor participation is rooted not only in the functional health benefits, but also in the emotional benefits of actual participation. Over three-fourths of participants agree that participating in outdoor activities gives them a feeling of accomplishment, an escape from life's pressures and a connection with themselves (Outdoor Industry Foundation's Exploring the Active Lifestyle survey, 2004).

3. River Enhancements (Recreation and Resource Protection)

- **Provide Multiple River Recreation Experiences:** Carefully designed whitewater features for river play and surfing are the most common recreational river improvements. Another option is to strategically place boulders on the sides and in the middle of the river which create eddies and channels that become a challenging slalom course. These in-river improvements attract all levels of kayakers, rafters and stand-up paddleboarders. Instructors can bring students for lessons and beginners can hone their skills. Paddlers can workout, compete or just play. New events can be added to the Royal Gorge Whitewater Festival. Anglers can enjoy the increased fishing opportunities that the boulders and eddies provide. A River Park that is designed with these features alongside amenities such as riverside trails, park land, spectator viewing sites and benches will make this area a destination spot for both river users and spectators.

- **Provide Paddle Facilities:** This includes boat chutes (descending "whitewater staircases") notched through existing diversion dams. Facilities also include portages around the dams, launch/landing points and possible wayfinding. Where possible, create whitewater features at existing water diversions. See In-River Improvements Technical Memorandum located in Appendix 1 for more information regarding in-river improvements.
- **Improve River Experience:** This includes improving riverbanks for better access, safety, and aesthetics. Remove broken concrete and exposed steel, replace with natural rock and landscaping where possible and provide buried armoring of riverbank that can be vegetated where necessary. Design river improvements with a supplementary function of improving fish habitat. Provide and maintain fishing opportunities along the river, which include improved fish habitats and access for fishing (some of these should be accessible - ADA).

It is also intended to guide recreational in-river improvements of the Arkansas River corridor within Eastern Fremont County using the McLaughlin Whitewater Design Group technical memorandum which can be found in Appendix 1 of this report.

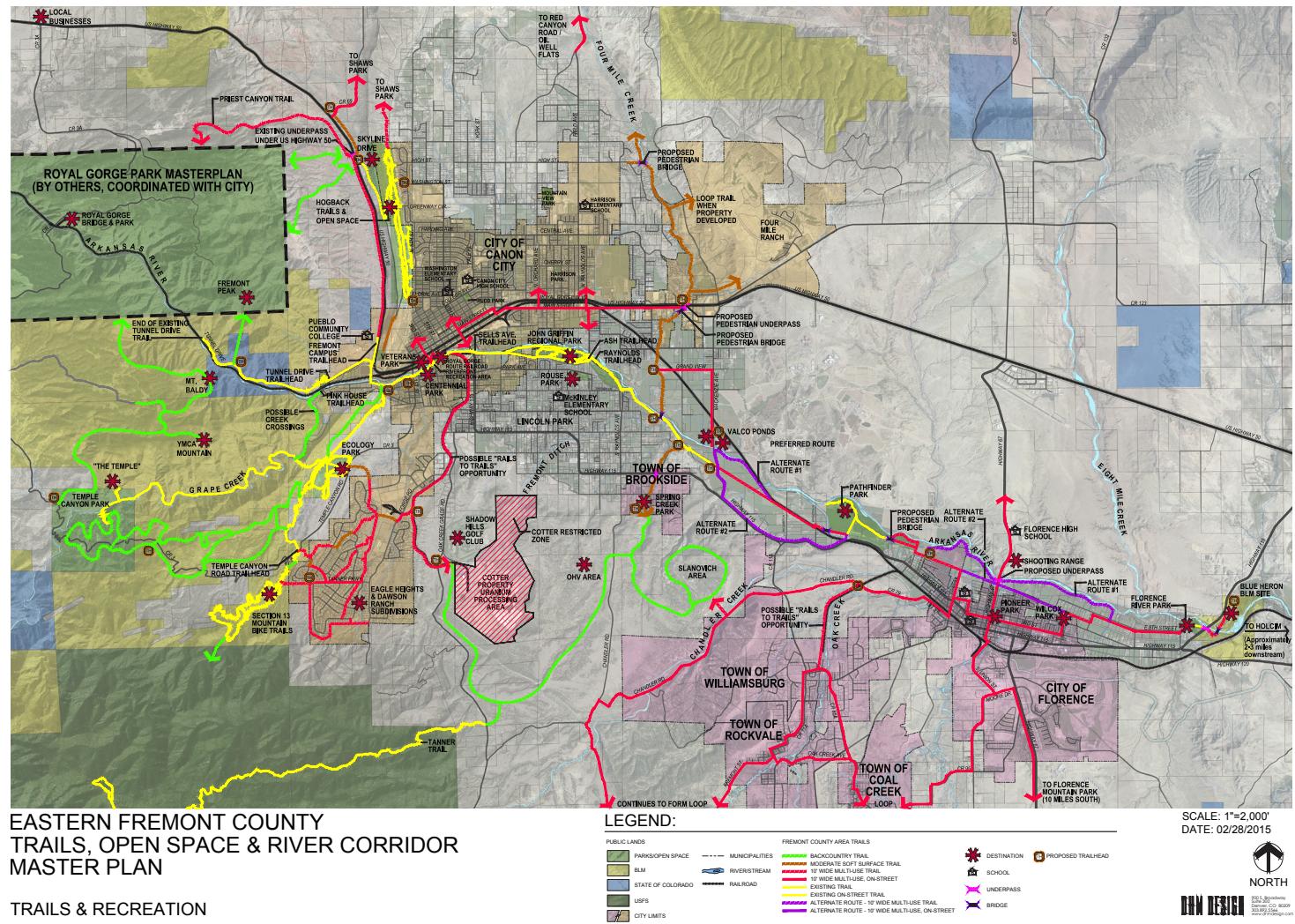
Protect the river and adjacent riparian areas primarily defined by the 100-year floodplain. The goal is to protect this unique and vital resource from adverse effects such as erosion, flood damage, adverse livestock impacts and insufficient low flows.

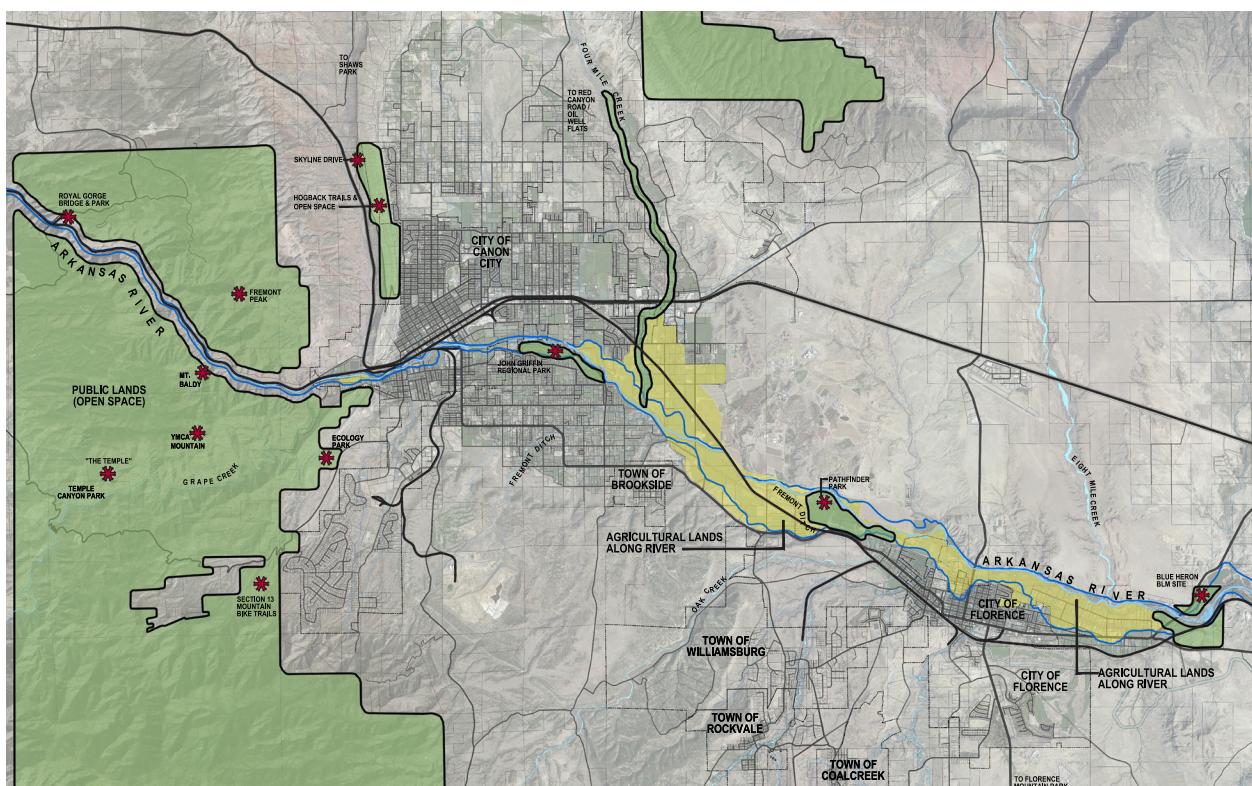
The Recommended Layouts and Alignments

It is a key directive and philosophy of this plan to realize a net benefit to all those that reside, work the land, recreate and visit the project area. It is also essential that private property rights be respected with on-the-ground improvements accomplished through equitable agreements between owners and those that implement the projects described herein. To achieve this, the recommended improvements and layouts have been carefully aligned on the plan maps to achieve functionality, continuity and connectivity while avoiding intrusion on private interests, sensitive wildlife areas, agriculture, and other valued resources.

The layouts shown in this plan are opportunities. Specific easements or R.O.W.s must be acquired as projects move ahead towards implementation.

The maps that follow depict the trails and recreation, open space conservation, river enhancements, and recreation recommendations:





EASTERN FREMONT COUNTY
TRAILS, OPEN SPACE & RIVER CORRIDOR
MASTER PLAN

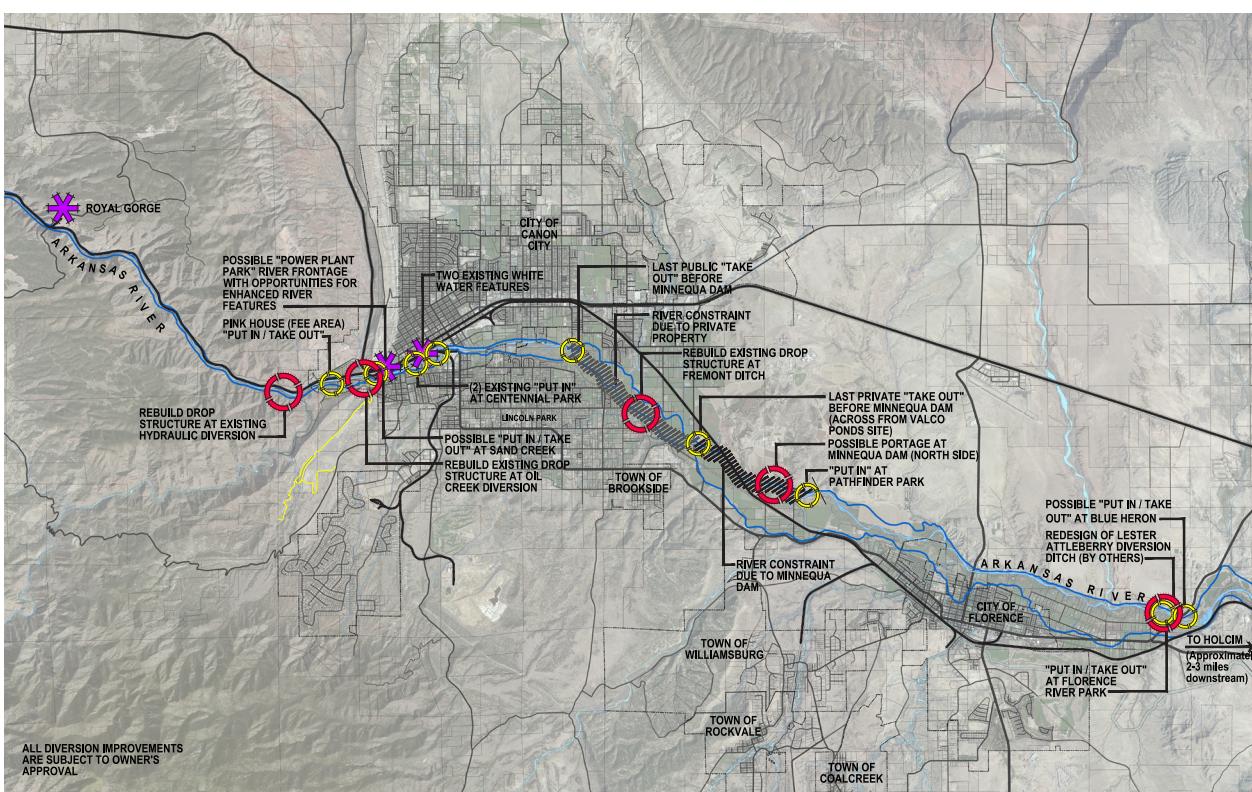
LEGEND:

OPEN SPACE	
PUBLIC LANDS	MUNICIPALITIES
AGRICULTURAL LANDS	RIVER/STREAM
DESTINATION	RAILROAD
	100-YEAR FLOODPLAIN

SCALE: 1"=2,000'
DATE: 02/28/2015



OPEN SPACE CONSERVATION



EASTERN FREMONT COUNTY
TRAILS, OPEN SPACE & RIVER CORRIDOR
MASTER PLAN

LEGEND:

RIVER	
DESTINATION	MUNICIPALITIES
PUT IN / TAKE OUT	RIVER/STREAM
DIVERSION DITCH / DAM	RAILROAD

SCALE: 1"=2,000'
DATE: 02/28/2015

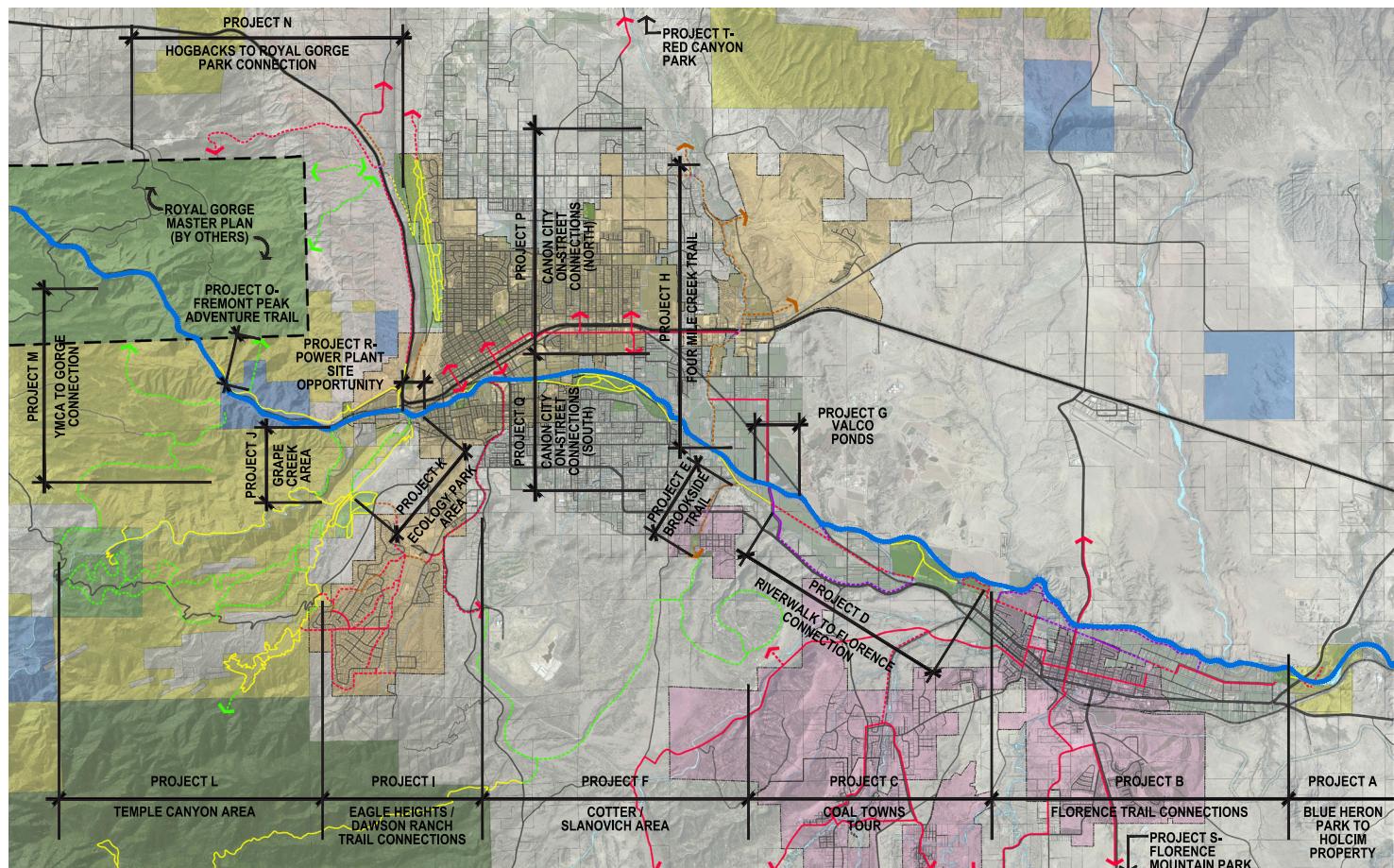


RIVER ENHANCEMENTS & RECREATION

Project Areas

For purposes of analysis, the 16-mile planning area was divided into 22 projects to allow flexibility in securing funding and right-of-way. These projects are not listed by priority:

- A. Blue Heron Park to Holcim Property
- B. Florence Trail Connections
- C. Coal Towns Tour
- D. Riverwalk to Florence Connection
- E. Brookside Trail
- F. Cotter/Slanovich Area
- G. Valco Ponds
- H. Four Mile Creek Trail
- I. Eagle Heights/Dawson Ranch Trail Connections
- J. Grape Creek Area
- K. Ecology Park Area
- L. Temple Canyon Area
- M. YMCA to Gorge Connection
- N. Hogbacks to Royal Gorge Park Connection
- O. Fremont Peak Adventure Trail
- P. Cañon City On-Street Connections - North
- Q. Cañon City On-Street Connections - South
- R. Power Plant Site Opportunity
- S. Florence Mountain Park
- T. Red Canyon Park
- U. Arkansas River Whitewater Improvements
- V. Open Space Conservation



EASTERN FREMONT COUNTY
TRAILS, OPEN SPACE & RIVER CORRIDOR
MASTER PLAN

PROJECT AREAS MAP

Project Areas – Segment by Segment

Project A: Blue Heron Park to Holcim Property

Conservation and Resources

Preservation of the existing healthy open space area and providing additional programming are goals for the underutilized Blue Heron Park. Maintain a natural open space setting, advantageous to wildlife viewing and a passive recreation experience. Key features of this area are the existing ponds located at the center of the site and its river front access. Lands around the existing ponds and along the Arkansas River are prime for waterfowl viewing and fishing. This site is also important for hunting both water fowl and deer. These lands should be kept in a healthy state to assure adequate open space, water and vegetation to support the habitat.

Recreation, Trails and Access

Blue Heron Park would become the east terminus for the Arkansas Riverwalk Trail. The site is currently used for waterfowl viewing, fishing and kayak practice. The community expressed interest in providing additional programming for the site and better utilization of on-site natural features. The additional programming could include a series of looped trails, shade shelters, a new trailhead and wayfinding. With the potential for increased visitors, expanded parking would be recommended. Scenic overlooks with interpretive signage along the river and existing ponds would provide educational information about the site and its natural surroundings. The location of the park lends itself to both a river put-in and take-out for boaters. There is potential for a second river put-in and take-out approximately (3) miles east of the Blue Heron Park site at the Holcim Inc. property, provided there is landowner cooperation. As a destination for boaters and wildlife viewers, on-site camping would also provide an opportunity for additional use by the public.

Description

The existing park site is situated at the northeast intersection of State Highway 115 and the Arkansas River, east of the City of Florence.



View Of Blue Heron Site



View Of Blue Heron Site

Project B: Florence Trail Connections

This project area is significant as it provides pedestrian and bicycle access to and through Florence's downtown business district and residential areas from the east edge of Pathfinder Park to Florence River Park. The plan provides family-friendly passage through town to businesses, schools, city parks and adjacent community parks along the river.

Recreation, Trails and Access

On-street routes and wayfinding are the improvements proposed for the downtown trail connection. On-street routes shall be identified throughout the downtown business district. Wayfinding and signage will help guide pedestrians and cyclists to numerous Florence parks (Florence River Park, Wilcox Park and Pioneer Park), the Arkansas Riverwalk Trail, Florence schools, as well as connections to residential and commercial areas on either side of the business district. The plan also includes (2) alternate routes along the Arkansas River and sanitation district easement as a connection between Florence River Park and Pathfinder Park. Right-of-way would need to be acquired for these two alternate routes.

Description

On-street routes are identified on Highway 67 (Pikes Peak Avenue), E. 8th Street, E. 3rd Street, Church Avenue, Maple Avenue, 5th Street, and N. Frazier Ave. Alternate route #1 parallels the Arkansas River from 8th Street, under State Highway 67 to Cyanide Avenue. Alternate route #2 extends from N. Frazier Ave. to Wilcox Park within the sanitation district easement.



View East On 3rd Street



View North On Frazier Ave.

Project C: Coal Towns Tour

Williamsburg, Rockvale and Coal Creek, otherwise known as the Coal Towns, all have a rich history of coal, oil and gas production that dates back over 100 years. An on-street bicycle route through and around the Coal Towns offers a unique leisurely touring experience that celebrates the mining history of the area.

Recreation, Trails and Access

On-street routes with added wayfinding will better connect the Coal Towns to the City of Florence. Interpretative signage along the route will enhance the visitor's experience of the historical mining towns. The on-street route will pass historic buildings and mining sites. A multi-use trail along a historic rail bed is also proposed from Florence to Williamsburg, including a trailhead.

Description

The three Coal Towns are located southwest of the City of Florence.



Town Of Rockvale - Coal Town Tour



Rails To Trail Opportunity At Chandler Rd.

Project D: Riverwalk to Florence Connection

Conservation and Resources

This trail segment is especially significant as it connects the existing Arkansas Riverwalk trail to the City of Florence through Pathfinder Park. The preferred route follows the sanitation district land as well as easements through private property, providing direct access from the MacKenzie Avenue trailhead to Pathfinder Park. This segment of trail provides users an opportunity to experience working landscapes on scenic agricultural lands.

Recreation, Trails and Access

This trail project would include approximately 12,000 lineal feet of 10'-0" wide multi-use trail from Cyanide Drive to the existing riverwalk at MacKenzie Ave. From Pathfinder Park, over the Minnequa Ditch, through private property easements to McCumber Lane. From McCumber Lane, the trail would run west on sanitation district owned land to MacKenzie Ave.

Creating safe passage through the private property that provides security and preserves the working landscape is critical. A small section of trail is also proposed between the east end of Pathfinder Park and Cyanide Avenue. Trailhead improvements would include removable bollards or gates for easy access by maintenance vehicles. Additional fencing and signage would help ensure trail users stay within designated areas and not trespass on private property. Adjacent private property owners currently use the sanitation district easement as a means of passage between grazing areas. To maintain access to each side of the sanitation district easement, fencing, access gates and a cattle underpass (culvert) would be provided. Trail amenities such as benches, interpretive signage and wayfinding would be provided along the 1.5-mile trail segment.

There are two alternate trail routes for this project. Alternate route #1 is a 10'-0" wide multi-use trail that follows the Arkansas River between MacKenzie Ave and approximately McCumber Lane. Because the Arkansas River is a centerpiece of the Fremont County community, this alternate would include scenic overlooks and resting areas. Some of the challenges for this option include private property ownership and providing livestock access to the river.

Alternate route #2 follows MacKenzie Avenue south to Highway 115 where it parallels the north shoulder of the highway for approximately 5,000 feet up to McCumber Lane. While this remains an option, it presents numerous obstacles such as private property, steep slopes, heavy traffic, proximity to homes and a less desirable trail experience.

In the Central Front Range Master Plan, CDOT has identified a Highway 115 Walk/Bike path connecting Cañon City east to Florence and Colorado Springs as a priority. There may be funding opportunities with CDOT for this project.

Description

This trail segment stretches from Cyanide Avenue west to the MacKenzie Avenue trailhead, through Pathfinder Park.



View Looking West From MacKenzie Ave.



Preferred Route Along Sanitary District Property



Mackenzie Trailhead

Project E: Brookside Trail

The Town of Brookside is host to a variety of wineries and is seen by locals as the gateway into the Slanovich property, an area known for its quality natural trail system. A trail from the existing Arkansas Riverwalk to Spring Creek Park would provide a connection to the surrounding communities.

Recreation, Trails and Access

In an effort to provide pedestrian and bicycle access to the Town of Brookside, a moderate soft surface trail would be provided along the existing drainage way from the Arkansas Riverwalk to Spring Creek Park. This project will utilize the existing drainage culvert to provide safe passage under Highway 115.

Description

The Brookside Trail runs south from the Arkansas Riverwalk to the existing Spring Creek Park.



Existing Spring Creek Park



Existing Box Culvert At Hwy 115

Project F: Cotter/Slanovich Area

Conservation and Resources

This project area consists of open space that is privately owned and currently used by backcountry open space users. The acquisition of right-of-way for this area is a key component. The natural rocky, piñon-juniper landscape should be protected and will provide for a rugged backcountry experience and destination. Existing trails at all levels of difficulty are found throughout this area and the appeal is the low-to-no maintenance that they require. The Cotter property, to the west, is an existing uranium processing plant that is currently being decommissioned. Due to an environmental incident in the late 1970's, an environmental assessment of the area will be required prior to the development of trails, OHV area or other built improvements. The Cotter Corporation has expressed interest in working with the community to provide a recreational lease on the property. Coordination to acquire an easement with the Slanovich family would be required.

Recreation, Trails and Access

The existing backcountry (single-track) trail system should be protected in its current condition. The acquisition of right-of-way would allow for future backcountry (single-track) trail improvements, connection into the existing trail systems and provide an OHV destination west of Chandler Road. At several local OHV user group meetings, participants indicated the need for close to home recreation (youth skill progression development), and family friendly facilities offering diverse experiences. The OHV area would focus on local use and would not be marketed as a regional destination. Wayfinding along the trails will inform users of trail difficulty and interpretive signage will educate users of the surrounding landscape and its historical mining use.

Description

The Cotter / Slanovich area is located south of Highway 115 between the Town of Williamsburg and the Dawson Ranch subdivision.



View Of Cotter/Slanovich Area

Project G: Valco Ponds

Conservation and Resources

The former Valco Quarry site consists of two ponds that are located on either side of MacKenzie Ave along the Arkansas River. With lands around the existing ponds being a prime location for waterfowl and wildlife viewing, the area lends itself to a passive open space park. Wetland preservation, site restoration and environmental education are important to restoring and maintaining a natural passive experience.

Recreation, Trails and Access

The Valco Ponds site will serve as a passive recreation destination, with a looped trail system, and fishing access to both the river and ponds. These amenities will help to enhance and provide for a more natural experience. Proposed moderate soft surface trails around the ponds and multi-use trails for site connectivity, (land on both sides of MacKenzie Avenue) will enhance the sites recreational use. The project will include potential public river access for boaters and an underpass at MacKenzie Avenue to tie both sides of the site together. Providing a public river take-out at the Valco Ponds site would extend the river experience by adding an additional mile to floatable waters above the Minnequa Dam. It should be noted that access to Florence is impeded by the Minnequa Dam which presents a hazard to river users. The long term goal of AHRA is to provide river access along the entire length of the Arkansas River to Pueblo Reservoir. Bicycle access into the site is provided by an on-street (shared-use) route along MacKenzie Avenue. Overlooks/decks, shade shelters, fishing access and rest areas throughout the site will enhance the visitor experience. This site lends itself to youth volunteer projects and outdoor educational programs.

Description

The Valco Ponds site is located north of the Arkansas River, on both sides of MacKenzie Avenue.



View Of Valco Ponds

Project H: Four Mile Creek Trail

Conservation and Resources

Four Mile Creek is a tributary of the Arkansas River. This project aims to preserve the riparian area, as defined by the 100 year floodplain, while allowing users to experience and explore the tributary's ecosystem. This project would encompass the confluence with the Arkansas River.

Recreation, Trails and Access

The proposed moderate soft surface trail along the creek bank connects the Arkansas Riverwalk Trail to the Red Canyon and Oil Well Flats Areas. Due to the narrow space available, this arterial trail connection was determined to be a 4' to 5' width - moderate soft surface trail. The trail segment will include trailheads at multiple entry points, multiple creek crossings, an underpass at US Highway 50 and a pedestrian bridge over the Arkansas River. Wayfinding should be located along the trail while interpretive signage will educate users of the local riparian ecology. This project will need to gain cooperation from local landowners, as the entire length is along private property.

Description

The Four Mile Creek Trail runs north-south on the eastern edge of Cañon City, from the Arkansas Riverwalk to the Red Canyon / Oil Well Flats area.



View Of Fourmile Creek North Of Hwy 50



View Of Hwy 50 Underpass

Project I: Eagle Heights/Dawson Ranch Trail Connections

Conservation and Resources

This project connects the existing trail network found within the neighborhood to outside destinations such as Section 13 non-motorized trail system, downtown Cañon City, Ecology Park, Cotter/Slanovich property, etc.

Recreation, Trails and Access

By enhancing the existing subdivision trail system, Eagle Heights and Dawson Ranch will be better connected to surrounding recreational opportunities and downtown destinations. Wayfinding and signage should be included in this project to promote safety and provide directions to and from the neighborhood. Additional moderate soft surface trails are recommended as connections to outside destinations.

This project also includes an opportunity to provide a Rail-to-Trail connecting the Dawson Ranch and Eagle Heights subdivisions to the downtown Cañon City area. The 10'-0" multi-use trail (Rail-to-Trail) will include rest areas and interpretive signage to educate users of the historic mining sites, railroad and natural surroundings. Right-of-way, specifically with the railroad, will be necessary for this project.

Description

The project's trails are located within the Eagle Heights and Dawson Ranch subdivisions, located southwest of Cañon City.



Possible Rail To Trail Opportunity



Existing Trails In Dawson Ranch



Existing Trails In Dawson Ranch

Project J: Grape Creek Area

Conservation and Resources

This project creates a primitive trail connection between an Arkansas River put-in/take-out (Arkansas Headwaters Recreation Area - Pink House) and an abundant amount of open space on BLM land. Grape Creek occasionally floods, washing out the rail road bed, but offers a rugged wilderness experience to those who don't mind getting wet. Grape Creek Canyon and the Grape Creek Wilderness Study Area are desired destinations. The terrain is geologically complex and varies from rocky, rolling hills to steep, rugged canyons and mountains. Subtle remains of the historic railroad spur offer historical significance and provide trail opportunities.

Recreation, Trails and Access

This backcountry trail following Grape Creek will include multiple primitive pedestrian bridges for creek crossings due to steep slopes on both sides of the creek. Wayfinding signage (BLM standards) should be provided at the Arkansas Headwaters Recreation Area - Pink House trailhead.

Description

The Grape Creek Trail runs south from the Pink House Trailhead to meet the existing trail system at Ecology Park.



Confluence Of Grape Creek And Arkansas River



View West From Pink House

Project K: Ecology Park Area

Conservation and Resources

Ecology Park is an open space park owned by Fremont County and operated by Cañon City High School Ecology Club. It is a reclaimed landfill, 40 acres in size. Existing access into the open space is off of Temple Canyon Road (CR 3). The park has scenic views of surrounding mountains, canyons and creek corridors. Preservation of the natural surroundings, existing back country (single-track) trail system and addition of back country trails & connections would be the main goal for this project. The trail would link the City of Cañon City and Dawson Ranch to Ecology Park, and ultimately other BLM land, creating a backcountry trail experience.

Recreation, Trails and Access

This project involves construction of multiple back country (single-track) trails, parking near downtown Cañon City, and trailhead improvements at the Summit Property. The recommended single-track, backcountry trail will host a variety of uses, including hiking, biking, and horseback riding.

Description

The Ecology Park area is located roughly one mile southwest of Cañon City, along Temple Canyon Road.



View West At Ecology Park



View West Of Ecology Park Trailhead

Project L: Temple Canyon Area

Conservation and Resources

The project area includes several hundred acres of land to the south of the Royal Gorge. Spectacular views of the west mountains and the historic Dawson Mining district can be seen while hiking into the Temple Canyon Area. Protection of scenic vistas and natural formations is critical for the area. The Temple Canyon area has miles of existing scenic trails with wide ranges in elevation, distance, and difficulty offering multiple back country experiences.

Recreation, Trails and Access

Multiple primitive backcountry trails are proposed for this project. The proposed trails are all located on BLM land. Temple Canyon Park is owned by the City of Cañon City.

Description

The Temple Canyon area is located roughly three and a half miles southwest of Cañon City.



Existing Temple Canyon Park Sign



View Of Temple Canyon

Project M: YMCA to Gorge Connection

Conservation and Resources

Preservation of scenic vistas and the remote back country experience of the Royal Gorge's southern rim are critical to this project.

Recreation, Trails and Access

A connection is made from the Royal Gorge Area to Temple Canyon Park, through a series of additional primitive trails would provide users a rugged wilderness. A connection to "The Temple", a well-known natural amphitheater found in the canyon, will be made possible with this project.

Description

This connection is on the southern rim of the gorge.



Nonans Peak



"The Temple"



View Of Southern Rim Of Royal Gorge

Project N: Hogbacks to Royal Gorge Park Connection

Conservation and Resources

Preservation of view corridors (from Fremont Peak and Skyline Drive), protection of natural features, such as the hogbacks, and connections from downtown Cañon City to the Royal Gorge Park providing a unique geologic experience is important to the success of this project.

Recreation, Trails and Access

This project encourages the connection between the Hogbacks and the Royal Gorge Park. There is an opportunity to market these trails as a tourist destination with shuttles between Cañon City and the Royal Gorge project area. The Royal Gorge Park should become a recreation hub which includes trails, camping, picnicking, biking and other active and passive activities. The programming would be fine tuned in the RNL plan currently being developed (2015). A trailhead with parking and trailhead improvements at the existing US Highway 50 underpass is recommended for day use. A 10'-0" wide trail through Priest Canyon will provide a more gradual, family friendly trail into the park, while other primitive trails offer a more backcountry experience. Priest Canyon Road would also provide an opportunity for limited 4-wheel drive use. Interpretive signage will inform users of the unique geologic history of the Gorge and Skyline Drive area, while rest areas located at scenic overlooks will point to those areas of geologic significance. Currently, the land surrounding the Royal Gorge Park is privately owned and cooperation with the land owners will be necessary for Right-of-Way.

Description

This connection is between the Royal Gorge Park and Skyline Drive. US Highway 50 bisects the area.



View East From Royal Gorge Park



View West From Us Hwy 50

Project O: Fremont Peak Adventure Trail

Conservation and Resources

Fremont Peak is the highpoint on the northeast rim of the Royal Gorge Park Area. This desert peak is part of a very small sub-range of mountains called the Gorge Hills. The peak is covered in diverse desert flora and provides magnificent views of the Sangre de Cristos as well as Pikes Peak to the north. Providing a recreational destination, while preserving the view corridors and desert ecology, is the goal for this project. The Fremont Peak Adventure Trail will aim to become a destination that challenges users with its steep grades.

Recreation, Trails and Access

The proposed trail will be rugged backcountry single-track track with extremely steep slopes, stairs, various structures, cables, ladders, steps and logs, etc. The trail should be designed and built to be sustainable without regular maintenance. The trail will have high levels of exposure with grades up to 12%. The City is currently pursuing an RFP for detailed design. A trailhead and access gate will be located half way down the existing Tunnel Drive. Signage at the base of the Royal Gorge will advise users of the associated risks of hiking this trail and will indicate rules, regulations, and boundaries for the trail. Trail pull-off areas will serve as rest area, where interpretive signage may point to views of the valley. Cooperation between the County, BLM and the State of Colorado will be necessary for Right-of-Way.

Description

Access to the Fremont Peak Adventure Trail is from Tunnel Drive, on the west side of Cañon City, north of the river.



View North Of Tunnel Drive Towards Fremont Peak



Existing Tunnel Drive Trail

Project P: Cañon City On-Street Connections – North

Cañon City is divided by US Highway 50, which runs east-west through the center of town. The northern portion of Cañon City consists of the hogbacks, residential areas, agricultural land, and established businesses that serve the residents and the tourists. Providing safe shared-use on-street routes for pedestrians and cyclists is the main objective.

Recreation, Trails and Access

Wayfinding and at-grade route marking is the main improvement for this area. On-street routes will help guide residents to destinations such as Washington Elementary School, Cañon City High School, Harrison Elementary School, Rudd Park, Harrison Park and Mountain View Park. Crossing US Highway 50 will take place at existing crossings with crosswalks and pedestrian lights. Trailheads located on the eastern edge of the hogback, where local roads end at the open space, provide access into the Hogbacks Open Space. Wayfinding for northern destinations such as, Red Canyon Road, Oil Well Flats, and Shaws Park, will also be designated.

Description

On-street routes will be marked with signage along numerous roads.



Existing Crosswalk At Hwy 50



View North Along Field Ave.

Project Q: Cañon City On-Street Connections – South

South of US Highway 50, Cañon City consists of residential and agricultural land, as well as many recreational opportunities due to the river. The farming and ranching way of life supports qualities that are widely valued by Cañon City and that go far beyond the scenic vistas and rugged character of the landscapes. While producing agricultural commodities, properly managed working farms protect critical habitat for game, fish, and other wildlife. Further, farms sustain families with close ties to the land and the economy and traditions of rural communities. Preserving the small town, rural atmosphere as well as the agricultural land, perhaps through conservation easement programs, is the primary focus for this area.

Recreation, Trails and Access

Wayfinding and at-grade route marking is the main improvement for this area. On-street routes will help guide residents to destinations such as Veterans Park, Centennial Park, the Royal Gorge Route Railroad, John Griffin Regional Park, Rouse Park, McKinley Elementary School, and the Lincoln Park neighborhood.

Description

On-street routes will be marked with signage along numerous roads.



View North On 9Th Street



View South On Raynolds Ave

Project R: Power Plant Site Opportunity

Conservation and Resources

The W.N. Clark Power Plant is in the process of being decommissioned and dismantled. Black Hills Energy, the property owner, has been collaborating with the City of Cañon City over the possible transfer of the property to the city. Potential uses for the property are also being considered.

Recreation, Trails and Access

The proposed use for the Power Plant site is unknown at this time. The site is within the western gateway into town, and can help shape Cañon City's character and introduce visitors to the historic and recreational destination with its proximity to the river and other outdoor opportunities.

Description

Power Plant property is located north of the Arkansas River, at the western edge of Cañon City before US Highway 50 turns north.



View Of Power Plant Site



WN Clark Power Plant

Project S: Florence Mountain Park

Conservation and Resources

Florence Mountain Park is a 200-acre mountain park that is bordered by the National Forest and a private ranch. The park includes picnic and restroom facilities as well as an outdoor amphitheater. Newlin Creek Trail on National Forest lands is just down the road from the park, taking hikers up into a canyon with waterfalls and a creek as well as a historic lumber site. The park is often used for re-enactments, community gatherings, and sometimes music festivals.

Recreation, Trails and Access

This project recommends an on-street bicycle route from the City of Florence to the Florence Mountain Park. Users will be guided by wayfinding along State Highway 67 and County Road 15. The existing facilities should be examined and, if necessary, repaired to meet local codes. This project would include general maintenance of the site.

Description

The mountain park is south-west of the City of Florence, west of State Highway 67.



Amphitheater At Florence Mtn. Park



Florence Mtn. Park

Project T: Red Canyon Park

Conservation and Resources

This park is north of Cañon City where hikers and mountain bikers can explore 600 acres of pinon, sage, and red rock formations. The park is part of Cañon City's park system. Activities also include picnicking, ATV (in designated areas), and wildlife watching.

Recreation, Trails and Access

This project recommends an on-street bicycle route from Cañon City to Red Canyon Park along Field Avenue and Red Canyon Road.

Description

The mountain park is north of Cañon City off of Red Canyon Road.



Red Canyon Park



Interpretive Display on Red Canyon Road

Project U: Arkansas River Whitewater Improvements

Conservation and Resources

The Arkansas River is recognized as one of the nation's most popular locations for river recreation. Creating attractive recreational destinations along the river corridor would provide for a wide variety of recreational users and spectators.

Recreation, Trails and Access

This project includes enhancements to the river banks, existing boat chutes, and water parks as well as proposes safe passages and diversions. New whitewater features would be designed with site specific planning/engineering efforts in the future. Colorado Parks and Wildlife at AHRA will be involved with the safety and construction of in-river improvements. See Appendix 1 for the In-River Improvements Memorandum completed by McLaughlin Whitewater Design Group.

Project V: Open Space Conservation

This would be a detailed conservation planning project used to identify and prioritize open space parcels along the river corridor. The plan would engage the public to identify which parcels have the most value. Tools, mechanisms, and incentives would include conservation easements, zoning, working with land trust, etc.



Rafting Along The Arkansas River

CHAPTER FOUR:

Vision to Reality: Implementation



Key Implementation Considerations

Leadership

Easements, Acquisitions and Rights-of-Way

Roster of Projects

Potential Funding Sources

Building and Maintaining Community Support

Management Considerations

Next Steps



E A S T E R N

F R E M O N T

C O U N T Y

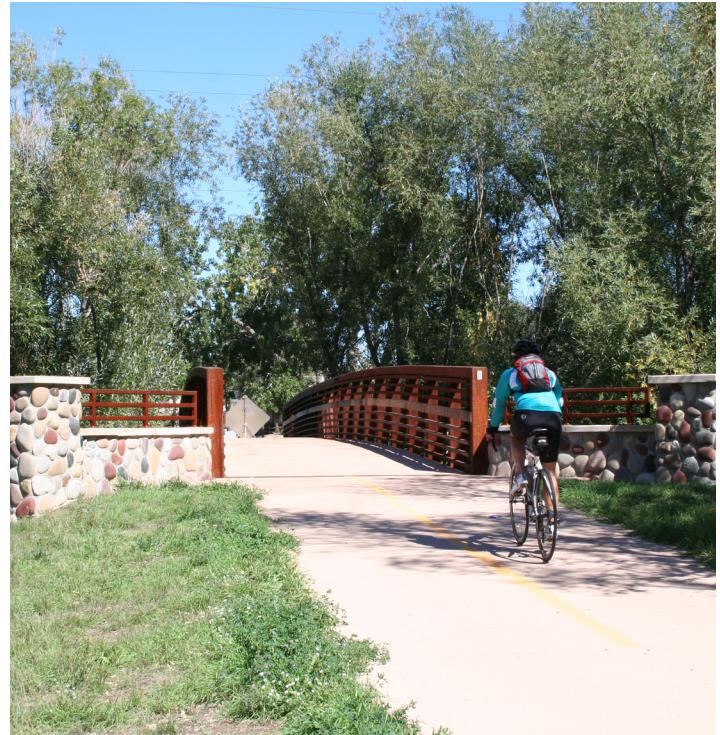


Vision to Reality: Implementation

The future for Eastern Fremont County's open space, trails and river envisioned in this document is both visionary and challenging. The network of trails and open space as an amenity will become an increasingly valuable asset as project areas are completed. Numerous studies have shown that green infrastructure—especially an improved river—is vital, supporting both livability and economic development. Many communities in Colorado and across the nation have invested in this kind of infrastructure in order to compete as a first rate place to live and do business.

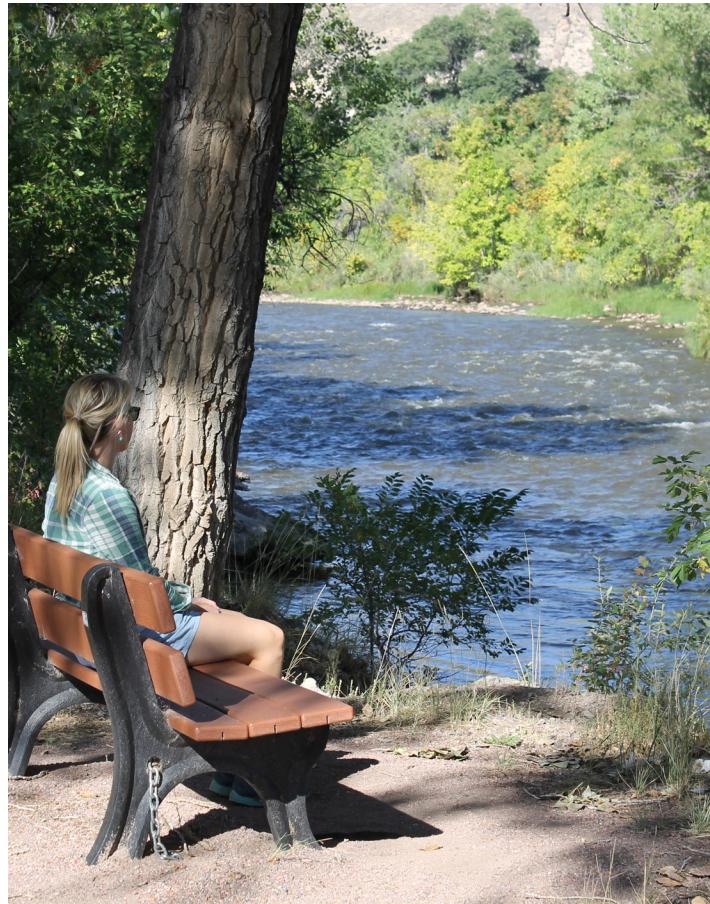
The scope of the plan is large and, indeed, it may take a generation or more to realize all of the improvements envisioned. It reflects the ideas and aspirations of the communities, the partners and the stakeholders who participated in the planning process.

This plan is the starting point—a roadmap to a better future. The key is to take the next logical steps. This includes having an implementation plan that puts an effective and sustainable program in place to move forward in a timely and systematic manner to complete the goals of this plan over a number of decades.



To accomplish this, there needs to be an effective and enduring organizational structure providing leadership and strong community engagement. This includes forging a cooperative effort among the parties to see all of the improvements through to completion. Skills in community advocacy, working with property owners, design, engineering, right-of-way acquisition, fundraising and overall coordination will be needed. Staff, consultants, political leaders and other champions for the project must be engaged. Paramount is having a designated entity and "point person" charged with managing the effort and accomplishing completion of project milestones on time and within budget. There also needs to be a designated entity(s) with authority to accept grants, appropriate funds, accept right-of-way conveyances, retain contractors, monitor construction and take on long-term management and maintenance of lands and improvements.

Emphasis should be placed on accomplishing clear and publicly visible objectives each year that inspire and enable continuity throughout the project area until the work is accomplished.



Key Implementation Considerations

Experience in other communities with similar plans, shows that there are specific elements that comprise a successful implementation program. These include:

1. Agree upon a vision and action plan.
2. Commit community leadership and staff to champion the plan. (continuation of the current Technical Working Group)
3. Continue to build community support.
4. Recruit project administration and professional services.
5. Begin securing land agreements, rights-of-way and permits.
6. Identify and secure funding sources and partners.
7. Initiate pilot projects and a phasing scheme.
8. Identify maintenance responsibilities.
9. Plan for follow-through and long-term continuity.



Leadership

Leadership and organization are the two most important considerations in taking a plan from concept to reality. Key functions of leadership include:

- Working with property owners, project advocates and other stakeholders to communicate the vision and build support.
- The capacity to acquire and hold rights-of-way, easements and other land holdings.
- Citizen advocacy and community leadership to champion the plan.
- Garnering resources and funds including grant writing.
- Staff oversight and advocacy to complete project tasks.
- Building and maintaining effective partnerships among agencies, jurisdictions and stakeholders.
- Assuring consistency of ordinances and programs with implementation and stewardship objectives.
- Oversight of design, planning, construction, maintenance and stewardship of improvements and properties.

Almost without exception, success hinges on having a strong committed group of individuals (or a small group of individuals) to embrace and champion the plan.

Leadership should form a clear organizational structure defining roles and responsibilities for each project from start to finish.

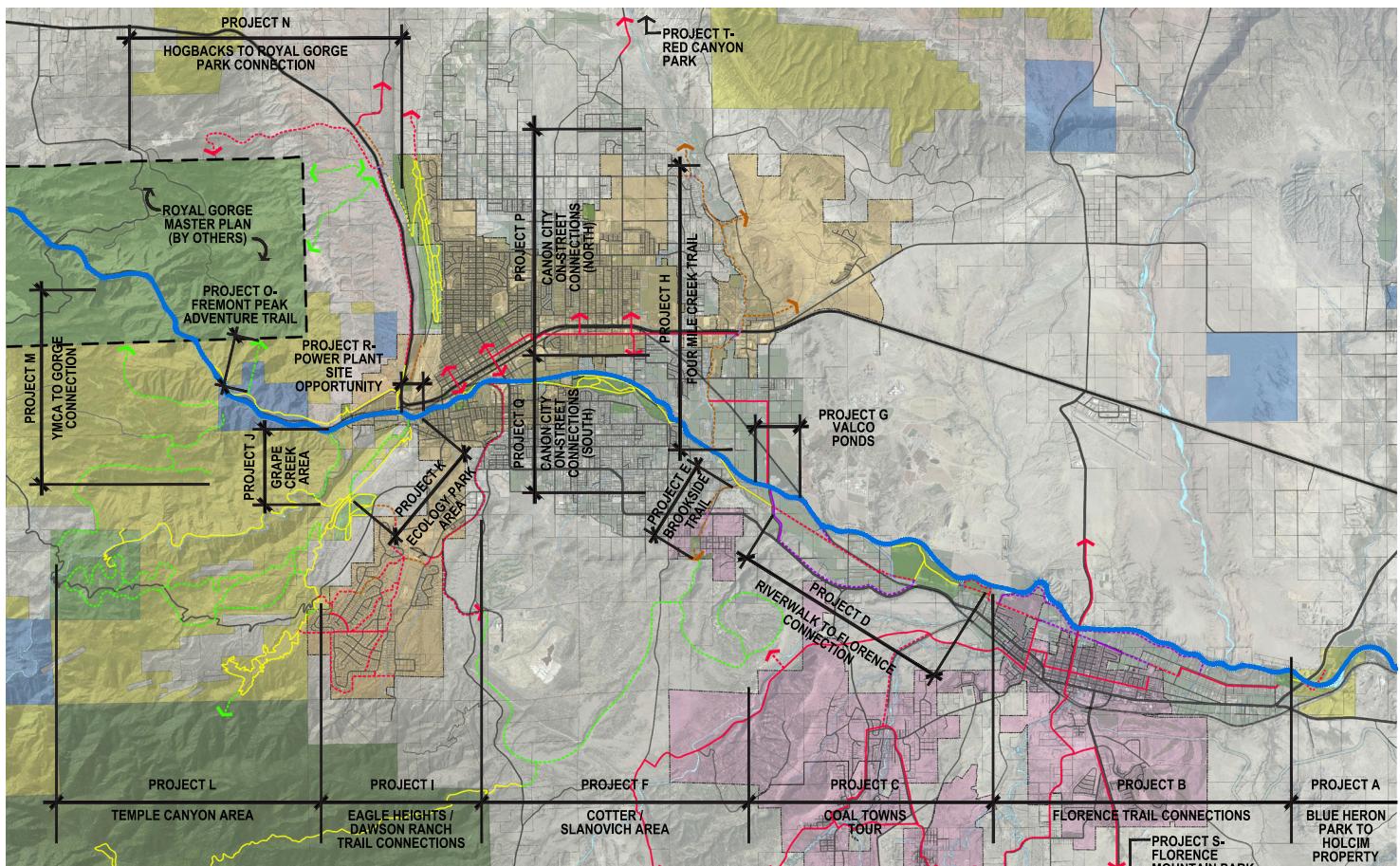


Roster of Projects

Project Areas – Segment by Segment

Following are 22 specific potential capital improvement projects. These projects are in no way prioritized, as there are a number of variables that need to be worked out before selecting a first project. Depending on fundraising and available resources these projects could be further divided into smaller sub-phases. (Note that cost estimates (planning level estimates) do not include land acquisition and that all improvements are subject to landowner approval).

- A. Blue Heron Park to Holcim Property
- B. Florence Trail Connections
- C. Coal Towns Tour
- D. Riverwalk to Florence Connection
- E. Brookside Trail
- F. Cotter/Slanovich Area
- G. Valco Ponds
- H. Four Mile Creek Trail
- I. Eagle Heights/Dawson Ranch Trail Connections
- J. Grape Creek Area
- K. Ecology Park Area
- L. Temple Canyon Area
- M. YMCA to Gorge Connection
- N. Hogbacks to Royal Gorge Park Connection
- O. Fremont Peak Adventure Trail
- P. Cañon City On-Street Connections - North
- Q. Cañon City On-Street Connections - South
- R. Power Plant Site Opportunity
- S. Florence Mountain Park
- T. Red Canyon Park
- U. Arkansas River Whitewater Improvements
- V. Open Space Conservation



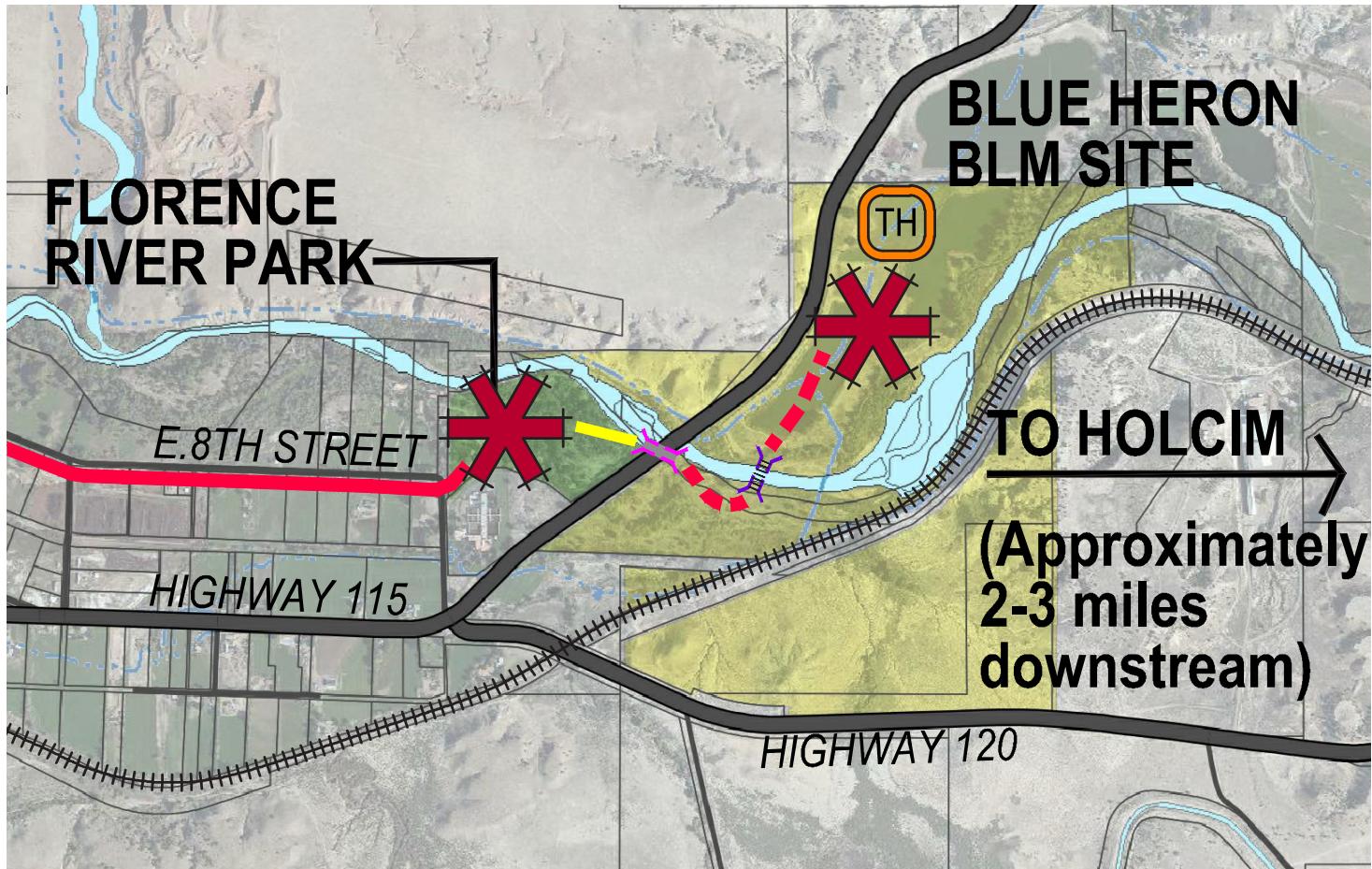
EASTERN FREMONT COUNTY TRAILS, OPEN SPACE & RIVER CORRIDOR MASTER PLAN

PROJECT AREAS MAP

VISION TO REALITY: IMPLEMENTATION 55

Project A: Blue Heron Park to Holcim Property**Improvement Type:** Trail & Open Space Improvements**Project Description:** Passive open space recreation area and improved river access.**Catalytic Benefit:** Blue Heron Park would become a community destination.**Planning Level Cost Estimate:**

Trailheads Improvements (gates, bollards, signage, fencing):	\$10,000
Parking:	\$20,000
10'Wide Multi-Use Trail (400LF):	\$20,000
Grading & Erosion Control:	\$60,000
Moderate Natural Surface Trail:	\$50,000
Shade Shelter:	\$50,000
Site Furnishings:	\$15,000
Bridge Abutments:	\$50,000
Pedestrian Bridge (300LF):	\$325,000
Underpass (100LF):	\$100,000
Signage and Wayfinding:	\$10,000
Total:	\$710,000
Design & Permitting (25%)	\$177,500
Contingency (15%)	\$106,500
Total:	\$994,000

LEGEND:

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.

Project B: Florence Trail Connections**Improvement Type:** On-Street Route Wayfinding and Multi-Use Trails**Project Description:** This project would be a continuation of the Arkansas Riverwalk Trail through the City of Florence. Wayfinding signage will link on-street routes to the Arkansas Riverwalk trail, Florence parks, schools, and commercial areas.**Catalytic Benefit:** Creates continuation of the existing Arkansas River Walk trail through the City of Florence to the Florence River Park.**Planning Level Cost Estimate:****Preferred Route:**

Wayfinding & Signage:	\$30,000
Crosswalk Enhancements:	\$20,000
	Subtotal: \$50,000
Design (10%)	\$5,000
Contingency (15%)	\$7,500
	Total: \$62,500

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.

Alternate Route #1:

10'-0" Wide Multi-Use Trail (12,000LF):	\$600,000
Grading & Erosion Control:	\$600,000
Trailhead Improvements:	\$15,000
Pedestrian Underpass (100LF):	\$100,000
Signage and Wayfinding:	\$10,000
	Subtotal: \$1,325,000
Design (10%)	\$132,500
Contingency (15%)	\$198,750
	Total: \$1,656,250

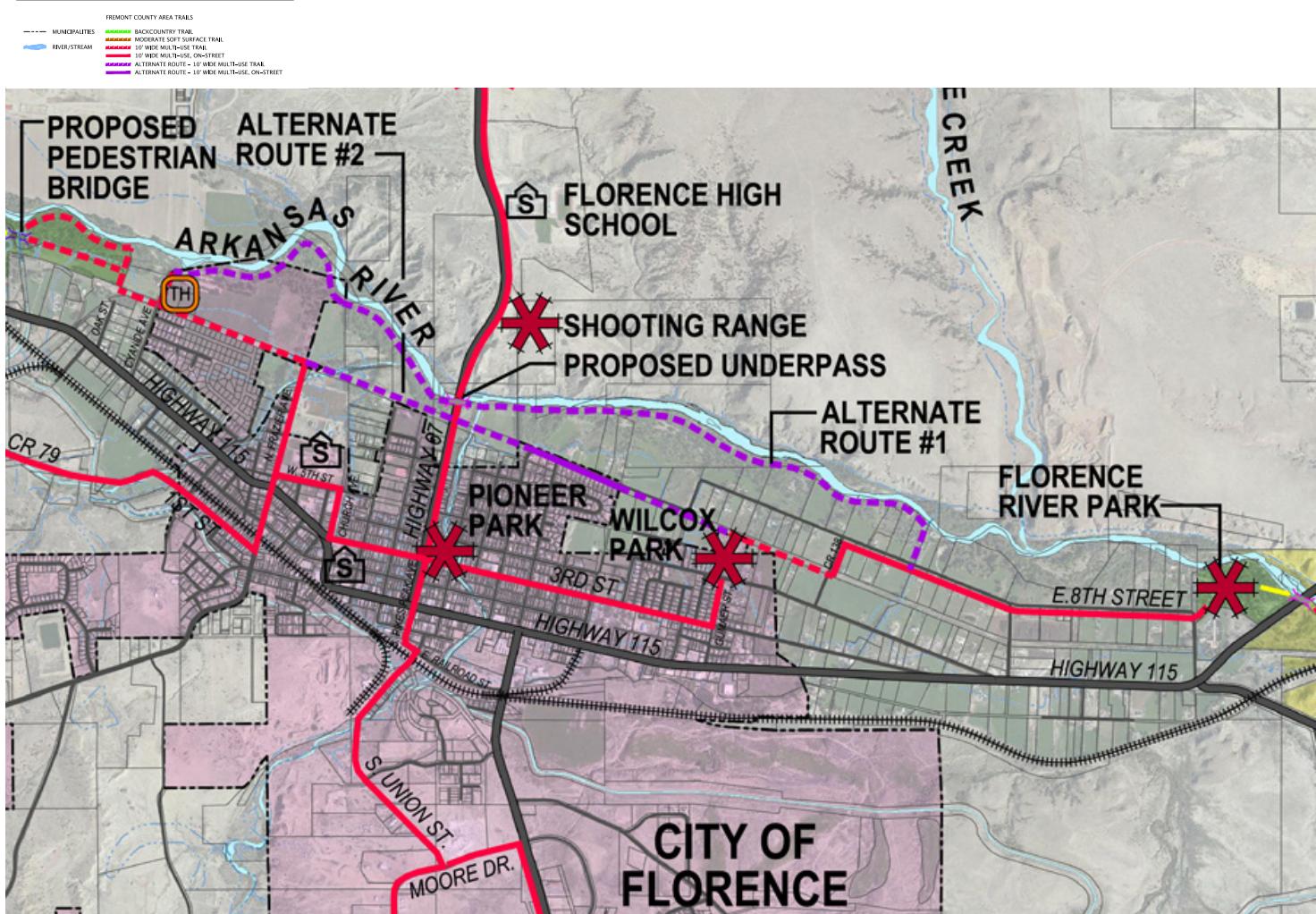
Note: Portions of the "Preferred Route" are still required with either alternate route #1 or #2.

Alternate Route #2:

10'-0" Wide Multi-Use Trail (5,700LF):	\$285,000
Grading & Erosion Control:	\$285,000
Signage and Wayfinding:	\$10,000
	Subtotal: \$580,000
Design (10%)	\$58,000
Contingency (15%)	\$87,000
	Total: \$725,000

Project B: Florence Trail Connections (Continued)

LEGEND:



Project C: Coal Towns Tour

Improvement Type: On-Street Bicycle Route

Project Description: Wayfinding signage to allow cyclist to connect Williamsburg, Rockvale, and Coal Creek (Coal Towns) with the City of Florence and provide a historical touring experience.

Catalytic Benefit: Creates a loop through the Coal Towns from the City of Florence.

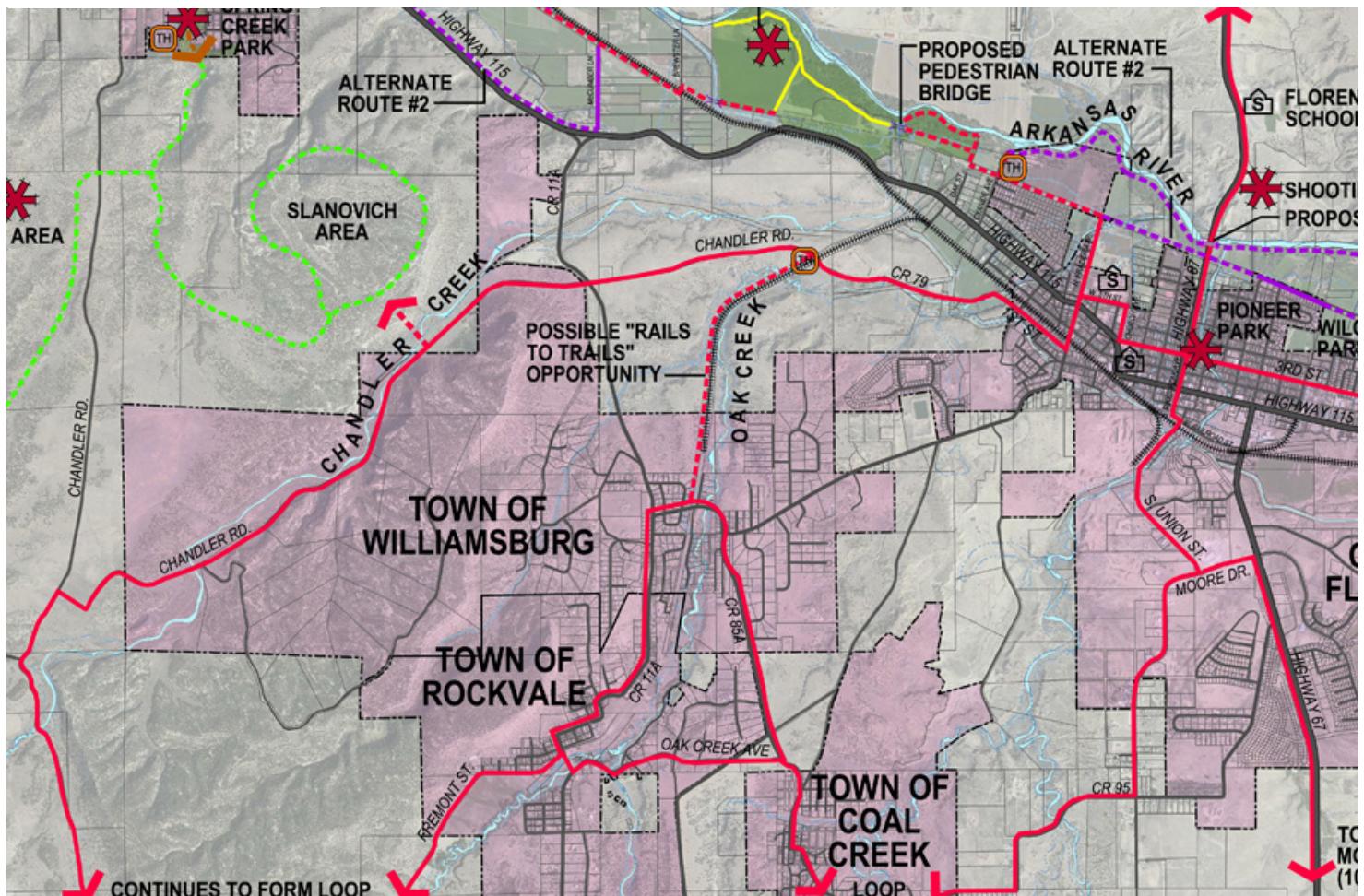
Planning Level Cost Estimate:

Trailheads Improvements (gates, bollards, signage, fencing):	\$10,000
10'Wide Multi-Use Trail (Rails-to-Trails) (6,700LF):	\$335,000
On-Street Route Markings:	\$30,000
Site Furnishings (Rest Area):	\$10,000
Site Furnishings (Rest Area):	\$5,000
Signage and Wayfinding:	\$30,000
	Subtotal: \$420,000

Design (10%)	\$42,000
Contingency (15%)	\$63,000
	Total: \$525,000

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.

LEGEND:



Project D: Riverwalk to Florence Connection**Improvement Type:** Multi-Use Trail**Project Description:** This trail segment would be a continuation of the Arkansas Riverwalk Trail.**Catalytic Benefit:** Provides an extension of the Arkansas Riverwalk Trail from Cyanide Avenue to the MacKenzie Avenue trailhead, through Pathfinder Park.**Planning Level Cost Estimate:****Preferred Route:**

Trailheads Improvements (gates, bollards, signage, fencing):	\$10,000
10'Wide Multi-Use Trail (9,000LF):	\$450,000
On-Street Trail Markings:	\$5,000
Site Furnishings (Rest Area):	\$5,000
Fencing:	\$250,000
Box Culvert (Livestock Underpass):	\$50,000
RR Crossing Improvement:	\$45,000
Bridge Abutment:	\$20,000
Pedestrian Bridge (Minnequa Ditch):	\$50,000
At-Grade Culvert Crossing (Chandler Creek):	\$50,000
Signage and Wayfinding:	\$15,000
	Total: \$950,000

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.

Design (10%)	\$95,000
Contingency (15%)	\$142,500
	Total: \$1,187,500

Note: Portions of the "Preferred Route" are still required with either alternate route #1 or #2.

Alternate Route #1:

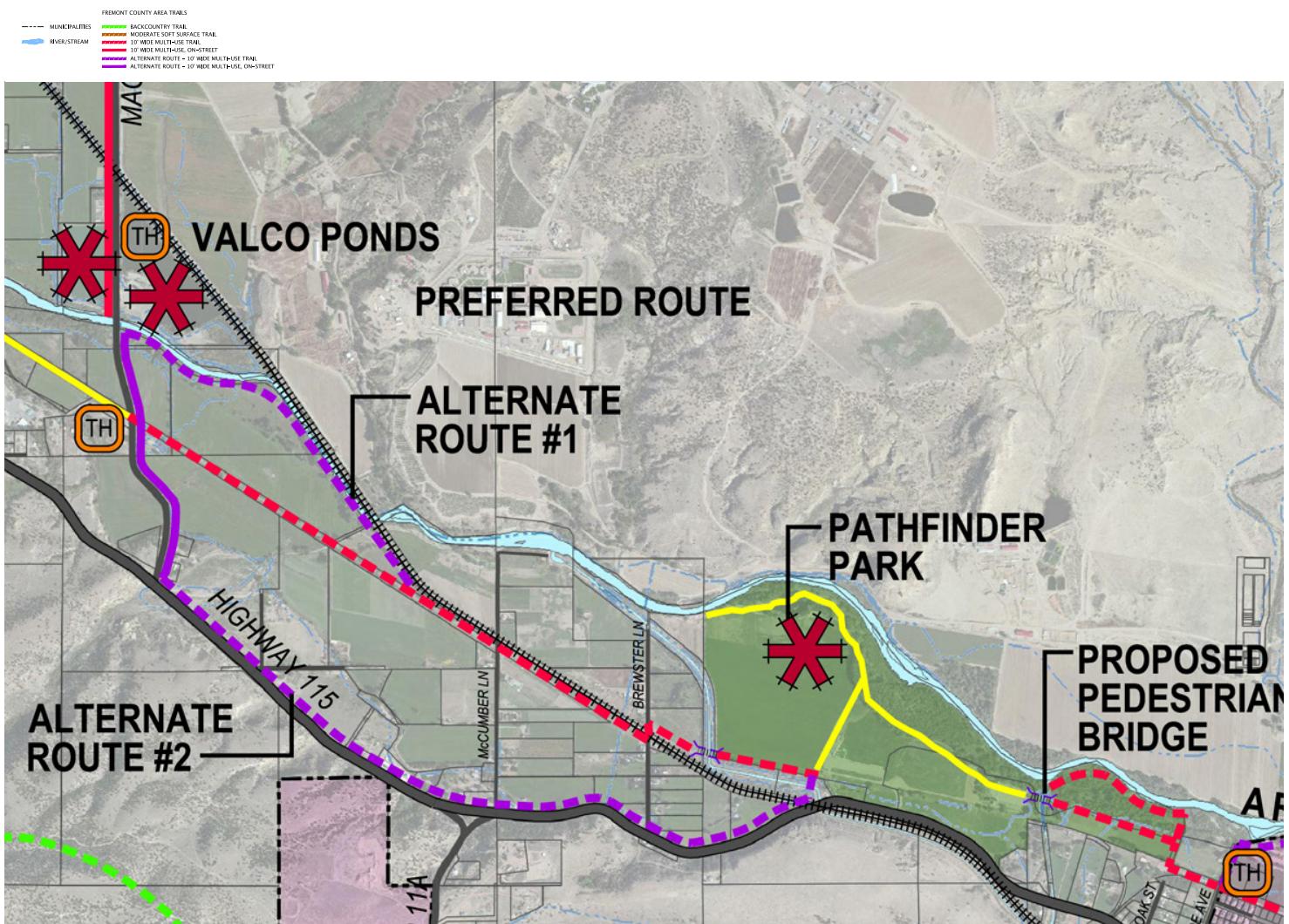
10'-0" Wide Multi-Use Trail (5,000LF):	\$250,000
Grading & Erosion Control:	\$250,000
On-Street Trail Markings:	\$5,000
	Subtotal: \$505,000
Design (10%)	\$50,500
Contingency (15%)	\$75,750
	Total: \$631,250

Alternate Route #2:

10'-0" Wide Multi-Use Trail (9,500LF):	\$475,000
Grading & Erosion Control:	\$475,000
On-Street Trail Markings:	\$10,000
RR Crossing Improvement:	\$90,000
Concrete Retaining Walls:	\$950,000
Bridge Abutment:	\$20,000
Pedestrian Bridge (Minnequa Ditch):	\$50,000
	Subtotal: \$2,070,000
Design (10%)	\$207,000
Contingency (15%)	\$310,500
	Total: \$2,587,500

Project D: Riverwalk to Florence Connection (Continued)

LEGEND:



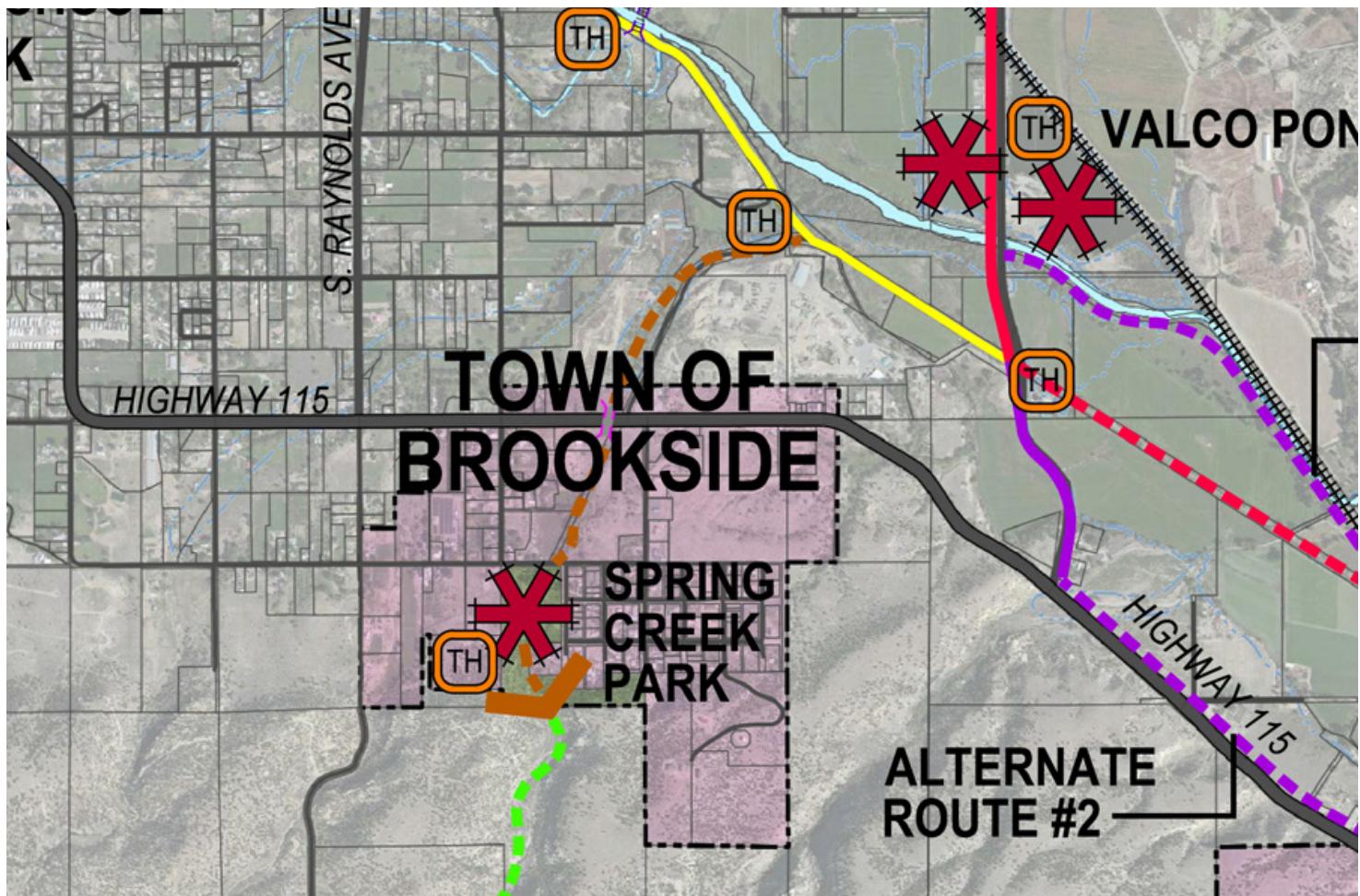
Project E: Brookside Trail**Improvement Type:** Moderate Soft Surface Trail**Project Description:** Create a moderate soft surface trail along the existing drainage way from Spring Creek Park to the existing Arkansas Riverwalk utilizing and enhancing an existing underpass at State Highway 115.**Catalytic Benefit:** Strengthens the connection between the Brookside neighborhood and the Arkansas Riverwalk.**Planning Level Cost Estimate:**

Moderate Soft Surface Trail:	\$90,000
Grading & Erosion Control:	\$18,000
Culvert Repairs (City Standards):	\$30,000
Signage and Wayfinding:	\$10,000
	Subtotal: \$148,000
Design (10%)	\$14,800
Contingency (15%)	\$22,200
	Total: \$185,000

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.

LEGEND:

— MUNICIPALITIES	— FREMONT COUNTY AREA TRAILS
— RIVER/STREAM	— BACKCOUNTRY TRAIL
— HIGHWAY	— MEDIUM SOFT SURFACE TRAIL
— 10' WIDE MULTIMODE, ON-STREET	— 10' WIDE MULTIMODE, OFF-STREET
— ALTERNATE ROUTE + 10' WIDE MULTIMODE TRAIL	— ALTERNATE ROUTE + 10' WIDE MULTIMODE, ON-STREET

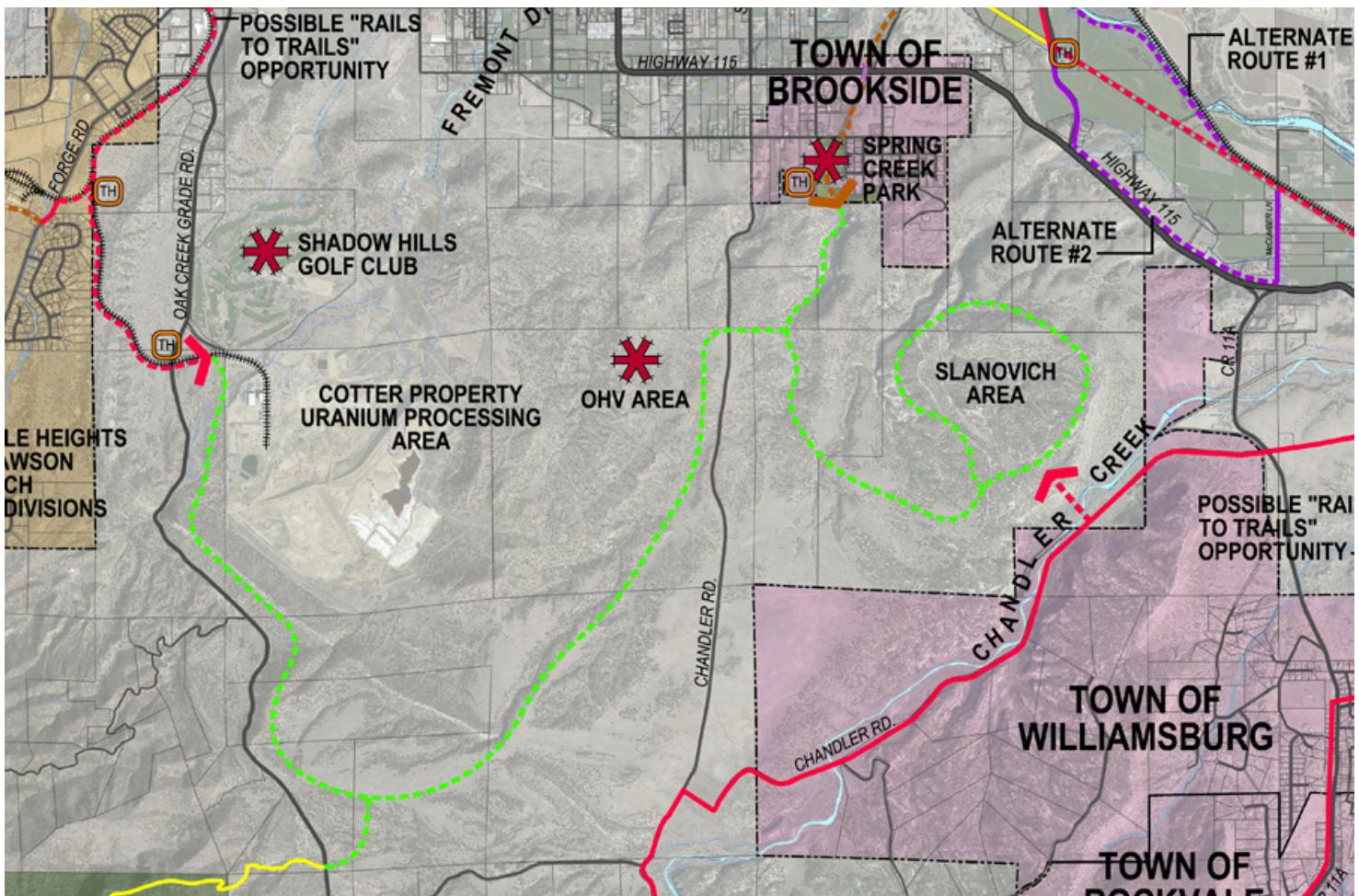


Project F: Cotter/Slanovich Area**Improvement Type:** Backcountry Trails**Project Description:** Backcountry open space area primarily used by OHV groups, mountain bikers, hikers and equestrian groups. Area to consist of natural single-track backcountry trails.**Catalytic Benefit:** Regional destination attracting backcountry open space users.**Planning Level Cost Estimate:**

Trailheads Improvements (gates, bollards, signage, fencing):	\$10,000
10'Wide Multi-Use Trail (Rails-to-Trails) (5,000LF):	\$250,000
Grading & Erosion Control:	\$250,000
Backcountry Trails:	\$500,000
Parking:	\$33,000
Signage and Wayfinding:	\$20,000
OHV Area:	\$100,000
	Subtotal: \$1,163,000
Design (10%)	\$116,300
Contingency (15%)	\$174,450
	Total: \$1,453,750

LEGEND:

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.



Project G: Valco Ponds**Improvement Type:** Open Space Improvements and On-Street Routes**Project Description:** A passive park destination, with a looped trail system, primitive camping, pond & river fishing access that would provide a final public river takeout prior to the Minnequa Dam. Access to the site is provided by an on-street MacKenzie Avenue route.**Catalytic Benefit:** Passive park destination for land and river recreation, and provides a final public takeout prior to the Minnequa Dam.**Planning Level Cost Estimate:**

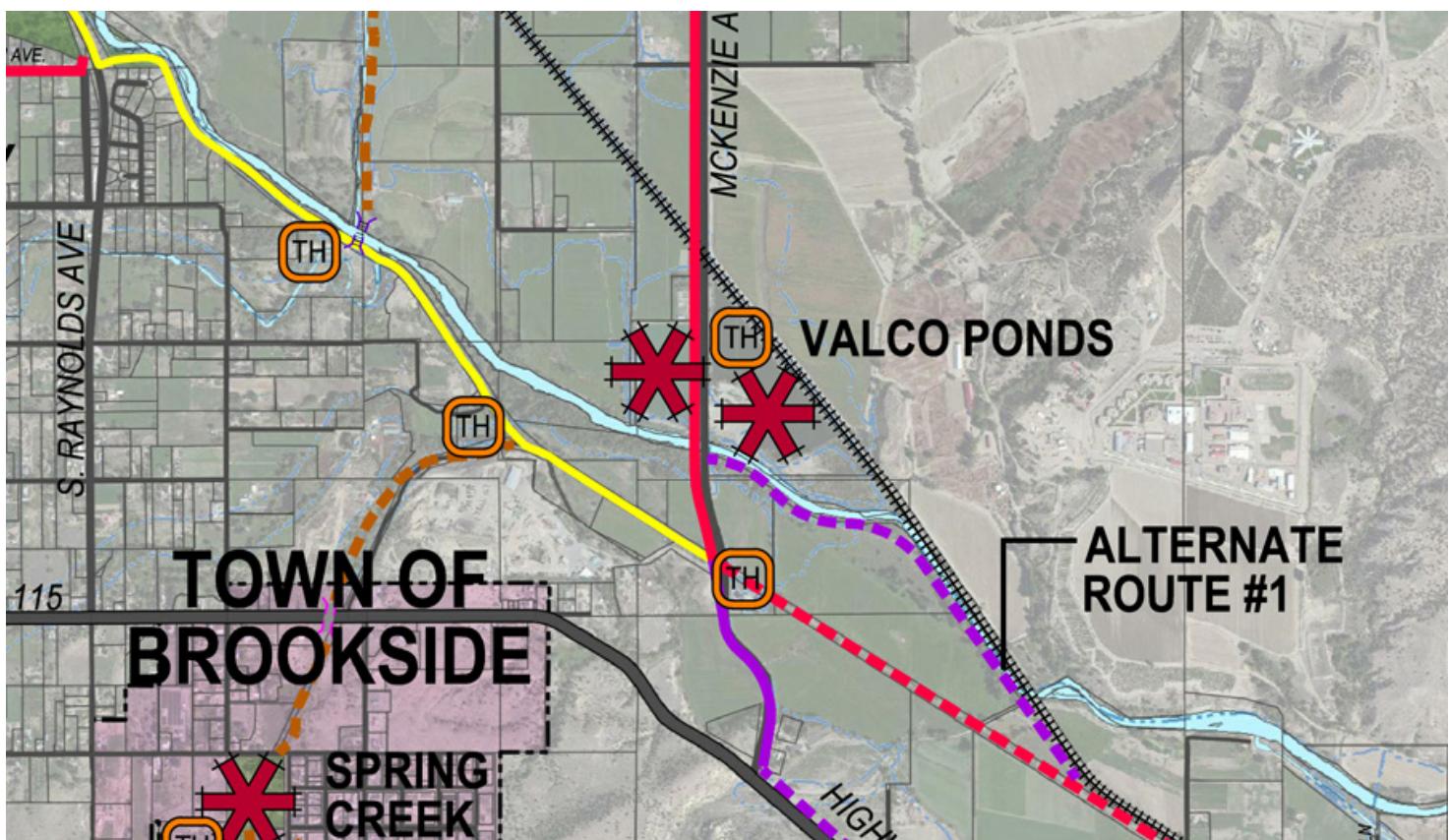
Site Restoration:	\$250,000
Trailheads Improvements (gates, bollards, signage, fencing):	\$10,000
Parking:	\$50,000
Moderate Soft Surface Trail:	\$200,000
10'Wide Multi-Use Trail (1,200LF):	\$60,000
Grading & Erosion Control:	\$60,000
On-Street Route Markings:	\$10,000
Shade Shelter:	\$250,000
Site Furnishings:	\$50,000
Underpass:	\$100,000
River Put-In/Take-Out Area:	\$30,000
Signage and Wayfinding:	\$10,000
	Subtotal: \$1,080,000

Design (10%)	\$108,000
Contingency (15%)	\$162,000
	Total: \$1,350,000

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.

LEGEND:

FREMONT COUNTY AREA TRAILS	
— MUNICIPALITIES	BACKCOUNTRY TRAIL
— RIVER/STREAM	MODERATE SOFT SURFACE TRAIL
— HIGHWAY	10' WIDE MULTI-USE, OFF-STREET
— ALTERNATE ROUTE – 10' WIDE MULTI-USE TRAIL	ALTERNATE ROUTE – 10' WIDE MULTI-USE, ON-STREET



Project H: Four Mile Creek Trail

Improvement Type: Moderate Soft Surface Trail (4'-5' width due to narrow available space)

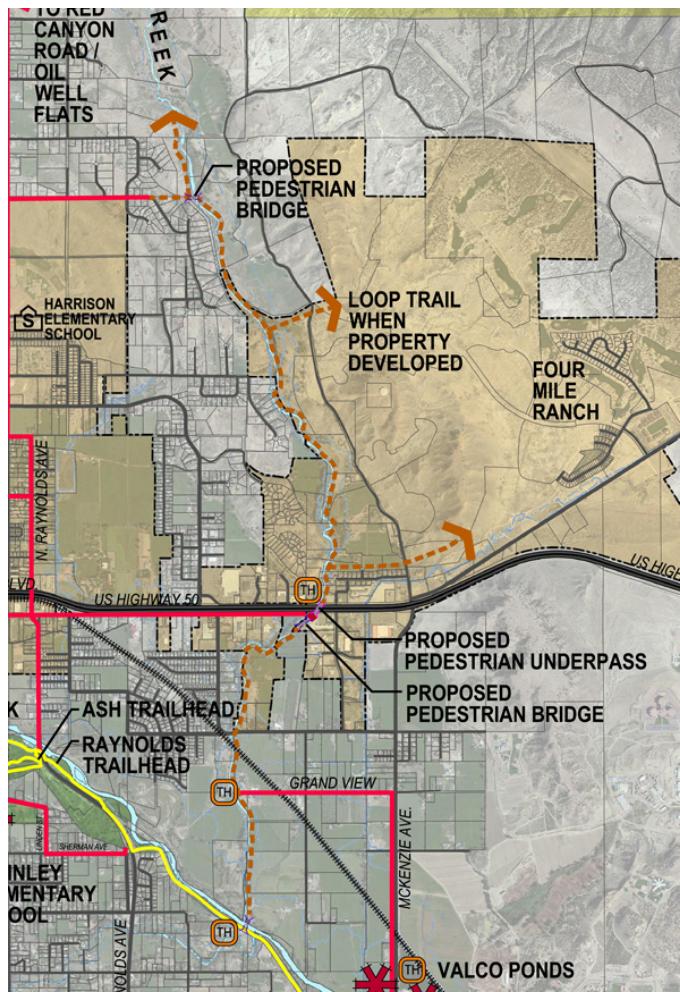
Project Description: This project includes a proposed moderate soft surface trail along the creek bank, including two creek crossings as well as an underpass at US Highway 50

Catalytic Benefit: Creates a trail connection between the Arkansas Riverwalk and the Red Canyon Road/Oil Well Flats area.

Planning Level Cost Estimate:

Trailheads Improvements (gates, bollards, signage, fencing):	\$10,000
Moderate Soft Surface Trail:	\$750,000
Grading & Erosion Control:	\$150,000
Bridge Abutments:	\$30,000
Pedestrian Bridge:	\$500,000
Pedestrian Underpass:	\$500,000
Interpretive Signage:	\$5,000
Signage and Wayfinding:	\$10,000
Subtotal:	\$1,955,000
Design (10%)	\$195,500
Contingency (15%)	\$293,250
Total:	\$2,443,750

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.



Project I: Eagle Heights/Dawson Ranch Trail Connections

Improvement Type: On-Street Route and Rails-to-Trail Connection

Project Description: This project creates a greater on-street trails network and proposes a multi-use trail along an existing rail bed.

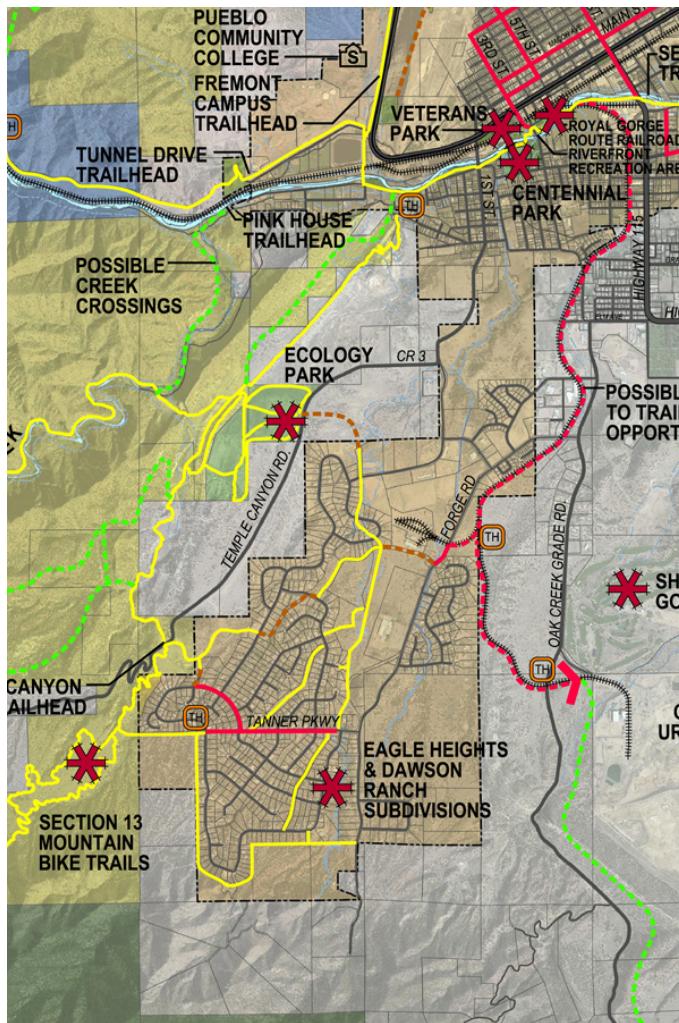
Catalytic Benefit: This creates a connection between downtown Cañon City, the Arkansas Riverwalk, Ecology Park, Section 13, Cotter/Slanovich Property and the Eagle Heights/Dawson Ranch subdivisions.

Planning Level Cost Estimate:

Trailheads Improvements (gates, bollards, signage, fencing):	\$20,000
10'-0" Wide Multi-Use Trail (Rails-To-Trails) (13,000LF):	\$650,000
Moderate Soft Surface Trail:	\$130,000
Grading & Erosion Control:	\$26,000
On-Street Route Markings:	\$10,000
Site Furnishings (Rest Area):	\$5,000
Signage and Wayfinding:	\$5,000
	Subtotal: \$846,000
Design (10%)	\$84,600
Contingency (15%)	\$126,900
	Total: \$1,057,500

Note: These costs do not include upgrading existing internal pathways within Dawson Ranch.

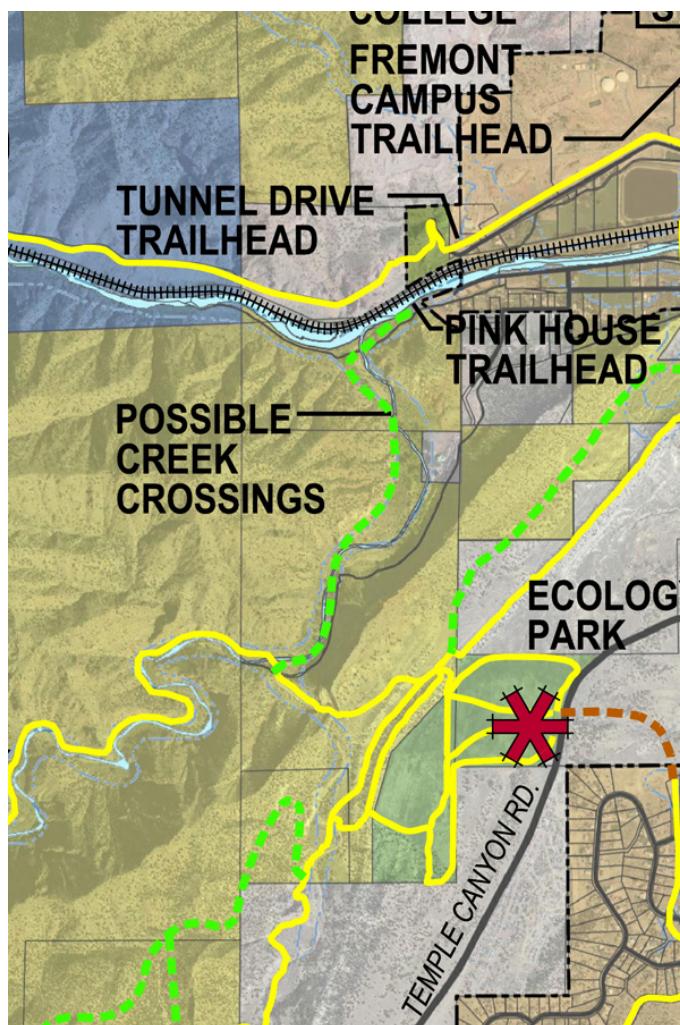
Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.



Project J: Grape Creek Area**Improvement Type:** Moderate Soft Surface Trail**Project Description:** Moderate soft surface trail following Grape Creek, from the Pink House Trailhead to the existing Grape Creek trail.**Catalytic Benefit:** Trail connection from Arkansas Riverwalk through the Grape Creek area to highly desirable backcountry destinations beyond.**Planning Level Cost Estimate:**

Possible Trailheads Improvements (gates, bollards, signage, fencing):	\$10,000
Backcountry Trail With 3 Bridge Crossings:	\$200,000
Grading & Erosion Control:	\$22,000
Pedestrian Bridge (Primitive):	\$30,000
Site Furnishings (Rest Area):	\$10,000
Signage and Wayfinding:	\$5,000
	Subtotal: \$277,000
Design (10%)	\$27,700
Contingency (15%)	\$41,550
	Total: \$346,250

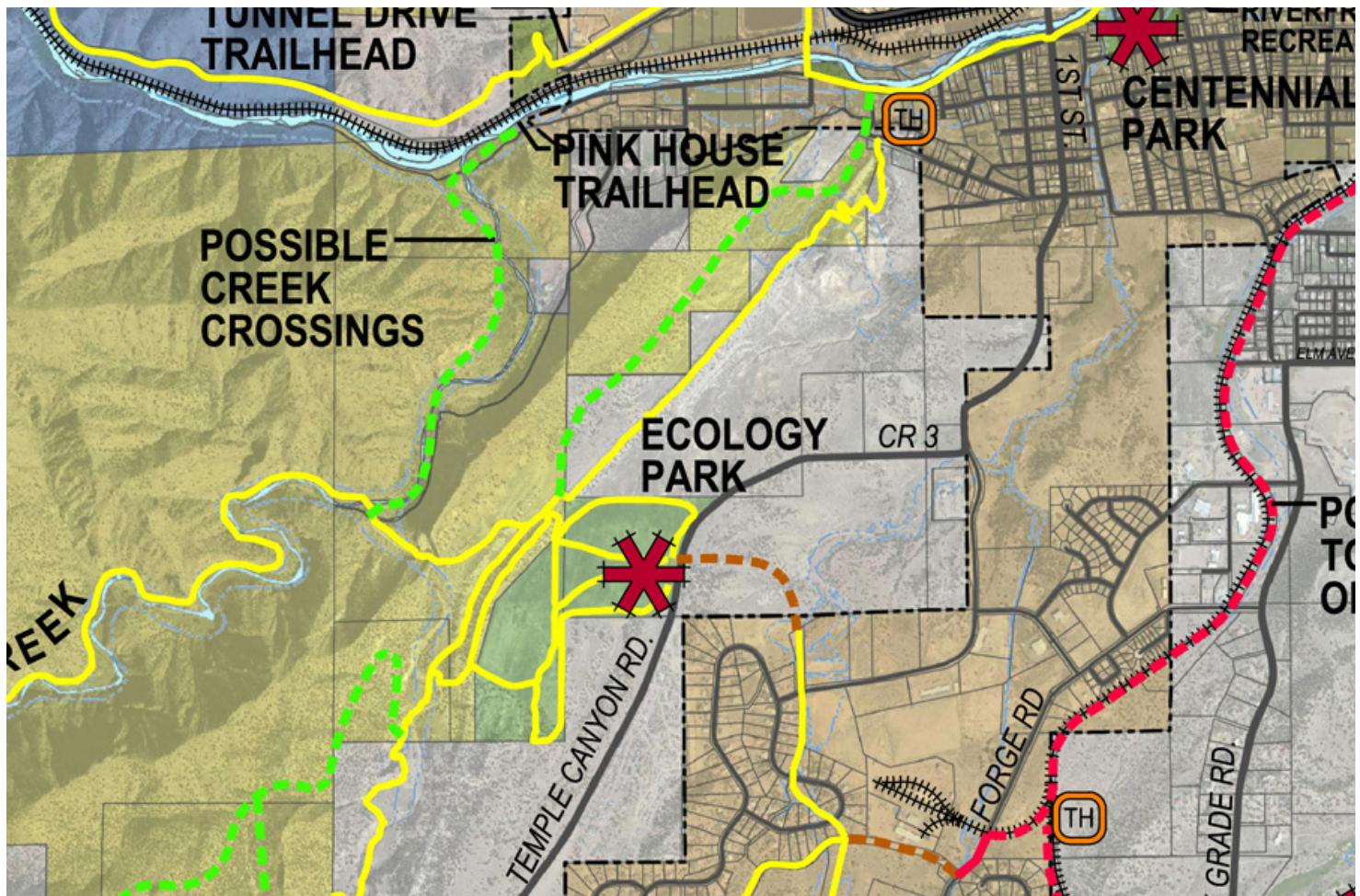
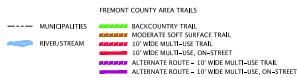
Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.



Project K: Ecology Park Area**Improvement Type:** Backcountry (single-track) Trail**Project Description:** Backcountry (single-track) trail linking downtown Cañon City to backcountry destinations. Backcountry single-track ridgeline trail with overlooks. Improvements to the existing trail system found at Ecology Park.**Catalytic Benefit:** This project adds to the existing Ecology Park trail system and includes improvements to existing trails in the Ecology Park area.**Planning Level Cost Estimate:**

Trailheads Improvements (gates, bollards, signage, fencing):	\$10,000
Backcountry (Single-track) Trail:	\$130,000
Grading & Erosion Control:	\$26,000
Signage and Wayfinding:	\$10,000
	Subtotal: \$176,000
Design (10%)	\$17,600
Contingency (15%)	\$26,400
	Total: \$220,000

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.

LEGEND:

Project L: Temple Canyon Area

Improvement Type: Backcountry (single-track) Trail

Project Description: Backcountry open space area primarily used by mountain bikers, hikers and equestrian groups. Area to consist of natural single-track backcountry trails.

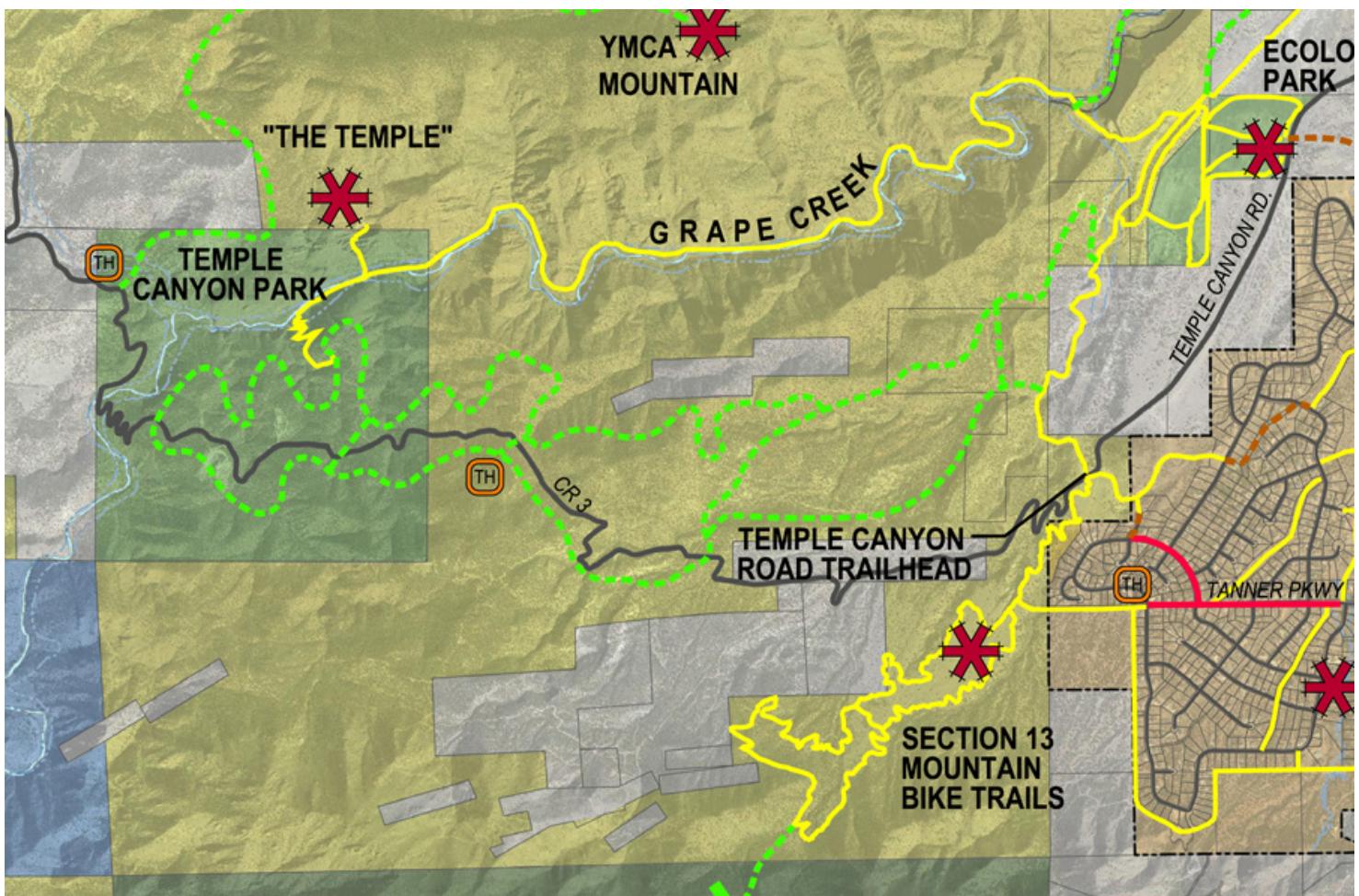
Catalytic Benefit: Expands the existing backcountry trail system and provides a connection from the Ecology Park area to Temple Canyon Park.

Planning Level Cost Estimate:

Trailheads Improvements (gates, bollards, signage, fencing):	\$10,000
Backcountry Trail including stream crossings:	\$1,250,000
Grading & Erosion Control:	\$250,000
Signage and Wayfinding:	\$10,000
	Subtotal: \$1,520,000
Design (10%)	\$152,000
Contingency (15%)	\$228,000
	Total: \$1,900,000

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.

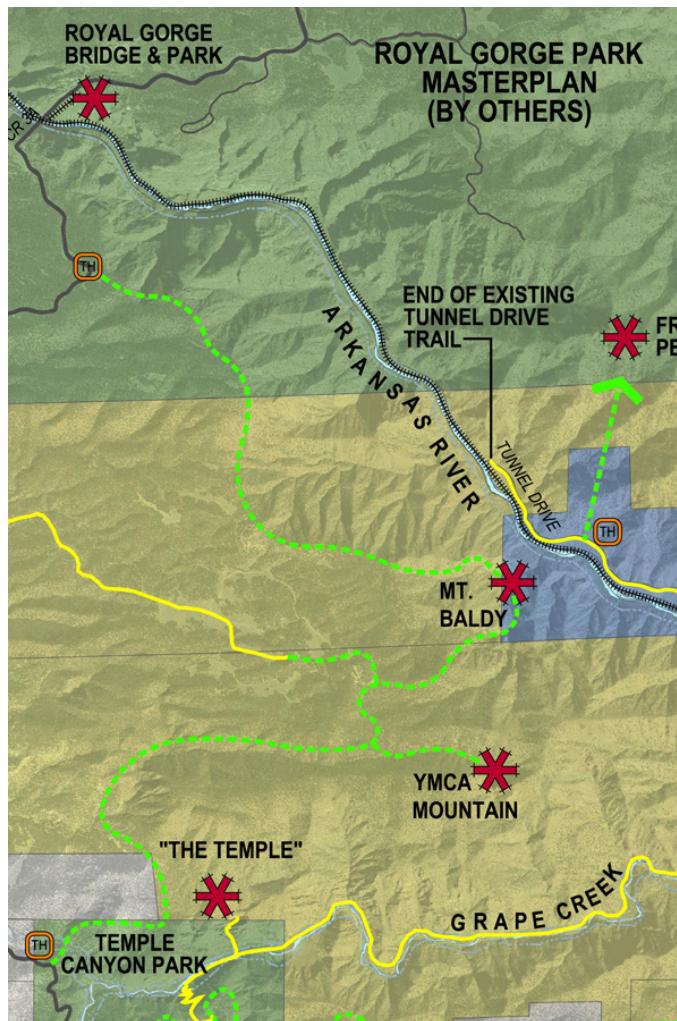
LEGEND:



Project M: YMCA to Gorge Connection**Improvement Type:** Backcountry (single-track) Trail**Project Description:** Backcountry open space area primarily used by mountain bikers, hikers and equestrian groups. Area to consist of natural single-track backcountry trails with scenic overlooks.**Catalytic Benefit:** Creates and expands upon an existing backcountry trail system on the south rim of the Royal Gorge, with opportunities to summit YMCA Mountain and Mt. Baldy.**Planning Level Cost Estimate:**

Trailheads Improvements (gates, bollards, signage, fencing):	\$10,000
Backcountry Trail:	\$700,000
Grading & Erosion Control:	\$140,000
Parking:	\$30,000
Signage and Wayfinding:	\$10,000
	Subtotal: \$890,000
Design (10%)	\$89,000
Contingency (15%)	\$133,500
	Total: \$1,112,500

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.



Project N: Hogbacks to Royal Gorge Park Connection

Improvement Type: Moderate Soft Surface Trails & 10'-0" Wide Multi-Use Trail

Project Description: (3) Soft surface trails connecting the Hogbacks and the Royal Gorge Park via existing roadbeds where possible. Trailheads along US Highway 50 and rest areas along the trail will be included.

Catalytic Benefit: Connecting the Royal Gorge Park to Skyline Drive and downtown Cañon City

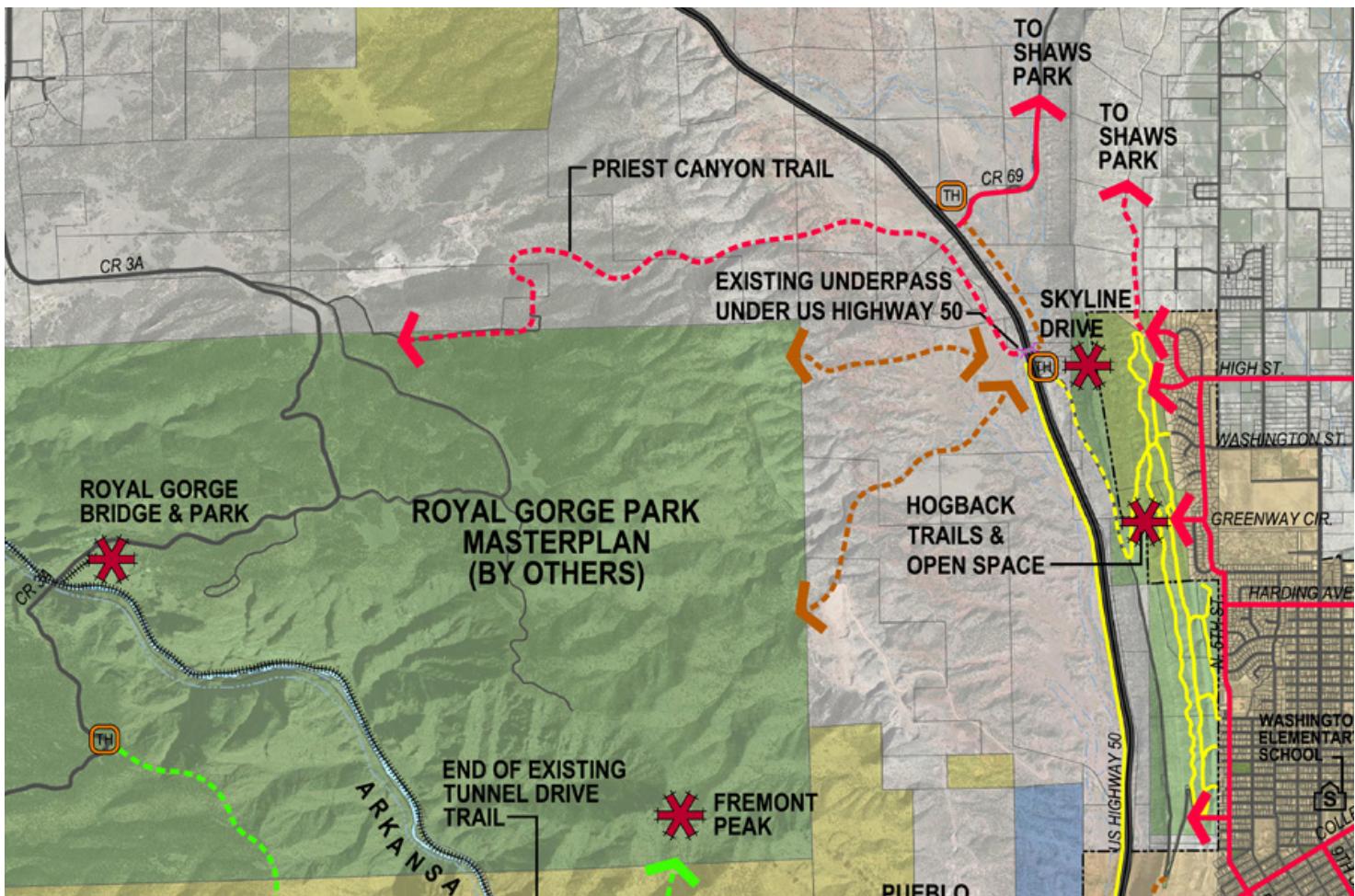
Planning Level Cost Estimate:

Trailheads Improvements (gates, bollards, signage, fencing):	\$20,000
10'-0" Wide Multi-Use Trail (27,500LF):	\$1,375,000
Moderate Soft Surface Trail:	\$260,000
Grading & Erosion Control:	\$189,500
Parking:	\$35,000
Site Furnishings (Rest Area):	\$10,000
Signage and Wayfinding:	\$10,000
Subtotal:	\$1,899,500
Design (10%)	\$189,950
Contingency (15%)	\$284,925
Total:	\$2,374,375

LEGEND:



Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.



Project O: Fremont Peak Adventure Trail**Improvement Type:** Backcountry (single-track) Trail

Project Description: The trail will include natural surface, single-track up to Fremont Peak. The trail will also include numerous steps due to the steep slope, various structures, cables, ladders, logs, etc. This trail will provide high levels of exposure with grades up to 12%.

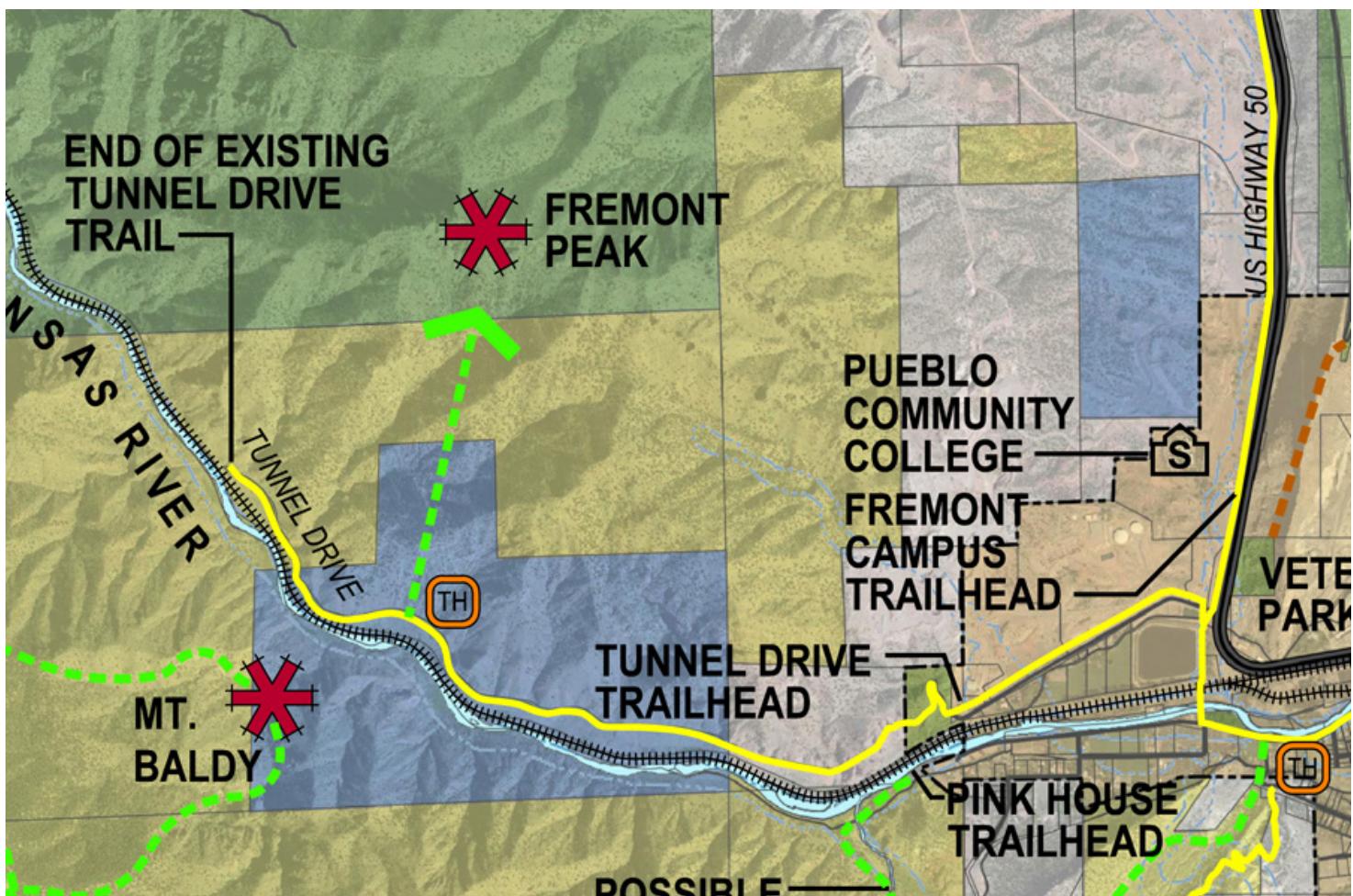
Catalytic Benefit: Creates an active destination in the Royal Gorge Park area.

Planning Level Cost Range: \$500,000 to \$1,000,000

LEGEND:

FREMONT COUNTY AREA TRAILS	
— MUNICIPALITIES	BACKCOUNTRY TRAIL
— RIVER/STREAM	MAGNETIC SOFT SURFACE TRAIL
— 10' WIDE MULT-USE TRAIL	10' WIDE MULT-USE, ON-STREET
— 10' WIDE MULT-USE, OFF-STREET	ALTERNATE ROUTE - 10' WIDE MULT-USE, ON-STREET
— ALTERNATE ROUTE - 10' WIDE MULT-USE, OFF-STREET	ALTERNATE ROUTE - 10' WIDE MULT-USE, ON-STREET

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.



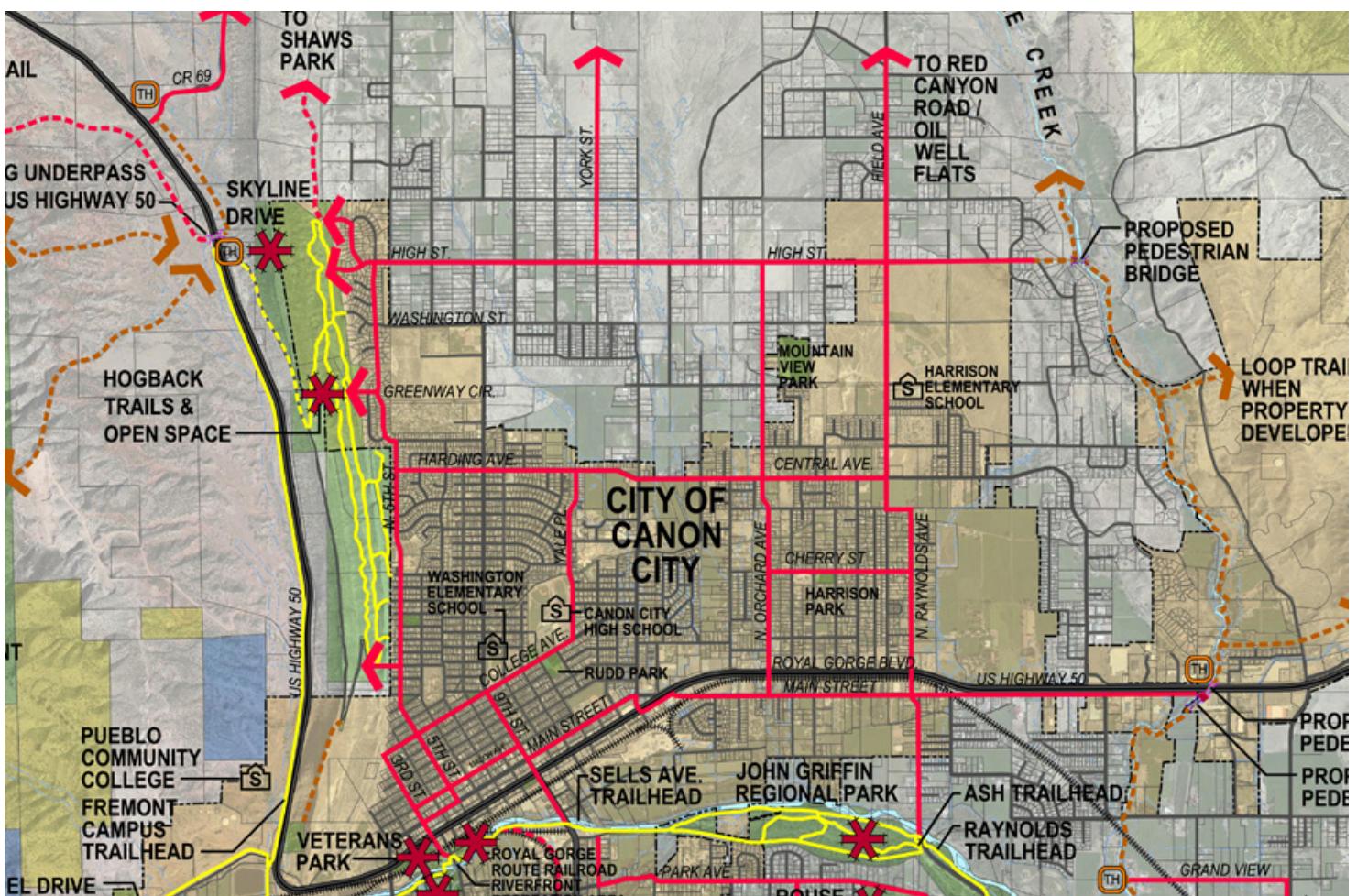
Project P: Cañon City On-Street Trail System – North**Improvement Type:** On-Street Wayfinding & Delineation**Project Description:** On-street (north-south and east-west) routes and wayfinding signage along commonly used downtown streets north of the Arkansas River.**Catalytic Benefit:** Connects the neighborhood residents to downtown destinations, the hogbacks and the Arkansas Riverwalk Trail.**Planning Level Cost Estimate:**

<u>Signage and Wayfinding:</u>	\$100,000
	Subtotal: \$100,000
<u>Design (10%)</u>	\$10,000
<u>Contingency (15%)</u>	\$15,000
	Total: \$125,000

LEGEND:

— MUNICIPALITIES	FREMONT COUNTY AREA TRAILS
 RIVER/STREAM	BACK-COUNTRY TRAIL
 G UNDERPASS	MONKAKI SOFT SURFACE TRAIL
 10' WIDE MULT-USE TRAIL	10' WIDE MULT-USE, ON-STREET
 10' WIDE MULT-USE, ON-STREET	10' WIDE MULT-USE TRAIL
 ALTERNATE ROUTE + 10' WIDE MULT-USE, ON-STREET	ALTERNATE ROUTE + 10' WIDE MULT-USE, ON-STREET
 ALTERNATE ROUTE + 10' WIDE MULT-USE, ON-STREET	ALTERNATE ROUTE + 10' WIDE MULT-USE, ON-STREET

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.



Project Q: Cañon City On-Street Trail System – South

Improvement Type: On-Street Wayfinding & Delineation

Project Description: On-street (north-south and east-west) routes and wayfinding signage along commonly used downtown streets south of the Arkansas River.

Catalytic Benefit: Connects the neighborhood residents to downtown destinations and the Arkansas Riverwalk Trail.

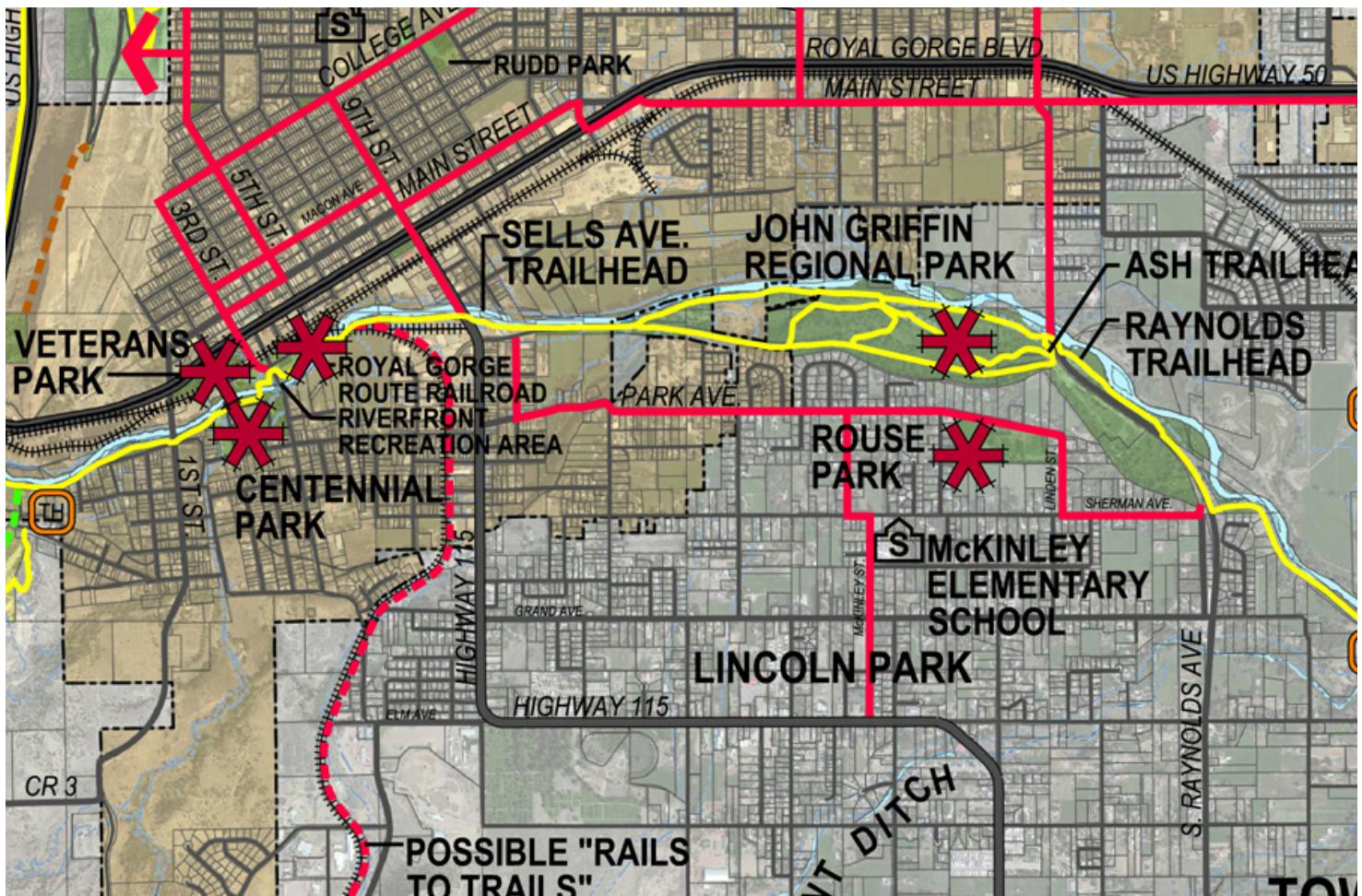
Planning Level Cost Estimate:

Signage and Wayfinding:	\$100,000
	Subtotal: \$100,000
Design (10%)	\$10,000
Contingency (15%)	\$15,000
	Total: \$125,000

LEGEND:

FREMONT COUNTY AREA TRAILS	
— MUNICIPALITIES	— BACKCOUNTRY TRAIL
— RIVER/STREAM	— MIGRANT SOFT SURFACE TRAIL
— 10' WIDE MULT-USE TRAIL	— 10' WIDE MULT-USE, ON-STREET
— 10' WIDE MULT-USE, ON-STREET	— ALTERNATE ROUTE + 10' WIDE MULT-USE, ON-STREET

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.



Project R: Power Plant Site Opportunity**Improvement Type:** Repurpose Power Plant Site**Project Description:** Gateway and waterside development to Cañon City from both the highway and the Arkansas River**Catalytic Benefit:** Improves the entrance into Cañon City, and connects the riverfront to downtown and other existing amenities, creating a character of place.**Planning Level Cost Estimate:** TBD**LEGEND:**

FREMONT COUNTY AREA TRAILS	
— MUNICIPALITIES	■ BACK-COUNTRY TRAIL
— RIVER/STREAM	■ MOKKANI SOFT SURFACE TRAIL
— 10' WIDE MULT-USE TRAIL	■ 10' WIDE MULT-USE, ON-STREET
— 10' WIDE MULT-USE, OFF-STREET	■ ALTERNATE ROUTE - 10' WIDE MULT-USE TRAIL
	■ ALTERNATE ROUTE - 10' WIDE MULT-USE, ON-STREET

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.



Project S: Florence Mountain Park**Improvement Type:** On-Street Bicycle Route**Project Description:** The mountain park is south-west of the City of Florence, west of State Highway 67.**Catalytic Benefit:** Provides cyclists access into Florence Mountain Park.**Planning Level Cost Estimate:**

<u>Park Improvements:</u>	\$500,000
	Subtotal: \$500,000
Design (10%)	\$50,000
<u>Contingency (15%)</u>	\$75,000
	Total: \$625,000

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.

Project T: Red Canyon Park**Improvement Type:** On-Street Bicycle Route, hiking/biking trails and park improvements.**Project Description:** The park is north of Cañon City on Red Canyon Road.**Planning Level Cost Estimate:**

<u>Park Improvements:</u>	\$100,000
	Subtotal: \$100,000
Design (10%)	\$10,000
<u>Contingency (15%)</u>	\$15,000
	Total: \$125,000

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.

Project U: Arkansas River Whitewater Improvements**Improvement Type:** River Improvements**Project Description:** These projects include redesign and construction of existing drop structures/diverion dams, enhancements to the river edge, existing boat chutes, portage trails, and water parks as well as proposes safe passages and diversions. See Appendix 1 for the River Recreation report completed by McLaughlin Whitewater Design Group.**Planning Level Cost Estimate:***See Appendix 1 for planning level cost estimates.*

Estimates for design would be based upon specific in-river projects including floodplain modeling, 404 permitting and other Army Corp of Engineer requirements.

Note: Cost estimate does not include land acquisition or easements and is subject to negotiations with the appropriate land owners and management tools available to the respective agencies.

Potential Funding Sources

There are several funding programs that could be available over the next several years.

These leading potential sources include:

- Local Appropriations
- Great Outdoors Colorado Including Large Scale and Special Opportunity Programs
- Colorado State Trails Program
- Conservation Set-Aside Tax Benefits*
- Conservation Trust Fund
- Federal Programs such as Transportation Enhancements and the Land and Water Conservation Fund**
- Individual, Philanthropic and Corporate Giving
- Adoption of an Open Space, Parks and Trails Sales Tax Initiative
- In-Kind and Volunteerism

*Under Colorado Law, landowners who agree to set aside developable lands for conservation purposes can reap substantial tax benefits directly, or cash benefits, by remarketing the tax benefits to others in need of a state tax deduction.

**Though the near-term and long-term future of these programs may be in doubt due to cutbacks, there are a number of potential federal programs that could become available. These include transportation enhancement monies; flood disaster funds; trail monies; Land and Water Conservation funds; possible future stimulus programs; health and fitness and community development programs. It may be helpful to monitor federal web sites to identify programs. American Trails (www.americantrails.org) typically posts alerts about various programs.

Building and Maintaining Community Support

Solid community support for the project is critical. Landowners, residents, business people, user groups, and agency partners must not only be inspired by the plan, but also embrace it over the long term. Clearly, the community needs to be kept informed, involved and realize a direct benefit from the various projects. This can be accomplished by:

- Engaging stakeholders and leaders in the planning and implementation process—through presentations, surveys, planning workshops, volunteer projects and special events. The project partners should lead and coordinate this effort, perhaps through the creation of an outreach sub-committee. The Project Coordinator(s) should keep a list of the contacts and regularly brief them. This might also include holding public update meetings at key junctures in the implementation process.
- Having an effective public information program including clear, easy-to-read reports, brochures, web-site updates, posters, and progress presentations. Several prominently located “status boards” should be posted at prominent locations. The status boards should show the plan map and key objectives and a contact number for more information or to volunteer. The boards should be regularly updated to show progress and need for suggestions, additional support and funds.
- Prioritizing, completing and building public awareness of projects—to demonstrate the benefits of the projects.
- Immediately moving forward with pilot projects—that demonstrate the plan’s vision as well as completing and dedicating additional projects or project elements year by year.
- Having a quality management and maintenance program—that includes an effective citizen/user feedback mechanism to provide a responsive ear for each landowner, business, resident and user concern.

Management Considerations

The proposed built improvements including the trails, river corridor, open space parks and related facilities will require upkeep, patrol and other management functions. In addition there should be oversight of conservation efforts including monitoring of dedicated conservation easements. With several jurisdictions involved, an effective coordination structure must be put in place. Funding, staffing and quality control are essential elements. The partners may choose to each manage and maintain their respective projects or may plan to cooperatively pool maintenance resources and management through working agreements. In addition to professional services, volunteers may be able to adopt parcels and sections of the trails network and provide some support maintenance such as litter pick up and upkeep of wayfinding signs and other improvements not requiring heavy equipment or special skills. It should be noted, however, that volunteers require staff to coordinate them and services may be sporadic.

Based on an investigation of planning in several comparable communities, annual operations and maintenance costs are estimated to run between \$2,500 and \$10,000 or more per mile for trails depending on level of use and services, \$250 to \$300 per acre undeveloped open spaces, and significantly more per acre for more formal areas depending on the level of improvement and maintenance. There may also be additional monitoring and coordination costs. As a general benchmark, an overview of open space programs along the Front Range reports an ongoing allocation of 23% to 35% of total annual program budgets to operations. This of course will change over time as the bulk of the acquisitions and improvement fall into place.

Key maintenance activities will include:

- Stewardship of acquired open space properties and parks such as weed, pest, invasive, and vegetation management;
- Management of easements;
- Litter and debris removal on open space and park sites;
- Trail maintenance patrol and monitoring;
- Maintenance of trail furnishings and related infrastructure such as railings, signs, gates, benches, picnic tables, etc.;
- Trail sweeping and surface repair and debris removal;
- Trail corridor weed and vegetation management;
- Watering trees and landscape materials in urban areas if and where applicable;
- Remedial repair of improvements such as fixing washouts, erosion;

- Public safety and rescue patrol, enforcement and emergency services;
- Larger infrastructure upkeep including pedestrian bridges, parking areas, and boat chutes;
- Snow removal, if feasible and appropriate;

Next Steps

With completion of this plan the following next steps are key to accomplishing the above implementation objectives:

1. Adoption of The Plan
2. Project Start-up—assign staff to initiate right-of-way acquisition and funding applications.
3. Establish an Official Start-up Group (Technical Working Group)—engaging a leadership committee appointed by the local municipalities. Work to promote the project and build liaisons with key stakeholders such as business people, land owners, developers and public spirited citizens who might be willing to contribute to the effort.
4. Select short term project priorities.
5. Start-Up Funding—identify, commit seed money to initiate the implementation process.
6. Pursue Project Funding—Identify and pursue philanthropic, state--especially GOCO funding—and if available, federal funding in the next grant rounds for trails and other early action improvements.
7. Initiate Acquisitions and Projects—Immediately pursue negotiation of conservation easements and trail rights-of-way. Carry out the specific built pilot projects and the five-year start-up.
8. Review Regulatory Context—Review current development regulations and identify ways to improve ordinances such as open space and trail corridor dedications, setback requirements along the river (and roads to leave room for roadside trails), and incentives to promote trail and greenway benefits.
9. Promote the Plan—Create a public information program including a Web site to keep community posted on the projects, accomplishments, volunteer activities, etc.

Appendix 1:

In-River Improvements

Technical Memorandum



TECHNICAL MEMORANDUM



Eastern Fremont County Recreational In-River Improvements of the River Corridor Master Plan

TO: DHM
COPIES: File
FROM: McLaughlin Whitewater Design Group
DATE: 1/23/2015

I. INTRODUCTION

This technical memorandum summarizes the efforts by the McLaughlin Whitewater Design Group's in supporting DHM Design with the development of the Eastern Fremont County Trails, Open Space & River Corridor Master Plan. Our effort relates to planning of in-river recreational improvements in the subject reach of the Arkansas River. The reach extends from upstream of Cañon City near the Hydraulic Diversion through Cañon City and the City of Florence to the Lester Attleberry Diversion.



Flow and weather conditions during the August 14, 2014 site visit.

The scope of our work is cursory in nature with the intent to assist with long-term planning. This work included visual assessment of the field condition, identification of safety issues, review of the existing diversions and planning related to objectives of the master plan. The site assessments were performed via a raft float trip.

Specific objectives include:

- Identification and estimation of the approximate size of proposed major components.
- Outlining the types of the major elements to be investigated in a future preliminary design phase.
- Identification of future design related efforts.
- Providing cursory-level budgeting information.

Further refinements, modifications, and prioritizations to the improvements described within will need to be evaluated based upon flood conveyance and related modeling, land ownership and availability of both construction and permanent access and easements, permitting, etc. This would be accomplished in a detailed master plan or preliminary design effort.

II. BACKGROUND

On August 14, 2014 several stakeholders and members of the master plan design team conducted a site investigation of the Arkansas River through Cañon City. Other than one portage, the trip started at the Pink House river access and continued through the take-out just downstream of the Lester Attleberry Diversion. This eleven-mile reach includes eight active diversions, two existing whitewater features at Centennial Park, a number of bridges, extensive channel armoring, and various man-made encroachments. The portage around the hazardous Minnequa Diversion Dam was necessary for obvious safety reasons and this obstruction is a significant consideration of this planning effort. The various exiting river features, diversions and proposed improvements are shown on the attached plan labeled Eastern Fremont County- Trails, Open Space & River Corridor Master Plan.



The excellent “Pink House” access was the start for the on-site investigation conducted by the design team and local stakeholders.

The eight diversions that support irrigation, industrial, and municipal water supplies are also a primary focus of this planning effort. The majority of the dams and drops that function to divert water from the river are utilitarian and do not provide for adequate recreational passage. Most include some degree of excessive hazard to river recreationalists throughout the normal range of river flows.

Early coordination between the Whitewater Kayak and Recreation Park (WKRP) Committee and Arkansas Headwaters Recreation Area (AHRA) Citizens Task Force (CTF) resulted in designating a section of the Arkansas River corridor in Canon City that can be enhanced with whitewater features, in-river and riverbank improvements. This section of river is located between the AHRA Pink House river access and the Ninth Street Bridge. In 2010, two recreational features or “drops” were completed within this section which began the Canon City Whitewater Park located in Centennial Park. The features were developed with the help of GOCO funds and have since been successful in creating an attraction for the City. The Royal Gorge Whitewater Festival is held at the park each June and is well attended. All of the money raised from the festival goes back into the community of Canon City with 40% of the proceeds going back into the Canon City Whitewater Park.

This initial planning effort is cursory in nature and is focused on the existing diversions and drop structures. A future effort should include an entire river preliminary design effort. This would further define proposed improvements to the drops and evaluate other recreational and river stabilization improvements such as jetties and eddy structures. However a detailed reach-long hydraulic evaluation with focus on scour and an alluvial (mobile) bed will need to be conducted to ensure the maintenance of flood conveyance, avoid unintended “drowning out” of existing recreational and diversion drops.

III. VISION FOR IN-RIVER RECREATION IMPROVEMENTS

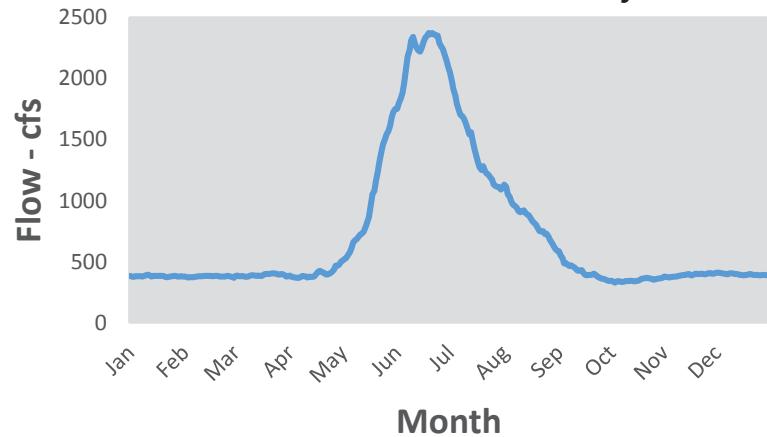
Our understanding is that the communities are interested in making this reach of the Arkansas a continuous recreational corridor. This vision seems appropriate given the quality of the river and its location being immediately downstream of the nationally known Royal Gorge run. In addition to attracting raft and kayak traffic from this very popular run, a continuous recreational corridor through two cities with highly recreational drops would be unique in Colorado. A number of communities in Colorado have one or two whitewater features, but there are currently no venues that include a series of high quality whitewater drops linked together through several communities. The creation of this type of recreational amenity may be referred to as a water trail or blueway (see glossary) and there creation is becoming increasingly popular.

One of the first water trails in the country was along the South Platte River in the Denver Metro area. A water trail on this reach of the Arkansas River dotted with great waves and holes throughout its length would set a new standard and create an attractive destination for a wide variety of recreationalists and spectators. The great flows, aesthetics, water quality, and amenities allow for the creation of great whitewater features throughout the typical recreational season. The flow rate and reliability of flow within this reach is a great attribute and should be made the most of. These flow conditions allow for the creation of large waves that are attractions by rafters, kayakers, and surfers. Large well-formed waves draw a wide range of recreationalists and would create a water trail and whitewater features of national or international caliber. Features that reliably create three to five feet high waves with good characteristics are highly desirable for river surfing, rafting, kayaking and other boarding sports.



Continuous recreational river corridors have lately been called water trails or blueways. This eleven mile reach is sprinkled with great whitewater features and scenic views, and would set a new standard in Colorado and the west.

**Average Daily Flow over Last 50 Years
Arkansas River - Canon City**



In Colorado, the wave feature in Glenwood is a good example of such a feature. Skillful application here would reliably create wave features over the duration of the season and at flow rates normally experienced on the Arkansas. Waves at features in Boise, Idaho, and other locations, have been created within the mid-May through September average daily flow range of 600 to 2400 cfs as shown on the graph above. Creating a string of high-quality waves and holes throughout this eleven mile reach is a primary focus. Constructing new drops, such as those recently constructed at Centennial Park, would be part of this planning effort. However, the construction of new drops within this reach can be difficult and costly. This is primarily due to the impacts of such new features on the flood capacity of the river. New drops can elevate regulatory floodways and mitigation of these impacts is often very expensive.

This is particularly true in rivers such as the Arkansas as new drops can reduce the capacity for rivers to carry cobble or what is known as bed material. This in turn results in deposition of the cobble and increases the river bed and floodplain elevation beyond what is predicted using standard modeling. This secondary effect of reducing the rivers ability to transport cobble and river bed material has been practically detrimental on a number of rivers in Colorado.



(All Photos copyrighted)

**New wave features brings more people, sports, spectators and fun
- during normal river flows.**

IV. PROPOSED IN-RIVER IMPROVEMENTS

This level of planning is the most basic. This does not mean that the results or value are diminished, rather initial planning efforts are the most critical phase in implementing a great vision and plan. Clearly this is caveated by the quality of the plan and the assumptions, and that subsequent efforts including funding, and design efforts that are needed effectively implement it. Various improvements are described below, and shown on the attached figures.

While there have been many recreational whitewater features built in Colorado, the performance of these has varied widely. Most of the whitewater structures built in Colorado have experienced structural failure and have required significant repairs or reconstruction. While all sites require some maintenance, repairs related to failure are much more costly and should not be confused. Others constructed whitewater features have not performed as intended. One underlying fundamental in the development of this plan is that all improvements are designed as permanent structures with a very low probability of failure and with performance demonstrated as intended. This approach usually results in the lowest life cycle costs and reduces the safety risk exhibited by structures that create dangerous conditions during failure. This fundamental is taken into account in our range of costs and in the planning of features. However, future planning, budgeting, and design should be oriented toward robust features that will be a permanent amenity rather than an on-going headache and safety concern. The creation of permanent durable features that reliably perform over a wide range of flows have been consistently met since the early 1980s by several design teams.

Design Considerations for Structures and Features

There are numerous consideration when planning and designing improvements within a recreational river corridor. A more complete narrative can be found in the latest draft of the Urban Drainage and Flood Control (UDFCD) design criteria manual¹. The following considerations are particularly relevant and should be reviewed when making improvements within this reach of the Arkansas River. The Cities may want to consider adopting these or other design criteria so as to facilitate implementation of the long-term vision.

1. **Egress.** Provide multiple opportunities for egress out of the channel – particularly in critical locations such as before and after rapids or drop structures.
2. **Create Opportunities for Self Rescue.** Avoid hydraulic and physical conditions that make it difficult for in-channel users to access the banks. For structures that significantly impair self-rescue, consider sloped racks and sides and ladders or stairs.
3. **Sharp Edges.** Avoid sharp edges and protruding objects.
4. **Strainers.** Avoid the creation of “strainers” and the potential for debris to collect and act as such. Accumulation of debris on bridge piers, intakes, railing or other infrastructure and woody vegetation or features used for fish habitat or bank stabilization are of primary concern.



Limited Closure on Arkansas River
Posted June 3, 2014

Performance of recent improvements on the Silver Bullet Diversion Drop was not as anticipated and resulted in closure of this reach of the Arkansas River and redesign.

(Photo and caption from AWWA)

5. **Intakes and Screens.** Prevent accidental entry into gates or inlet works with bar racks or screens at intakes (headgates) and design for approach velocities so as not to create impingement hazards.
6. **Utilities and Apparatus.** Provide physical separation or barriers if practical and (at a minimum) warning buoys and signs when hydraulic grates or screens, sluice gates, etc. are accessible and present a hazard to in-river users.
7. **Fish and habitat considerations.** Include integral or separate “roughened channel” fish passage² which support both recreational use and fish passage and aquatic habitat.
8. **Safety Signage.** Include warning signs of hazards (intakes, etc.) upstream of hazards and at the start of drop structures or a series of drop structures. Signs to advise positive actions such as encouraging the use of proper equipment are also prudent.

Recreational improvements proposed in this master plan are described in the following sub-sections. A summary table with subjective rankings and cost ranges of the improvements is included in the final section of this memorandum.

Existing Diversions

Recreational whitewater features are often best located at existing diversions where floodplain impacts have already been experienced and have (hopefully) been included in floodplain modeling and local planning. Furthermore, it is economical to have one drop structure provide both the pool needed for diverting flows and the downstream conditions needed to create a whitewater feature. These two functions are readily accommodated by the same structure with several attributes of recreational features improving diversions performance. The addition of recreational and navigable features to diversion dams has been studied and successfully applied since the 1980s.^{3,4,5}

There are eight diversions along this eleven mile reach, they are shown on the attached plan labeled Eastern Fremont County- Trails, Open Space & River Corridor Master Plan – River Enhancements & Recreation. Starting at the upstream end of the reach, these include the:

- Hydraulic Ditch,
- City's Water Supply Diversion,
- Intake for the power plant,
- Oil Creek Ditch,
- Fremont Ditch,
- Minnequa Dam,
- Diversion 1,600 l.f. d/s of the Minnequa Dam, and the
- Lester Attleberry Diversion.

Pathways (portages) should be provided around all drop structures - even if designed for boat passage, and around potentially dangerous obstructions or areas with dangerous hydraulic conditions. Portages around boatable drop structures are needed because they provide an alternative route for those who do not wish to run the whitewater drop; or if flow rates, the presence of debris, or other conditions make running the drop structure hazardous. Jetties upstream of the entrance at water's edge to the portage path are also included. Maintenance access such as that needed for the removal of debris should be also be included at all diversion drops.

Signage should be provided at locations where public use is intended near hydraulic structures and where hazards are not obvious to the responsible user. Warning signs for dams or drop structures that are to be avoided (i.e. having no passage) are critical. There are a number of signage examples and guidelines across the United States.

Hydraulic, Oil Creek and Lester Attleberry Diversions

Preliminary designs for replacement of existing drops with navigable drops for the Hydraulic Diversion and the Oil Creek Diversion have been developed by the Arkansas Headwaters Recreation Area (AHRA). In addition there may be ongoing consideration of upgrading the Lester Attleberry Diversion. (Plans not currently available.) These improvements have been identified as high priority by the Colorado Parks and Wildlife in this region of the Arkansas River. The proposed plans appear to fit with the objectives of this planning effort. Implementation, final design and funding of these improvements, like all others envisioned in this plan, should be based upon the performance reliability, structural durability, and recreational objectives discussed above. Additional armoring and structure will likely be needed to meet design standards as discussed above. To meet some of these objectives, the footprints and configuration of the proposed structures may be altered somewhat, but these renderings are sufficient for this level of planning. As stated above, portage facilities, provisions for maintenance access, permanent recreational access, and signage should be added to these designs. Other designs that would create higher quality wave features that operate over a wider range of flows could be considered. These could include adjustable wave features and other amenities. Evaluation of these are beyond the scope of this effort, but should be considered (at some level) in future planning and design.

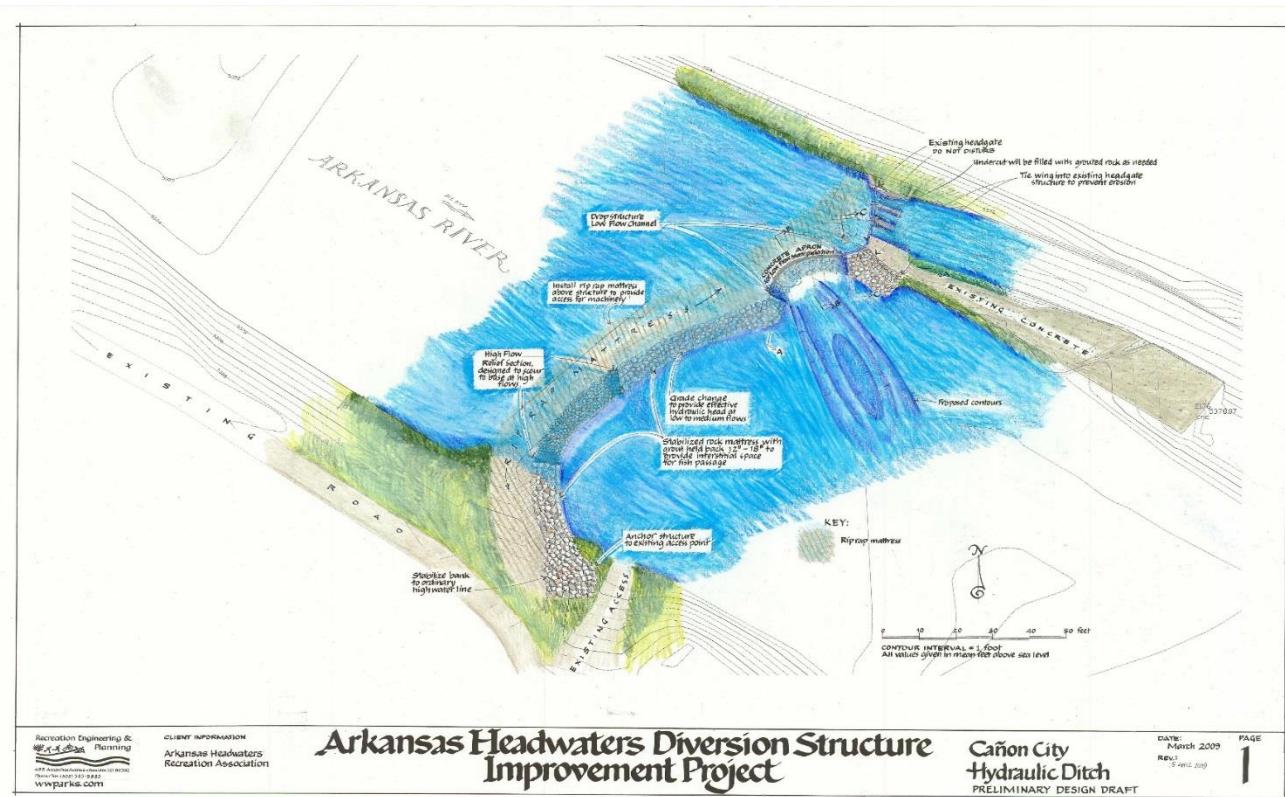


Lester Attleberry Diversion

Consideration for developing the low-lying land between the river and the diversion ditch into a naturalistic river park should be made if:

- the power plant property adjacent to the Oil Creek Diversion is to be developed into a park, and
- the diverter can be assured of improvements to operations and maintenance of the diversion.

This would be a great attribute to the river corridor and whitewater features.



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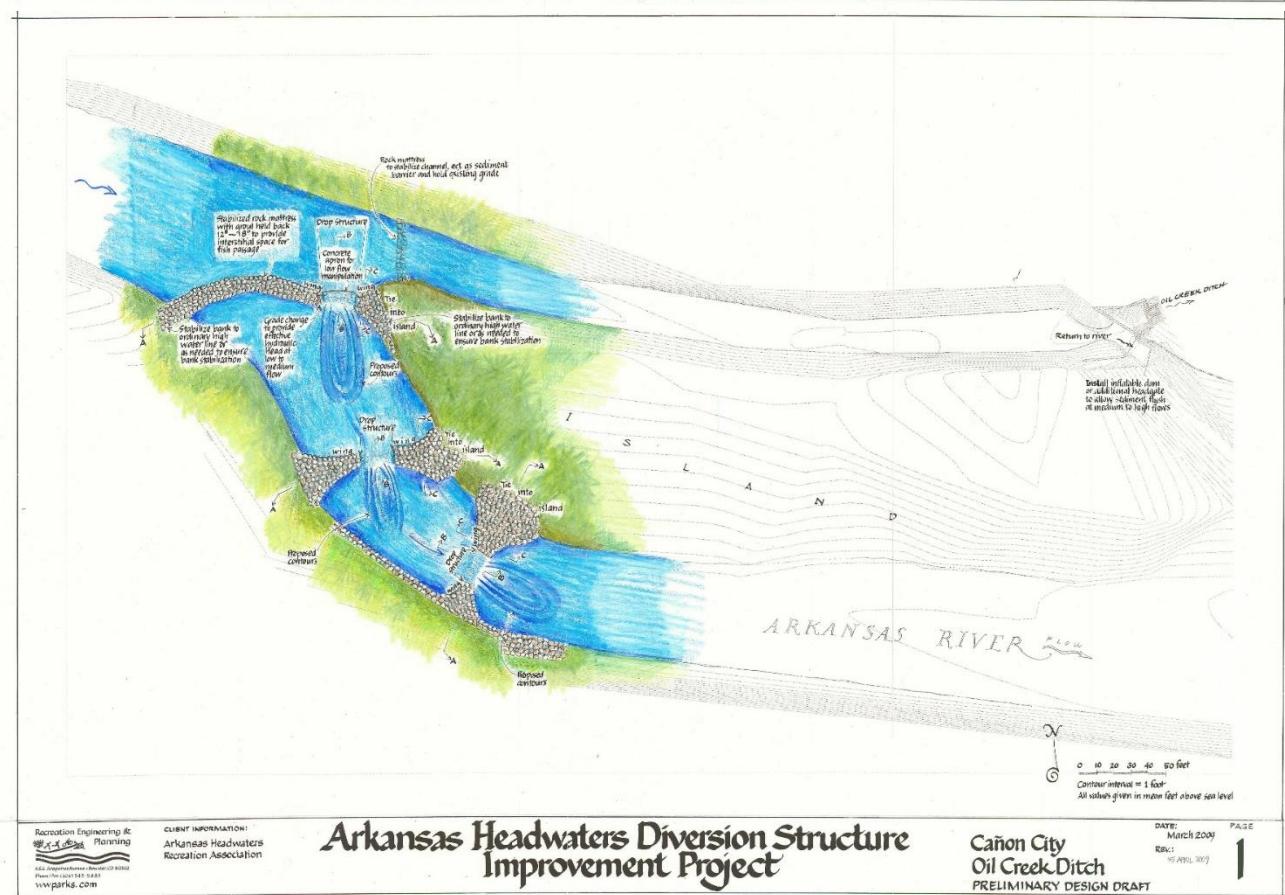
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DATE: March 2009
REV: 04-02-2009

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Cañon City
Hydraulic Ditch
PRELIMINARY DESIGN DRAFT



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Cañon City
Oil Creek Ditch
PRELIMINARY DESIGN DRAFT

Preliminary Designs of the Hydraulic and Oil Creek Ditches by the Arkansas Headwaters Recreation Area (Plans included in the attachments)

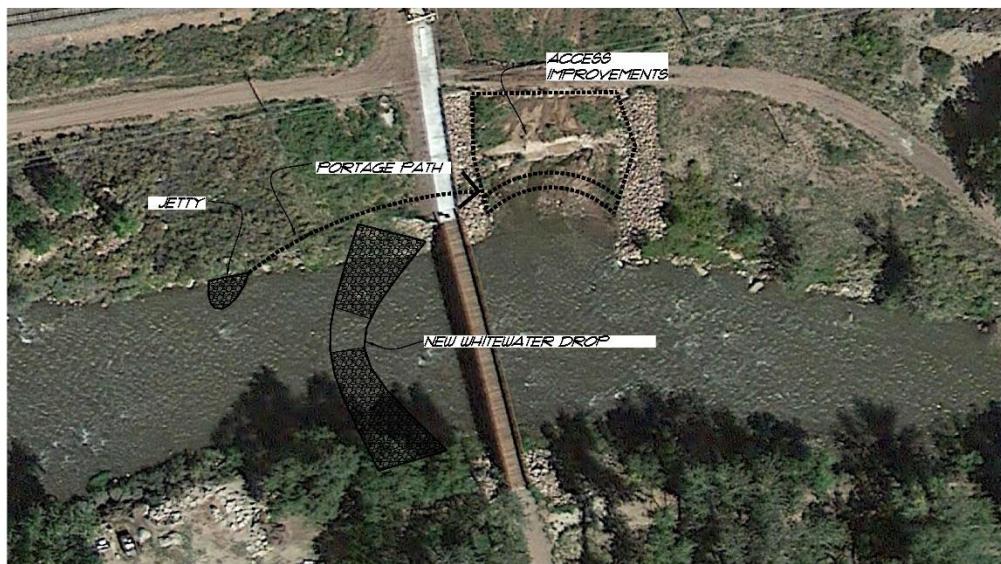
City Water Supply Diversion

This diversion was designed by the late Bill Taggart – the pioneer of whitewater design in this country. It was designed to allow basic passage through the diversion dam, and not as a destination or highly recreational whitewater feature. This was due (in part) to the small size of the structure compared to the amount of vertical drop needed and related capital costs. The structure appears to be of robust and permanent construction and performs its diversion functions well.

There are a number of alternative improvements that could be implemented at this diversion to increase recreational value. One is to modify one of the drops, (probably the lower one) to create a signature wave feature. Other alternatives would include modifying the river right grade control structures for boating or equip with flashboards to increase the flow to the existing chutes. A promising



The free spanning foot bridge located upstream of the Oil Creek Ditch Diversion and downstream of the City's Water supply Diversion is an excellent location for a new drop. The bridge would provide excellent viewing and the location would create a more of a continuous recreational corridor.



option is to essentially move the second drop further downstream under the footbridge where access and the site is more conducive to recreation and viewing. This would be accomplished by constructing a new drop at this location and possibly some minor modifications to the lower drop of the diversion. For reasons described above, this is the only new drop proposed within this plan, and the ability to reasonably accomplish this would need to be determined in a detailed preliminary design with final design level hydraulic analysis. Refinements in the design of the proposed upper drop at the Oil Creek Ditch diversion may also be required. Some property acquisition or easements on river left and related improvements would be needed to enhance access to this drop structure. Access on river right has the benefit of allowing legal access to the existing city diversion waves.

Intake for the power plant

The existing intake for the power plant is constructed with a variety of steel, rock and rubble. In addition to being an eyesore, the various sharp edges and submerged structure or debris create an unnecessary hazard to river users. It is likely that submerged debris, rubble, and sharp rock exist around and possibly downstream of the structure. It is proposed that this existing intake structure and related submerged debris be removed. If the intake is to be abandoned, then the site should be restored to a natural appearing condition. If the diversion is to remain, we recommend a new diversion and screened inlet that meets current standards for recreation safety.



Existing intake for the power plant creates eyesore and safety issues.

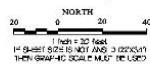
Fremont Ditch

The existing drop consists of loose boulders and rock arranged in a diagonal fashion across the channel. The intent of the diagonal alignment is not clear and future design effort should investigate this orientation. Large floating debris have accumulated on the higher boulders and create an unnecessary hazard.

This single drop could be replaced by a single or double drop depending upon budget and recreational priorities. The schematic layout shown in the adjacent figure shows a single drop configuration with a counter weir to maintain local stability and a recovery zone. Improvements to the berm that separates the south bank of the river from the ditch would be integrated into the design. A coarse debris rack with improved access should also be included.



The Existing Drop at the Fremont Diversion.

EASTERN FREMONT COUNTY TRAILS, OPEN SPACE & RIVER CORRIDOR MASTER PLAN
FREMONT DIVERSIONPRELIMINARY
October 10, 2014

The Proposed Schematic Layout of the Fremont Drop Structure

Minnequa Dam

The Minnequa Dam represents the most significant impediment within this reach of the Arkansas River. The dam consists of a number of radial gates which open from the bottom upward. When functioning, these gates create a significant and unavoidable hazard by tending to pull recreationalists under water and through the gate. It is our understanding that several days after the field trip, three women experienced this hazard first hand. These gates preclude the addition of a whitewater bypass within the vicinity of the dam. From a recreational corridor planning perspective, this significant obstruction dramatically inhibits the interconnection and continuation of this recreational water trail.

There are a number of methods to adapt navigable whitewater passage around or through the dam, but most, if not all, of the existing gates would need to be removed and replaced with less hazardous gates. This has been successfully accomplished at a number of structures, but given the size and number of the existing gates, capital costs would be quite high.

Portage facilities at the Minnequa Dam are needed to create an effective water trail and continuous whitewater recreational corridor. As discussed above, even if the Minnequa Dam is made navigable, portage facilities are still desirable.

Two alternatives for portage around the Minnequa Dam are shown. The North Portage route would likely entail an elevated walkway and a path cut into the steep slope and around the north abutment. The South Portage would use the existing roads and require a foot bridge over the canal. Inclusion of vehicular access with parking for egress would be a significant advantage of the South Portage alternative. Owner approval, easements, and other issues would obviously be needed to construct and maintain any portage facilities.

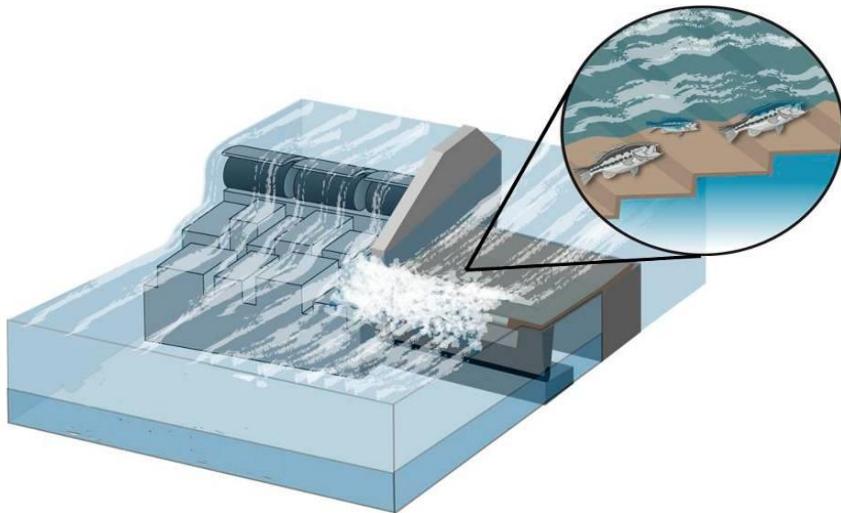
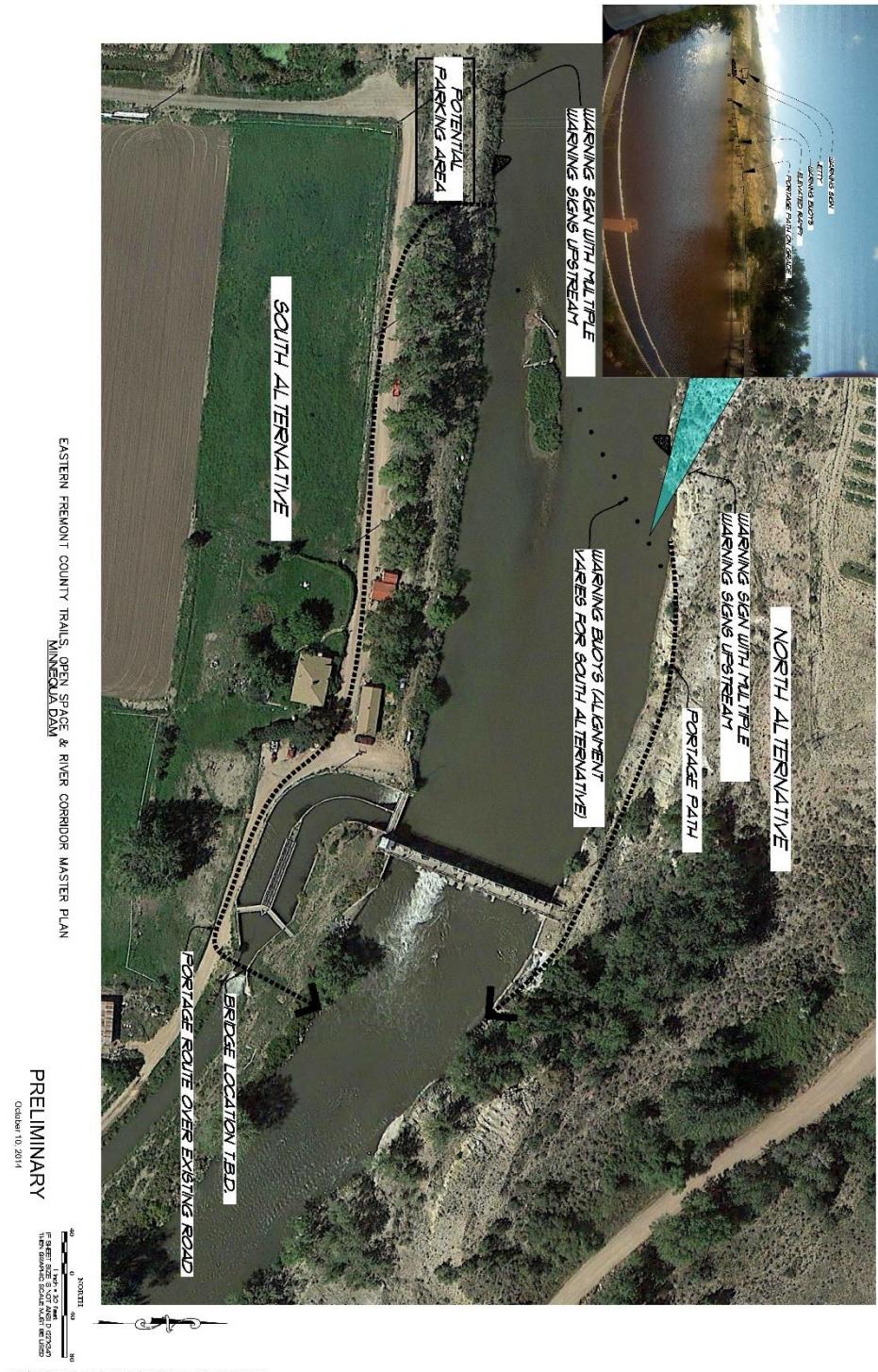


Illustration of low-hazard gates combined with navigable gates at a dam. In addition to fish passage, a navigable gate can be designed to create a world-class surf wave or a benign feature as desired.



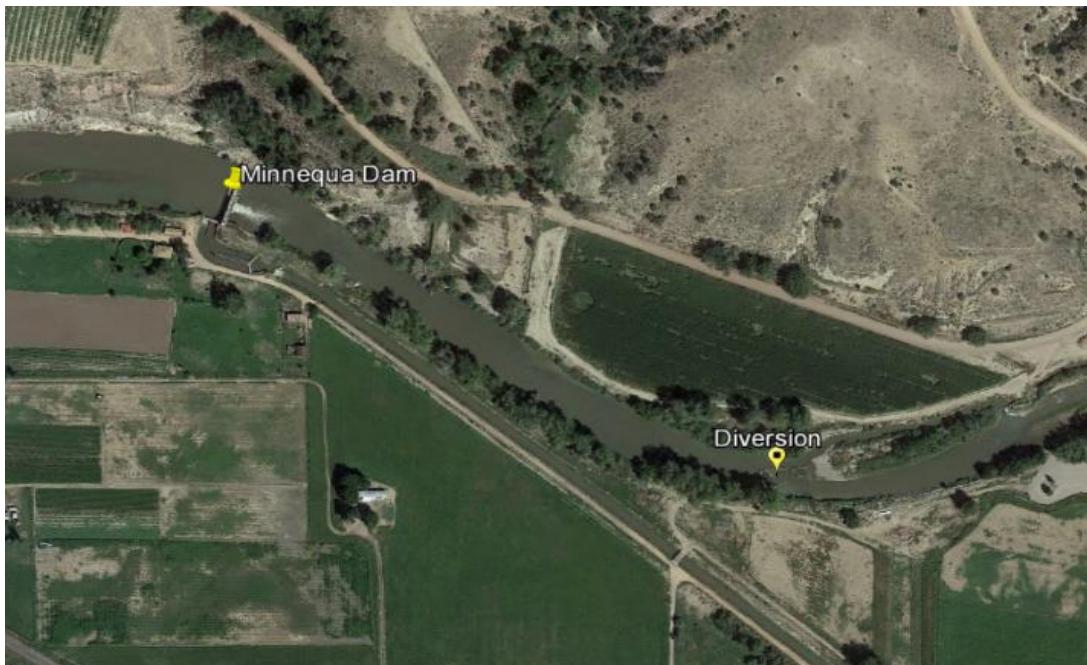
Minnequa Dam with its hazardous radial gates.



The radial gates of the Minnequa Dam preclude navigable passage through the dam. Without replacement of the gates, navigable passage is not viable and portage facilities are needed to continue the water trail.

Diversion 1,600 l.f. d/s of the Minnequa Dam

The name and details of this diversion are not known to the design team. It appears that a single reconstructed drop with portage facilities and intake improvements would enhance the recreational and safety aspects of this existing drop. There appears to be an advantage of connecting and improving access to this drop to the existing Pathfinder Park parking area/boat ramp.



Diversion downstream of Minnequa Dam

Diverters as Stakeholders

Recreational improvements to diversions must be accomplished with cooperation of the diverter. Well-designed and integrated improvements to diversions improve recreational uses, safety, and fish passage, avoid negative impacts to flood plains, and improve diversion performance. Diversion performance can be improved by reducing the intake of sand and sediments, reducing the intake of floatable debris, reducing maintenance, and eliminating the need to rebuild the structure – even after extreme flooding events. Agreements related to maintenance and operations are often drafted to insure that the diverter and the project proponents are clear on future responsibilities. In our experience when recreational features have been added to diversions, the diverter has always experienced improvements in operations or reduced costs. It should be realized by project stakeholders that operations of the diversion take precedents to recreational and aesthetic objectives.

Cañon City Whitewater Park

From a recreational standpoint, the upper drop appears to be functioning quite well. While observed at only one flow, the hydraulic formation looked good. Access and formation of the eddies also looked good.

Observations of knowledgeable persons of the features performance at other flow rates were quite positive. The second feature appeared to be in good physical condition, is appropriately located, and has good access. In our opinion, the observed recreational performance was less than the first feature and some have reported that its performance at other flows is not of the caliber of the upper drop at higher flow rates. Stakeholders also reported that the more benign hydraulic is beneficial for beginner users.

Due to the central location, and modest cost to modify or “tune” these features, consideration for modification of these features is suggested. Objectives could include having one or both create signature waves or holes at higher and the lower range of typical flows. Another objective could be to have one of the features “in” or performing well throughout the typical recreational season.



The Cañon City Whitewater Park was developed along a stretch of the Arkansas River with the help of GOCO funds.



Upper Drop at Centennial Park creates a recreational whitewater feature with accessible eddies at the 830 cfs flow rate.



The lower drop did not form a highly recreational feature at the 830 cfs flow rate.

A well-formed wave feature that would support freestyle kayaking tricks and river surfing is readily achievable at the 830 cfs flow rate experienced during our site visit. A large wave that is optimal for wave surfing with surf boards, “boogie” boards, and recreational kayaking can also accommodate less skilled boaters. It should be noted that river surfing is different than standup paddle boarding and is similar to surfing on ocean waves with the ability to rapidly maneuver, cut, and perform similar tricks.



These two features create waves and holes of national stature at flow rates similar to those the day of the site visit (830cfs).

The tuning efforts could be minimal or more involved and possibly include the addition of an adjustable element on top of the structures that form these features. Such improvements would allow the creation of large and stable waves over a wide range of river flows that would be optimal whitewater for competition and recreation. Numeric and physical model studies, as well as design experience has shown that the shape of certain relatively small features within a recreational whitewater drop can have tremendous impact on the formation of these finicky waves. However the result are waves that are rare and highly desirable in the whitewater kayaking and river surfing world.

Preliminary design and computer modeling of tuning improvements would likely be needed to provide an estimate of cost for budgeting and a sense of the feature that would result throughout the range of flows.

Water Trail Improvements

Improvements to the various diversions and whitewater park would create a string of highly recreational features to add exiting interest to rafters, kayakers, surfers, and observers. Improvements to link these amenities into one regional attraction can be considered water trail improvements. These include access to the river's edge, aesthetic improvements, more naturalistic river bank armoring, fishing access, signage, and creation of deeper channels (thalweg) within the river to create better fish habitat, more interesting features, and improved recreational boating.

In addition, the development of this water trail should include removal of sharp rock and debris that is scattered in and along the banks throughout this reach. In addition to improving aesthetics, it would reduce the hazards related to foot entrapment and abrasions.

These improvements can be accomplished over time, but including them in planning, budgeting, and on-going development should be considered for adoption as part of this plan.



Rock features between the whitewater drops could be enhanced to create deeper thalweg with eddies to further enhance and connect this focal area of the recreational reach



Aesthetic Improvements (such as needed at this wall) would enhance the water trail experience.

Improvements such as these could be done economically and constructed on a long-term basis to allow for budgeting.



Jetties can be placed along the river's edge to create eddies, stabilize river banks, and create interesting currents for river recreationalists. These should be considered throughout this entire reach. However due to flood conveyance and river stabilization issues, detailed modeling and evaluation are needed to determine placement and design. This is well beyond the scope of this effort and should be included in future planning efforts.

V. BUDGETING AND PRIORITIZATION

The improvements shown on the attached plan labeled Eastern Fremont County- Trails, Open Space & River Corridor Master Plan and described above are summarized in the following table. Cost ranges, safety improvements, and recreational benefits have been categorized into groups. As this is a broad level review, the benefits are subjective and based upon the experience of the design team. Cost ranges are broad and also reflect judgment of the team. The intent is to provide the Stakeholders with an overall vision and help guide the initial steps of implementation of the plan. Once it is desired to pursue specific improvements, preliminary design should be conducted to more accurately assess costs and benefits. The more significant of these efforts such as diversion improvements should include detailed hydraulic analysis, to insure diversion performance, verify adverse impacts to adjacent land owners, and the regulatory floodplain. The preliminary design should also include working with the local diverters and land owners and developing consensus with stakeholders. As with traditional civil works projects, this would then allow for further funding efforts, permitting, land acquisitions or easements –if needed, and a focused final design that would meet expectations.

Description of Categories

Categories for Benefit Cost Ratio	
A	Great, Key element in implementation of in-river recreation plan
B	Good, important element in implementation of in-river recreation plan
C	Fair, Likely that a detailed analysis of the benefit/cost ratio greater than one.
Unsure	Analysis Required to make basic judgment
Safety Categories for In-river Recreationalists	
A	Of the highest priority -particularly if a continuous recreational corridor is desired.
B	Proposed improvement would significantly reduce existing river hazard.
C	Proposed improvement would reduce exiting river hazard
n.a.	Proposed improvement would have no significant impact on safety
Categories for Costing	
Range of Capital Costs	
1	\$20 to \$200k
2	\$200k to \$ 500k
3	\$500k to \$1.5m
4	\$1.5m to \$3m
5	\$3m to \$15m
Notes:	
Land and easement costs (if needed) not included.	

Safety, Cost, and Recreational Benefit/Cost Categorization Table.

Safety Category	Recreational Benefit /Cost Category	Cost Category	Recreational River Improvement	Notes
A	A	1 to 2 (i)	Portage Facilities around Minnequa Dam	Safety Priority and needed to connect recreational river reach between Canon City and the City of Florence
A	A	1 (ii)	River Access and Parking Upstream & Downstream of Minnequa Dam	same
A	Unsure	5	Minnequa Dam- Replace gates and create boat passage	The need to greatly lower the hazard of the existing radial gates combined with the height of this dam would make this option quite expensive.
B	A (iv) or B	3 to 4 (i)	New Whitewater Drops, abutments, and sub structure to stabilize upstream lowlands area of Power Plant Park	Reduce hazards and create highly recreational features
B	A or B (v)	2	Lester Attleberry Diversion	One or two drops is possible
B	B	3	New Whitewater Drops and Bank Improvements at Oil Creek Diversion	Reduce hazards and create highly recreational features
B	B	2	New Whitewater Drops at the Hydraulic Diversion	Reduce hazards and create highly recreational features
B	B	1 to 3 (iii)	Removal of debris (angular rock etc.) in River - Primarily downstream of diversions	Angular rock and construction debris - creates hazards in reach detracts from river experience
B	B	2	New Whitewater Drop at Fremont Ditch	Reduce hazards and create highly recreational features
C	C	2	River Improvements between Centennial Park Drops	Boulder Jetties and Transverse grade control to create deeper thalweg and eddies.
n.a.	C	2	Improvements at City Water Intake Drop to Create Wave Feature	Existing structure could be modified to create a large wave feature - low cost/ recreational benefit ratio
n.a..	A	1	"Big Wave" Improvements to Lower Whitewater Feature at Centennial Park	Central location and low cost/recreational benefit ratio
General Notes				
Safety and Recreational opinions based upon objective to create a recreationally connected reach between Canon City and the City of Florence				
Safety priorities , cost benefit ratio, and cost ranges are based upon professional judgment without detailed analysis. Input from stakeholders recommended to temper these initial cursory judgments. Further detailed analysis may alter these initial opinions.				
Foot Notes				
i	Depending on option, easements, etc.			
ii	Plus acquisition of lands, easements (if any) , or other needed access improvements			
iii	Depending upon extent - further investigation and input from experienced rafters needed.			
iv	If the adjacent area is developed into a park and improvements are highly integrated into park			
v	If Minnequa Dam portage or navigability improvements are made, a high quality whitewater feature could create higher recreational value as it would be the final rapid in this recreational reach			

Glossary of Related Terms

The following glossary is intended to improve consistency and accuracy in communications with the river recreating community. The reader should note that the definitions of all terms are not universally recognized within this specialized industry.

Term or Abbreviation	Meaning
Aggradation	Aggradation involves the raising of the channel bed elevation, an increase in width/depth ratio, and often a corresponding decrease in channel capacity.
Attainable	The ability for recreational water craft to navigate upstream (in eddies) to enter a whitewater wave or hole from downstream. This allows recreationalists to stay at one feature for extended periods of time.
Bed Load	Coarse sediment transported along the bottom of the river by saltation, sliding, hopping, etc.
Benthic Macroinvertebrates	Benthic Macroinvertebrates are small animals living among the sediments and stones on the bottom of streams, rivers and lakes. Insects comprise the largest diversity of these organisms and include mayflies, stoneflies, caddisflies, beetles, midges, crane flies, dragonflies, and others. Other members of the benthic macro invertebrate community are snails, clams, aquatic worms, and crayfish. They are extremely important in the food chain of aquatic environments as they are important players in the processing and cycling of nutrients and are major food sources for fish and other aquatic animals
Counter Weir	A counter weir is a drop structure or armored channel section downstream of a drop structure, pool, or hydraulic disturbance. It is usually smaller than the upstream drop structure and maintains the elevation of the tailwater experienced by the upstream drop structure or other hydraulic disturbance. They are often placed at the downstream limit of the Recovery Pool.
Drop or Drop Structure	A constructed feature or structure in a Channel that creates a downward step in the water surface and a resulting hydraulic jump downstream of the structure. These can typically have a hydraulic drop of one-half to eight feet. These structures can be used for a number of purposes including diversions, recreation, and river stability. They can also be called grade control structures, diversions, grade control structures, low-head dams, weirs, or just drops. They have been constructed of boulders, concrete, steel, wood, and plastic. Regarding recreational whitewater, a Drop Structure is a physical feature that forms a "wave" or "hole", boat chute, whitewater park or whitewater feature.
Eddies	Eddies are usually formed downstream of an obstruction or curvature in a river or channel. Eddies swirl on the horizontal surface of the water. Typically, they are areas where the downward movement of water is partially or fully arrested and currents flow in an upstream direction – if slow enough, a nice place to rest or to make one's way upstream.

Freestyle	Competitive event where boaters perform tricks on a “breaking wave” or “hole”.
Hole(s)	A “hole” is formed when the supercritical jet on the downstream face of an obstruction within the channel is directed toward the invert within the formation of the hydraulic jump. This causes the surface water and the upper portion of the water column to flow back upstream toward the obstruction. A strong breaking wave (see below) is often confused with a hole. It differs from a hole in that the supercritical jet is lifted and directed within the upper portion of the water column within the initial formation of the hydraulic jump. The distinction between a hole and a breaking wave however is not consistently identified within the whitewater community. In hydraulic design terms, it is a particular formation of a hydraulic jump (see below). In the design of man-made whitewater or other structures within a river or waterway, it is usually created by a Drop Structure or structure(s) which create a significant constriction in the channel. Holes in recreational structures are typically designed for entertainment and skill-building, places where paddlers use the features to perform various moves.
	Poorly designed holes can be dangerous. They can dramatically aerate the water, possibly to the point where they lose the capacity to carry watercraft. In overly-retentive holes or “keepers” (see below) a boater may become stuck in the recirculating water. Some of the most dangerous types of holes are formed by low-head dams (weirs), ledges, and similar types of obstruction. Low-head dams or other structures that form a uniform hydraulic with no irregular or weak point are particularly dangerous. Low-head dams are insidiously dangerous because their danger cannot be easily recognized by people who have not studied whitewater.
Hydraulic	The term “hydraulic” can refer to a “hole” or “wave” – see definitions. The technical term is a hydraulic jump, although it could also be used to describe a hydraulic formation known as a supercritical shock wave.
Hydraulic Drop	Sometimes referred to as just “drop”. The vertical distance between the upstream and downstream water surface elevation. This can be applied to a single feature or to multiple features within a river reach or whitewater course.
Hydraulic Jump	A hydraulic transitional formation that occurs between supercritical and subcritical flow. This occurs downstream of a constriction or Drop Structure when the fast flow collides with the slower moving flow in a downstream pool. It is commonly referred to by river recreationalists as a “hole”, “wave”, or “hydraulic”.
Keeper	See Overly-Retentive Hydraulic.

Maintenance	Includes efforts and costs for: clean up after high-flow events, normal maintenance related to parks, re-vegetation after large storms, and replacement of loose rock if: 1.) the movement does not negatively impact whitewater performance/safety and 2.) The efforts are previously identified and, optimally, included in an Operations and Maintenance Plan and budgeting. If these conditions are not met, then operations would likely be considered repairs, replacement, or reconstruction. Also see Structural Failure and Tuning/Adjustments.
Overly-Retentive Hydraulic	A hydraulic condition –technically a specific form or a hydraulic jump –that can occur downstream of a natural or man-made feature (such as a low-head dam). This condition tends to trap boaters, swimmers, or other floating objects for an extended length of time. This condition can also be called a submerged hydraulic, keeper, reverse roller, drowning machine or a variety of negative descriptors followed by the term “hole” or “hydraulic”.
Play Boating	Recreational boating primarily for surfing and performing “tricks” on breaking waves or in holes. These are typically whitewater kayaks and canoes. This type of recreational use can also include surfing, standup paddle boarding, and body boarding.
Pillows	Pillows are formed when a large flow of water runs into a large obstruction, causing water to "pile up" or "boil" against the face of the obstruction. Pillows are also known as Pressure Waves.
Portages or Portage Paths	Portages or portage paths are land routes used by in-river users to bypass or avoid dams, drop structures, or other in-channel obstructions. Portages can also serve as “detours” around sections of water that in-river users choose not to run.
Put-in	A put-in is a formalized area that facilitates access of in-river users and their craft to enter the water. They are often located at the downstream end of a portage path or upstream of a reach of river that is commonly used by recreationalists.
Recovery Pool or Zone	A recovery zone or pool is slow moving reach of the river immediately downstream of a drop structure, series of drop structures, or other challenging hydraulic feature that allows for recovery by recreational users.
River Access (See Put-in and Take out)	A formalized area that facilitates access of in-river users and their craft to enter or exit the water. Put-ins and Take-outs are river accesses with one particular emphasis.
Slalom	Competitive event where boaters negotiate gates suspended over the river for the fastest time.
Strainers.	Strainers can be deadly obstacles within a boatable channel. Water passes through but solid objects like boats or people do not, similar to a kitchen strainer used to drain spaghetti or clean vegetables. A tree or fallen branch is the most common type.

Structural Failure	Movement of rock, or structures that: 1) is unanticipated or 2) results in a condition that negatively impacts safety. Correction of structural failures usually occurs after the initial construction. Also see Maintenance and Tuning.
Submerged Hydraulic Jump	See Overly-Retentive Hydraulic
Take-out	A take-out is a formalized area where in-river users can exit the river with their craft. They are often located at the upstream end of a portage path or at the downstream end of a reach of river that is commonly used by recreationalists.
Tailwater	Tailwater is the downstream elevation of the water in a channel relative to a particular feature or structure. Tailwater has a significant impact on the performance of a drop structure and the resulting hydraulic jump.
Tuning or Adjustments	Due to the complex nature of hydraulics and the use of irregular boulders, some adjustments to rock or structure is usually required after the initial construction and the river is observed to flow through the features. This is usually conducted at the direction of the designer shortly after the initial construction or after the first year or two of operations. Also see Maintenance and Structural Failure.
Water Trail or Blueway	A water trail or blue way is a recreational corridor of open water, usually consisting of a reach of river(s) and perhaps lakes, which is readily navigated by various types of recreational watercraft. Water trails usually include land based improvements to facilitate this type of recreation. These improvements can include trails or paths to access the waterway, launch ramps, parking, restrooms, changing rooms, signage, and portages around drop structures, dams, or other impediments to continuous navigation. In-river improvements such as boat chutes around dams, navigable drop structures or whitewater parks are improvements that more enthusiastically support a river trail.
Wave(s)	Waves found in most man-made structures are formed similarly to holes and are sometimes referred to as a “hydraulic”. In hydraulic design terms, it is a formation of a hydraulic jump which is created downstream of supercritical flow. In the design of man-made whitewater or other structures within a river or channel, it is usually created by a Drop Structure or a structure which creates a significant constriction in the channel. Waves are noted by a smooth upward sloping face as the flow enters the hydraulic jump. This “green water” at the upstream portion of the formation is followed by a crest and downward sloping face. A wave can have a significant amount of whitewater or “haystack” and appear similar to a hole. These are called breaking waves. Sometimes a particularly large wave will also be followed by a long series of waves or “wave train”. Waves in channels can also be created without the formation of a hydraulic jump.

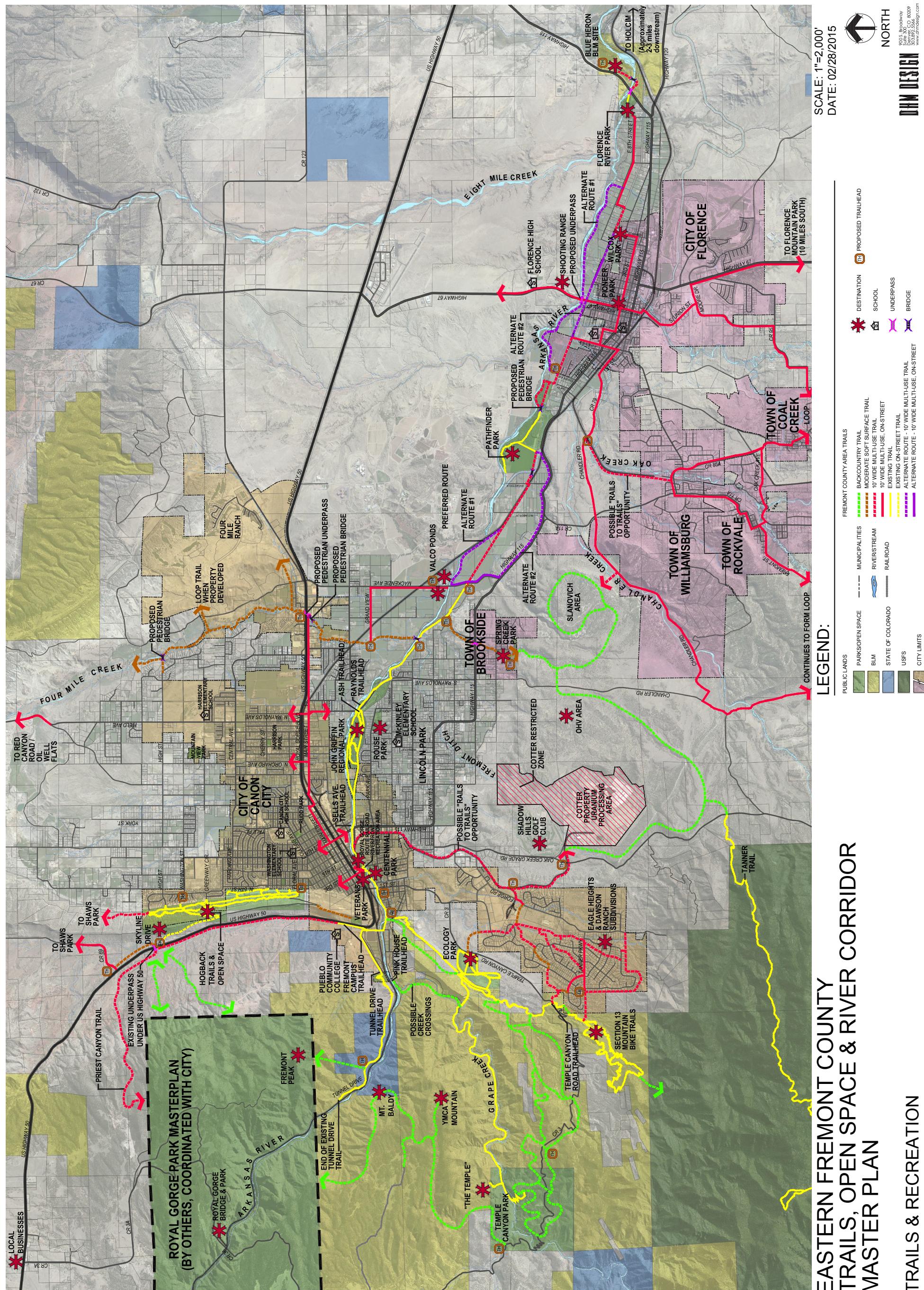
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Appendix 2:

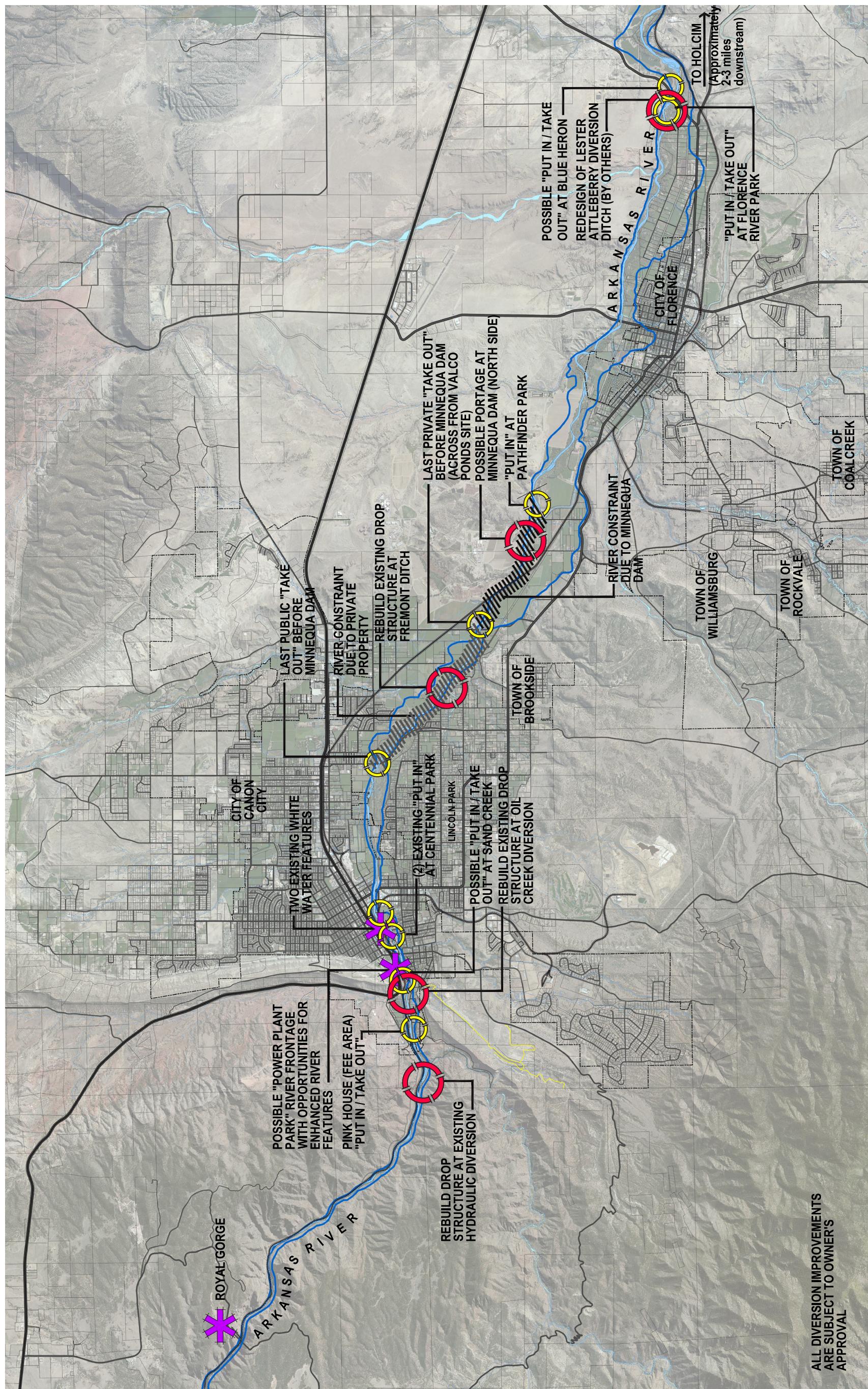
Project Area Maps





EASTERN FREMONT COUNTY TRAILS, OPEN SPACE & RIVER CORRIDOR MASTER PLAN

TRAILS & RECREATION



EASTERN FREMONT COUNTY TRAILS, OPEN SPACE & RIVER CORRIDOR MASTER PLAN

ALL DIVERSION IMPROVEMENTS
ARE SUBJECT TO OWNER'S
APPROVAL

LEGEND:

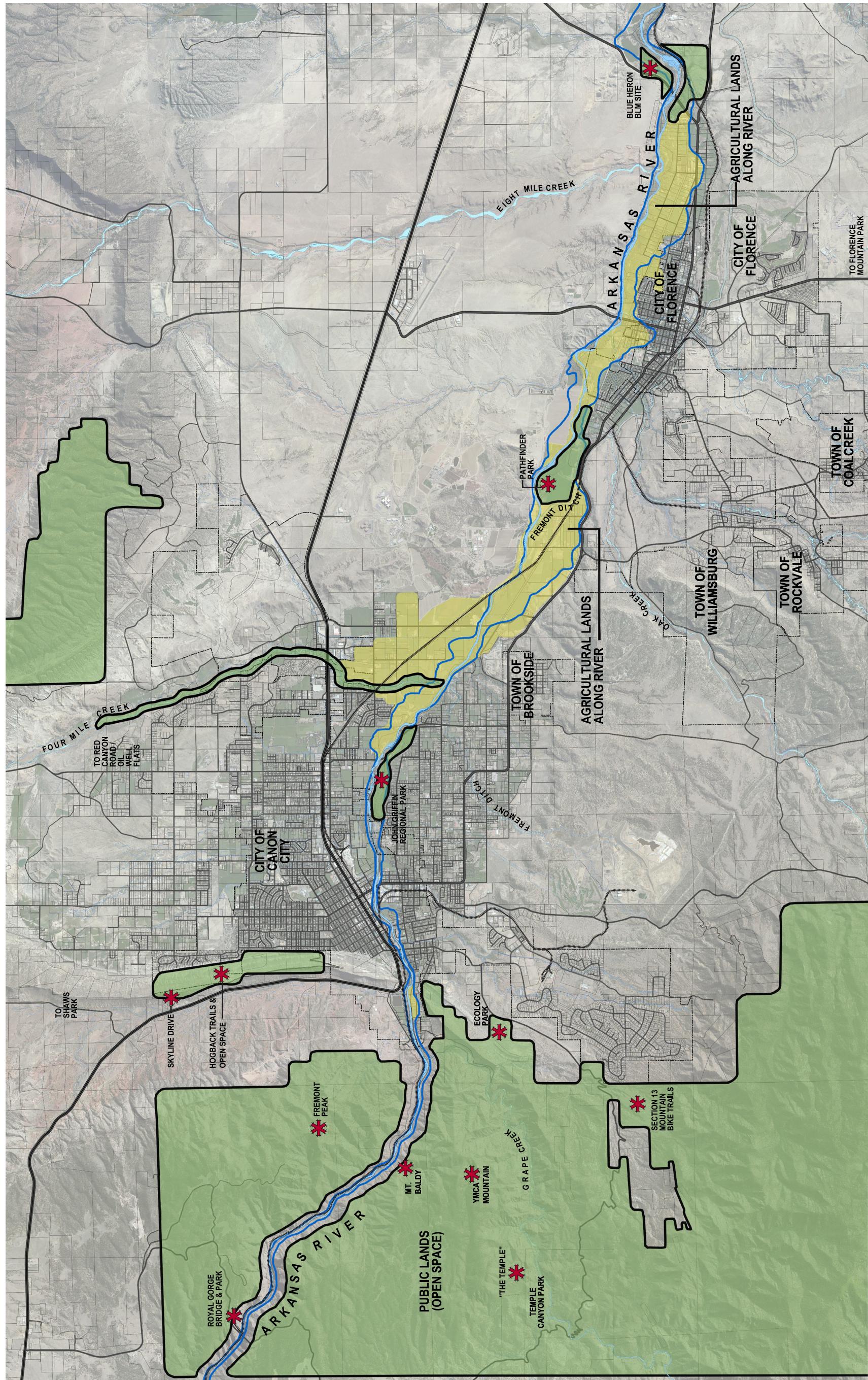
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DATE: 02/28/2015

RIVER ENHANCEMENTS & RECREATION

PUT IN / TAKE OUT 100 YEAR FLOODPLAIN

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EASTERN FREMONT COUNTY TRAILS, OPEN SPACE & RIVER CORRIDOR MASTER PLAN

OPEN SPACE CONSERVATION

SCALE: 1"=2,000'
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