

Helper City River Revitalization

Conceptual Study Report

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Introduction

This Conceptual Study outlines a vision for a restored and enhanced Price River and riparian corridor. The vision is to create an inviting riverfront that facilitates river recreation and supports ecological functions. Concepts are revolved around conserving riparian lands to buffer adjacent developments, preserve open space, improve flood capacity, and create an accessible riverfront. Concepts presented enhance recreation opportunities through a paved and soft trail system, picnic areas, and water craft launch sites. Focal features include whitewater waves, ADA access ramps, fishing ponds, and overlook areas.

The Price River runs through the heart of Helper City. Helper City is centrally located in Utah and known as a historic railroad town with charming downtown character. The Project is within the Price River Watershed and includes 2.5 miles on the mainstem. The Price River flows for 130 miles from 9,000 feet to 4,122 feet at the confluence with the Green River. The reach is in the upper portion of the watershed, approximately 30 miles downstream of Scofield Reservoir, and 0.5 miles downstream of Price Canyon. The reach is along the urban riverfront and characterized by mixed residential, commercial, and agricultural land uses. The reach is located from the north end of town at Balanced Rock, down to Spring Glen. Appendix A includes the vicinity map.



Transforming the Price River's neglected past.....

...to its celebrated future.....



Purpose and Need

The purpose of the River Revitalization Project is to maximize restoration potential of the Price River prior to redevelopments taking place along the riverfront. Helper City is in the planning phase to revitalize their downtown and improve stormwater infrastructure. Three overlying needs have been identified to guide planning efforts:

- 1.) The Project is immediately upstream of a 303(d) impaired segment of the Price River listed for partially supporting beneficial uses. There is a need to reduce and repair Non-point Source (NPS) pollution and implement Total Maximum Daily Load (TMDL) recommendations to help move the Price River toward meeting beneficial uses (aquatic health, and reduced TDS loads).
- 2.) Historic unpredictable flooding lead to levees and retaining walls confining the river. There is a need to maintain the flood control function while restoring ecological functions.
- 3.) Helper City is known as a historic railroad town with an economic base that fluctuates with coal production and the mining industry. Encouraging tourism and promoting economic development by enhancing recreation with green space, trails, fishing and whitewater will bring additional economic revenue to the area helping to offset the slow periods.

Goals and Objectives

The goals of the Study are to demonstrate that: 1) a healthy river and riparian environment can feasibly exist within Helper City, 2) restoration benefits the greater community, 3) restoration improves water quality, and 4) restoration encourages sustainable development. The objective is to maximize all of the valuable river functions such as; flood conveyance, sediment transport, recreation, and riparian and aquatic health. The Project goals and objectives promote the intrinsic economic, social, and environmental benefits of river revitalization.

Concept Planning

An inventory and analysis of the existing natural and man-made resources and conditions of the riverfront were conducted. This inventory included a topographic and GPS field survey of the channel and banks to collect data on the channel morphology, hydraulics, storm water outfalls, sediment, vegetation and other existing conditions. A conceptual design level hydraulic model was developed using HEC-RAS to evaluate channel capacity and flood flow elevations.

Concept level designs are presented in Appendix A. These drawings present ideas to address degradations, improve stream health, and facilitate recreation. Concepts presented align multiple local, county and statewide plans for restoration, recreation, and economic growth. These plans include the Helper City General Plan, Helper City Storm Water and Capital Facilities Improvement Plan, Carbon County Weed Management Plan, Carbon County Natural Resource Use and Management Plan, Carbon County and Price City Trails Plan, Utah Wildlife Action Plan, the DEQ/EPA West Colorado Total Maximum Daily Load Implementation Plan, and the Draft Price River Watershed Plan. Concept plans address the following objectives to complement existing plans:

1. Preserve open space
2. Support responsible development and long-term health of the land and watershed
3. Enhance multiple recreational uses
4. Promote alternative modes of transportation through pedestrian and bicycle trails
5. Encourage multi-agency and public and private landowner coordination
6. Support public education programs
7. Promote stewardship and connect citizens to the land
8. Maximize public and private benefits of water resources
9. Reduce non-point source pollution loading
10. Buffer and improve storm water quality and reduce quantity
11. Remove invasive species
12. Enhance the riparian area
13. Enhance the urban fishery
14. Improve fish passage
15. Facilitate angler access
16. Encourage tourism and business growth
17. Support economic development

Concept Implementation

The Project has been broken down into 5 reaches for ease of phasing the Project for implementation. The total project has been estimated to cost approximately \$6M. Partnerships and funding opportunities are identified herein to help strategize the Project for implementation over the next several years. Reaches have been identified based on breaks between bridges and construction staging areas, and are listed sequential from upstream to downstream

Reach I: Bedrock Hotel to Martin Road, \$1.3M

Reach II: Martin Road to N. Main Street, \$1.1M

Reach III: N. Main Street to Janet Street, \$0.6M

Reach IV: Janet Street to Poplar Street, \$1.6M

Reach V: Poplar Street to Spring Glen, \$1.4M

A Pilot Project has been funded by the DWQ, Carbon County and Helper City to demonstrate the benefits of the River Revitalization Project. The Pilot Project will implement BMPs to reduce non-point source pollution (hydromodification, and sediment input), and improve the riparian diversity, canopy cover, aquatic habitat and floodplain connection. The Pilot Project will show adjacent landowners the benefits of land stewardship and riparian conservation. The Pilot Project is planned for construction spring and summer of 2014.

Conceptual planning efforts were coordinated with the Helper City Storm Water Improvement Projects. These storm water projects are being constructed summer 2013-2014. Helper City committed an additional \$120,000 into their stormwater infrastructure projects to upgrade the system to include the installation of oil/water separators and increased sizing and distance of pipe to anticipate for wetland finishing areas to buffer storm water outlets.

Social and Economic Benefits

Cities around the world have made revitalization of their waterfront a priority. Storm water pollution regulation, water quality standards, and fisheries management have stemmed the tide of ignoring the health of our Rivers. Restoring rivers to a more natural state, and at the same time enhancing the recreational experience, has increased the quality of life.

River trail systems are the first investment that many cities make along revitalized waterfronts, and Helper City is no exception with the popular Price River Parkway. The success of river trails has led the city to further invest in the health of their river. The quality of recreational experiences are directly impacted by the health of the natural environment. The basic premise of the Helper City River Revitalization vision is to create a riverfront that enhances recreational experiences and the health of the Price River. A lively mix of recreational uses will be attractive and accessible for a vibrant riverfront that connects the community to the outdoors. A healthy and functioning riverfront encourages respect and lifelong stewardship for the Price River.

Recreation

The Price River is a unique recreational resource in Utah. The Price River Canyon attracts whitewater paddlers and anglers throughout the state. Helper City is located at the mouth of Price Canyon. Revitalizing the Price River will expand this recreational experience through the town of Helper.

The character of the channel is steep gradient class II-III whitewater with limited pools, long riffle-runs, and several diversion and grade control structures. Modifying the diversions and grade control structures to be navigable would create a 2.5 mile reach for watercraft recreation. Enhancing these structures with wave-hole features attract whitewater enthusiasts. Freestyle kayakers, Stand-Up Paddle boarders, whitewater canoeists, small rafts, inflatable kayaks and tubers will flock to the river to cool off. Pools downstream of wave features are popular low-flow wading holes on a hot summer day, or fishing on a quiet afternoon.

Urban fishing opportunities are enhanced with access to the River, restored pool-riffle sequences, and off-channel ponds. Restoring a low-flow thalweg, improving sediment transport to mobilize the bed,



and enhancing the channel with habitat features improve the aquatic habitat. Off-channel ponds, and accessible pools, provide a great resource for kids to get into the sport. Enhancing the Gigliotti pond with shade trees and landscaping will create a more inviting area.

Conceptual restoration of the riparian corridor includes access trails to the River at wading holes, wave features, and fishing enhancement structures. Upland park amenities, such as paved trails, overlook areas with patios, ADA accessible fishing ramps, water craft launch sites, and boardwalks over wetlands facilitate multiple user groups. Conceptual opportunities focus concentrated use areas at terraces and patios for outdoor concerts, whitewater wave events, and a fishing pond. Recreational use is appropriately dispersed with natural areas between designated use areas.



- Recreational Amenities*
- Paved Trails*
- Soft Nature Paths*
- Boardwalks over Wetlands*
- Overlook Areas*
- River Access*
- ADA Accessible Ramps*
- Whitewater Waves*
- Fishing Enhancements*
- Terraced Amphitheaters*
- Picnic Areas*
- Bathrooms*
- Parking Areas*
- Interpretative Signs*
- Camping Facilities*

Use Patterns

Use patterns reflect season, time of day and flow rates. The whitewater recreation season is typically from April-June during high flows. This season can be expanded during the moderate flow season when water is being delivered through Helper City to downstream water users.

The Price River is a unique resource in Utah, and is the main supply for consumptive water users throughout the watershed. The Revitalization reach is upstream of significant diversions, and the sustained flow for downstream water delivery can be enhanced to create a recreational asset for the community and visitors. During the summer and moderate flow periods, most water sports activities are likely to be tubers, inflatable kayakers and other water crafts. Wading in the enhanced river pools is also a popular past time.

Walking, bicycling, and trail running will occur during all times of the year. These activities are most popular during warmer months and cooler times of the day. Eighty five percent of users at riverfront parks are passive users that walk and sit at resting areas (Podolak, Multifunctional Riverscapes, UCWRC, 2012).

Fishing use patterns follow ecological processes. The fly hatch, water quality and quantity affect the number of fisher persons at the River.



- Recreational Uses*
- Bird Watching*
 - Walking and Running*
 - Bicycling*
 - Fishing*
 - Wading*
 - Kayaking*
 - Canoeing*
 - Stand-Up Paddle Boarding*
 - Small Watercraft*
 - Swimming*
 - Other*

Outdoor Tourism Industry

The outdoor tourism industry can enhance the tax base and job creation. Revitalization of Helper City's riverfront is anticipated to tap into the \$646 Billion Outdoor Recreation Industry. A fully developed riverfront has the potential to be an economic generator for the community. Creating an accessible riverfront park adjacent to downtown hotels, antique shops, art galleries and restaurants make an inviting attraction for visitors. Proposed amenities can host events such as whitewater freestyle competitions, outdoor concerts, and small markets.

The Project reach is adjacent to highway 6, a major transportation route that short-cuts I-70 and I-15 travel. More than 40,000 vehicles a day pass through Helper City. An estimated 20,000 residents live within Carbon County, and 2,000 within Helper City. Helper City's economic base fluctuates with coal production and the mining industry. In an area suffering from chronic unemployment, a redeveloped riverfront is expected to boost existing businesses, create new business opportunities, and increase property values. The revitalized riverfront has potential to be a destination location for tourists, and a draw throughout the greater region.



Reduced Maintenance

A reconnaissance study done by the United States Army Corps of Engineers reported the average annual cost for flood damage repair in Helper is \$75,000 for the primary damage reach evaluated between Hill street and Janet street. The city of Helper is highly susceptible to catastrophic flooding, with the potential for over 2 feet of water to cover the downtown historic district (Price and Helper Reconnaissance Report, USACE). The Project has potential to not only reduce the catastrophic threat of flood damage, but the annual maintenance costs for flood control and bank stabilization.

- Economic Benefits
- \$646 Billion Outdoor Recreation Industry*
- \$525 Billion Travel Related Spending*
- Boost Existing Businesses*
- Create Business Opportunities*
- Increase Property Values*
- Host Special Events*
- Generate Tourism*
- Free Marketing*
- Potential Population Growth*
- Reduced Maintenance*



Environmental Education and Stewardship



The Project will improve environmental awareness of the Price River. Educational signs throughout the riparian corridor highlight different aspects of the project such as: watershed and land stewardship, storm water quality, riparian and wetland vegetation, and aquatic habitats. The river provides a central location to outreach the public for awareness and stewardship.

A Water Watch program with local schools and volunteer groups is an excellent avenue to get students outside to learn about the River, and assist with water quality monitoring. These programs are useful for identifying water quality issues. When a “red-light” occurs, the Division of Water Quality can be notified to set up additional and more thorough monitoring.

Incorporating an outreach program to educate adjacent landowners, irrigation districts, and other municipalities on BMPs will improve watershed-wide restoration. Implementation of a completed project will show real-life examples on BMPs to reduce non-point source loading of the River.



The proposed access and park amenities will facilitate outdoor education and recreation programs. For example, reducing navigation hazards will attract the Utah Whitewater Club, and other local outdoor clubs to teach kayaking, canoeing and watercraft recreation. The proposed bank terracing and patios will provide a venue to host outdoor classrooms, swift water

rescue training, beginning kayaking, and fishing courses. The Ogden River Restoration Project is a perfect example of transforming a neglected river into a community centerpiece. For example, local Boy Scout groups organized a day for watercraft floating and clean-up on the Ogden River. Weber State University, Utah Whitewater Club and Wasatch Touring introduced 600 students to river recreation by donating equipment and guiding tours down the river. The Venture Academy, Ogden Preparatory Academy, Weber State University, Utah State University, and other educational institutions have incorporated watershed education along the river into their program. The Helper City River Revitalization Project has potential to engage the community and outreach to youth groups similar to the Ogden Project.

River stewardship and community appreciation for the local river environment are some of the greatest achievements of riverfront revitalization projects. Enhancing the unique attributes of the Price River will get people outdoors. It is the people that recreate and immerse in nature that appreciate the land to become stewards. Engaging watershed groups and schools with monitoring and volunteer work fosters a stewardship ethic. Enhancing the educational and recreational experiences along the Price River will create lifelong stewards to protect riparian lands, water quality, and wildlife habitats.

Environmental Benefits

Non-point Source Pollution

The Price River (UT1406007-005) is a perennial stream that drains the southeast portions of the Wasatch Plateau. Beneficial use classifications are: 2B, 3A, and 4. The Project is immediately upstream of a 303(d) impaired segment of the Price River listed for partially supporting beneficial uses. In 2010, the downstream segment was listed for macroinvertebrate and biological impairment; and in 2004 for total dissolved solids (TDS). These non-point pollution sources (hydromodifications, sediment loading, diminished native riparian vegetation, and loss of floodplain connectivity) have adversely impacted natural channel functions and significantly contribute to the 303(d) listed impairments downstream.

Degradations

Hydromodification: The reach is encroached by the railroad, seven bridge crossings, two abandoned railroad crossings, concrete and junk fill material, and residential developments. The channel has been modified with steel-pile grade control structures that were installed to realign the channel for route US6 and the railroad. There are two abandoned diversion structures, and one active diversion within the Project reach.

Surface Runoff: Areas with no public storm water infrastructure wash pollutants directly into the river. Runoff from roof tops, roads, bridges



and other impermeable surfaces wash road salts, sediment, pesticides, heavy metals and other pollutants into the Price River. The river cuts through the Price River formation of sandstone outcrops overlying the Mancos shale. The soils are highly erodible, and the shale formation is naturally high in soluble salts.

Storm Water Runoff: Adjacent development, such as city roads, route US 6, and the rail road are significant sources for NPS loading. The current storm water system catches water from parking lots and streets and directly discharges into the river without buffer zones. Storm water carries oil, chemicals, debris, sediment, and other pollutants into the Price River. The lack of attenuating flows coupled with no detention areas exacerbates negative consequences.

Streambank Erosion: The banks have been filled with concrete and junk, denuded by the pathway, bridge abutments, abandoned crossings, and residential developments. Significant portions of the banks are near vertical and unstable. Spoil pile berms, floodwalls, and retaining walls are dilapidated and failing into the river leaving exposed soils and junk materials.

Riparian Buffer: The majority of the banks are a narrow corridor of vegetation encroached by fill material, dilapidated retaining walls, spoil piles, and floodwalls. Significant portions of the banks are vertical with no riparian buffer and lack significant cover for channel shading and root mass for stabilizing the stream banks. Vegetation cover is fairly monotypic and Tamarisk and Russian Olive dominate the canopy. These species have a negative impact on the Price River by narrowing the channel and contribute to dewatering because they use more water than native species.

Gully Erosion: There are two gullies that are head cutting and significant inputs of sediment. These gullies are within the Mancos shale formation which is highly erodible and natural source of soluble salts.



Recreational Activities: There are several random access points throughout the reach where pedestrian traffic is trampling the banks and denuding vegetation.

Best Management Practices

BMP Recommendations

Define Development Setbacks
Riparian Land Conservation
Buffer Storm Water
Install oil/water Separators
Reconnect the Floodplain
Diversify Native Riparian Vegetation
Remove Fish barriers
Improve Aquatic Habitat
Improve Sediment transport
Facilitate Watercraft Navigation
Stabilize Eroding Banks
Designate Recreation Access
Maximize Biostabilization
Maintain Erosion Control
Reduce Impervious Areas
Outreach public education



Concepts presented in the Revitalization Plan propose to implement recommended BMPs identified in the West Colorado River Total Maximum Daily Load (Price River, San Rafael River, and Muddy Creek TMDLs for Total Dissolved Solids West Colorado Watershed Management Unit, Utah, August 2004). Proposed BMPs specifically address NPS listed in the TMDL Project Implementation Plan: Surface Runoff, Urban Runoff, Streambank Erosion, Gully Erosion, and Recreational Activities. Best Management Practices to reduce impairments to aquatic life are also presented in the Conceptual Plan. The implementation of BMPs will aid in the preservation of current water uses by reducing the NPS loads within the watershed and move the Price River toward meeting TMDL targets.

Conceptual Restoration Treatments

Hydromodification: Structures affecting natural channel processes are proposed to be removed or improved to restore channel functions, and to improve aquatic habitat, flood conveyance, and bank stability. It is recommended that Helper City adopt the practice that new, repair, or improvement projects incorporate natural channel functions (sediment transport, floodplain connection, fish passage, etc.) and watercraft navigation into the design. Conceptual restoration plans propose to remove top of bank berms, floodwalls, retaining walls, and fill material in order to reconnect the floodplain and establish riparian vegetation. Conceptual restoration plans propose to improve grade control and diversion structures to allow for fish passage and navigation.

Surface Runoff: Development setbacks are proposed to be desingated, and where possible, seek to establish riparian land conservation. Conceptual designs propose a Riparian Land Conservation based on the floodway. Realigned paved paths, resloping

the banks, live wood revetments, vegetated terraces, and in some areas a realigned channel, are restoration concepts proposed to create a riparian buffer for the River.

Storm Water Runoff: Conceptual restoration plans buffer storm water returns with vegetated swales and detention/wetland areas to help control runoff rates, allow for sediment to settle, and buffer non-point source pollution. Five city storm water return areas in the reach are planned for improvements to be constructed 2013-2014. These improvements include oil/water separators and increased pipe diameters to accommodate for riverfront detention areas at outfalls.

Stream Bank Erosion: Conceptual restoration plans stabilize eroding stream banks using both hard and soft techniques. On the outside of river bends and at encroached areas with high velocities, hard points are proposed with toe boulders and terraces. Biostabilization techniques are utilized as a preferred design such as; vegetated terraces, live wood revetment structures, and vegetation derived geotextile fabrics. It is recommended to adopt the practice to reduce the use of riprap blankets and retaining walls and require biostabilization to be maximized into redevelopment and improvement projects.

Riparian Buffer: Conceptual plans propose to diversify the landscape with native plantings to enhance wildlife habitats, improve shading and food sources, and reduce the amount of sediment production and delivery. Russian Olive and Tamerisk dominate the riparian canopy because of the fill material and disconnected floodplain. Invasive species mitigation control work using the cut-stump herbicide method is recommended one year prior to mechanical removal to reduce future maintenance and ensure long-term success.

Gully Erosion: Conceptual plans propose to stabilize two gullies with live-crib structures (living check-dams) and a riparian buffer. Methods will reduce head cutting, stabilize over steepened banks, and incorporate root mass for long-term support and aesthetics. It is recommended to adopt practices to reduce concentrated flows and head cutting, and combine physical structures with vegetation improvements for biostabilization control that will reduce velocities, and sediment production and transport.

Recreational Activities: Conceptual plans propose to offset the paved pathway from the top of bank to provide an adequate riparian buffer. Designating soft trails to the channel, utilizing thorny vegetation barriers and educational signs will reduce random trampling of the bank. It is recommended to adopt the practice to appropriately concentrate recreational use and disperse the use between natural riparian and wetland areas.

Public Education: Conceptual planning, herein, outlines a public outreach program that provides information, education involvement, and stewardship activities to raise awareness, foster community stewardship, and promote land use practices to reduce non-point source pollution.

Load Reductions

The Project actions will reduce NPS pollutant loading and improve water quality. Each BMP includes a specific NPS task and measurable goal. Water quality improvements are currently estimates based on preliminary investigation. Upon completion of design and construction, accurate measurements of the water quality benefits and load reductions shall be determined.

Total Project improvements are estimated to be:

- 62 acres of river and riparian corridor conservation.
- 26,400 linear feet of bank restoration.
- 50 acres of riparian vegetation restoration (removed invasive species and enhanced with native vegetation).
- 12 acres of enhance in-channel (benthic macroinvertebrate) habitat.
- 1.6 acres of wetlands.
- 2.5 acres of removed impervious surface.
- 2 gullies stabilized.
- 15 storm water outlets buffered.
- 8 fish passage barriers removed.
- 38,000 tons of removed debris and trash fill from the banks and channel.
- 272,000 CY of fill material and levees removed from the floodplain.
- 41 acres of restored floodplain connectivity.
- Over 20,000 region-wide citizens embracing their riverfront with stewardship, education, recreation, and volunteer service.



Hydrology and Hydraulics

The Price River Watershed is in the semi-arid intermountain west with four distinct seasons. Precipitation ranges from 9 inches at the lower parts of the watershed to 30 inches at the headwaters in the Wasatch Plateau. Temperatures range from over 100 F degrees in the summer to below zero in the winter. The seasonal hydrograph is influenced by operations of Scofield Reservoir, a large water storage facility on Fish Creek. Fish Creek is a headwater and major tributary to the Price River. The hydrograph peak is in early spring (April-May) when warm temperatures melt high elevation snow. Base flows are affected by municipal, agricultural and industrial water uses. The hydrology of the Price River is a flashy regime that often spikes during rain events typically occurring in July. The river cuts through the sandstone bookcliffs overlying the Mancos shale. These formations have high runoff rates and carry high sediment loads.

Historical flows for the reach were evaluated using the Heiner gage (USGS-09313000) to determine flood flow scenarios, and bankfull conditions. Historically flood flows occur during the months of July and August from severe thunderstorms. Bankfull flows are sustained from snowmelt runoff typically occurring in April-May. Active diversions within the reach were combined to the North Carbon Canal in 2003, upstream of the Heiner gage. The Wellington Gage less the Utah Division of Water Rights flow records for the Gay Ditch and North Carbon Group were used to determine irrigation and water delivery flows through the reach.

Design Flows

Four different flow scenarios are recommended for design. Channel geometry and in-channel structures should be evaluated during low-flows to ensure adequate depths for fish habitat and passage for fish and navigation. Bank full flows should be evaluated for connection to the floodplain, overbank processes, and wetland connection. The 100-yr flow should be evaluated for affects to the floodway, scour potential, and fish passage over structures. In-channel recreation enhancement structures are recommended to be designed for flows during the runoff and irrigation season to maximize the use and attract people to the river during the summer months.

Design Flows

Low flow 10 cfs

Bankfull flow 300cfs

Recreation flow 80-300cfs

100-yr flow 11,800cfs



Conceptual Hydraulic Analysis

There will be a number of hydraulic benefits resulting from work done on the Price River. Historically the river was straightened, the floodplain filled, the banks hardened, and the river constrained and modified to maximize hydraulic conveyance and minimize risk to property and life. Restoration actions accomplish improvements to hydraulics that are beneficial to man-made areas, as well as for natural vegetation, aquatic, and terrestrial species.

Restoration actions will add horizontal and vertical stability, as well as variability to the river. Increased sinuosity, width to depth ratios, and a defined thalweg will improve the hydraulic conveyance and result in the creation of additional habitats. The channel will diversify velocities and depths (variation will initiate formation of pools and riffles), and thereby diversify the habitat types. Habitats adjacent to the channel will be improved as overbank flows will refresh wetlands, provide refuge for fish during floods, and areas for sediments to settle. This overbanking process disperses erosive energy over a vegetated surface minimizing bank erosion in an otherwise “u” shaped channel.

The ability for a river to disperse laterally at high flows is important to man-made structures as well. Currently, the Ivy, Poplar, Hill/Canal, Janet, and N Main Street, and other bridges in town are channel width constrictions and have none to low clearance from the elevated storm water surface elevations to the low chord of the bridge. This causes the water to flow faster increasing its erosive energy, and increasing the water surface elevations putting stresses on the bridges and their supporting structures (abutments, wingwalls, and piles). Additionally increased water surface elevations resulting from constrictions increase the flooding risk to adjacent residential and commercial developments.

Uniform surfaces, like a straightened river channel, are excellent at conserving energy in a hydraulic system, (eg. canal or pipe). This energy can erode bank, bearing, or bed material at an accelerated rate. Energy dissipated on a vegetated is instead dissipated on a structure, banks, and bed resulting in undermining, scour, incision, and increased sediment delivery from over-steepened banks. Scouring of the riverbed also typically results in finer sediments that are ideal for aquatic organisms’ habitat washing downstream. This leaves behind an armored surface of cobble and boulders that are not as suitable for refuge. Adding large boulders creates velocity shadows for resting fish, helps retain mobile sediments, and creates further hydraulic diversity.

Partnerships

With such a hefty price tag of \$6M, resource sharing and partnerships will be the key to success. This Project will take a committed effort from Helper City to bring together local and state governments, environmental interests, private organizations, local businesses and the community.

The social, economic, and environmental benefits of the project provide a framework to build partnerships. Coordinating these partnerships to fund aspects of the Project is the recommended strategy for success. Utilizing volunteer efforts, recycling boulders and other materials, and obtaining easements are strategies to reduce costs.

Several state agencies have been coordinated with for concept planning and partnership development; these include the Division of Water Quality, Department of Wildlife Resource, Department of Agriculture and Food, and State Engineer office. Federal agencies include the U.S. Fish and Wildlife, Endangered Fish Recovery Program, the Natural Resource Conservation Service, and National Park Service. Local coordination with Carbon County Planning department, adjacent landowners, and irrigation users have also been coordinated with for conceptual planning.

The Utah State University extension office, the Utah Division of Wildlife Resources, Price River Enhancement Committee, Americorps, private landowners, and others have offered to support this project through monitoring, volunteer efforts, potential land easements, and other resources.

There is great momentum for implementing a successful Project. The \$19M Helper City Storm Water Improvement Project, and the \$120K in river revitalization storm water improvements, is a great example for shared planning and resources. This effort can be used to leverage funding opportunities.

The Pilot Project planned for construction spring 2014 is an opportunity to showcase the benefits and continue to build partnerships with landowners, natural resource agencies, and the community. Projects that involve utility crossings, modifications to diversion structures, and adjacent redevelopment, are potential partner projects for River Revitalization. Outreach to local businesses, environmental groups, and youth organizations for local participation is equally important to assist with volunteer work, maintenance, monitoring, and event sponsorship.

Funding and Partnership Opportunities

Local	Application Period	Program Description
Helper City	October	Capital Improvement funding and in-kind contributions for administration and construction oversight services, and donation of equipment and materials.
Community Impact Board	Quarterly	The Permanent Community Impact Fund was developed to provide financial assistance to areas impacted by natural resource development. Funds are typically allocated as a grant/loan mix, with a fixed low interest rate loan, geared toward improving public infrastructure. The Project proposes to improve public infrastructure by improving the floodway, reducing public safety hazards, and to facilitating and enhancing recreation.
Carbon County Special Services	March	Community improvement grants geared towards recreation and transportation improvement projects.
NFW Wells Fargo Environmental Solutions	December	The National Fish and Wildlife administers the Wells Fargo grants geared toward improving aquatic habitat and water quality, with emphasis on incorporating community stewardship, volunteer, and educational opportunities.
Private Foundations	TBD	There are multiple private foundation grants to support restoration of wildlife and enhancement of community green space and parkways.
State		
Division of Water Quality-State Revolving Loans	Quarterly	The Division of Water Quality provides financial assistance to local governments and districts for improvement to water resource infrastructure. Funds are typically allocated as a grant/loan mix, with a fixed low interest rate loan.
Division of Water Quality-Non-point Source Pollution Program	April	The Division of Water Quality provides funding for projects that improve water quality and reduce non-point source pollution.
Division of Wildlife-Watershed Restoration Initiative	January	The Division of Wildlife provides funding for projects that improve wildlife, with emphasis given to projects that target sensitive and high priority conservation species. This Project proposes to restore aquatic habitat and reconnect historical spawning habitats for aquatic species, as well as improve riparian food sources and perching stands for birds.
Division of Wildlife-Blue Ribbon	January	The Division of Wildlife provides funding for projects that restore aquatic habitats and secure public access. This Project proposes to improve sport fishing opportunities and public access to the river.
Department of Agriculture and Food-Invasive Species Mitigation	February	The Department of Agriculture Invasive Species Mitigation Program is geared toward assisting private, local government, and public land managers funding to stop the spread of invasive weed species throughout Utah. This Project proposes to remove Russian Olive reducing fire hazards within town, and a significant seed source transporting downstream. This Project proposes to enhance the riparian area by control invasive species, and improving wildlife habitat and recreation access.

Division of State Parks and Recreation-multiple programs		The Division of State Parks has multiple funding assistance programs for the development of trails, and park facilities. The Project proposes to promote alternative modes of transportation, expands the River Parkway Trail, incorporates boat access points and other opportunities for camping and park facilities. The close proximity to HWY6 offers additional attraction for roadside parks. It is recommended to coordinate with staff and planning into the States SCORP.
Division of Forestry, Fire and State Lands		The Division of Forestry, Fire and State Lands has multiple programs for urban and community forestry grants, these include Arbor Day Grants, and Green Streets, and Community Forestry Partnership Grants.
Emergency Management		Hazard Mitigation Assistance grants are available for local governments participating in the NFIP to reduce risk to flood damage. The
Mitigation Grants		The Division of Water Quality administers various mitigation grants geared toward improvement of natural resources lost or damaged as a compensation settlement. The Army Corps of Engineers administers various mitigation grants to offset development impacts that are not able to reclaim resources in that area. These grants are typically prioritized per geographic area and resource improvements per the mitigation agreement.
Federal		
Division of Water Quality-319 Program	April	The Division of Water Quality provides financial assistance to local governments and districts for improvement to water resource infrastructure. Funds are typically allocated as a grant/loan mix, with a fixed low interest rate loan.
EPA 5 star-Urban Waters	January	The Fish and Wild Life administers grants to projects that incorporate stewardship, education, and restoration of natural resources.
Natural Resource Conservation Service-multiple programs		Multiple programs are available to help fund restoration of private lands. These programs are geared toward agricultural land. Conceptual planning proposing restoration treatments upstream of Martin Road and downstream of Birch street are agricultural lands.
National Parks and Trails-Multiple Programs		Land Water and Conservation Funds and Recreation Trail funds are allocated by Congress on an annual basis. A state maintains eligibility for these funds by preparing the State Comprehensive Outdoor Recreation Plan (SCORP).
In-Kind Resources and Match		
Division of Wildlife Resources-Monitoring		The Division of Wildlife has offered to support this project by electro-fish sampling monitoring.
USU Extension Technical Assistance		The local Utah State University office has offered to support this project by providing technical assistance for the removal of Russian olive, and the specifications for riparian enhancements.

USU-RTCA Program	August	Staff has offered to support this project through planning resources, and to develop opportunities for including the project in the states SCORP. Conceptual planning for adjacent trails, parks, boat ramps and access, camp areas, and other recreation amenities are opportunities to include in State-wide planning efforts.
Helper City Storm Water Projects		The \$20M storm and drinking water capital improvement project may be leveraged as part of Helper City's investment toward improving non-point source pollution and upgrading the city storm water infrastructure.
Land Easements		Lands donated for riparian conservation and construction access can be leveraged as a matching resource.
Helper City Street Improvements		Partner project opportunity for green street landscaping from Main Street to River Trails.
Local School District		Engaging local school districts and educators to incorporate a Water Watch Program, and other educational studies are often viewed as match and given higher priority for funding.
Volunteer		Planning for volunteer events to engage local residence and business will help promote stewardship and awareness for the Project.

*This table is intended to provide a framework for establishing partnerships. There are many other resources, grand or small, that will be required for a successfully completed project.

Land Ownership and Riparian Conservation

Riparian land conservation is integral for maximizing restoration potential. Private landownership exceeds 70% of the land within the Project. Obtaining conservation easements should involve the landowner early so that they can be part of the design process and concerns can be resolved. This gives Property owners an opportunity to choose elements like natural privacy barriers, fencing, and public access. Landowners are most often concerned about future maintenance, privacy, liability, and use limitations. Clearly explaining the conservation agreement and addressing concerns is the key to landowner cooperation. Highlighting the individual benefits and the overall Project outcomes will help the city obtain landowner support, and the potential donation of lands for riparian conservation.

- Landowner Incentives
- Reduced Maintenance*
- Reduced Hazards*
- Increased Property Values*
- Improved Aesthetics*
- Improved Flood Conveyance*
- Protection from Loss of Land*
- Tax Deduction (donated lands)*



Monitoring and Maintenance

Setting up a monitoring program early on will help maintain and adaptively manage the Project. Developing partnerships for monitoring components encourages collaborative efforts and sharing of resources. For example, a Water Watch program with local volunteers will help with water quality monitoring. The College of Eastern Utah students may be interested in conducting riparian, channel and bank surveys. Carbon County may help with weed mapping, the Division of Wildlife has offered to collect fish population surveys, and the Division of Water Quality conducted baseline surveys for macroinvertebrate populations.

Recommended monitoring parameters provide metrics to assess the stream health condition and qualify improvements gained by BMP implementation. Results may show trends toward continued improvement, or uncover recommendations for adaptive management including BMPs, operational practices, and other watershed restoration needs. Implementation of monitoring will provide technical support to Helper City for maintenance needs, the Division of Water Quality for assessment of stream health, and the Division of Wildlife resources for assessment of riparian and aquatic health, fish stocking, and regulation.

Photographic Monitoring: Photographs taken at referenced locations will show changes over time; the impacts from recreation users, accumulation of sediment under bridges, and the stability and function of restoration treatments and structures. These photographs are recommended at bridges, outside of bends, high use recreation access sites, steep banks, and other areas that may show qualitative record of conditions. Photographic monitoring is recommended to be conducted annually and following flood events at referenced stations.

Channel and Bank Surveys: Cross section and longitudinal profile surveys are recommended to establish baseline conditions and show physical habitat improvements. Topographic surveys of the channel, banks and floodplain for pre-restoration conditions have been collected for this Conceptual Study. Channel surveys will determine the stability of in-channel structures, and the formation of a thalweg. Functional attributes of the channel will be monitored by the structures' ability to scour and deposit sediments, provide low-flow habitat for fish, and navigable passage for watercrafts. Bank surveys will monitor the stability of the bank and how the newly excavated floodplains connect with the channel for overbank processes and convey flood flows.

Riparian Surveys: Vegetation transects surveys will validate whether restoration treatments were effective at diversifying the age and species in the riparian corridor. In addition, these surveys will help determine if birding food sources and perching stands are maintained in the riparian corridor. Pedestrian patterns should also be inventoried for erosion and trampling.

Riparian Invasive Species Inventory: An inventory of the approximate cover and location of weed species and competitive non-native trees are recommended to be

conducted prior to restoration. This inventory can be done with a handheld GPS to map areas of concern and estimate approximate cover. This inventory will aid in determining control treatments and adaptive management of the riparian corridor.

Community Use Surveys: Community use surveys will gather information on the public's overall perspective of the Project. These surveys may determine how the public values the riparian corridor and the river in their quality of life and how they use the riparian corridor (i.e., transportation, active or passive recreation). Setting up a website questionnaire is a good way to solicit community input.

Aquatic Surveys: The objective of restoring the physical changes to the channel is to create a positive biological response in the aquatic community. Monitoring the macroinvertebrate community composition and abundance is a good metric for stream health. Fish population surveys show the abundance, age, and type of fish present in the Price River. Fish passage inspection by a qualified biologist during storm flow, low-flow, and flood flow will help determine passage improvements to structures. These surveys will help with management decisions and the assessment of the biotic integrity of the River.

Water Quality Sampling: Setting up a volunteer program for grab samples is helpful for general assessment of water quality. These programs are helpful to the State to determine if more extensive monitoring within the reach needs to be prioritized. Grab samples recommended are: temperature, turbidity, conductivity, and pH. Utah State University extension offers a Water Watch program which provides equipment, training and monitoring program support.

Indicators to Measure Success

The Revitalization Project strives to reduce impacts to stream health by rehabilitating the riparian corridor, reconnecting the floodplain, and buffering storm water. In conjunction with the physical and biological habitat improvements, the Revitalization Project attempts to balance recreational uses by appropriately providing access while isolating riparian segments. The project proposes to make physical changes to the riparian corridor anticipating for a desired biological habitat response.

Ecological goals for the Project are based on physical habitat improvements. There are unknown factors that may limit a positive biological response, therefore ecological based goals for the project are:

- 1.) Improve flood flow conveyance and natural overbank processes.
- 2.) Enhance in-stream habitat by creating a defined thalweg, diversifying velocity currents, increasing pocket water and object cover, and diversifying deposition and scour areas.
- 3.) Improve fish passage.
- 4.) Increase in the diversity and composition of the plant communities.
- 5.) Increase in the diversity of riparian habitats by planting wetland, mesic, and upland species.

- 6.) Reducing non-point source pollution with constructed stormwater basins, vegetated swales, wider riparian corridor, and improved bank stability.
- 7.) Appropriately facilitating recreational uses to minimize impacts.

The ecological goals define process-based targets for implementing BMPs. Ecological goals are targets, not fixed requirements or standards. Adaptive management and monitoring may identify other ecological goals.

Operations, Maintenance, Repair, Replacement, and Rehabilitation

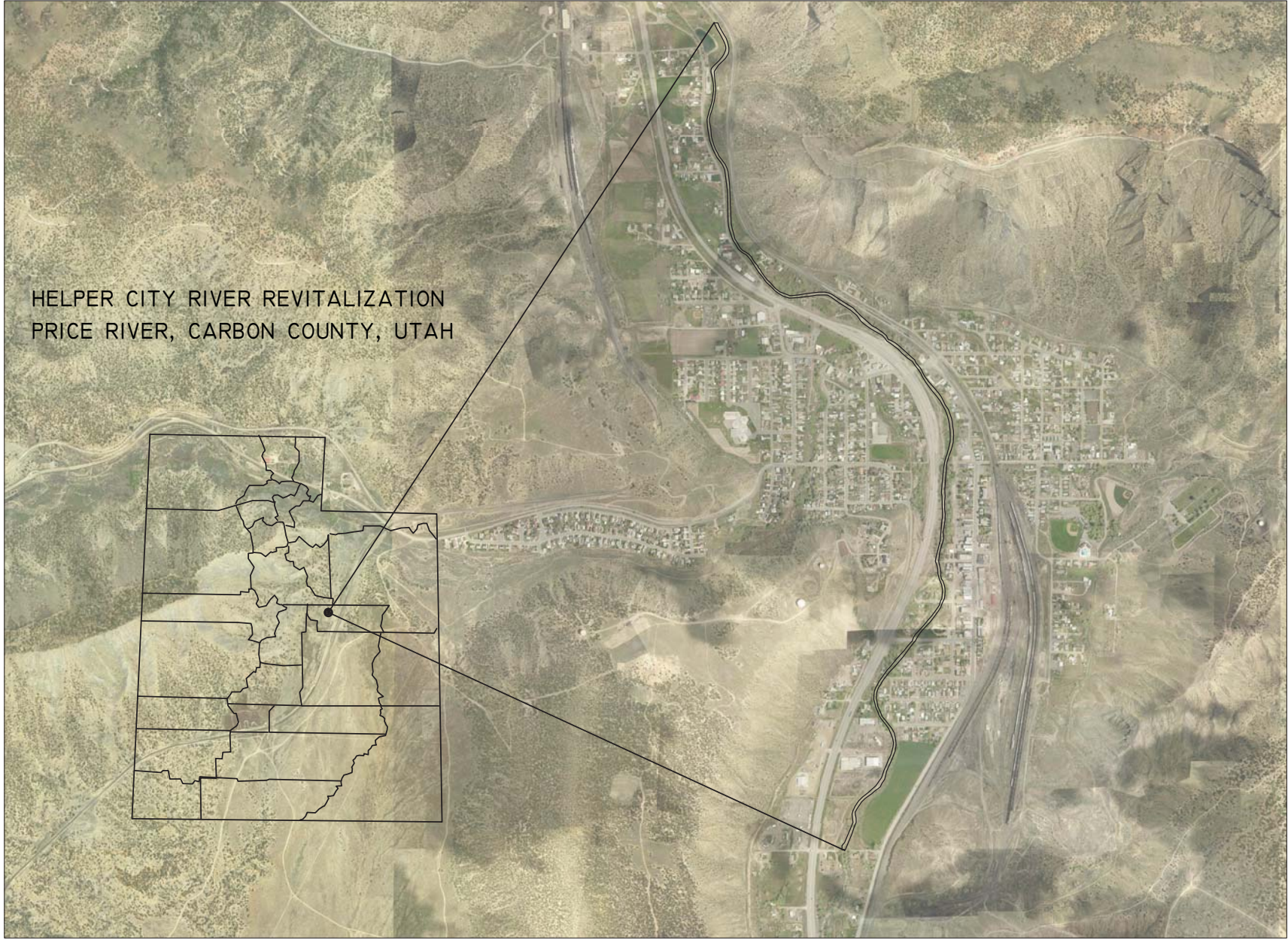
An Operations, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) manual will need to be prepared to guide post-construction operations. During the development of this manual there needs to be close and early coordination with any third parties involved ensuring their commitment. Helper City will be responsible for maintaining the Project in perpetuity. Monitoring of the Riparian Corridor will help uncover any corrective actions, or additional BMPs that need to be implemented for maintenance. Helper City should anticipate a budget of \$1,700 per acre for annual maintenance operations of natural use areas, and up to \$3,800 for high use area. Annual operations will include but not be limited to: maintaining irrigation for adequate vegetation establishment, weed control, trash receptacles, dog-scoop bins, recreational uses, and storm water outfalls. Periodic maintenance of structures and upgrades to recreational facilities may also be necessary. Capital improvement projects typically budget 15% of the total project for the life-time of the Project.

Adaptive Management

Recommendations for monitoring and maintenance should follow an adaptive management process. Adaptive management is based on clear identification of degradations and NPS pollution and taking action to address those needs. The adaptive management process is geared toward improving best management practices and implementing long-term solutions. When the collected and interpreted monitoring data identifies maintenance needs or shows poor restoration success, then measures may be modified or adapted to better improve stream health. For example, monitoring results may indicate pedestrian traffic is eroding the bank and suggest the need for more restrictive measures such as fencing at the top of the bank.

Appendix A

Conceptual Opportunities (V-Map, C1-C10)
Concept Cost Estimate



HELPER CITY RIVER REVITALIZATION
PRICE RIVER, CARBON COUNTY, UTAH

General Notes

HELPER CITY RIVER REVITALIZATION
VICINITY MAP

No.	Revision/Issue	Date
	COVER	1-9-13

Firm Name and Address



P.O. Box 2163
Glenwood Springs, CO 81602
www.RiverRestoration.org

Project Name and Address

PRICE RIVER
HELPER CITY, UTAH

NOT FOR CONSTRUCTION

HELPER CITY RIVER REVITALIZATION CONCEPT PLAN

No.	Revision/Issue	Date
	C1	5-6-13

Firm Name and Address



RIVER
RESTORATION

P.O. Box 2123
Glenwood Springs, CO 81602
www.RiverRestoration.org

Project Name and Address

**HELPER CITY RIVER
REVITALIZATION PROJECT
PRICE RIVER, UTAH**



PROPOSED RESTORATION CONCEPTS

- CONSERVATION OF LANDS
- CONNECT FLOODPLAIN
- EXCAVATE/HAUL-OFF FILL MATERIAL
- ENHANCE RIPARIAN AND UPLAND PLANT COMMUNITY
- ENHANCE WETLANDS
- REMOVE ABANDONED DIVERSION STRUCTURE
- ENHANCE IN-STREAM HABITAT
- ENHANCE IN-STREAM RECREATION
- INSTALL STREAM ACCESS TRAILS
- ENHANCE DAY-USE AND FISHING POND
- INSTALL OVER-NIGHT USE AREA

EXCAVATE FILL AND ESTABLISH INTERIOR FLOODPLAIN. ENHANCE RIPARIAN AREA

LAND CONSERVATION

IMPROVE IN-TAKE STRUCTURE

ENHANCE WETLANDS

PARTNERSHIP PROJECT
CAMP GROUND AND PARK FACILITIES
TO BE INSTALLED BY OTHERS

MARTIN ROAD

PRICE RIVER

HWY 6

GIGLIOTTI POND

ENHANCE LANDSCAPE WITH SHADE TREES, SHRUBS AND HABITAT BOULDERS

EXCAVATE FILL AND ESTABLISH INTERIOR FLOODPLAIN. ENHANCE RIPARIAN AREA

RESTORE COBBLE BAR

SOFT ACCESS PATHS TO CLASS IV BOAT PUT-IN AND BEACH AREA

LAND CONSERVATION

EDDY FEATURE FOR BOAT PUT-IN AND LOW FLOW FISHING

GRAPHIC SCALE

(IN FEET)
1 inch = 80 ft.

240
120
60
0

STATE PLANE

DEMO ABANDONED DIVERSION STRUCTURE. RESTORE CLASS IV RAPID AND FISH PASSAGE

EXCAVATE INTERIOR FLOODPLAIN AND ENHANCE RIPARIAN AREA
DEMO ABANDONED IN-TAKE STRUCTURE

NOT FOR CONSTRUCTION

HELPER CITY RIVER REVITALIZATION CONCEPT PLAN

No.	Revision/Issue	Date
	C2	5-9-13

Firm Name and Address

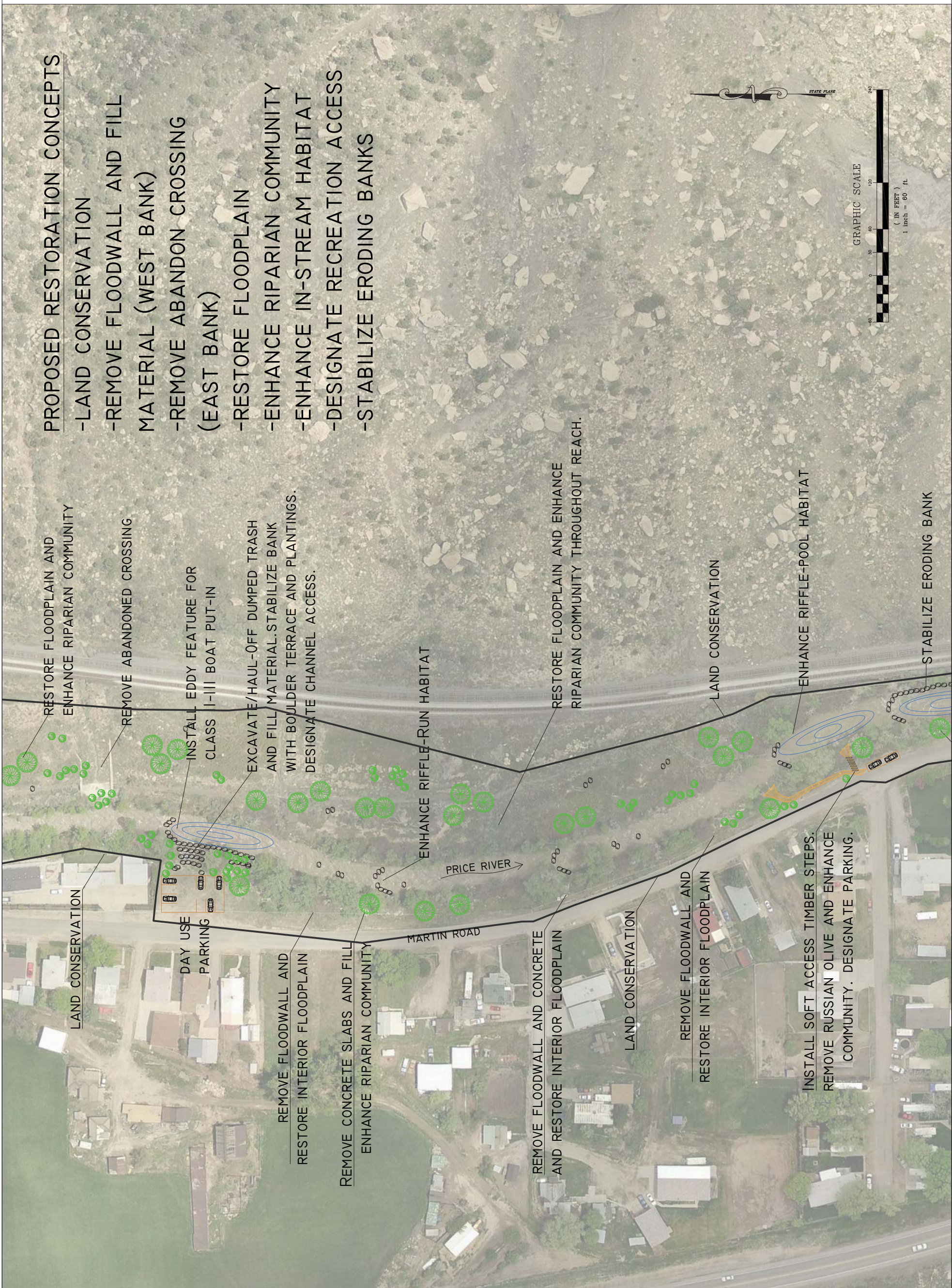
 RIVER RESTORATION
 P.O. Box 2123
 Glenwood Springs, CO 81602
 www.RiverRestoration.org

Project Name and Address
 HELPER CITY RIVER
 REVITALIZATION PROJECT
 PRICE RIVER, UTAH



PROPOSED RESTORATION CONCEPTS

- LAND CONSERVATION
- REMOVE FLOODWALL AND FILL MATERIAL (WEST BANK)
- REMOVE ABANDONED CROSSING (EAST BANK)
- RESTORE FLOODPLAIN
- ENHANCE RIPARIAN COMMUNITY
- ENHANCE IN-STREAM HABITAT
- DESIGNATE RECREATION ACCESS
- STABILIZE ERODING BANKS





- PROPOSED RESTORATION CONCEPTS**
- LAND CONSERVATION
 - REMOVE CONCRETE AND FILL MATERIAL FROM BANKS
 - RESTORE FLOODPLAIN
 - ENHANCE RIPARIAN COMMUNITY
 - ENHANCE IN-STREAM HABITAT
 - DESIGNATE RECREATION ACCESS
 - STABILIZE ERODING BANKS

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*HELPER CITY RIVER REVITALIZATION
CONCEPT PLAN*

No.	Revision/Issue	Date
C3		5-9-13

Firm Name and Address

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 Glenwood Springs, CO 81602
 www.RiverRestoration.org

Project Name and Address
 HELPER CITY RIVER
 REVITALIZATION PROJECT
 PRICE RIVER, UTAH





PROPOSED RESTORATION CONCEPTS

- LAND CONSERVATION
- REMOVE CONCRETE, AUTO AND FILL MATERIAL
- RESTORE FLOODPLAIN
- REALIGN CHANNEL TO WEST
- STABILIZE BANK AND CONSTRUCT INTERIOR FLOODPLAIN (EAST BANK)
- RESTORE STREAM BANKS
- REMOVE GRADE CONTROL STRUCTURES
- BUFFER STORM WATER OUTFALLS
- ENHANCE WETLANDS
- ENHANCE RIPARIAN COMMUNITY
- INSTALL RECREATION ACCESS TRAILS
- ENHANCE IN-STREAM HABITAT
- ENHANCE IN-STREAM RECREATION

NOT FOR CONSTRUCTION

**HELPER CITY RIVER REVITALIZATION
CONCEPT PLAN**

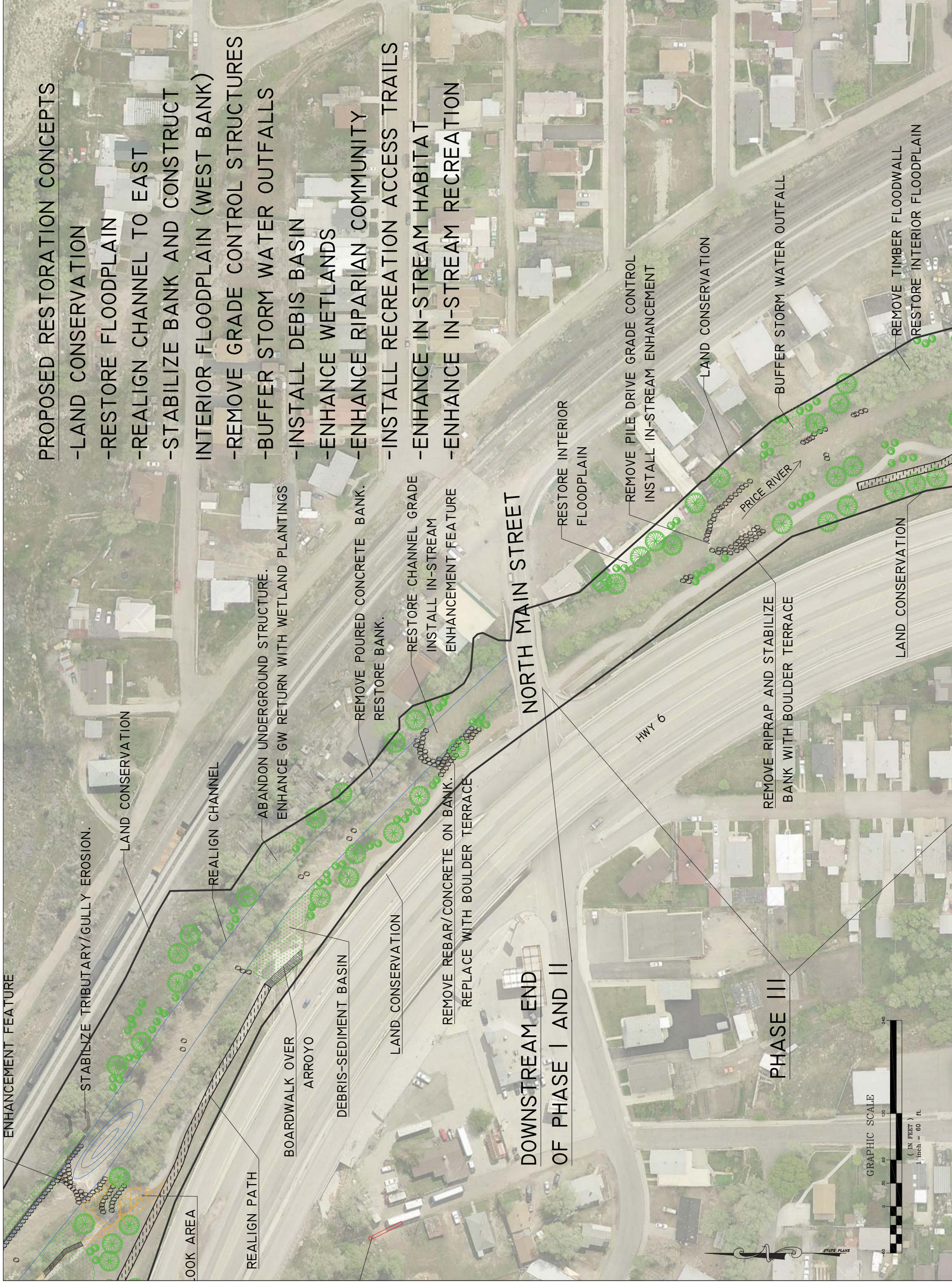
No.	Revision/Issue	Date
C4	5-9-13	

Firm Name and Address

RIVER
 RESTORATION
 P.O. Box 2123
 Glenwood Springs, CO 81602
 www.RiverRestoration.org

Project Name and Address
**HELPER CITY RIVER
 REVITALIZATION PROJECT
 PRICE RIVER, UTAH**





- PROPOSED RESTORATION CONCEPTS**
- LAND CONSERVATION
 - RESTORE FLOODPLAIN
 - REALIGN CHANNEL TO EAST
 - STABILIZE BANK AND CONSTRUCT INTERIOR FLOODPLAIN (WEST BANK)
 - REMOVE GRADE CONTROL STRUCTURES
 - BUFFER STORM WATER OUTFALLS
 - INSTALL DEBRIS BASIN
 - ENHANCE WETLANDS
 - ENHANCE RIPARIAN COMMUNITY
 - INSTALL RECREATION ACCESS TRAILS
 - ENHANCE IN-STREAM HABITAT
 - ENHANCE IN-STREAM RECREATION

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HELPER CITY RIVER REVITALIZATION
CONCEPT PLAN

No.	C5	Revision/Issue	Date
			5-9-13

Firm Name and Address



RIVER RESTORATION, INC.
P.O. Box 2123
Glenwood Springs, CO 81602
www.RiverRestoration.org

Project Name and Address

HELPER CITY RIVER
REVITALIZATION PROJECT
PRICE RIVER, UTAH



NOT FOR CONSTRUCTION

HELPER CITY RIVER REVITALIZATION CONCEPT PLAN

No.	Revision/Issue	Date
	C6	5-9-13

Firm Name and Address

 P.O. Box 2123
 Glenwood Springs, CO 81602
 www.RiverRestoration.org

Project Name and Address
 HELPER CITY RIVER
 REVITALIZATION PROJECT
 PRICE RIVER, UTAH



PROPOSED RESTORATION CONCEPTS

- LAND CONSERVATION
- REMOVE TIMBER AND STONE FLOODWALLS
- REALIGN PAVED PATH TO WEST
- RECONNECT FLOODPLAIN
- REMOVE GRADE CONTROL STRUCTURES
- REMOVE ABANDONED DIVERSION
- REMOVE ABANDONED DITCH AND LEVEES
- BUFFER STORM WATER OUTFALLS
- INSTALL RECREATION ACCESS TRAILS
- ENHANCE IN-STREAM HABITAT
- ENHANCE IN-STREAM RECREATION
- ENHANCE RIPARIAN COMMUNITY

PROPOSED RESTORATION CONCEPTS

- LAND CONSERVATION
- REMOVE TIMBER AND STONE FLOODWALLS
- RECONNECT FLOODPLAIN
- REMOVE GRADE CONTROL STRUCTURES
- INSTALL PAVED PATH
- INSTALL SOFT ACCESS TRAILS
- ENHANCE IN-STREAM HABITAT
- ENHANCE IN-STREAM RECREATION
- ENHANCE RIPARIAN COMMUNITY



*HELPER CITY RIVER REVITALIZATION
CONCEPT PLAN*

NOT FOR CONSTRUCTION

No.	Revision/Issue	Date
C7		5-9-13

Firm Name and Address
RIVER RESTORATION CO.
 P.O. Box 2123
 Glenwood Springs, CO 81602
 www.RiverRestoration.org

Project Name and Address
**HELPER CITY RIVER
 REVITALIZATION PROJECT**
 PRICE RIVER, UTAH



PROPOSED RESTORATION CONCEPTS

- LAND CONSERVATION
- REMOVE TIMBER AND STONE FLOODWALLS
- REMOVE LEVEES AND SPOIL PILES
- RECONNECT FLOODPLAIN
- REMOVE GRADE CONTROL STRUCTURES
- INSTALL OFF CHANNEL FISHING POND
- INSTALL WETLANDS
- INSTALL PAVED PATH
- INSTALL SOFT ACCESS PATHS
- ENHANCE IN-STREAM HABITAT
- ENHANCE IN-STREAM RECREATION
- ENHANCE RIPARIAN COMMUNITY

REMOVE FLOODWALL AND CONNECT INTERIOR FLOODPLAIN. OFF SET BOULDER WALL AND COMPACTED BERM.

EXCAVATE FILL AND CONNECT FLOODPLAIN ENHANCE RIPARIAN VEGETATION

IN-CHANNEL ENHANCEMENT FEATURE

CONSTRUCTED WETLANDS AT STORM WATER OUTFALLS

LAND CONSERVATION

EXCAVATE FILL, RESTORE FLOODPLAIN AND ENHANCE RIPARIAN VEGETATION

LAND CONSERVATION

EXCAVATE FILL AND REDUCE PARKING LOT. RECONNECT FLOODPLAIN INSTALL PAVED PATH AT TOP NEW BANK.

REMOVE RETAINING WALL. CONSTRUCT EDDY AND TERRACE BANK.

IVY STREET

REALIGN PAVED PATH

PARTNER PROJECT URBAN FISHING POND WETLANDS AT INFLOW AND OUTFLOW

PARTNER PROJECT REDISPLAY AND HIGHLIGHT MINING EQUIPMENT.

PARTNER PROJECT HELPER CITY STORM WATER IMPROVEMENTS

POPLAR STREET

END PHASE IV

LAND CONSERVATION

REMOVE LEVEE AND RECONNECT INTERIOR FLOODPLAIN CONSTRUCT PATH AT TOP OF BERM THROUGHOUT REACH

PHASE V

INSTALL PAVED PATH

REMOVE GRADE CONTROL STRUCTURE

LAND CONSERVATION

SOFT ACCESS PATHS

HELPER CITY RIVER REVITALIZATION CONCEPT PLAN

No.	Revision/Issue	Date
	C8	5-9-13

Firm Name and Address



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Project Name and Address

HELPER CITY RIVER
REVITALIZATION PROJECT
PRICE RIVER, UTAH



PROPOSED RESTORATION CONCEPTS

- LAND CONSERVATION
- REMOVE LEVEES AND SPOIL PILES
- RECONNECT INTERIOR FLOODPLAIN
- CONSTRUCT OFFSET COMPACTED BERM
- STABILIZE ERODING BANKS
- BUFFER STORM WATER
- INSTALL PAVED PATH
- INSTALL SOFT ACCESS TRAILS
- ENHANCE IN-STREAM HABITAT
- ENHANCE IN-STREAM RECREATION
- ENHANCE RIPARIAN COMMUNITY



*HELPER CITY RIVER REVITALIZATION
CONCEPT PLAN*

No.	Revision/Issue	Date
	C9	5-9-13

Firm Name and Address
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P.O. Box 2123
Glenwood Springs, CO 81602
www.RiverRestoration.org

Project Name and Address
**HELPER CITY RIVER
REVITALIZATION PROJECT
PRICE RIVER, UTAH**



PROPOSED RESTORATION CONCEPTS

- LAND CONSERVATION
- REMOVE LEVEES AND SPOIL PILES
- RECONNECT INTERIOR FLOODPLAIN
- STABILIZE ERODING BANKS
- IMPROVE DIVERSION STRUCTURE
- INSTALL PAVED PATH
- ENHANCE IN-STREAM HABITAT
- ENHANCE IN-STREAM RECREATION
- ENHANCE RIPARIAN COMMUNITY



END OF PHASE V

HELPER CITY RIVER REVITALIZATION CONCEPT PLAN

No.	Revision/Issue	Date
	C10	5-9-13

Firm Name and Address
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 P.O. Box 2123
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Project Name and Address
HELPER CITY RIVER REVITALIZATION PROJECT
 PRICE RIVER, UTAH



Table 1: Engineers Opinion of Conceptual Costs																
Description	Unit	Reach 1: Balanced Rock to Martin Road			Reach 2: Martin Road to N. Main			Reach 3: N. Main to Janet			Reach 4: Janet to Poplar Street			Reach 5: Poplar Street to Spring Glen		
		Quantity	Unit Cost	Total	Quantity	Unit Cost	Total	Quantity	Unit Cost	Total	Quantity	Unit Cost	Total	Quantity	Unit Cost	Total
Best Management Practices																
Care of Water	ea	4	\$7,000	\$28,000	2	\$7,000	\$14,000	3	\$7,000	\$21,000	3	\$7,000	\$21,000	3	\$7,000	\$21,000
Staging Area	ea	4	\$3,000	\$12,000	2	\$3,000	\$6,000	1	\$3,000	\$3,000	2	\$3,000	\$3,000	2	\$3,000	\$6,000
Traffic Control	LS	2	\$1,000	\$2,000	2	\$1,000	\$2,000	1	\$1,000	\$1,000	1	\$1,000	\$1,000	2	\$1,000	\$2,000
Mobilization	LS	1	\$5,000	\$5,000	1	\$5,000	\$5,000	1	\$5,000	\$5,000	1	\$5,000	\$5,000	1	\$5,000	\$5,000
Utility Relocate	LS	2	\$2,000	\$4,000	0	\$2,000	\$0	0	\$2,000	\$0	1	\$2,000	\$0	0	\$2,000	\$0
SubTotal General Construction				\$51,000			\$27,000			\$30,000			\$30,000			\$34,000
Riparian and Bank Restoration																
Excavate interior floodplain bench	CY	13889	\$4	\$55,556	11647	\$4	\$46,588	3436	\$4	\$13,744	8144	\$4	\$32,578	8142	\$4	\$32,567
Haul and Dispose Concrete, Metal, Debris	ton	3427	\$14	\$47,981	270	\$14	\$3,780	1080	\$14	\$15,120	2361	\$14	\$33,059	500	\$14	\$7,000
Haul and Dispose Fill material	CY	6944	\$14	\$97,222	5824	\$14	\$81,530	1718	\$14	\$24,053	4072	\$14	\$57,011	4071	\$14	\$56,992
Onsite Dispose and Compact Fill	CY	6944	\$7	\$48,611	5824	\$7	\$40,765	1718	\$7	\$12,026	4072	\$7	\$28,506	4071	\$7	\$28,496
Invasive Species Removal	acre	7	\$4,400	\$30,794	9	\$4,400	\$39,865	5	\$4,400	\$24,191	16	\$4,400	\$71,393	10	\$4,400	\$42,132
Riparian Enhancements/Temp Irrigation	acre	7	\$23,000	\$160,971	5	\$23,000	\$104,192	5	\$23,000	\$115,000	16	\$23,000	\$373,190	10	\$23,000	\$220,235
Wetland plants	AC	0.50	\$10,206	\$5,103	0.40	\$10,206	\$4,082	0.15	\$10,206	\$1,531	0.40	\$10,206	\$4,082	0.14	\$10,206	\$1,406
Salvage and grading top soil	CY	2778	\$6	\$17,500	891	\$6	\$5,611	2062	\$6	\$12,989	4887	\$6	\$30,786	4885	\$6	\$30,776
Import Topsoil	CY	1389	\$22	\$30,556	445	\$22	\$9,796	1375	\$22	\$30,253	3259	\$22	\$71,707	3258	\$22	\$71,682
Erosion Control Blanket	SY	8333	\$5	\$41,667	9738	\$5	\$48,689	4123	\$5	\$20,617	19547	\$5	\$97,733	9770	\$5	\$48,850
Soil Lift/Coir block	lf	400	\$21	\$8,252	1096	\$21	\$22,600	0	\$21	\$0	0	\$21	\$0	0	\$21	\$0
Live Cribwall	lf	0	\$200	\$0	400	\$200	\$80,000	0	\$200	\$0	0	\$200	\$0	338	\$200	\$67,600
Geotextile fabric/drainage weave	SY	1356	\$9	\$12,200	823	\$9	\$7,410	620	\$9	\$5,580	1111	\$9	\$10,000	1867	\$9	\$16,800
Boulder retaining/terrace wall	ton	673	\$78	\$52,510	155	\$78	\$12,066	552	\$78	\$43,089	501	\$78	\$39,073	594	\$78	\$46,332
Bridge Demo	LS	0	\$0	\$0	1	\$7,000	\$7,000	0	\$7,000	\$0	1	\$7,000	\$7,000	0	\$7,000	\$0
Urban Fishing Pond	LS	0	\$0	\$0	0	\$0	\$0	0	\$0	\$0	1	\$150,000	\$150,000	0	\$0	\$0
Subtotal Riparian and Bank Restoration				\$608,922			\$513,974			\$318,192			\$1,006,118			\$670,866
Aquatic Habitat and Channel Restoration																
Demo Existing/Grade Diversion Structure	ton	3426	\$10	\$34,262	334	\$10	\$3,341	225	\$10	\$2,250	0	\$10	\$0	297	\$10	\$2,970
Demo Hydraulic Breaker time	hr	80	\$135	\$10,800	0	\$135	\$0	0	\$135	\$0	0	\$135	\$0	0	\$135	\$0
Riffle enhancement	ton	792	\$78	\$61,776	277	\$78	\$21,622	99	\$78	\$7,722	396	\$78	\$30,888	495	\$78	\$38,610
Recreation enhancement	ton	792	\$78	\$61,776	693	\$78	\$54,054	396	\$78	\$30,888	231	\$78	\$18,018	528	\$78	\$41,184
Habitat Clusters	ton	21	\$58	\$1,220	36	\$58	\$2,067	5	\$58	\$290	25	\$58	\$1,436	45	\$58	\$2,584
Relocate Salvaged Boulders	ton	300	\$35	\$10,500	200	\$35	\$7,000	50	\$35	\$1,750	100	\$35	\$3,500	50	\$35	\$1,750
Toe boulder bank stabilization	ton	1184	\$58	\$68,665	1869	\$58	\$108,380	751	\$58	\$43,544	1444	\$58	\$83,738	2426	\$58	\$140,679
Relocate/PIP Head gates	LS	0	\$58	\$0	0	\$58	\$0	0	\$58	\$0	0	\$58	\$0	2	\$3,000	\$6,000
Subtotal Aquatic and Channel Restoration				\$248,998			\$196,464			\$86,444			\$137,579			\$233,777
Landscape and Trail																
Paved Asphalt Tail	SF	26400	\$3	\$79,200	14510	\$3	\$36,275	9660	\$3	\$28,980	1309	\$3	\$3,927	28710	\$3	\$86,130
Demo Haul-off asphalt path	SF	0	\$1	\$0	13200	\$1	\$6,600	4620	\$1	\$4,620	0	\$1	\$0	0	\$1	\$0
Soft Trail Access	sy	8687	\$4	\$34,748	795	\$4	\$3,179	223	\$4	\$892	150	\$4	\$601	89	\$4	\$356
Timber Steps	ea	2	\$2,500	\$5,000	0	\$2,500	\$0	0	\$2,500	\$0	1	\$2,500	\$2,500	0	\$2,500	\$0
Boulder stone access	ton	32	\$98	\$3,105	10	\$98	\$980	16	\$98	\$1,552	8	\$98	\$776	21	\$98	\$2,070
Overlook wall/patio	ton	0	\$175	\$0	265	\$175	\$46,301	0	\$175	\$0	248	\$175	\$43,313	0	\$175	\$0
Boat ramp	LS	1	\$7,000	\$7,000	0	\$7,000	\$0	0	\$7,000	\$0	0	\$7,000	\$0	1	\$7,000	\$7,000
Educational Signs	ea	2	\$1,500	\$3,000	2	\$1,500	\$3,000	1	\$1,500	\$1,500	2	\$1,500	\$3,000	1	\$1,500	\$1,500
Boardwalk abutment/piers	ls	0	\$9,000	\$0	2	\$9,000	\$13,500	0	\$9,000	\$0	0	\$9,000	\$0	0	\$9,000	\$0
Boardwalk decking	sf	0	\$12	\$0	987	\$12	\$11,844	0	\$12	\$0	0	\$12	\$0	0	\$12	\$0
Pedestrian Bridge	LS	0	\$90,000	\$0	0	\$90,000	\$0	0	\$90,000	\$0	0	\$90,000	\$0	1	\$90,000	\$90,000
Subtotal Landscape and Trail				\$132,053			\$121,679			\$37,545			\$54,117			\$187,055
Construction Total				\$1,040,973			\$859,117			\$472,180			\$1,227,814			\$1,125,698
Engineering and Environmental Services																
Construction Survey (1%)		1		\$10,410	1		\$8,591	1		\$4,722	1		\$12,278	1		\$11,257
Construction Engineering Oversight (6%)	LS	1		\$62,458	1		\$51,547	1		\$28,331	1		\$73,669	1		\$67,542
Land Survey	LS	1		\$2,000	1		\$2,000	1		\$2,000	1		\$2,000	1		\$2,000
Operation and Maintenance Plan (1%)	LS	1		\$10,410	1		\$8,591	1		\$4,722	1		\$12,278	1		\$11,257
Permitting 2%	LS	1		\$20,819	1		\$17,182	\$1		\$9,444	\$1		\$24,556	1		\$22,514
Engineering and Design Plans 15%	LS	1		\$156,146	1		\$128,868	1		\$70,827	1		\$184,172	1		\$168,855
Environmental and Coordination 3%	LS	1		\$31,229	1		\$25,774	\$1		\$14,165	\$1		\$36,834	1		\$33,771
Engineering and Environmental Services				\$293,473			\$242,553			\$134,211			\$345,788			\$317,196
Total Project				\$1,334,446			\$1,101,669			\$606,391			\$1,573,602			\$1,442,894