Summary Feasibility Report and Conceptual Design Drawing for Whitewater and Habitat Improvements to the Little Salmon River
Riggins, Idaho

October, 2008 (Revised October 14, 2008 and Feb, 2009)

Prepared For
City of Riggins, Idaho

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Introduction

Whitewater kayaking is one of the fastest growing outdoor sports in the country and whitewater parks are an emerging trend as a way to provide river related recreation near population centers. Diverse communities ranging in population and geographic characteristics are turning back to their rivers as a source of recreation, education, and local pride. Whitewater parks attract citizens of all ages and cross all socio-economic lines. The operation of whitewater parks across the country have shown that these types of projects provide a number of benefits including new recreational opportunities, economic stimulus, enhanced aquatic habitat, and environmental education opportunities.

Flowing through Riggins, Idaho, the Little Salmon River has great potential to host a multi-use park. Improvements to the bank and channel would help open up the river to recreational use by paddlers, anglers, and other users, as well as help enhance the habitat for the salmon, steelhead, and Bull Trout that inhabit the river.

The City of Riggins contracted Recreation Engineering and Planning (REP) to complete a site feasibility study and conceptual design drawing for modifications to the Little Salmon River between the vicinity of the Mill Bridge and the confluence with the Main Salmon River. The conceptual design drawing consists of fish habitat and recreational boating improvements, as well as related bank and access improvements. These bank, whitewater, and fishing improvements will be designed with ADA access and opportunities in mind. The improvements will help strengthen the tie between the river and the community, provide a whitewater paddling amenity for the local community, and create a whitewater and fishing resource for the region.

Feasibility

REP conducted a site visit on Monday, June 23rd to determine site feasibility and manage collection of pertinent data for conceptual design purposes. During the site visit, REP liaised with local paddlers, interested citizens, and town staff. REP collected photos and field notes to be used during the permitting and design process.

Based on the data collected during the site visit and subsequent analysis, REP believes the Riggins is a feasible site for whitewater improvements and possesses characteristics that have supported some of the more successful whitewater parks built by REP. Specifically, the site is centrally located with shops, motels, and eating establishments nearby. Parking is available at multiple locations near the site providing site users with easy access. Parking and infrastructure could easily be improved to allow ADA access to

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the river pools, fishing platforms and viewing areas. The site contains adequate gradient to create whitewater structures. Based on these qualities, REP recommends site improvements.

Multiple Objectives

This project will be required to serve many different user types. The reach is popular for fishing, and any changes will be made with a goal of maintaining and increasing fishing opportunities. The whitewater drops and pools provide excellent fish habitat and have shown to be particularly valuable as salmonid habitat. Fishermen will continue to frequent the area both during boating season and during the off-season. Selective creative play areas with natural boulders and accessible riverside play areas will be fun for kids and their families. The area will be enhanced for walkers, joggers, picnickers, and will provide ample opportunity for simply spending time by the river watching boaters and fisherman. ADA access for whitewater and fishing opportunities will also be included. In addition, many youth oriented paddling and angling programs have sprung up around the development of whitewater parks as a way to provide healthy, accessible recreation for young people.

Project Description

The project area spans from the vicinity of the Mill Bridge at the upstream end to the confluence with the Main Salmon River on the downstream end. An aerial image of the project site is shown below in Figure 1. Modifications associated with this project include in-stream modifications, bank restoration and terracing, improved access points, and trails.

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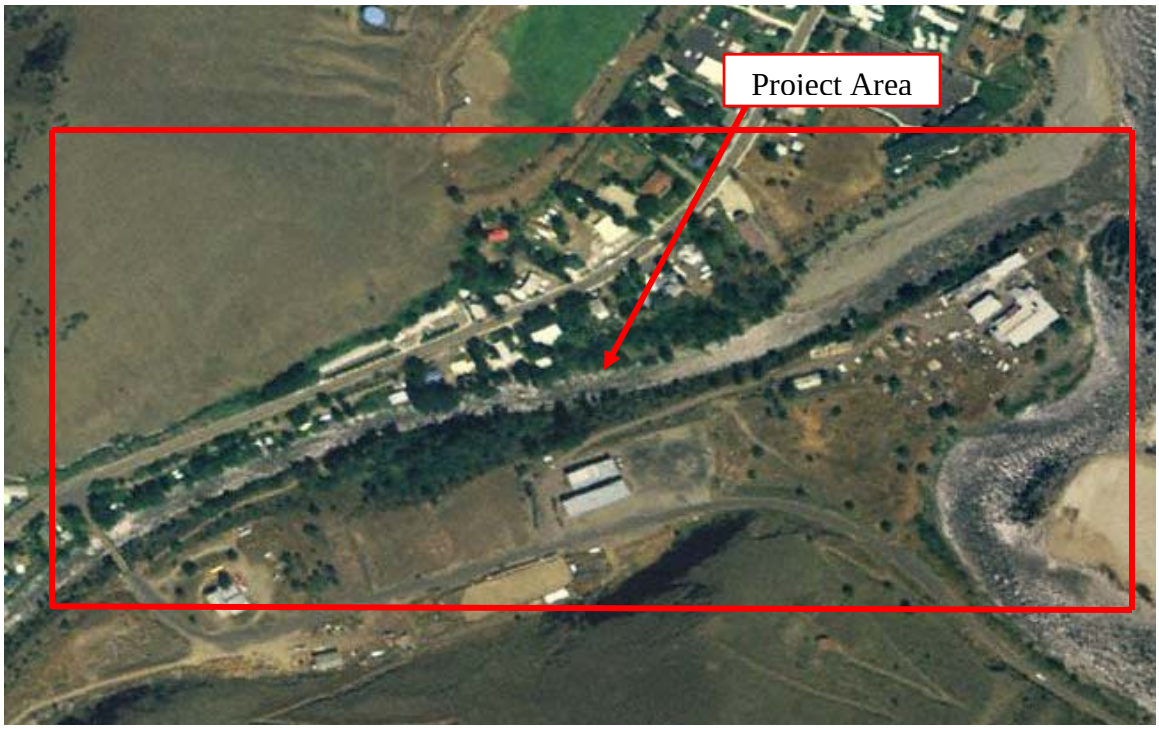

Figure 1. Aerial image of the Little Salmon River project area in Riggins, Idaho.

Existing Conditions

The existing conditions of the project reach can be characterized as moderately disturbed. The Mill Bridge crosses the river near the upstream end of the site, and rip-rap, gabion baskets, and concrete stabilization have been placed for bank stabilization along the river left (as looking downstream) bank. Although these measures can be effective for flood protection, they provide negative impacts to the habitat and aesthetic value of this stretch of river.

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Figure 2. Existing bank stabilization on the west bank.

Access to the river throughout the project reach is currently limited. Access near the Mill Bridge via the west bank is not possible due to private ownership. However, two existing cuts provide easy access to the east bank via existing gravel trails (Figure 3). No access points exist further downstream due to steep east banks (Figure 4).

Figure 3. Mill Bridge and access to east bank via easily accessible gravel trails

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Figure 4. Examples of the steep east-side bank

Non-improved parking exists at the Mill Bridge. Additional improved parking spaces will be required at this main access point to accommodate increased river use and to provide proper ADA access.

Hydrology

The average monthly streamflow at the site is illustrated below in Figure 5

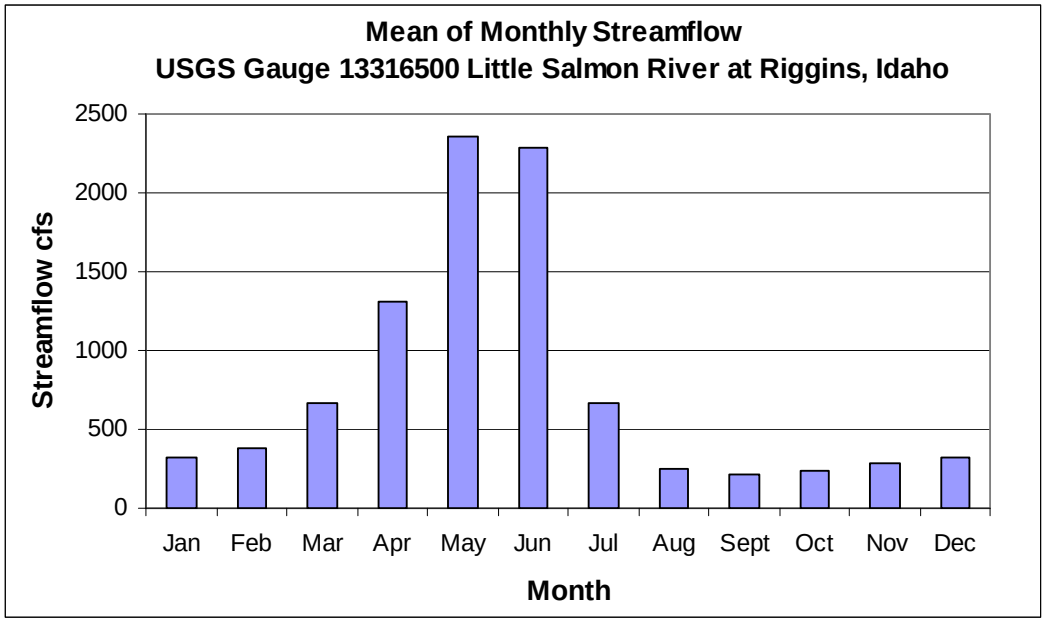

Figure 5: Mean monthly stream flow at USGS Gauge 05457700 13316500 (Source waterdata.usgs.gov, period of record 1951-2007)

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High flows on the Little Salmon River at Riggins generally occur in the months of April through June, and drop in the middle of the summer. During these high flow periods, conditions are ideal for in-stream recreation such as kayaking and fishing. In addition, the low flows in October and November are ideal for Steelhead fishing. Average monthly flows range from 300 to 2,000 cfs (Figure 5). However, in rare cases, peak flow has historically reached over 12,000 cfs (Figure 6).

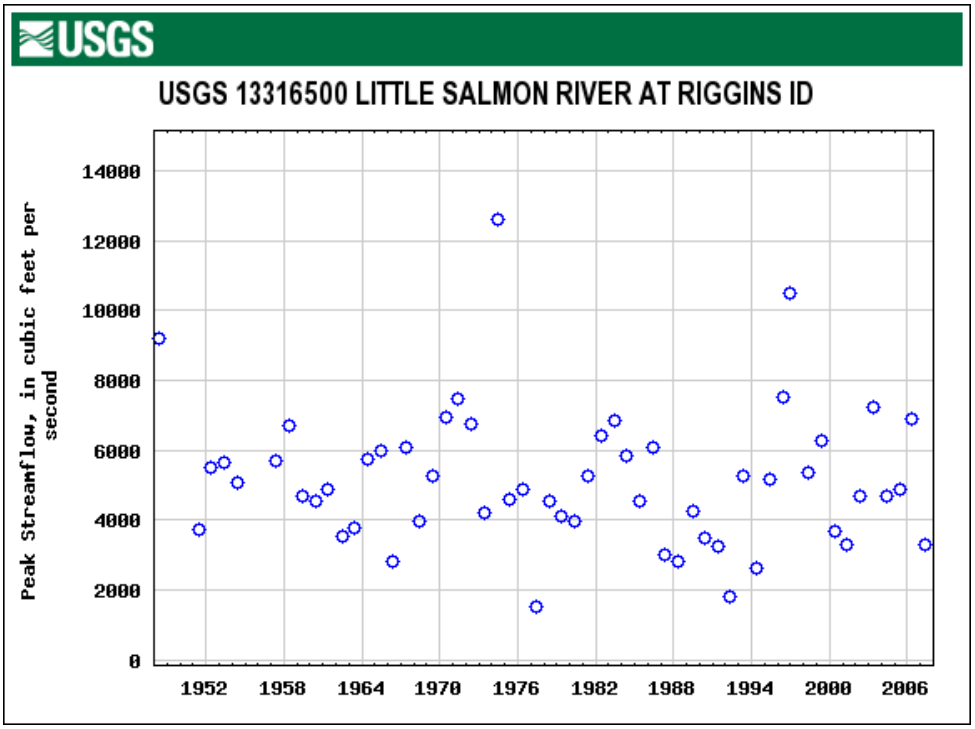

Figure 6. Peak flows at USGS Gauge 13316500 Little Salmon River at Riggins, ID
(source: waterdata.usgs.gov)

Proposed Improvements

In-stream, bank stabilization, river access, and trail improvements are proposed along the reach of the Little Salmon River between the Mill Street Bridge and the confluence with the Main Salmon River. Typical drawings of these improvements are shown in the Appendix and are further described below.

Minor In-Stream Whitewater Features and Habitat Improvements

Minor in-stream modifications could be made over the full length of the river to enhance boating and fish habitat. These modifications would consist of offset deflectors with random boulder clusters placed throughout the entire length of the project site. These

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deflectors and boulder clusters create eddies, pools, and jets of current that are excellent for beginner whitewater recreation instruction and fish habitat diversity.

Primary Whitewater Features

The primary whitewater features would consist of “U” Structures, which are typical REP whitewater structures that create waves or holes that cater to recreational and freestyle kayakers and fisherman. These structures are constructed using large, grouted rock anchored into the bed and bank of the river. The structures would also have a gradual slope to allow for fish passage. In addition, the deep pools downstream of “U” Structures provide excellent habitat for fish, especially during spring and summer runs. Signage at the site should be provided to ensure that all users, inflatable or hard boat, wear a life-jacket and helmet. Figure 7 shows examples of two typical “U” Structures.

Figure 7. (left to right) A "U" Structure designed for instruction in Salida, CO and freestyle kayakers utilizing another "U" Structure in Steamboat Springs

Bank and River Access Improvements

Several bank stability and river access improvements are included within the conceptual design. Access points are important for minimizing the impact of river usage, and providing safe access to the water. Four river access points are proposed in this conceptual design. The first proposed access point is upstream of the Mill Bridge on the existing cut going down to the river. The second proposed access point is downstream of the Mill Bridge on the existing cut going down to the river. This second access point would be designed for ADA access for disabled river users. The third proposed access point is at the downstream end of the “Blackberry Gorge” and could also serve as the ADA takeout point. The “Blackberry Gorge” is located at the downstream end of the floodplain bench associated with the second access point. The fourth proposed access point is at the existing City Park on the Main Salmon River, about ¼ mile downstream of the main project reach. This last access point would serve as a final take-out for in-stream park users. All of these improvements are envisioned to be attractive, functional,

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permanent, and designed to blend with and improve the natural environment. Figure 8 and Figure 9 show examples of bank terracing work completed by REP.

Figure 8. Example of bank terracing replacing an existing wall and stabilizing a stormwater outlet pipe.

Figure 9. Before and after example of bank terracing and trail

Design Objectives

This project will serve many users. The park will serve three main user-types: in-stream users, on-bank users and anglers. The primary in-stream users will be whitewater enthusiasts including kayakers, canoeists, rafters, tubers, and boogie board/surfers. On-

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bank users include pedestrians, joggers, picnickers, bird watchers and swimmers. The design also accommodates anglers with improved river access and fish habitat improvements. The whitewater drop structures would create drops and pools providing excellent fish habitat in the summer and excellent overwinter habitat in the colder months. Typically, whitewater parks are popular fishing areas due to the deep water habitat and aerated water. Structures will not be located downstream near the confluence of the Main Salmon River due to low-gradient. This area is a deposition area and the structures would be inundated during high flows in the Main Salmon River.

An additional design objective is ensuring that this whitewater project is ADA-friendly. This will include (but is not limited to) construction of paved parking, paved trails and an ADA-friendly fishing platform.

There will be no negative flood impact due to this project. It is a standard procedure to conduct a proper flood modeling study in order to ensure that there will be no rise in water surface elevations during high-flows. In addition, many of the proposed structures should be designed to be “at grade”, meaning they will not encroach into the cross-sectional area of the channel. Other techniques that may also be used to accommodate high flows include increasing the cross-sectional area, over-bank grading and pool excavation. Similar whitewater improvement projects that have been built in the United States have required a floodplain analysis to ensure there will be no negative impact on the floodplain.

In-stream users would be provided with both float through and park-and-play type whitewater features designed to provide a variety of difficulties depending on flow rates at the park. At higher flows the course will become more challenging and the hydraulics featured at the “U” Structures will become more dynamic and powerful. At lower flows these same structures will accommodate beginner and intermediate boaters who seek to develop their skills. Many other whitewater parks have been used extensively for instruction, and accommodate beginners and children. Figure 10 shows an instructional clinic at an REP park in Colorado.

On-bank users will be able to take advantage of easy riverside access, improved trails for walking and jogging, as well as new terraced areas on the east bank for lounging and spectating.

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Figure 10. Beginner instruction at an REP Whitewater Park in Salida, CO

Accessibility

The project, as mentioned, is located between the Mill Bridge and the confluence of the Little Salmon and Main Salmon Rivers. Non-improved parking already exists near the Mill Bridge and improved public parking activity downstream of the confluence with the Main Salmon River. However parking and infrastructure improvements will be required at the site due to increased use as well as accommodating ADA access.

Maintenance

In-stream improvements are virtually maintenance-free assuming they are designed and built correctly. It is imperative that during the design phase that careful attention is paid toward anchoring these structures well into the banks and beds of the river so that there is no possibility of failure. Regular inspections should be scheduled to evaluate any significant erosion during the first year and every year thereafter. Many projects of this type in free-flowing rivers that experience high spring flows and flood flows have proven these whitewater features to be structurally and hydraulically sound. Other free-flowing rivers that experience powerful peak flows that have whitewater improvements on them are the Truckee River in Nevada, The Arkansas, Yampa and Gunnison Rivers in Colorado, the Bear River in Wyoming as well as the Clarks Fork River in Montana. Trees, ice and woody debris will be passed in the course of normal flows, but should be removed if suspended during high-use times as they represent an immediate in-stream hazard.

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Anticipated Use

Given the flow rates available at the park, it is expected that boaters will visit the park throughout the months of April through June. After streamflow decreases, it is expected that in-stream use by advanced paddlers will decrease, but use by novice paddlers will continue. There could be a significant conflict between salmon fishermen and boaters during the spring salmon run. Since this project will increase habitat and holding water, fishermen would gravitate towards the newly constructed pools. After construction, if there is found to be significant conflicts some regulation may be required to give preference to fishing during the days of the short season and limit others users to the days during the week when fishing is closed. However, most whitewater improvement projects have not required any regulation.

Costs

See the attached cost estimate. Normally, the bulk of this cost is in construction of in-channel improvements. In-stream drops and pools should be constructed, along with any related paths/ access ways, during low-flow periods. Many Towns and Cities have much of the required rock available at active work sites or in storage. Reduction in rock costs can have a significant impact on the total cost of the project.

Future Work

If the City decides to go forward with this project, future tasks include but are not necessarily limited to:

- Detail Design
- Flood/Fluid Modeling
- Permit Applications
- Construction and Bid Documents
- Construction and Construction Inspections

It is recommended that the design team open a dialogue with related planning and government agencies as soon as possible following the decision to proceed as it is often imperative that these stakeholders be included in the design process.

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Permitting

Several permits will need to be obtained before construction of any in-stream improvements can commence. Permitting can be time-consuming and should be started as soon as possible during the design process. Necessary permits are expected to include (but not limited to) the US Army Corps of Engineers Section 404 Permit, Idaho Department of Water Resources Stream Alteration Permit, and the Idaho Department of State Lands License Agreement. In addition, since federally listed endangered species are present (wild steelhead, salmon, and Bull Trout)) the US Fish and Wildlife service, as well as NOAA Fisheries, and Nez Perce Tribe may need to approve the project.
It should be noted that any permitting involving federally endangered fish can take an extensive amount of time. These types of permits have been acquired for similar projects including federal, state and local projects. Examples of projects that were completed requiring similar permits include The Truckee River in Sparks, Nevada (endangered fish species involved), The San Marcos River in San Marcos, Texas (endangered fish and endangered underwater plants), The Clark's Fork River in Missoula, Montana (bullhead trout present) and numerous projects in Colorado involving various trout species. Each permitting office may have specific requirements that must be completed during the permitting process. After the preliminary design phase, permits can be submitted to the various agencies and you will get a clear indication on how extensive the permitting process will be.

Conclusion

Modifications to the Little Salmon River in Riggins, Idaho are feasible and recommended. The river is a valuable resource to the community of Riggins, and could become even more valuable with the implementation of proposed improvements. The modifications outlined in this conceptual report would open the river to more recreational use and improve fish habitat through the reach. Similar improvements have had enormous impacts on the quality of life and local economies of communities throughout the country. Our $170,000 whitewater park in Golden, Colorado has had an estimated 1.7 to 2 million dollar per year impact on the local economy. Similar estimates have been made for our parks in Breckenridge and Vail. Another project, a two-channel whitewater park on the Truckee River at Wingfield Island in Reno, Nevada, has transformed a neglected and denuded section of downtown into a revitalized urban greenway with walking paths, shaded riverside seating, and picnic areas all surrounded by world-class whitewater that has already hosted major national competitions. Riggins has the potential to create a world-class recreational amenity that could benefit the entire community.

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Appendix

Concept Plan

See attached

Cost Estimate

Little Salmon River Whitewater Improvements Conceptual Cost Estimate Estimate for Whitewater Park Site Revised 10-13-08										
Item Number		**Description**		**Estimated Quantity**		**Unit**		**Unit Price**		**Item Total Price**
1		Mobilization		L.S.		L.S.		$20,000		$20,000
2		Water Control		L.S.		L.S.		$25,000		$25,000
3		Structure #1: New "U" structure. Includes rock acquisition, excavation, placement, grouting, backfill, pool excavation		500		cubic yards grouted rock		$75		$37,500

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4		Structure #2: New "U" structure. Includes rock acquisition, excavation, placement, backfill, pool excavation		500		cubic yards grouted rock		$75		$37,500
5		Structure #3: New "U" structure. Includes rock acquisition, excavation, placement, backfill, pool excavation		500		cubic yards grouted rock		$75		$37,000
6		Boulder deflectors and clusters		1,400		Cubic yards of rock		$45		$63,000
7		Large random boulders		100		each		$100		$10,000
8		Bank grading, Access & Terracing		L.S.		L.S.		$180,000		$180,000
9		Landscaping and Restoration		L.S.		L.S.		$20,000		$20,000
10		Miscellaneous equipment hours		200		hours		$120		$24,000
Subtotal										**$454,000**
11		Contingency/Design and Permitting		20%						$90,800
Total										**$544,800**

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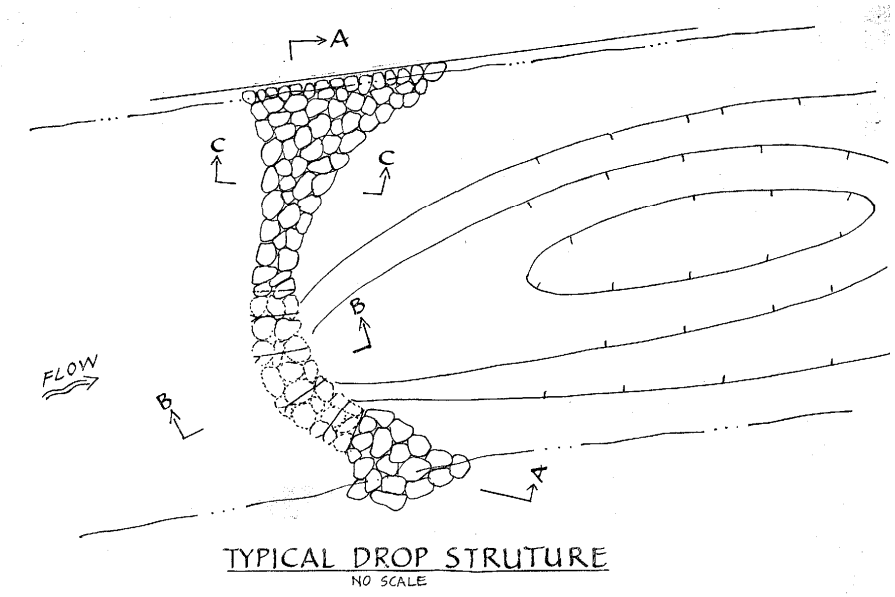
*In addition to these cost estimates, additional improvements to make trails and parking lot ADA-friendly, bathrooms, picnic area and an ADA fishing platform could exceed $300,000.00.

Typical Drawings



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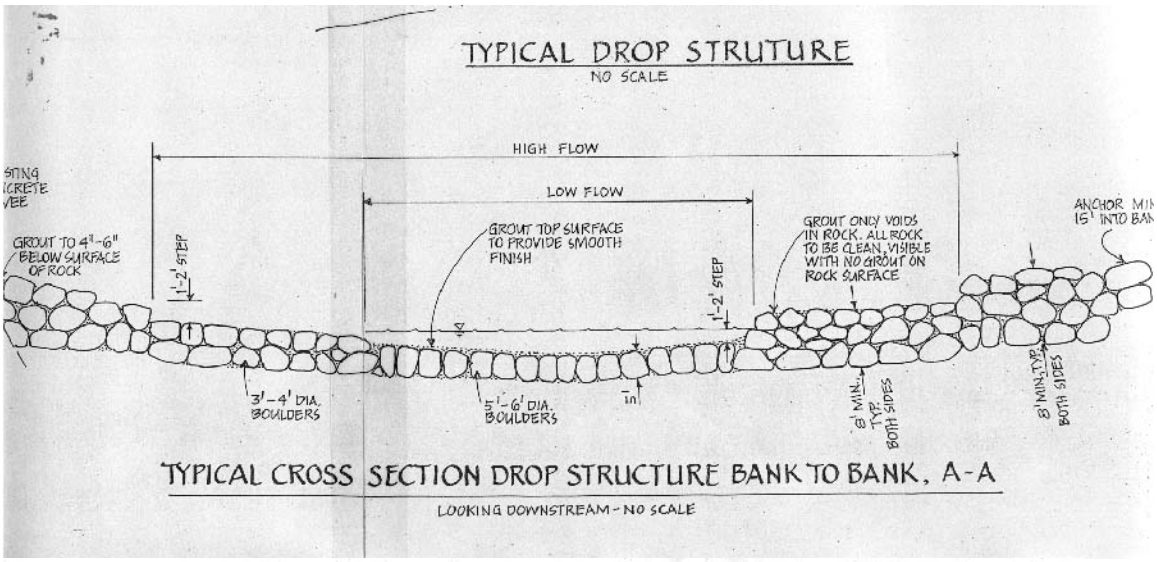

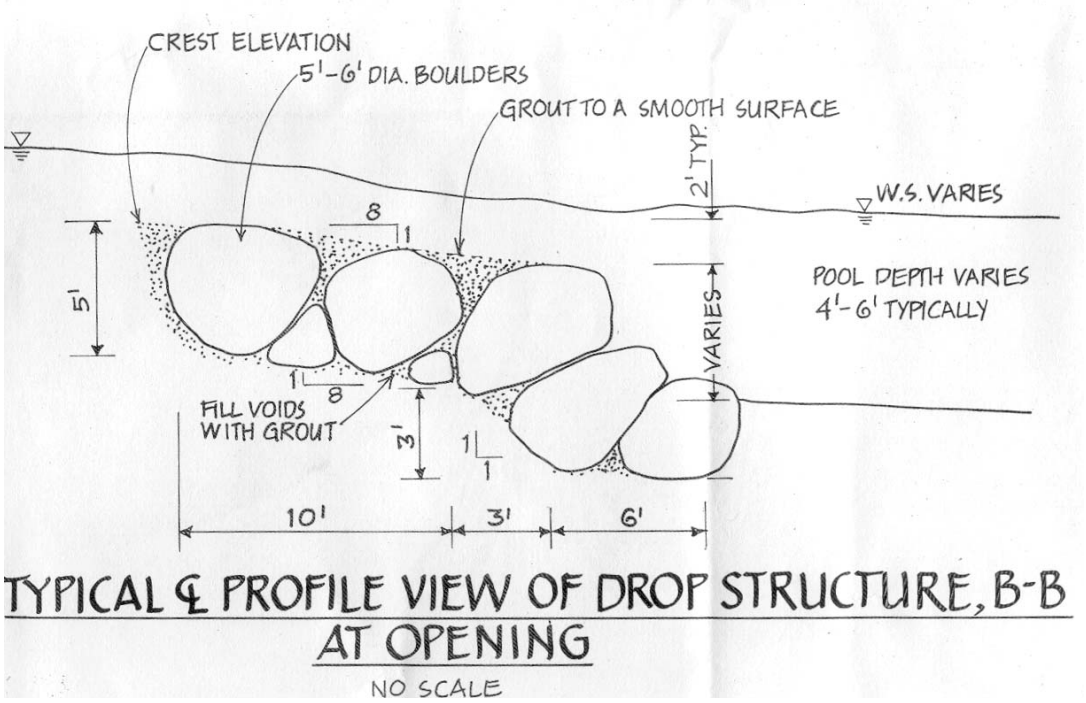

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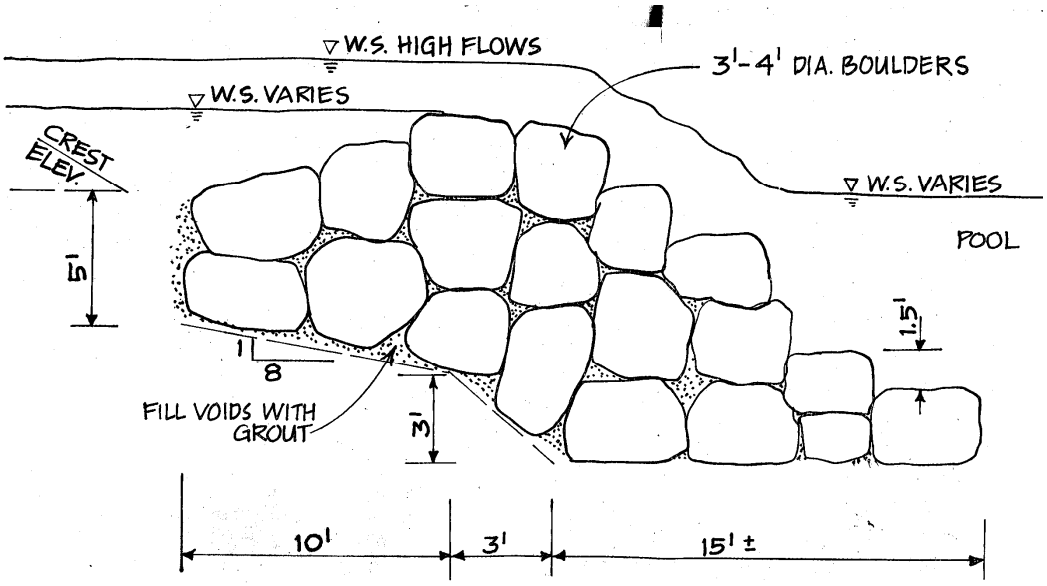
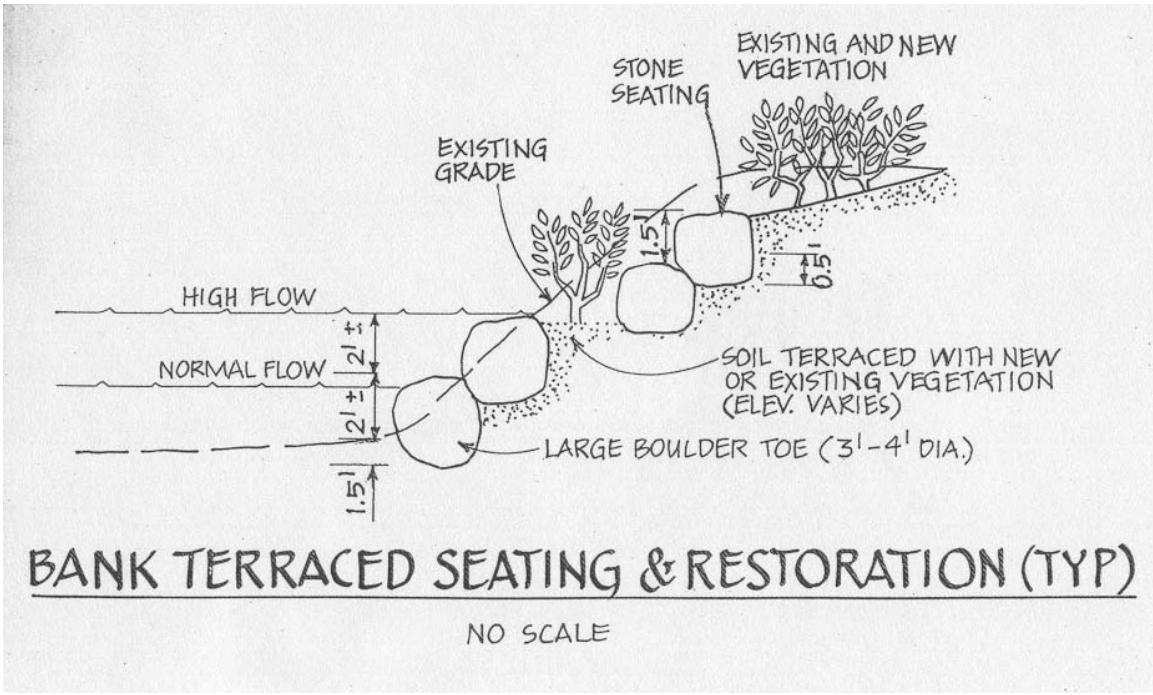


TYPICAL SECTION OF ROCK BEYOND DROP STRUCTURE OPENING, C-C

NO SCALE



BANK TERRACED SEATING & RESTORATION (TYP)

NO SCALE

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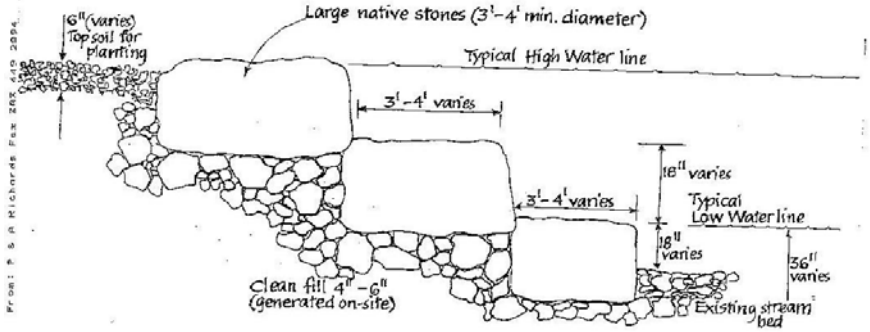

TYPICAL CROSS SECTION BANK TERRACING no scale

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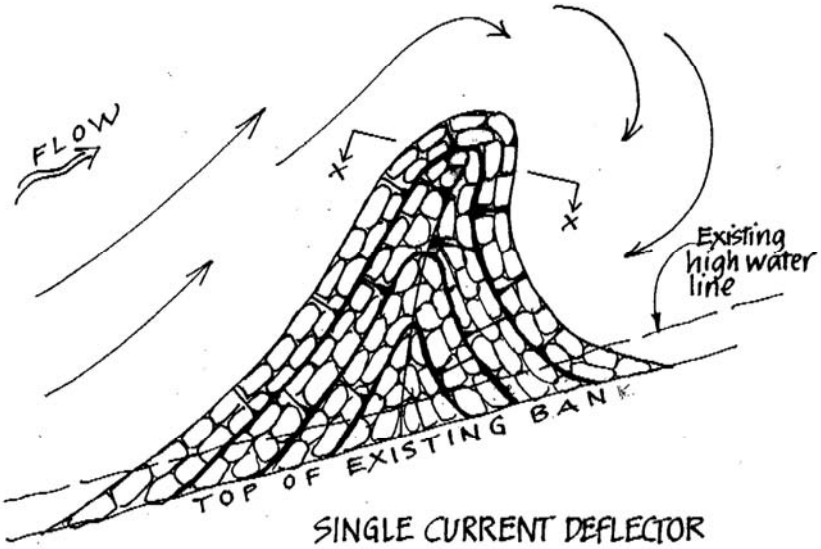
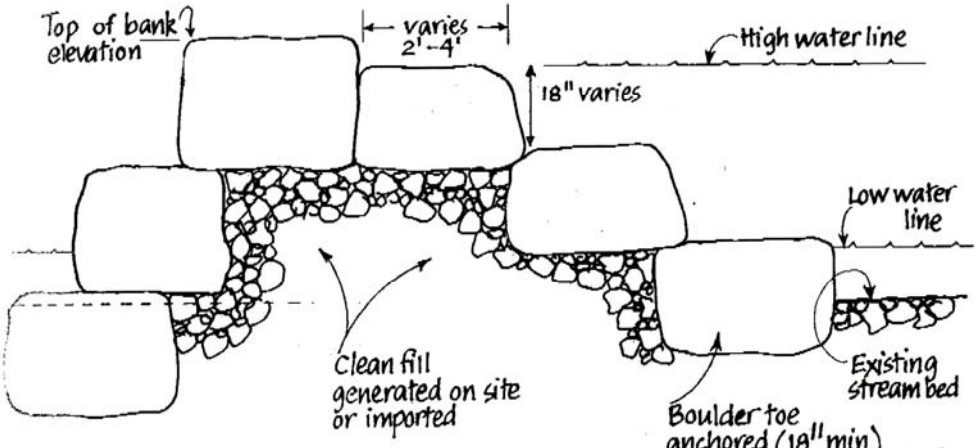


SINGLE CURRENT DEFLECTOR
Plan View - Typical - No scale



SINGLE CURRENT DEFLECTOR
Cross-section X-X-Typical - No scale

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