POUDE RIVER WHITENWATER PARK
CONNECTING THE COMMUNITY THROUGH INNOVATION

Submission for CASFM 2020 Engineering Award for Engineering Excellence:
Construction Project
POUDRE RIVER WHITENATER PARK

PROJECT OVERVIEW

The Poudre River Whitewater Park encompasses the vision that was set forth as part of the Poudre River Downtown Masterplan. The site includes the College Avenue Bridge, the historic Coy Diversion dam, and is adjacent to the historic Fort Collins municipal power plant. The purpose of this project was threefold: (1) To provide a recreational space for water enthusiasts in the region; (2) To restore fish passage and enhance riverine habitat through restoration and reconnection of the river to its floodplain; and (3) To provide flood mitigation through the removal of the Coy Diversion dam and overbank grading.

Design of the Whitewater Park began in early 2016 and was completed in summer 2018. The project required the procurement of numerous permits, including: (a) Individual 404 permit; (b) ESA/Section 106 (SHPO) clearance; (c) CLOMR/LOMR/city floodplain permit; (d) City development permit/approval; (e) Coordination with CDOT and the UPRR; (f) Coordination with private property owners; and (g) Coordination with numerous City Departments and Boards.

Construction on the 11-acre park began in August 2018 and concluded in October 2019. It includes boating features for kayaking and tubing, a 185-foot clear span pedestrian bridge, children's play area, a 35-space parking lot, and nearly a mile of paved trails. The $11.5 million project was funded through a public-private partnership.

The project was managed by City of Fort Collins Park Planning and Development. Anderson Consulting Engineers served as the leading project engineer, with ECI Site Construction management as the general contractor. Recognition is given to BHA Design as the Landscape Architect, S2O for the whitewater feature design, and the other numerous subconsultants and subcontractors who made this project possible.
CONSTRUCTION INNOVATIONS

DIVERSION SETUP
During installation of the cofferdam, the project team divided the river using a one-third/two-thirds split, opposed to the typical half-and-half split. This allowed the team to install the cofferdam on the northern third of the river and divert base flow from this portion. After diverting the flow, the existing irrigation diversion dams and boulder drop structures within the dewatered cell were removed, allowing the river bed within the northern third of the river to be excavated down 5-6 feet and lined with salvaged onsite riprap to limit erosion. This setup (1) Increased the volume in the northern third, which would ultimately become the main diversion, (2) Drew groundwater from behind the existing drop structures and dams, thus ultimately allowing access and direct loading of demolished structures into semis with no pumping, and (3) Ensured that a larger area would be completed by spring runoff and increased flows in case unforeseen challenges were encountered during construction.

REARRANGING ROCK MATERIAL
All existing riprap and boulders onsite were pink and not allowed to be visible in the final product. These boulders were broken up into smaller pieces and used at the bottom of the diversion and in the bottom of new bank protection areas and covered with the preferred grey granite.

PRODUCING NEW COBBLE
A large three-deck screening plant was brought in to screen the 20,000 yards of river bed excavation, resulting in three products being made and reused on site. Cobble larger than two inches was reinstalled in the completed riverbed, and gravel measuring 1-2 inches was used for bedding, dewatering operations, and drainage behind retaining walls. Material measuring less than one inch was used for backfill behind the new concrete retaining wall and bridge abutments.

FISH PASSAGE
In an effort to restore native fish passage within this reach of the river, the project team worked with Colorado Parks and Wildlife to design and construct fish passages at both whitewater drop features. Due to the concern that small, native fish may not be able to navigate upstream through the crests of the whitewater features, the fish passage channels were designed to bypass the crest features. This unique design allows for fish passage, while maintaining the functionality of the recreational features.

Construction of the fish passage channels included the placement of large river cobbles within the channel to provide velocity shelters for the fish as they swim upstream through the passage. In addition, the whitewater park has quickly become a popular fishing destination as anglers seek the many trout that frequent the pools and eddies created by the park’s in-stream features.

DISCOVERING AND PRESERVING HISTORY
The project team was tasked with delicately working around the historical Coy Diversion structure with links to the Poudre River’s storied agricultural past. This original irrigation canal previously carried irrigated water from the Poudre River to the former Coy family farm, later the Link-N-Greens Golf Course. Rather than remove this link to the City’s past, the northern most portion of the Coy Diversion dam and headgate were incorporated into the design of the project for educational opportunities.

Portions of the ditch and settling ponds were also repurposed to convey, detain, and clean stormwater flows from the street and site prior to being conveyed to the river. During excavation of the river bed, the construction team made an unexpected discovery of another historical structure in the middle of the river. The structure was identified as an infiltration gallery (circa 1930) to bring cooling water into the old Fort Collins Power Plant during low flows. Due to its location and impact on the project, the infiltration gallery was removed after the Colorado State Historic Preservation Office documented it. Portions of the structure were salvaged and are still on site today.

SUSTAINABILITY AS A TOP PRIORITY
Sustainability was a priority from the onset of design to the completion of construction, garnering remarkable results. To minimize material waste, multiple items that needed to be removed during the construction process were later repurposed for different park aspects. For example, more than 10,000 cubic yards of rock materials were excavated from the river, with 100 percent of these materials being reused within the park. The trunk of one of the large trees removed as part of the project was repurposed into several benches placed on site.

The project team also utilized the existing Coy Ditch and settling ponds to their advantage. Rather than fill the ditch and ponds in, which would have resulted in a substantial loss of existing wetlands and wildlife habitat, the design team incorporated them into the new stormwater outfall system that was constructed as part of the project. Stormwater from the adjacent street and parking lot is first treated by BMPs to flush out or through a newly constructed water quality pond. Stormwater is then routed through the ditch and into the ponds, where the existing wetlands and vegetation provide the opportunity for the removal of additional pollutants prior to being discharged to the river.

View the Storymap below to explore the Poudre River Whitewater Park in greater depth:
https://arcg.is/b0H5C

View the “Project Journey” time lapse video:
https://www.youtube.com/watch?v=ZIJusL27Sj&feature=youtu.be


**BENEFITS TO PUBLIC WELFARE**

Public safety was a key driving force in the Poudre River Whitewater Park project. Prior to the park's construction, the possibility of flood damage threatened surrounding properties. Through the removal of the existing Coy Diversion dam, the riverbed was lowered by as much as six feet. This change dramatically reduced flood depths upstream of the dam and significantly narrowed the 100-year floodplain and floodway, providing future development potential for approximately 10 adjacent commercial properties, which were removed from the floodway. The project also reconnected the river to its floodplain for lower, more frequent flows, while maximizing the beneficial environmental and recreational uses of the river corridor.

Furthermore, the lowering of the river bed increased the conveyance through the College Avenue Bridge to be able to accommodate the entire 100-year discharge of more than 13,000 cfs. This increase in conveyance significantly reduces the overtopping of College Avenue during large storm events and will allow for the complete removal of overtopping when additional upstream river projects are constructed.

The Poudre River has always been a popular location for water enthusiasts to engage in various activities. This project minimized public risk by addressing flood concerns, thus encouraging safe and active recreational opportunities for river goers.

**SERVING AS A MODEL FOR OTHER COMMUNITIES**

Completion of this project highlights how a public/private partnership can be leveraged to accomplish a myriad of goals. The creation of the Poudre River Masterplan set the framework for the project and was instrumental in getting buy-in from the public and numerous City Departments and Boards. Design of the project was extensive and required significant collaboration from many entities, but proved successful in completing a project that reduced flood risk, enhanced wildlife habitat, restored fish passage, and provides a great recreational space for the City of Fort Collins.