

## 2020 ENGINEERING EXCELLENCE AWARD NOMINEES

### SANDERSON GULCH CHANNEL IMPROVEMENTS

SUBMITTED BY: ICON ENGINEERING, CITY AND COUNTY OF DENVER DOTI, MHFD



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In the past, Sanderson Gulch flowed through undersized culverts and a channel within a narrow urban corridor that had insufficient capacity for major storms. Peak flows associated with the 100-year storm event overtopped roadways and railroad tracks and spilled out from the channel. Design of the Sanderson Gulch improvements included an innovative design approach to increase capacity for stormwater conveyance. The new unconventional channel and box culvert system now safely conveys the 100-year storm flows and has an additional 1,200 cfs capacity. The project includes a 12' x 4' box culvert and a geomorphic channel with flood terrace for low flows; two 14' x 8' and four 16' x 4' box culverts to convey high flows below the channel, roadways and railroad crossing; complex and decorative boulder structures at the inlet and outfall to South Platte River; a comprehensive restoration effort for long term health and stability of the stream and habitat; trail connections and increased safety for pedestrians.

### POUDRE RIVER WHITEWATER PARK

SUBMITTED BY: ANDERSON CONSULTING ENGINEERS, CITY OF FORT COLLINS

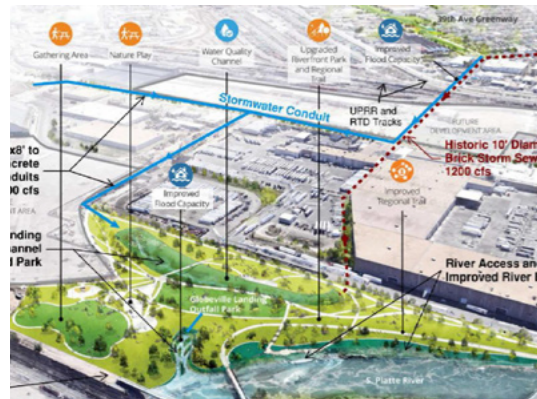


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The Poudre River Whitewater Park is the first whitewater park to be built in Northern Colorado. The Whitewater Park encompasses the vision that was set forth as part of the Poudre River Downtown Masterplan. The site includes the College Avenue Bridge, 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. The project required the procurement of numerous permits. The project 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 trails.

### GLOBEVILLE LANDING OUTFALL

SUBMITTED BY: CITY AND COUNTY OF DENVER, MHFD, MERRICK



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The Montclair drainage basin has no open drainage channel and the stormwater infrastructure is extremely undersized. Rainfalls greater than a 2-year storm event cause extensive surface flooding. The City endeavored to create a conduit system to alleviate this problem. The team designed 4,500 LF of concrete conduit (8'x8' to triple 10'x7' boxes) to carry stormwater in a 100-year event under 17 freight train tracks, two heavy commuter rails, Brighton Blvd., the Pepsi Bottling Co. property, and through an existing Superfund site. One of the biggest hurdles was the 500-foot-long segment (four 8' diameter pipes) tunneled under the UPRR yard. To achieve improved water quality and increased open space, the City designed an open, more natural stormwater outfall. The outfall is designed to dissipate the high-energy flow of water and features a stable, impermeable lining to separate and protect surface water. The project was a collaboration with Denver Parks and the community to renovate and update the existing park paths.

The 2020 Nominees are listed in no particular order.

## 2019-2020 CASFM SCHOLARSHIP RECIPIENTS

### BEN URBONAS SCHOLARSHIP NATALIE COLLAR

Natalie started her Hydrological Science and Engineering PhD candidacy at the Colorado School of Mines in August 2019 and is also a Water Resources Scientist/Hydrologist at Wright Water Engineers, Inc. The focus of her dissertation research will be post-fire hydrology with an emphasis on evaporative flux disturbance and recovery following wildfire instance. Historically, the planning and engineering community grappled with the implications of fires and flooding in urban environments reactively. She is going back to school to dedicate her career to better understanding the watershed disturbance response on a fundamental level because the tools our future deserves will require it.

### FAMILY SCHOLARSHIP GAVIN O'CONNELL

Gavin is the son of Pat O'Connell at Jefferson County. He attends the University of Colorado Boulder and plans to graduate in Spring 2021 with a degree in Aerospace Engineering. His position as a cadet in the CU Air Force ROTC Detachment 105, and as an Airman in the Reserves have strengthened his desire to become a leader, innovator, and fulfill a core value of service before self.

### UNDERGRADUATE SCHOLARSHIP PAGE CIRILLO

Page is an Environmental Engineering student at the Colorado School of Mines, graduating in Spring 2020. Page wishes to not only work in the field of environmental engineering, but wants to be someone who spearheads innovation to change the field. She has volunteered in the Solukhumbu Valley of Nepal and intends to continue her work there, potentially with improving the local drinking water systems.

## 2020 GRANT RECIPIENT UPDATE

In early 2020, MHFD, in partnership with (UWRI) and with support from the 2020 CASFM Water Quality Research Grant, initiated a regional stormwater research project to study bioretention basins installed across the Denver Metropolitan region. This study intended to evaluate successes of individual facilities installed over multiple decades and to understand design considerations and maintenance requirements by investigating performance metrics through infiltration testing, soil media gradation, nutrient analyses, and vegetation health assessments.

Early in the study, goals were defined as:

- Quantify the impact of vegetation on infiltration rates.
- Evaluate nutrient content in the bioretention media and health of the vegetation.
- Determine recommendations for type/coverage of vegetation to facilitate basin function.
- Evaluate the maximum recommended run-on ratio to the bioretention filter area.
- Identify bioretention media gradation ranges that result in functional infiltration rates.
- Determine pretreatment and maintenance recommendations based on available maintenance data and conditions within the bioretention basin.
- Develop a map and case study library of bioretention sites in the region.

MHFD developed a field assessment approach to collect data from different bioretention basins that varied by type, location, installation date, and maintenance history. After identifying potential sites, MHFD would review drawings, drainage reports, maps, vegetation plans, and maintenance records (if available) and collect site background information on each facility. Following background investigation, site inspections and performance-based fieldwork would include: infiltration testing, soil sampling of bioretention media mix (gradation and nutrients), and assessing vegetation health (e.g., health, condition, coverage, type, etc.). Results would be summarized, analyzed, and mapped interactively.

With the project now underway, MHFD has identified over twenty basins and completed the first round of infiltration and soil testing for the majority. Over the next year, MHFD plans on (1) expanding the list of facilities, (2) improving the data collection process for performance-based and vegetation assessments by creating a standard bioretention fieldwork survey, and (3) developing a beta version of an online interactive story map.

A literature review was completed by Geosyntec in June 2020. MHFD hopes this study, which is also being performed in conjunction with a Volume 3, chapter 4 and 6 update, can be used to inform the criteria.

