2020 CASFM Virtual Annual Conference

Going with the Flow

September 28 - October 1, 2020
Virtual Conference
WE MADE IT! WELCOME TO THE 1ST CASFM VIRTUAL CONFERENCE!

The CASFM Board and Conference Committee has spent the last five months putting together exciting technical tracks from around the State. Our goal as an organization is to share information, new technologies, and innovative ideas. This conference will give us an opportunity to do that. While the content is meaningful, we all will miss seeing old faces and meeting new members with a mountain backdrop.

Our theme this year, “Going with the Flow,” could not be more appropriate. What a year it has been! Everyone in this organization has had to alter their lives in some way and go with the flow. CASFM is an all-volunteer organization and we appreciate all the hard work that went into getting out of our comfort zone and planning a virtual conference in a few months’ time. In addition to a new platform, the Committee is introducing a new track this year, “Lessons Learned.” We are amazed at how willing our members are to share lessons learned, allowing our industry to continue to learn and grow. No one is sure what we will say when we look back at 2020, but hopefully we come out a little more patient, a little more willing to be flexible, and an openness to “Going with the Flow.”

The Board and Conference Committee would like to thank the presenters, sponsors, volunteers, and attendees for all going with the flow to make this conference a success. We rely on you to provide guidance and leadership for CASFM and the annual conference, and this would not be possible without each of you.

Sarah Houghland
Conference Chair
Enginuity Engineering Solutions

Morgan Lynch
CASFM Chair
Mile High Flood District (MHFD)

2020 CASFM CONFERENCE COMMITTEE!

This year’s virtual platform allows us to track how long attendees are viewing the content presented at the 2020 Virtual CASFM Conference. This tracking has the added benefit to allow both the user and CASFM to quantify their personal Continuing Education Credits for all who attended the conference. Please note, that once you are logged into the virtual platform for the Conference, the system will track all the Conference Sessions you view. Please also note that the system is very sensitive, and can tell when you click away from the conference page or session and may stop recording attendance time. If you happen to open a tab and click away from the conference content the system will log that change and may reduce the hours you can potentially receive for Continuing Education Credits. Each attendee will receive a file with the time spent viewing conference sessions and for those with CFMs, CASFM will submit your CEC’s on your behalf.

For any questions regarding CEC’s please contact: Sarah Houghland, shoughland@enginuity-es.com

2020 - 2021 OFFICERS & REGIONAL REPRESENTATIVES

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JOIN THE CONFERENCE CONVERSATION:
#CASFM2020
MONDAY, SEPTEMBER 28, 2020
10:00AM TO 11:30AM
General Membership Meeting
Moderator: Megan Lynch, MHFD

TUESDAY, SEPTEMBER 29, 2020
8:00AM TO 4:00PM
Technical Sessions

STORMWATER QUALITY & GREEN INFRASTRUCTURE
Moderator: Candice Owen, City of Boulder

STORMWATER QUALITY & IMPROVED QUALITY OF LIFE: A NEW ORDEAL IN NORTH DENVER
8:00 TO 8:30AM
Getachew William - Eagle & John Guinn - Wilson & Company
By integrating innovation stormwater solutions with open space and recreation
Denver is finding better solutions for both. See how this approach to green infrastructure
has been integrated in a design for a new regional park and natural area in north Denver.

URBAN DEBRIS MANAGEMENT PROGRAM
8:30 TO 9:00AM
Selena Kleszewski & Richard Abeyta - City and County of Denver (CCD)
Department of Transportation & Infrastructure (DOTI)
The Wastewater Management Division at DOTI has developed an Urban Debris
Management Program (UDMP). UDMP aims to anticipate debris mitigation
by implementing the effects of debris loading to the S. Platte River and other waterways with the City and Country of Denver.

PLANING FOR GREEN INFRASTRUCTURE RETROSPECT
9:00 TO 9:30AM
Shawn Tracy & Chris McMillan - HR Green
Monopolies considered an issue for the future face many challenges.
This presentation provides an outline of considerations, pitfalls and successes on green infrastructure programs through the use of case studies from several cities and first-hand experiences.

BREAK
9:30AM TO 10:00AM

WHAT’S NEW IN COLORADO?
Moderator: Shae Thomas, MHFD

THE COLORADO FLUVIAL HAZARD MAPPING PROGRAM: LINKING CONTEXT TO HAZARD WITH 2D INTEGRATION MANAGEMENT
10:30 TO 11:00AM
Donald Cozzio - Fluvial River Design, Katie Jurg - Watershed Science and Design & Jeff Studis - University of Colorado Boulder
This presentation will cover the framework in the Fluvial Hazard Protocol that helps users understand the role that context, setting, streams, and geospheric responses have on FHZ delineations. It will also provide an update on recommendations, including FHZ integration.

COLORADO POST WILDFIRE GUIDE
11:00 TO 11:30AM
Donna Chinchilla & Dave Solen - US Army Corps of Engineers (USACE)
Sacramento District
The guide was developed to combine expertise and resources to help communities and residents prepare for, respond to, and recover from wildfire and post-wildfire flood risks. This presentation will provide an overview of the guide.

IMPROVING PUBLIC SAFETY AT LOW HEAD DAMS IN COLORADO
11:30AM TO 12:00PM
Anwar Elzayat - WM & Bill McCormick - Dome Safety Branch of Division of Water Resources
low head dams are known as “swimming machines” due to the recirculating currents that can develop downstream of these structures. This presentation will focus on efforts by the Colorado D.O.M. to improve public safety at low head dams in Colorado.

BREAK
12:00PM TO 1:00PM

ONE STOP TO 1:00PM
Engineering Excellence Project Award Presentation:
Globeville Landing Outfall
Sponsored by: City and Country of Denver & MHFD
Project Engineer: Merrick

STORMWATER QUALITY & GREEN INFRASTRUCTURE
Moderator: Sara Johnson, Muller Engineering

THINKING DIFFERENTLY: STORMWATER PROBLEM SOLVING FOR UNIQUE SITES
1:30 TO 2:00PM
Emily Wilkins and Ann Kurzdale - Colburn Engineering; Maggie Lewis - WMWE
We are here to learn something new. Let’s try to do that in this session. We will look at three case studies for stormwater problem solving at unique sites, focusing on some of the interesting and different aspects. Case Studies: Stormwater Treatment and Treatment at Dallas Fort Worth National Cemetery, Splitting My Hair Water Quality and Detention Flood Benefits.

TRASH VAULT SQUADS: INTRODUCING INFRASTRUCTURE TO K-12 STUDENTS
2:00 TO 2:30PM
Danny Reucho - CCD (Stormwater Education and Outreach Program) & Troy Gammery - ICON
Working with 2-12 teachers and students we often lack lists of CASFM professionals. Two great training, let alone comfort, as educators though. We’ve got stories of trials and errors as well as successes to share.

BREAK
2:30PM TO 3:00PM

WHAT’S NEW IN COLORADO?
Moderator: David Morrisey, CCD DOTI

REGIONAL VISION FOR PEOPLE + NATURE + WATER
3:00 TO 3:30PM
Donna Cozzio - Metro Denver Nature Alliance
In the last decade, Colorado’s growth has accelerated along the Front Range, with the Denver Metro population increasing by 20%. In sustaining this growth, regulations, water, Colorado is becoming more diverse, the share of racial and ethnic minorities is expected to grow more than twofold over the next two decades. We are expressing for growth within scale. A Regional Conservation Assessment will aim decision makers with the foundational ecological framework to help position the state’s aquatic and terrestrial communities sustain clean air and water, and live local and state economies. We must implement strategic and equitable decisions that guide responsible development, protect and enhance ecosystems, and ensure nature access for everyone.

COVID-19: THE UNPLANNED RISK IN RISK MAP
3:30 TO 4:00PM
Marlo Mettey & Troy Thayer - FEMA Region VIII
COVID-19 is an unprecedented, global pandemic that has impacted many aspects of society. This presentation will provide key takeaways of COVID-19’s methods and strategies regarding our Risk MAP project to ensure safety amid the hazards.

WEDNESDAY, SEPTEMBER 30, 2020
8:30AM TO 4:00PM
Technical Sessions

LESSONS LEARNED: TRY AGAIN. FAIL AGAIN. FAIL BETTER.
Hosted by: The Learning Community Advisory Council
Moderator - Laura Kroeger, MHFD

PARTNERING WITH DEVELOPMENT: A STERLING GULCH EXAMPLE
8:30AM TO 9:00AM
This presentation will focus on lessons learned throughout the Mile High Flood Project’s improvement process. Specifically focusing on, coordination during design, flexibility and cooperation being essential during construction, and communication during the monitoring period.

WHY ARE THE WETLANDS DRY? LESSONS LEARNED WHEN ECLOGOISTS DON’T KNOW HOW TO BE HEARD IN MULTIDISCIPLINARY TEAMS
8:30AM TO 9:00AM
Monetale Worl - SCDOT Resources and Larry L. Powell - MHFD
With a recent history of failed attempts in raising a hand and taking a stand in a multidisciplinary team and how projects were adversely affected by that failure.

WHAT TIMBERS CREEK TAUGHT US?
9:00AM TO 9:30AM
Barbara Chengtoua - MHFD & Mark Hyllefi - Muller Engineering
After nearly a half-century, Timbers Creek has had attempts to rehabilitate a swampy and sandy creek. We took a different approach on the试行，learn from it as possible, understand the entire system before implementing a fix.

BREAK
9:30AM TO 10:30AM

2-D MODELING
Moderator: Tyler Rosburg, ICON Engineering

2-D TECHNICAL CONSISTENCY AND RECOMMENDATIONS
10:30 TO 11:00AM
Josh Hill - MDE & Geoffrey Uhlemann - Michael Baker
What happens when practitioners pose interdependent, and ideas to work together for the greater good? 2-D technical improvement initiated by multiple companies from several states has been meeting regularly to share company practices, 2-D hydraulic modeling, 2-D hydrologic models, decision metrics and decision factors for Risk MAP studies from cradle to grave (e.g. terrain through mapping). The intent is to identify standards of practice that can be leveraged across contractors, make results consistent, learn from another, and follow a similar level of quality. This presentation will focus on the coordination that has occurred, how it has benefitted the profession, and will highlight notable recommendations.

2-D RESULT COMMUNICATION AND USE
11:00 TO 11:30AM
Thuy Patton - FEMA Region VIII, Terri Fead - MHFD, Rigel Rucker - AECOM
This presentation will focus on lessons learned throughout the Mile High Flood Project’s improvement process. Specifically focusing on, coordination during design, flexibility and cooperation being essential during construction, and communication during the monitoring period.

2-D NATIONAL EFFORTS
11:30AM TO 12:00PM
Scott Hogan - FHWA, Isaac Allen - AECOM
At the national level, various agencies are making strides to better facilitate the use of existing 2-D technologies and methodologies. FHWA has created an 8-person group to tackle several 2-D roadway challenges, began pilot testing of alternative 2-D solutions, and began revising existing standards and guidelines for floodplain mapping. Federal Highway Administration has taken a proactive role in promoting and standardizing 2-D modeling through the release of multiple papers and other initiatives. This presentation will focus on what these efforts entail, what the future of 2-Droadway might look like, and what the results will mean for local stakeholders.

BREAK
12:00PM TO 1:00PM

1:00PM TO 1:30PM
Engineering Excellence Project Award Presentation:
Poudre River Whitewater Park
Sponsored by: City of Fort Collins
Project Engineer: Anderson Consulting Engineers

LESSONS LEARNED: TRY AGAIN. FAIL AGAIN. FAIL BETTER.
Hosted by: The Learning Community Advisory Council
Moderator - David Skudowsky, MHFD

A PAIR OF LESSONS LEARNED STORIES FROM THE LAFAYETTE-LOUISVILLE BOUNDARY AREA PROJECT
1:30PM TO 2:00PM
Dave Skudowsky - MHFD
This lessons learned presentation will tell a pair of stories from this CIP project that was featured as a finalist for the 2019 Infrastructure Excellence Award. The stories include a comparison of two polar opposite low bid contractors working side by side on different phased projects. One has tried to hard to maximize a highly qualified contract and now have to perform repairs.

DON’T DO WHAT WE DID!
2:00PM TO 2:30PM
Heather Skudowsky - ICON & Dave Skudowsky - MHFD
Come hear about the stumbles, blunders and times our panel thought about changing a different profession. They’ll open up for sharing and inquisitions from audience, in person or submitted anonymously.

BREAK
2:30PM TO 3:00PM

2-D MODELING
Moderator: Tyler Rosburg, ICON Engineering

CDOT REGION 4 2-D MODELING REVIEW AND THE D-27-G BRIDGE REPLACEMENT
3:00PM TO 3:30PM
Scott Hogan - FHWA, Isaac Allen - AECOM
CDOT Region 4 Hydraulics continues to implement a robust QAV/QGC process for 2-D hydrologic modeling, including a review checklist. The session will walk through the review process with a 2-D case study for the D-27-G US34 Bridge Replacement in eastern Colorado, and will highlight the project successes relative to the checklist.

2 FOR RAIN-ON-SNOW-ON-GRID WITH UPLANDS, TOO!
3:30PM TO 4:00PM
Kimberly Pinto - AECOM
Like some western Colorado watersheds, the Sierra Valley in California experiences severe snow events from winter to spring coincide. We’ll learn about the parameters, HEC-RAS modeling of upland hydrology and tying it into related 2-D precipitation-runoff hydraulic analysis on a valley floor.
NAVIGATING THROUGH LARGE URBAN STORM SEWER DESIGN AND CONSTRUCTION CHALLENGES FOR DENVER’S 33RD STREET OUTFALL PROJECT ALONG A NARROW AND HEAVILY URBANIZED CORRIDOR
8:00AM TO 8:30AM
Jeff Hodel - Wilson & Company & Steve Chu - CCD
The 33rd Street Outfall north of downtown Denver provides 5-year stormwater conveyance through an 11H box culvert with depths of almost 500’. A 10-foot diameter tunnel for 450 ft crossing the UPRR and RTD corridor highlights the project.

VISTA DEL RIO DRAINAGE AND ROADWAY
8:30AM TO 9:00AM
Craig Rueter & Keita Wiles - Bohannan Huston
Based on expert SWMM analysis, the Vista del Río drainage and roadway project provided valuable community infrastructure, reduced area flooding, removed 90 homes from the floodplain, and provided the added benefits of new roadways and utilities throughout the neighborhood.

DAHLIA OUTFALL PIPE: STORY OF DEDICATION AND DETERMINATION TO OVERCOME DIFFICULTY
9:00AM TO 9:30AM
Teresa Patterson - MHFD
Story of how the team came together to design and build a deep storm sewer trunk line across an irrigation ditch and through an abandoned landfill - all within a matter of a few months.

BREAK
9:30AM TO 10:30AM

WATER MEDLEY
Moderator - Brent Kaslon, Valerian

WHAT TO EXPECT WHEN YOU’RE EXPECTING... A METRO DISTRICT
10:30AM TO 11:00AM
Mark Schutte - MHFD
It’s important for local governments, consultants, and contractors to properly understand how Metro Districts operate. The goal of this presentation is to discuss what questions to ask, what to look for, and what to expect from Metro Districts.

HOW TO PARTNER WITH THE ARMY CORPS, AN OVERVIEW OF USACE PROGRAMS & AUTHORITIES
11:00AM TO 11:30AM
Eric Malleney & Melissa Weyerntler - USACE, Sacramento District
An overview of the U.S. Army Corps of Engineers’ business lines, programs, and authorities including flood risk management, ecosystem restoration, floodplain management services, and planning assistance. Information about how to initiate partnership and cost share requirements will be included.

VIRTUAL DESIGN AND COLLABORATION ADAPTATIONS FOR THESE CHALLENGING TIMES
11:30AM TO 12:00 PM
Jesse Clark & Chris Loftus - Stream Landscape Architecture
The COVID-19 pandemic created an unprecedented need to keep design work moving while collaborating remotely. Learn about some new effective techniques for A&E project teams to remotely brainstorm and collectively evolve ideas throughout the design process. (Illustrated through project examples.)

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1:30PM
Thinking Differently: Stormwater Problem Solving for Unique Sites
Emily Villines - Calibre Engineering; Maggie Lewis - Wright Water Engineers

2:00PM
Trash Vault Squads: Introducing Infrastructure to K-12 Students
Donny Roush - CCD (Stormwater Education and Outreach Program)
Troy Carmann - ICON Engineering

4:00PM
Closing Remarks
Moderator: Morgan Lynch, MHFD
Closing remarks, virtual raffle, project award winner announcement.
**WEDNESDAY, SEPTEMBER 30**

**LESSONS LEARNED - TRY AGAIN, FAIL AGAIN, FAIL BETTER.**

*Sponsored By: ICON Engineering*

**Moderators:**
- Laura Kroeger (MHFD) 
- David Skuodas (MHFD)

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Drew Beck - Matrix Design Group 
Jerry Naranjo - Naranjo Civil Constructors |
| 9:00AM | Why are the Wetlands Dry? Lessons Learned When Ecologists Don’t Know How to be Heard in Multidisciplinary Teams | Monska Worah - ERO Resources 
Mary L. Powell - MHFD |
| 10:00AM | What Timbers Creek Taught Us?                                          | Barbara Chongtoua - MHFD 
Mark Nyhoff - Muller Engineering |
| 1:00PM | A Pair of Lessons Learned Stories from the Lafayette-Louisville Boundary Area Project | Dave Skuodas - MHFD |
| 2:00PM | Don’t Do What We Did!                                                  | Heather Seitz - ICON Engineering 
Dave Skuodas - MHFD |

**2-D MODELING**

*Sponsored By: Olsson, Inc.*

**Moderators:**
- Frans Lambrechtsen (Jacobs) 
- Tyler Rossburg (ICON)

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| 10:00AM | 2D Result Communication and Use                                         | Thuy Patton - CWCB 
Tani Fead - MHFD 
Rigel Rucker - AECOM |
| 11:00AM | 2D National Efforts                                                     | Scott Hogan - FHWA & Isaac Allen - AECOM                                 |
| 1:00PM | C DOT Region 4 2D Modeling Review and the D-27-G Bridge Replacement     | Steve Griffin - CDOT 
Anthony Alvarado - Ayres Associates |
| 2:00PM | 2D for Rain-on-Snow-on-Grid with Uplands, Too!                         | Kimberley Pini - AECOM |

**DOWN THE DRAINAGeway**

*Sponsored By: Bohannon Huston, Inc.*

**Moderator:**
- Drew Beck (Matrix Design Group)

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Steve Choi - CCD |
| 10:00AM | What to Expect When You’re Expecting...A Metro District                | Mark Schutte - MHFD |
| 11:00AM | Vista Del Rio Drainage and Roadway                                      | Craig Hoover & Rifka Wine - Bohannon Huston |
| 1:00PM | Dahlia Outfall Pipe: Story of Dedication and Determination to Overcame Difficulty | Teresa Patterson - MHFD |
| 2:00PM | Practical Uses of Urban Tunneling                                      | Christi Wisneder - Merrick & Company 
Ryan Marsters - Lithos Engineering |

**ADAPTED SESSIONS**

**SCHEDULE AT A GLANCE - TECHNICAL SESSIONS**

**THURSDAY, OCTOBER 1**

**WATER MEDLEY**

*Sponsored By: Merrick & Company* 

**Moderator:**
- Brent Kaslon (Valerian)

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| 2:00PM | Don’t Do What We Did!                                                  | Heather Seitz - ICON Engineering 
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Anthony Alvarado - Ayres Associates |
| 3:30PM | 2D for Rain-on-Snow-on-Grid with Uplands, Too!                         | Kimberley Pini - AECOM |
Candice Owen is the Stormwater Quality Supervisor for the City of Boulder. She manages the city’s MS4 permit and water quality in the city’s stormwater program. She is a first-generation Tennessee Volunteer with a B.S. in Civil Engineering and a M.S. in Environmental Engineering from the University of Tennessee, Knoxville. She is a registered Professional Engineer in the state of Colorado. Candice and her husband live in Golden and enjoy Avery’s many outdoor hobbies with their two cattle dogs.

Brent Kaslon is an Associate Principal at Valeron LLC and has been a member of CASFM for 8 years. As a Certified Floodplain Manager, Certified Planner, and landscape designer, Brent is a versatile asset to the Valerian team working on stream corridor restoration, parks and open space, neighborhood design and urban design. In his free time, he loves to spend time with his wife, Cassie, and two sons – Parker and Holden. He also loves to ski, garden, and grow apple trees.

Laura Kroeger is an Engineering Service Manager for the Mile High Flood District. Kroeger has over 20 years of experience in the field of water resources, design and construction. She has been part of the public sector workforce for over 25 years. Kroeger worked as a water resources consultant with a local engineering firm in Denver. She has a B.S. Civil Engineering from Valparaiso University, a M.S. Civil Engineering from University of Colorado Denver and is a Registered Professional Engineer in the State of Colorado. She works closely with the stormwater industry to promote community learning to advance the practice of people, property, and the environment from flood risks.

Dave Skoudas works as a Watershed Manager at the Mile High Flood District. Dave participates in master planning, design, construction, maintenance and development reviews for watersheds in the northern area of metro Denver. Dave has worked at MHD since 2000, prior to which he was an engineering consultant for Byers in Kansas, Nebraska, and Colorado. Dave received a BS in Civil Engineering from the University of Florida in 2000, is a registered Professional Engineer, a Certified Floodplain Manager, a LEED Accredited Professional, and a Stakeholder Competent Communicator. He is also the author of the book, The Effective Client: Why Being a Good Client is Smart Business in the Architectural, Engineering, and Construction Industries.

Frans Lambrechtsen is a project manager for the Watershed Design Group water resource group and has over 20 years of experience in engineering. He has a bachelor’s degree in civil engineering from Santa Clara University and a master’s degree in hydrology from the Colorado School of Mines. Drew was a graduate of the First Creek Stream Academy class and currently serves on the Technical Advisory Committee as CASFM’s liaison ensuring that members can become ambassadors to their watersheds and embrace design approaches that are resilient and sustainable. He is also the incoming Vice Chair.

Sara Johnson Sara is a Project Manager and Water Resource Engineer with Muller Engineering. With over 10 years of consulting experience with MS4 regulations and policy, hydrology and hydraulics studies to reduce urban impacts, stream restoration and mitigation, and flood risk mapping.

Laura Kroeger is an Engineering Service Manager for the Mile High Flood District. Kroeger has over 20 years of experience in the field of water resources, design and construction. She has been part of the public sector workforce for over 25 years. Kroeger worked as a water resources consultant with a local engineering firm in Denver. She has a B.S. Civil Engineering from Valparaiso University, a M.S. Civil Engineering from University of Colorado Denver and is a Registered Professional Engineer in the State of Colorado. She works closely with the stormwater industry to promote community learning to advance the practice of people, property, and the environment from flood risks.

Drew Beck is a deputy director and project manager for the Watershed Design Group water resource group and has over 20 years of experience in engineering. He has a bachelor’s degree in civil engineering from Santa Clara University and a master’s degree in hydrology from the Colorado School of Mines. Drew was a graduate of the First Creek Stream Academy class and currently serves on the Technical Advisory Committee as CASFM’s liaison ensuring that members can become ambassadors to their watersheds and embrace design approaches that are resilient and sustainable. He is also the incoming Vice Chair.

Shia Thomas is an Engineering Service Manager and has been with City and County of Denver since 2006. She oversees all planning related activities within the District, including watershed plans, flood risk identification and planning, and implementing the City’s Multiple Objective Management (CM/GC) delivery method for the First Creek Stream Academy. Shia attended the Colorado School of Mines where she graduated with a BS in Engineering with a specialty in Civil. Shia is a Professional Engineer in Civil Engineering, licensed in CO. Fiona has over 25 years of professional experience working in the field. She is also a Disaster Risk Reduction Specialist, and served as CASFM Chair from 2015 to 2017.

Tyler Rosburg is a project manager at ICON Engineering. At ICON, he contributes to stream restoration design, master planning, and flood modeling projects. Tyler has been involved with CASFM for 5 years and is currently the chair of the Outreach and Training Committee. In his free time, he loves spending time with his wife and son, hiking, backpacking, and exploring the outdoors.

Frans Lambrechtsen, Sara Johnson, Shea Thomas, Drew Beck, Tyler Rosburg

CASFM ENGINEERING EXCELLENCE PROJECT AWARD

2019 CASFM AWARD RECIPIENT: US 34 BIG THOMPSON CANYON FLOOD RECOVERY PROJECT

In September 2013, extreme flood waters washed away homes, cars, and much of US 34 through the Big Thompson Canyon between the City of Loveland and the Town of Estes Park in northern Colorado. The Emergency Response Reconstructed the last roadway and reopened the highway to traffic by December 2013, to fulfill a promise made to the citizens of Colorado by Governor John Hickenlooper. The Governor issued a second promise regarding US 34, that we would “build back better than before.” This project honored his pledge and met the project goal. The permanent repairs, completed with the Construction Manager/General Contractor (CM/GC) delivery method, involved extensive stakeholder coordination and innovative engineering to help the roadway and river recover and coexist to better withstand future disasters.

Health, Safety & Welfare

This project not only permanently repaired the highway, but also included resiliencies to help reduce the impact of similar events in the future. Entire communities were stranded after the 2013 floods, and this project prioritized providing at least 15-ft passable surface flood protection for access as many communities and local canyon residents as possible. Major construction took place over two permitted closure winter seasons, and safety-aware mindsets and an innovative resident access traffic control service led to 387,000 man-hours and over 5,000 vehicles passing through construction without one incident. Furthermore, the project team collaborated with stakeholders to ensure the health of the wildlife and river during construction, including an intensive multi-agency water quality monitoring program.

Creative, Unique & Innovative Solutions

Innovative and cost-effective solutions had to be developed to maximize post-flood emergency access. The design process included the formation of a “challenge team,” made up of contractors, designers, and CDOT representatives that took an objective look at the canyon’s problems in order to suggest possible solutions. One such solution, soil-cement mixing, involved the mixing of concrete and native material to form a 15-ft minimum width surface that adhered to bedrock. This solution provided a cost-effective alternative to cut and fill or MBG access, and allowed for additional resilience scope to be included elsewhere in the canyon.

Multiple Objective Management

The project team worked closely with many stakeholders, including the US Forest Service, CPW, the City of Loveland, Larimer County, and the Big Thompson Watershed Coalition. By creating a unified vision for the canyon and meeting monthly in offices and the field to review design, dewatering, and other construction practices, stakeholder needs were met and the project became a success.

Problem Solution, Budget & Schedule

By working 7 days a week, night and day over two permitted closure winter construction seasons, the project was able to shorten construction by 18 months. The project used the $280M program budget to maximize resiliency scope, providing 15-ft emergency surface flood protection across the vast majority of the canyon.

A model for other communities and projects

With the success of this project and of the flood recovery program, CDOT and the state of Colorado are expanding their focus on resilience to include a number of “challenge teams,” formed of contractors, designers, and CDOT representatives that took an objective look at the canyon’s problems in order to suggest possible solutions. One such solution, soil-cement mixing, involved the mixing of concrete and native material to form a 15-ft minimum width surface that adhered to bedrock. This solution provided a cost-effective alternative to cut and fill or MBG access, and allowed for additional resilience scope to be included elsewhere in the canyon.

PREVIOUS CASFM AWARD RECIPIENTS (LAST 5 YEARS)

<table>
<thead>
<tr>
<th>Year</th>
<th>Winning Project</th>
<th>Companies &amp; Agencies</th>
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</thead>
<tbody>
<tr>
<td>2019</td>
<td>US 34 Big Thompson Canyon Flood Recovery</td>
<td>Jacobs, Ayres, Kiewel, Muller, State of Colorado, CDOT</td>
</tr>
<tr>
<td>2018</td>
<td>Colorado Emergency Watershed Protection Program</td>
<td>Colorado Water Conservation Board</td>
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<tr>
<td>2017</td>
<td>Little Dry Creek Park</td>
<td>City of Westminster, MHD, Adams County, State of Colorado, Muller, Mattix</td>
</tr>
<tr>
<td>2016</td>
<td>South Platte River Vision Implementation Program: Grant-Frontier Park to Overland Pond Park</td>
<td>The Greenway Foundation, City and County of Denver Parks and Recreation Department, CDOM Smith</td>
</tr>
<tr>
<td>2015</td>
<td>Cherry Creek Bayley Ecological Park</td>
<td>Arapahoe County Open Space, SEMWA, MHD, Cherry Creek Basin Water Quality Authority, Muller, Vaisanen</td>
</tr>
</tbody>
</table>
SUBMITTED BY: ICON ENGINEERING, CITY AND COUNTY OF DENVER DOTI, MHFD

SANDERSON GULCH CHANNEL IMPROVEMENTS

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’ 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

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

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’ x 8’ to triple 10’ x 7’ 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 pipes) system at the inlet and outfall. The project was a collaboration with Denver Parks and the community to renovate and update the existing park paths.

VIEW THE FULL SUBMISSION HERE

2020 ENGINEERING EXCELLENCE AWARD NOMINEES

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 USAF Air Force ROTC Detachment 105, and as an Airman in the Reserves has strengthened his desire to become a leader, innovator, and fulfill a core value of service before self.

UNDERGRADUATE SCHOLARSHIP

PAGE O’RILIO

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.

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Poudre River Whitewater Park

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.

VIEW THE FULL SUBMISSION HERE

The 2020 Nominees are listed in no particular order.

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:

• Quantity 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 petri dish and maintenance recommendations based on available maintenance data and conditions within the bioretention basin.

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.
**Sponsor Contact List**

<table>
<thead>
<tr>
<th>FIRM</th>
<th>CONTACT</th>
<th>ADDRESS</th>
<th>PHONE/WEBSITE</th>
</tr>
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<tbody>
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### Schedule At A Glance

#### Tuesday, September 29, 2020

<table>
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<th>Time</th>
<th>Session</th>
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<tr>
<td>8:00 AM</td>
<td>Technical Sessions: Stormwater Quality &amp; Green Infrastructure</td>
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<tr>
<td>8:30 AM</td>
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<tr>
<td>9:00 AM</td>
<td>Break</td>
</tr>
<tr>
<td>9:30 AM</td>
<td>Technical Sessions: What’s New In Colorado?</td>
</tr>
<tr>
<td>10:00 AM</td>
<td>Break</td>
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<tr>
<td>10:30 AM</td>
<td>Technical Sessions: Stormwater Quality &amp; Green Infrastructure</td>
</tr>
<tr>
<td>11:00 AM</td>
<td>Break</td>
</tr>
<tr>
<td>11:30 AM</td>
<td>Technical Sessions: What’s New In Colorado?</td>
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<tr>
<td>12:00 PM</td>
<td>Break</td>
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<tr>
<td>12:30 PM</td>
<td>Technical Sessions: Stormwater Quality &amp; Green Infrastructure</td>
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<tr>
<td>1:00 PM</td>
<td>Engineering Excellence Project Award Presentation 1</td>
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<tr>
<td>1:30 PM</td>
<td>Technical Sessions: Stormwater Quality &amp; Green Infrastructure</td>
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<tr>
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<td>Break</td>
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<tr>
<td>2:30 PM</td>
<td>Technical Sessions: What’s New In Colorado?</td>
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<tr>
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<td>Technical Sessions: Lessons Learned</td>
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<td>9:00 AM</td>
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<tr>
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<td>Technical Sessions: 2-D Modeling</td>
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<td>Technical Sessions: 2-D Modeling</td>
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<td>Break</td>
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<td>Engineering Excellence Project Award Presentation 2</td>
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<td>Technical Sessions: Lessons Learned</td>
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<td>Technical Sessions: Down the Drainageway</td>
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<td>Break</td>
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<td>Technical Sessions: Water Medley</td>
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<td>Break</td>
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<td>10:30 AM</td>
<td>Technical Sessions: Water Medley</td>
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<td>11:00 AM</td>
<td>Break</td>
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<td>11:30 AM</td>
<td>Technical Sessions: Water Medley</td>
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<td>2:00 PM</td>
<td>Closing Remarks, Virtual Raffle, Project Award Winner</td>
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<tr>
<td>3:00 PM</td>
<td>Technical Sessions: Down the Drainageway</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>Technical Sessions: Down the Drainageway</td>
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