

# Pipelines 2018

## Planning and Design



Papers from Sessions of the  
Pipelines 2018 Conference  
Toronto, Ontario, Canada  
July 15–18, 2018

**ASCE**

*Edited by*  
Christopher C. Macey, P.Eng.

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UTILITY ENGINEERING  
& SURVEYING  
INSTITUTE

# PIPELINES 2018

## *Planning and Design*

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PROCEEDINGS OF SESSIONS OF THE PIPELINES 2018  
CONFERENCE

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American Society of Civil Engineers

EDITED BY  
Christopher C. Macey, P.Eng.  
Jason S. Lueke, Ph.D., P.Eng.



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## Preface

Pipelines are the arteries of the modern world that convey the essence of what drives quality of life, commerce, and public health for all of society. Whether conveying drinking water, collecting wastewater, storage and conveyance of storm water, or transport of petroleum or other fluids – pipelines are one of the most essential elements of modern infrastructure that impacts the way we live and ability to improve the world around us.

This year's conference theme is *Revitalizing Global Underground Utility Infrastructure*. It focuses on the awareness that pipelines are a global topic essential to our quality of life; that we have common issues and concerns independent of our nationality; and that our industry can work together to truly develop solutions without borders. This is an exciting realization that holds hope and promise for our future.

In coordination with the American Society of Civil Engineers, the technical program and this publication were planned and implemented by the Technical Program Committee, led by the Technical Co-Chairs. A call for abstracts was made for the first Pipelines conference outside of the United States, from which well over 300 abstracts were submitted. These abstracts were then sorted into tracks based on the general topic areas of Condition Assessment, Planning and Design, Construction and Rehabilitation, Utility Engineering and Survey, Multi-discipline, and Technical Posters. In addition, 5 panel sessions were included with topics from Women in Engineering to Ethics to Emergency Response as well as other specialized technical topics. This resulted in an extraordinarily high-quality program containing 175 papers and 15 poster presentations.

For publication purposes, technical papers from the eight presentation tracks were consolidated into the following three subjects: 1- *Pipelines 2018: Planning & Design*, 2- *Pipelines 2018: Condition Assessment and Construction & Rehabilitation*, and 3- *Pipelines 2018: Multidiscipline Topics and Utility Engineering and Survey*.

On behalf of the Technical Program Committee, we are pleased to offer you the Proceedings of ASCE Pipelines 2018 “*Revitalizing Global Underground Utility Infrastructure*”.

Yours truly,

Chris Macey, P.Eng., M.ASCE and Jason Lueke, Ph.D., P.Eng., M.ASCE

Technical Co-Chairs

# Acknowledgments

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William Fernandes, Toronto Water

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### *Pre-Conference Workshop Leads*

Workshop Chair – Erin McGuire, P.E., CDM Smith

Nathan Faber, P.E. - Large Diameter Pipeline Forum

Andrea Chisholm, PMP - Soft Factors of Project Success and a Partnering-Based Model of Project Delivery

Jerry Colburn - Right-of-Way Considerations in Pipeline Routing

Sri Rajah, Ph.D., P.E., G.E., S.E., P.Eng. - Upcoming MOP on Seismic Design of Buried Water & Wastewater Pipelines

Mark Knight, Ph.D., P.Eng. - Save Construction Time and Money with Subsurface Utility Engineering (SUE)

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Trevor Williams

The Technical Program Co-Chairs and the Steering Committee would like to thank the over 80 individuals which participated as part of the 2018 Technical Committee. Everyone worked as a team to review abstracts, papers, and posters, and continued to collaborate throughout the construction of this year's technical program. Most of the below technical committee members also served as moderators for the conference.

Pat Acker, P.E., P.L.S.	Charles Marsh
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The Technical Program Co-Chairs also thank the authors and exhibitors for their dedication to the industry in presenting at this conference. Without your contributions, the conference would not be possible.

And lastly, the Technical Program Co-Chairs express special thanks to Tennyson Muindi and William Fernandes, Conference Co-Chairs, and the Steering Committee for their efforts and leadership during the planning and execution of Pipelines 2018 Conference.



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