

The Butterfly Effect: Adding 66" BFVs Increases City Water Supply Resiliency

Matthew W. Stevens, PE
Senior Engineer



Paul Dossett, PE
Associate Vice President



January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



DWU serves 2.6M customers

- **23 customer cities**
- **Service area of 700 square miles**
 - *18 pressure planes*
 - *3 WTPs*
- **Water Delivery (Distribution Division)**
 - *5,000 miles of water mains*

UIC 2026 for Registered Attendees Only
Unauthorized Reproduction or Distribution Prohibited

January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



DWU serves surrounding cities, including these major suburbs:

- *Irving*
- *Garland*
- *Richardson*
- *Lewisville*
- *Cedar Hill*
- *DeSoto*
- *Lancaster*
- *Mesquite*
- *The Colony*
- *Coppell*
- *Grand Prairie*
- *Carrollton*
- *Farmers Branch*

UIC 2026 for Registered Attendees Only
Unauthorized Reproduction or Distribution Prohibited

January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



DWU serves customers with transmission mains

A 66-inch PCCP transmission main conveys water between Elm Fork WTP and the Bachman WTP

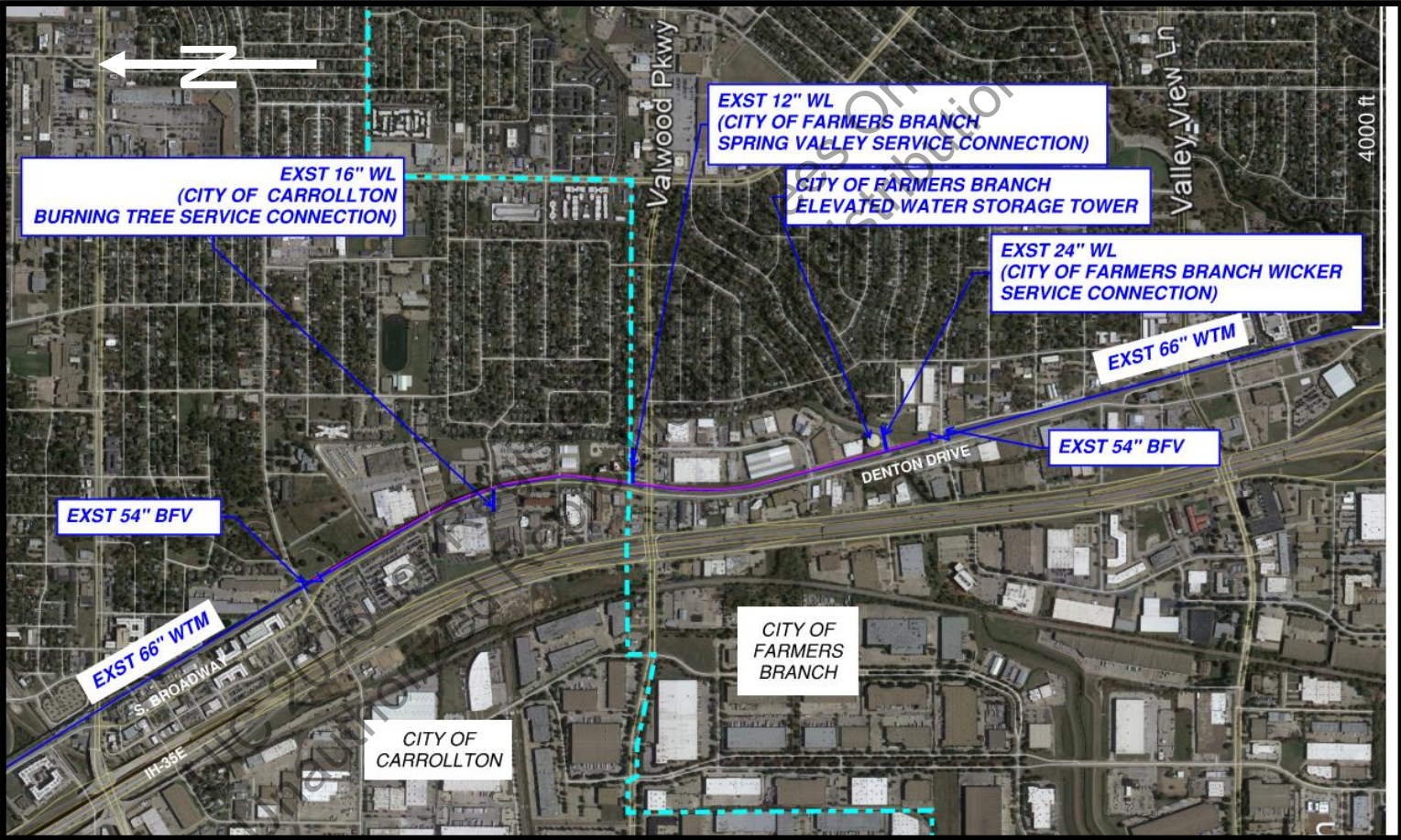
- Sending water both ways
- Serves Carrollton and Farmers Branch
- Constructed in July of 1950
- Each city has approximately seven days of elevated water storage

January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



Three connections near I-35 and Valwood Pkwy

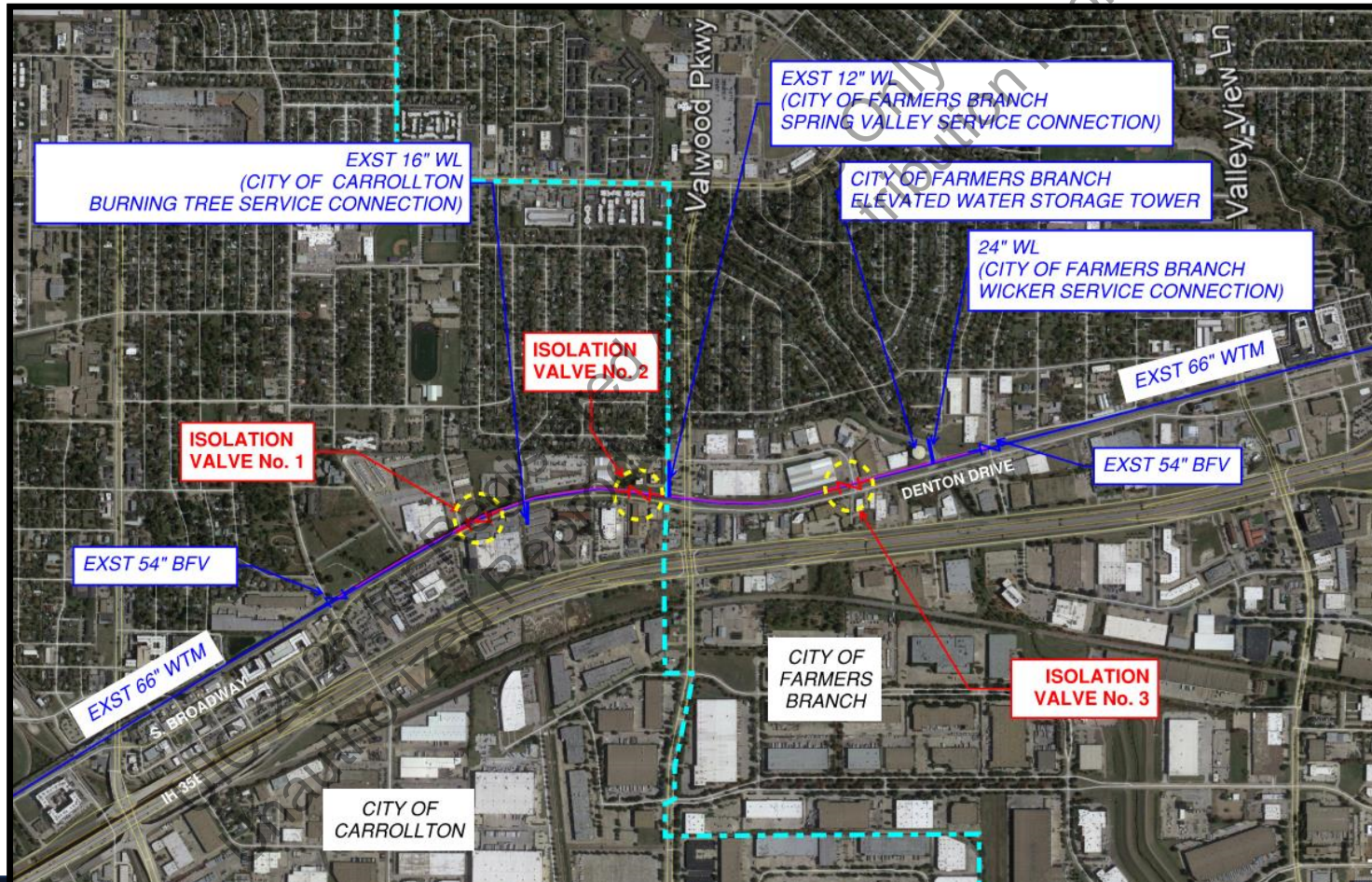


January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



Isolation valves provide resiliency



January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



Stakeholder involvement was critical

Coordination with the following:

- *City of Farmers Branch*
- *City of Carrollton*
- *DART – Specialized Training and Personnel*
- *Two Traffic Control Plans – Partial and Full Road Closure*
- *Early Valve Procurement => 36week lead time*

January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



Adding isolation valves creates potential thrust forces

Water is conveyed at 100psi between EFWTP and BWTP

- *Thrust Force = Pressure (psi) * Area (in²)*
 - *66-inch diameter pipe is 3,421 square inches*
- ⇒ *342,120 pound of thrust force*
- ⇒ *Equivalent of a F-150 truck at 45mph*

January 27 – 28, 2026

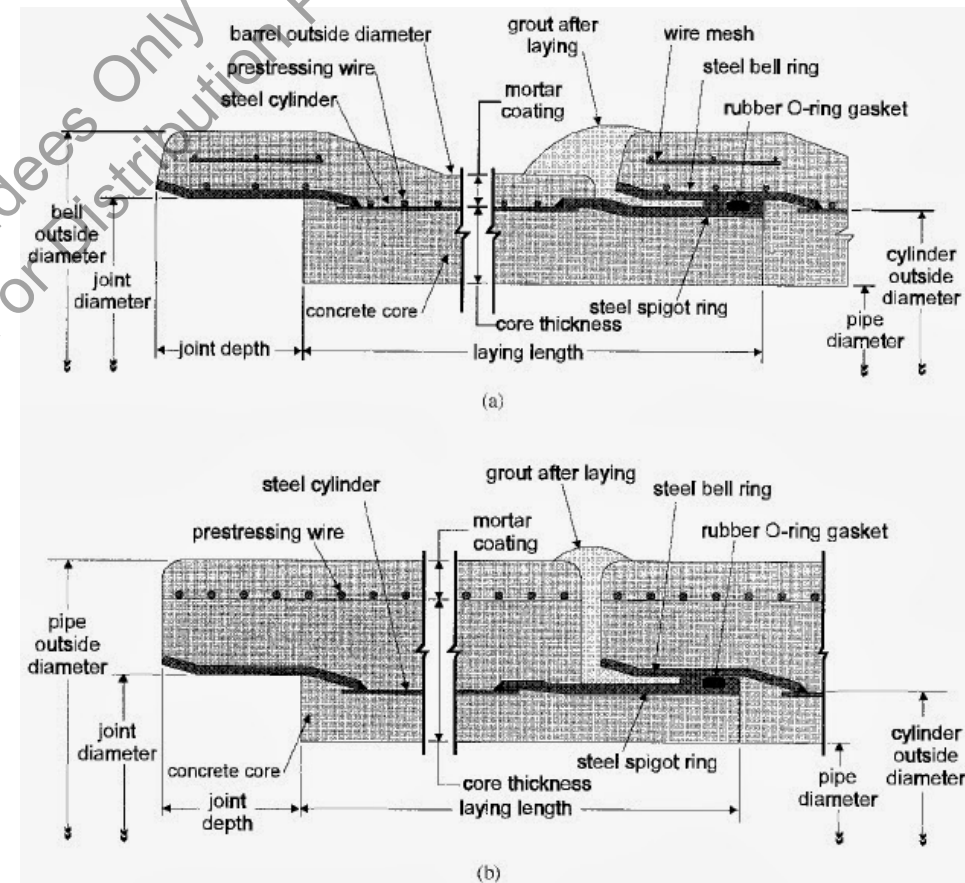
Henry B. Gonzalez Convention Center, San Antonio, Texas



Prestressed Concrete Cylinder Pipe (PCCP)

PCCP is governed by AWWA

- *Rigid Pipe*
- *Lined Cylinder => C301*
- *Embedded-Cylinder Pipe => C302*
- *Connections at the joints ONLY*



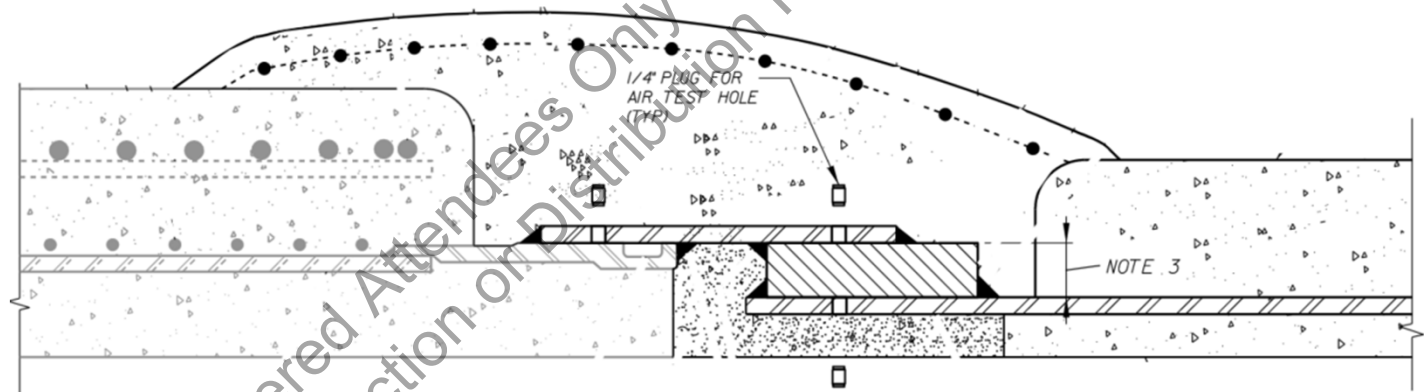
January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas

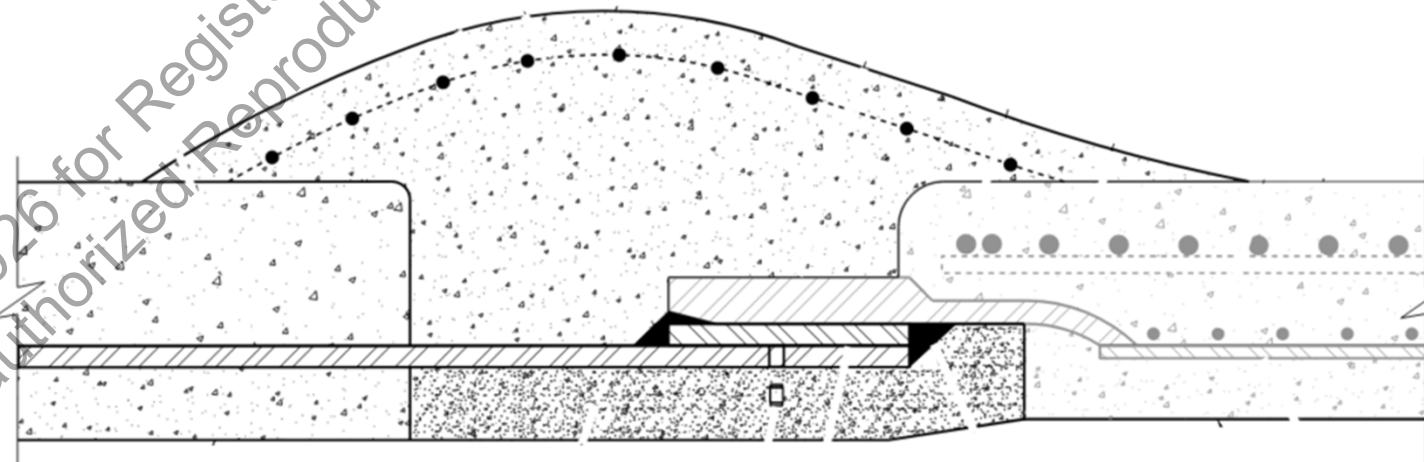


Steel pipe allows connections to PCCCP

Concrete spigot to steel connection



Concrete bell to steel connection

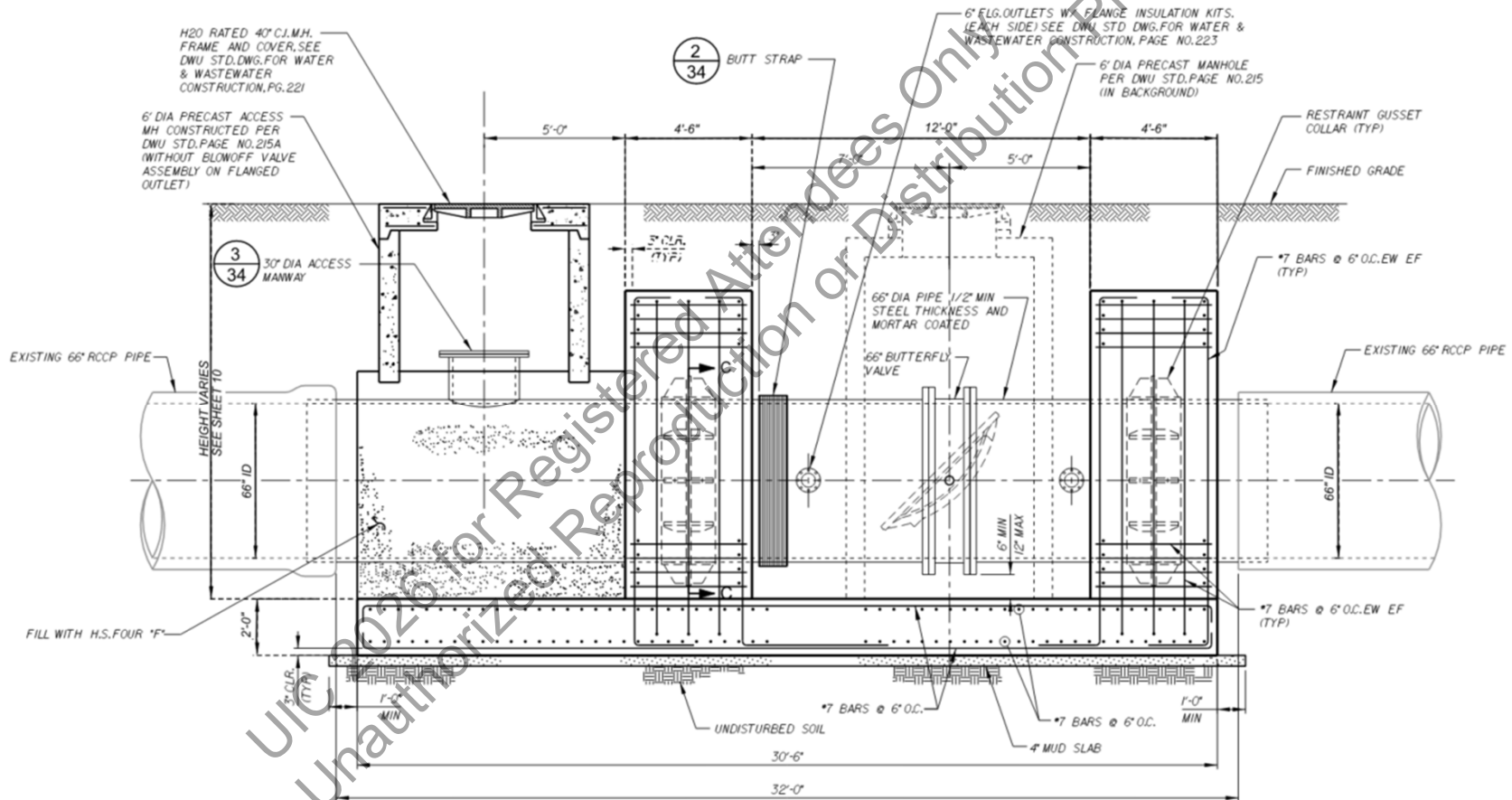


January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



Each location requires a significant structure

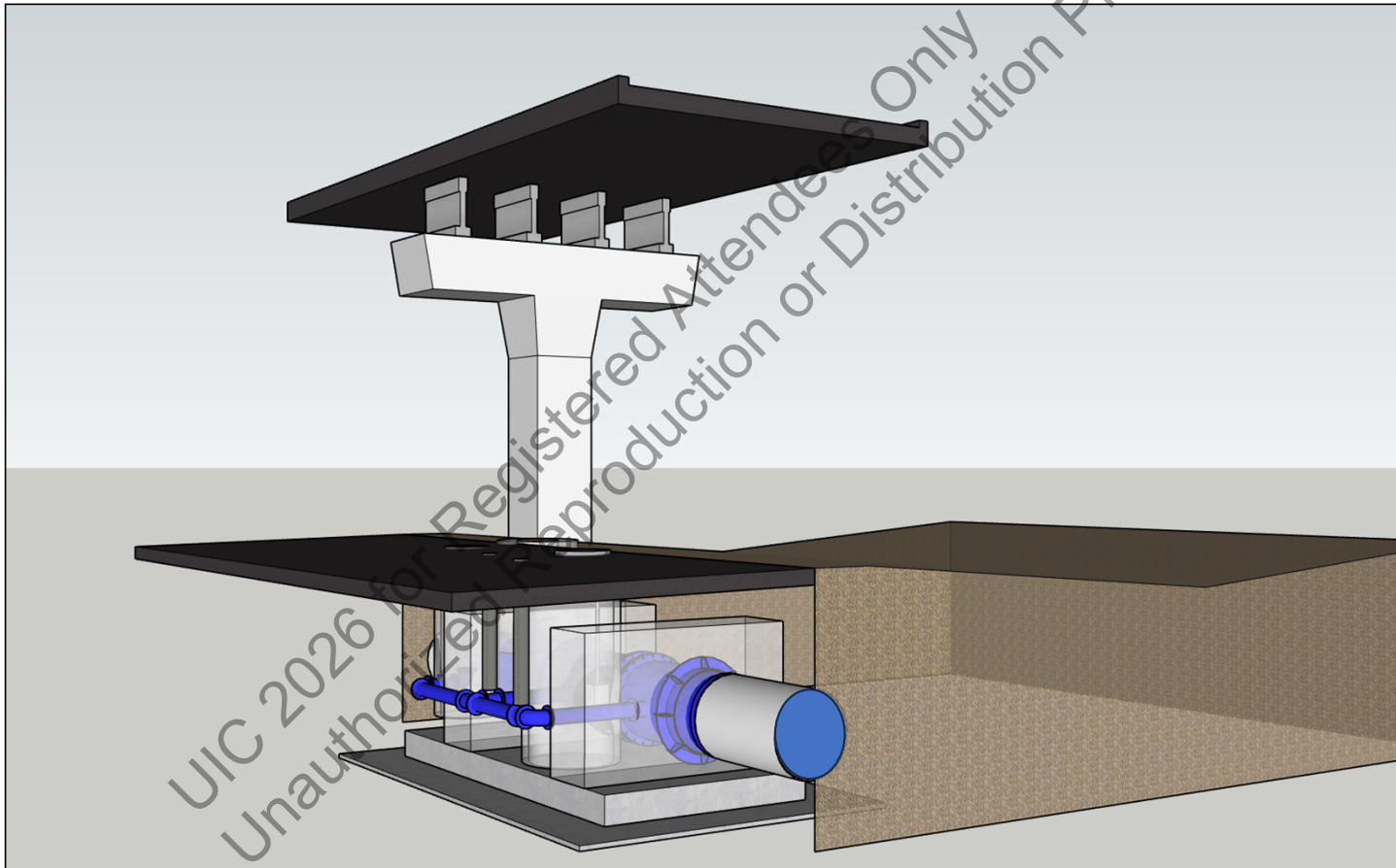


January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



Isolation Valve No. 1

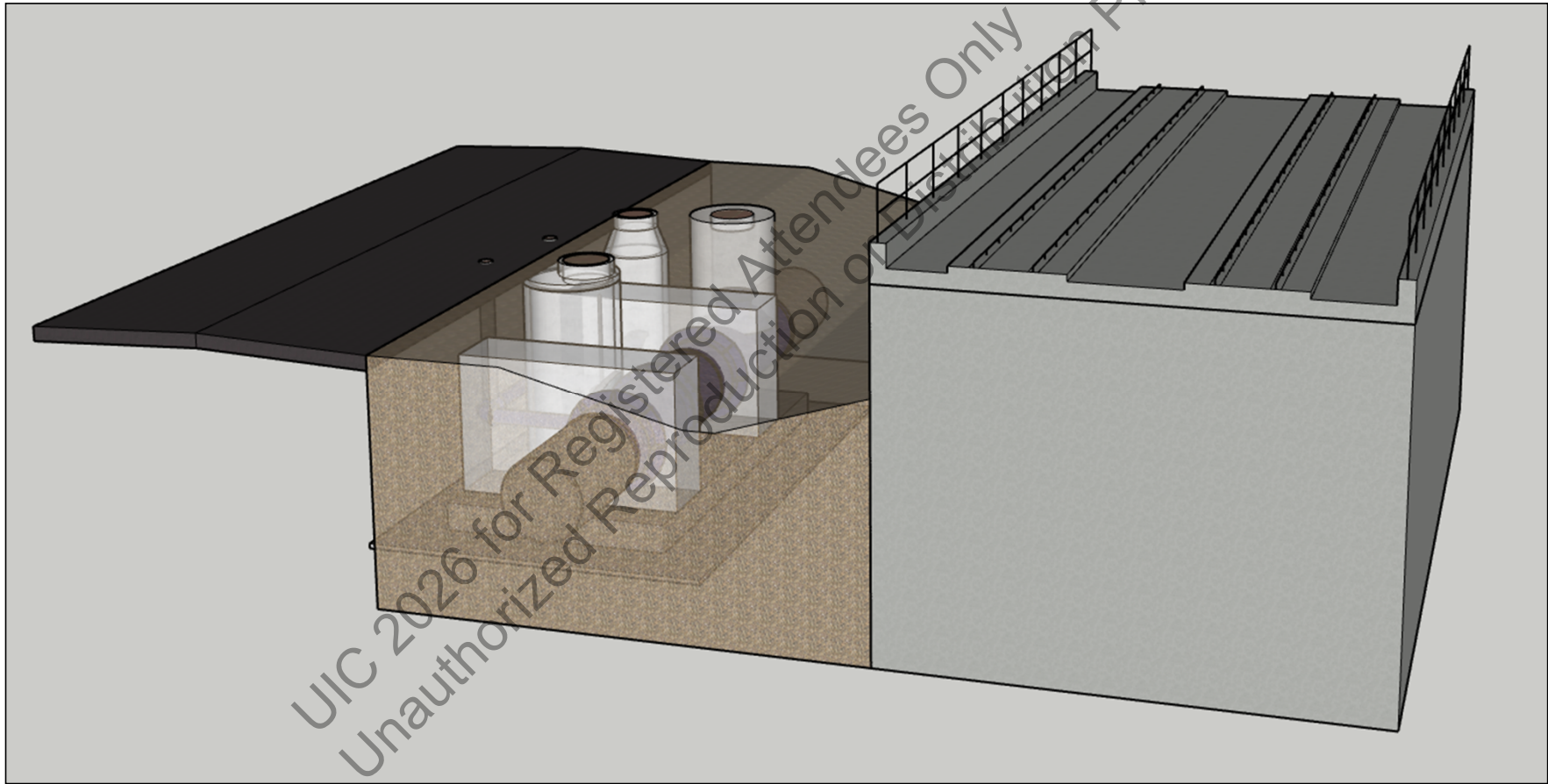


January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



Isolation Valve No. 2

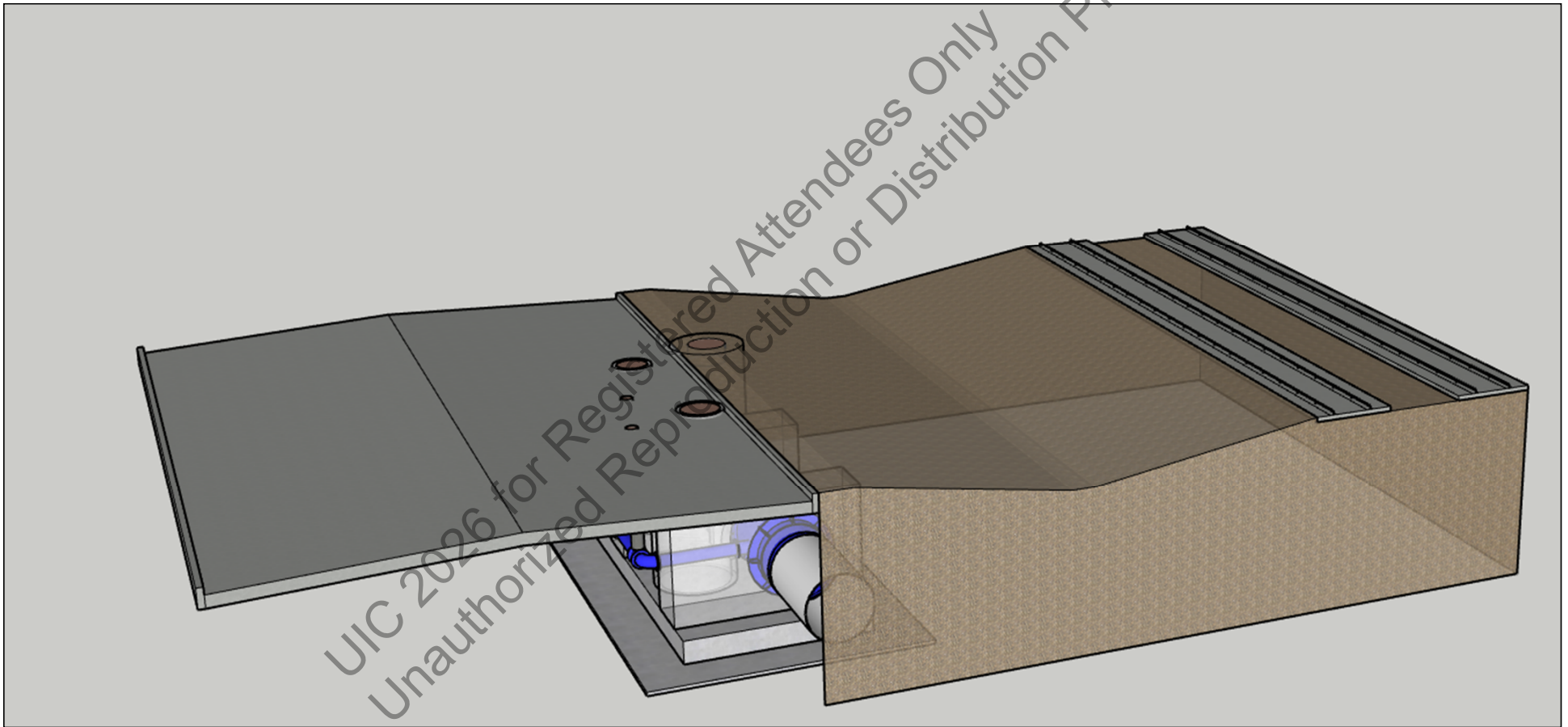


January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



Isolation Valve No. 3



January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



A Detailed Sequence Plan is a must

Requirements:

- *Each pipeline shutdown is for one valve installation and not multiple locations at the same time*
- *Minimum of two weeks between restoring service and starting the shutdown for the next installation*
- *All shutdowns were between November 1st and February 28th*
- *Submit Installation Plan and Detailed Schedule four weeks prior to beginning work*

January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



A Detailed Sequence Plan is a must

Phase 1 – Preparatory Pre-shutdown Phase

- a) *Establish Traffic Control (Partial)*
- b) *Excavate and confirm locations of the joints*
- c) *Implement a Trench Safety Plan*
- d) *Stage pipe, fittings, and materials, including DWU supplied valve*
- e) *Stage equipment required, including dewatering and pipe/valve handling equipment*

January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



A Detailed Sequence Plan is a must

Phase 2 – Pipe/Valve Installation Phase

- a) *Isolate DWU 66-inch water main with existing valves*
- b) *Dewater 6,700 LF of pipe*
- c) *Install valve and piping*
- d) *Install temporary supports and place pipe in service without closing valve*
- e) *Test, disinfect, flush, and sample water main*
- f) *Coordinate with DWU and load line for service*
- g) *Each installation is limited to 100 hours*

January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



A Detailed Sequence Plan is a must

Phase 3 – Pipe Support/Restraint and Restoration Phase

- a) *Construct concrete base and thrust collar within 14 days*
- b) *Temporary supports remain until 28-day strength and backfilled with fast-fix flowable fill*
- c) *Valve remains open until backfill is complete*
- d) *Site restoration is within 30 days, including pavement and seeding*

January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



Project is underway

- *The OPCC of the project was \$4.3M*
- *The project was bid in June 2025*
- *Awarded for \$3M by John Burns Construction Company of Texas LLC, September 24, 2025*
- *Construction will begin this winter*

UIC 2026 for Registered Attendees Only
Unauthorized Reproduction or Distribution Prohibited

January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas



Thank you.

Any Questions?

Matthew W. Stevens, PE
Senior Engineer
matthew.stevens@dallas.gov
214-671-9852

Paul Dossett, PE
Associate Vice President
pdossett@carollo.com
(817) 916-1834

UIC 2026 for Registered Attendees Only
Unauthorized Reproduction or Distribution Prohibited

January 27 – 28, 2026

Henry B. Gonzalez Convention Center, San Antonio, Texas

