



## Women Lead Response to Construction Challenges on Dallas Water Utilities 36" Interceptor

**Tracey Long, PE – Hazen and Sawyer**

**Neepa Shah, PE – Hazen and Sawyer**

**January 26, 2022**



## Agenda

### Joe's Creek Interceptor Improvements Project

Project Team

Background

Construction Methods

Challenges



# UNDERGROUND CONSTRUCTION TECHNOLOGY

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## WASTEWATER MAIN REPLACEMENTS AT VARIOUS LOCATIONS



**Dallas Water Utilities  
City Of Dallas, Texas**

**JOE'S CREEK INTERCEPTOR IMPROVEMENT PROJECT  
Contract No. : 18-397/398  
MAY 2018**

WATER & WASTEWATER SHEET INDEX

NO.	PID	LOCATION	DESIGN SHEET
1.	499	Webb Chapel Rd & Lombardy Ln From Joe's Creek to Park Lane	410-1549, SH.664-675
2.	499	Line 'A-1' Joe's Creek From Lombardy Ln to Chapel Creek Dr	410-1549, SH.676-681
3.	499	Line 'A-2' Joe's Creek From Lombardy Ln to Chapel Creek Dr	410-1549, SH.682
4.	499	Line 'B' Easement 800' North of Lombardy From Webb Chapel to Joe's Creek West 88'	410-1549, SH.683
5.	499	Line 'C' Chapel Creek Addn WW East From Webb Chapel to Joe's Creek	410-1549, SH.684-686
6.	499	Line 'E' Park Lane From Dale Creek to Webb Chapel	410-1549, SH.687-688
7.	499	Line 'F' Park Lane and Dale Creek Dr From Intersection to 480' South	410-1549, SH.689-690
8.	499	Line 'G' Alley East of Harwell Dr From Park Lane to Webb Chapel	410-1549, SH.691-693
9.	498	Park Lane & Bowman Blvd From Webb Chapel to 300' North of Chiseno St	410-1549, SH.694-697
10.	498	Line 'H' & 'I' And Water Line 2 Webb Chapel From Kincaid Cir to Park Ln	410-1549, SH.698-699
11.	498	Water Line 'I' Webb Chapel Rd From Kincaid Cir to Park Ln	410-1549, SH.700
12.	497	Timber Trail Dr & Bowman Blvd From Woodleigh Dr to Bowman Blvd 300' North of Chiseno St	410-1549, SH.701-705
13.	498	Line 'J' Walnut Hill Ln From Bowman Blvd to Joe's Creek	410-1549, SH.706
14.	497	Line 'K' Brownwood Park Annex From Timber Trail Dr to Joe's Creek	410-1549, SH.707
15.	497 498 499	Abandonment Plan - Joe's Creek From Woodleigh Dr to Lombardy Ln	410-1549, SH.709



N.T.S.

**Hazen**

IN ASSOCIATION WITH



HAZEN AND SAWYER  
300 WEST 7TH STREET, SUITE 702  
FORT WORTH, TEXAS 76102  
PHONE NO. 817-338-1111



FOR NEW PROJECTS



*Shirley J. Potts  
6/10/2018*

410 - 1549 Sh 662



## Project Team



City of Dallas

**Rishi Bhattarai, PE** – Design Project Manager

**James Wellington, PE** – Construction Project Manager

**Jerry Moyers** – Field Operations Manager

**Darren Reames** - NW Pipeline Inspector

**Miquel Alejo** - NW Superintendent

**Robert Alcala** - Pipeline Paving Inspector



**Tracey Long, PE** – Project Manager – Design and Construction Services

**Josh Farmer, PE** – Tunneling and Boring Corporate Lead

**Neepa Shah, PE** – SW Region Conveyance Lead



**Elliot Fuller** – Construction Manager





## Existing Interceptor Alignment

Joe's Creek from Lombardy to Marsh Lane

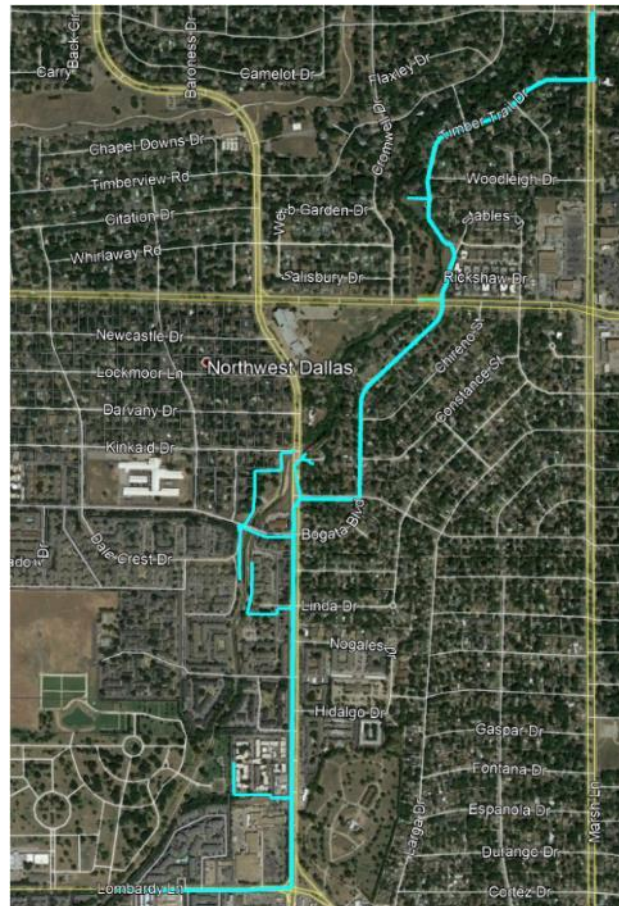




## Revised Alignment

From Downstream (South) to Upstream (North)

- Lombardy Lane
- Webb Chapel
- Bowman Blvd
- Brownwood Park Annex
- Crosses Walnut Hill
- Timber Trail Drive





## Joe's Creek Interceptor – PID 4917, 4918, 4919

- 8,700 LF of 36" WW (8,100 LF By Tunneling)
- 5,980 LF of 8"-12" WW by Open Cut And Pilot tube auger Boring (PTAB)
- 1,520 LF of 14" WW Slip Lined into Existing 24" WW
- 1,270 LF of 6"-12" Water by Open Cut

**Total Length 17,470 LF**

**Southland's Bid Price \$15.8M**

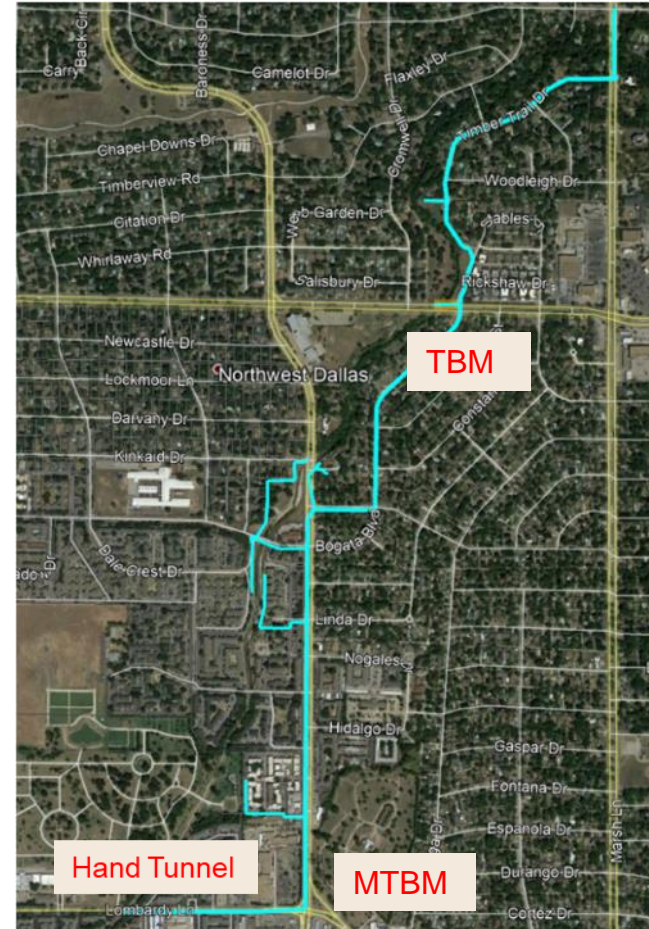




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## Tunneling Methods

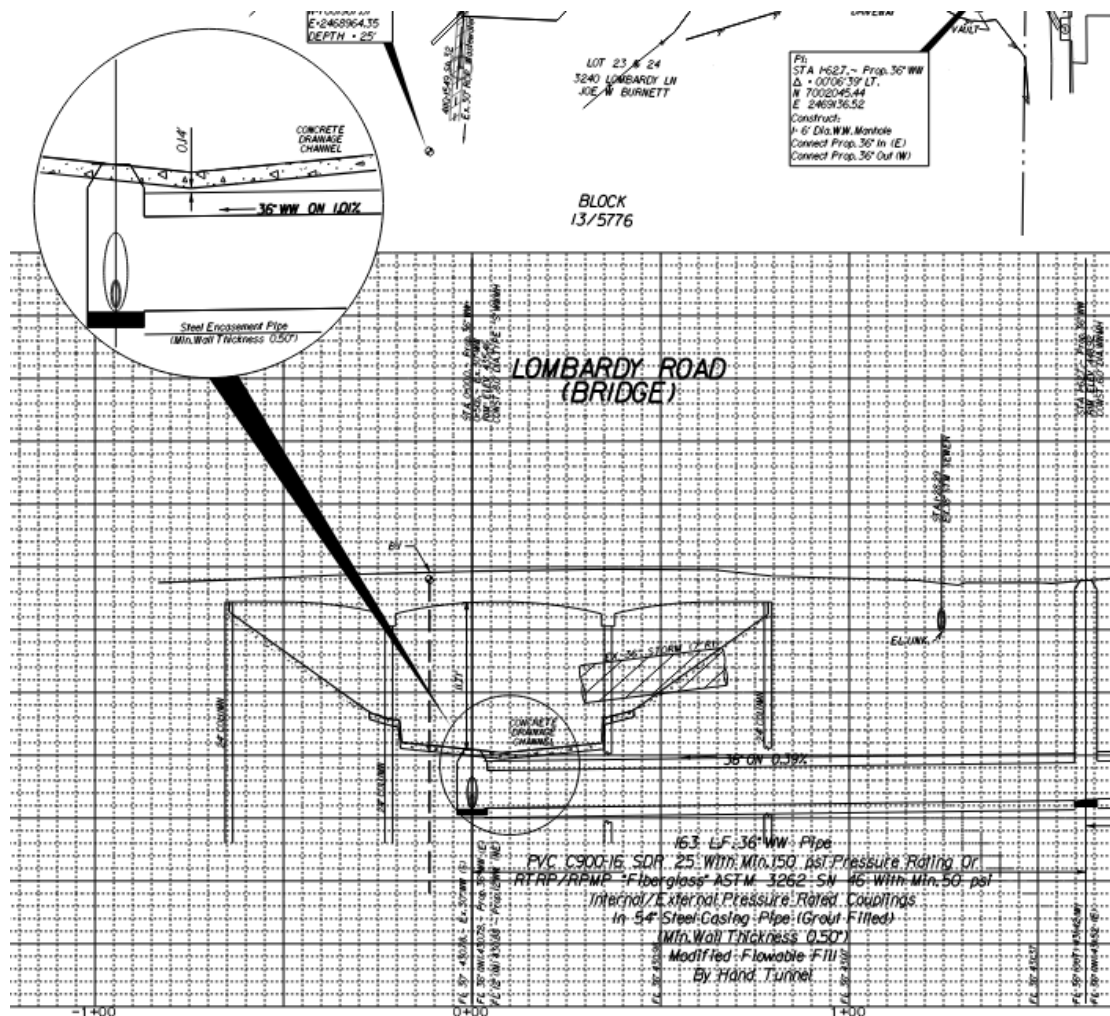






## Challenge: Utility Conflicts

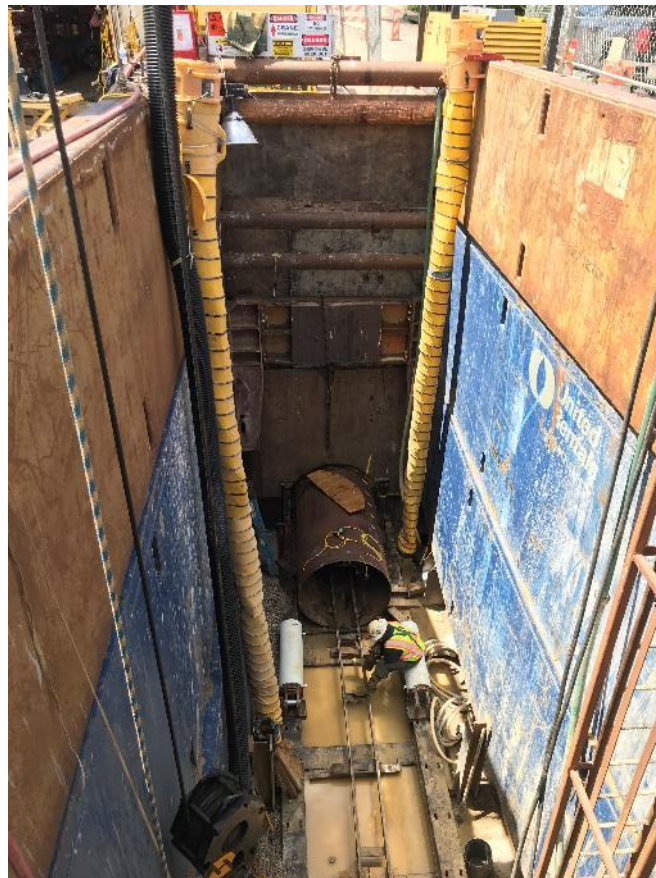
## 36" WW Interceptor





## Hand Tunneling

### Jacking Casing by Hand Tunneling







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## Hand Tunneling





## AT&T Conflict

Tunneling from Station 7+00 towards Station 0+00

- Notice to Proceed – 1/7/2019
- First Tunnel Section Under Construction
- Encountered 3/18/2019
- 35 ft Below Grade
- Part of the 911 System
- AT&T relocation completed – 7/2020 – 18 month later
- Southland Construction Completed for this segment - 11/2020







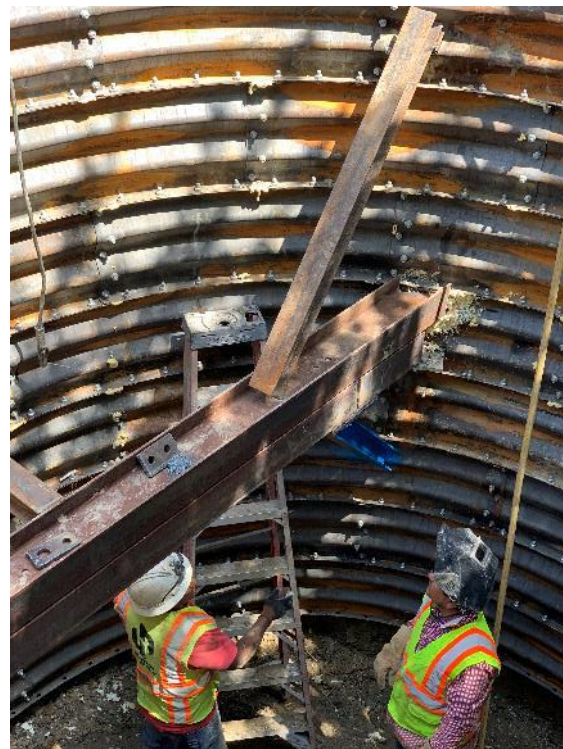
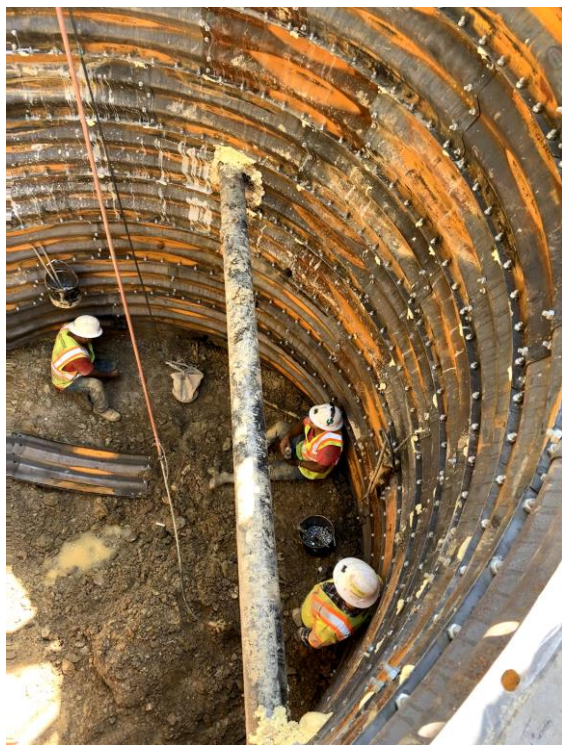
## Tunnel Liner Plate Shaft







## Utility Conflicts





## Challenge: Natural Disaster



## Tornado Strikes

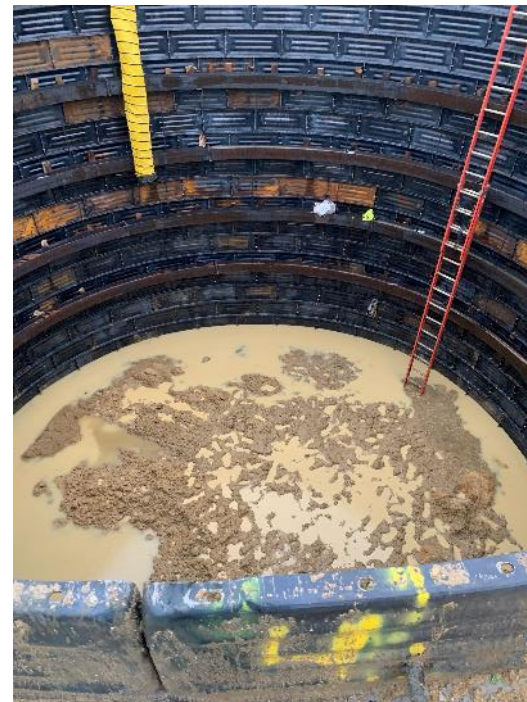
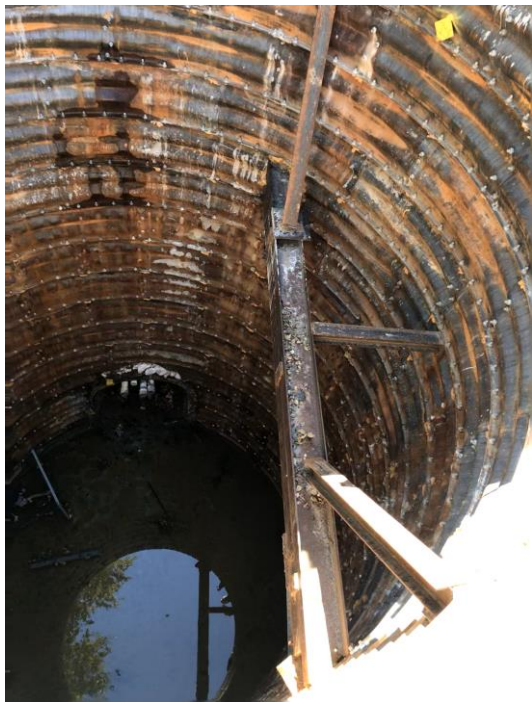
October 19, 2019







## Shaft Flooding





## Challenge: High Ground Water



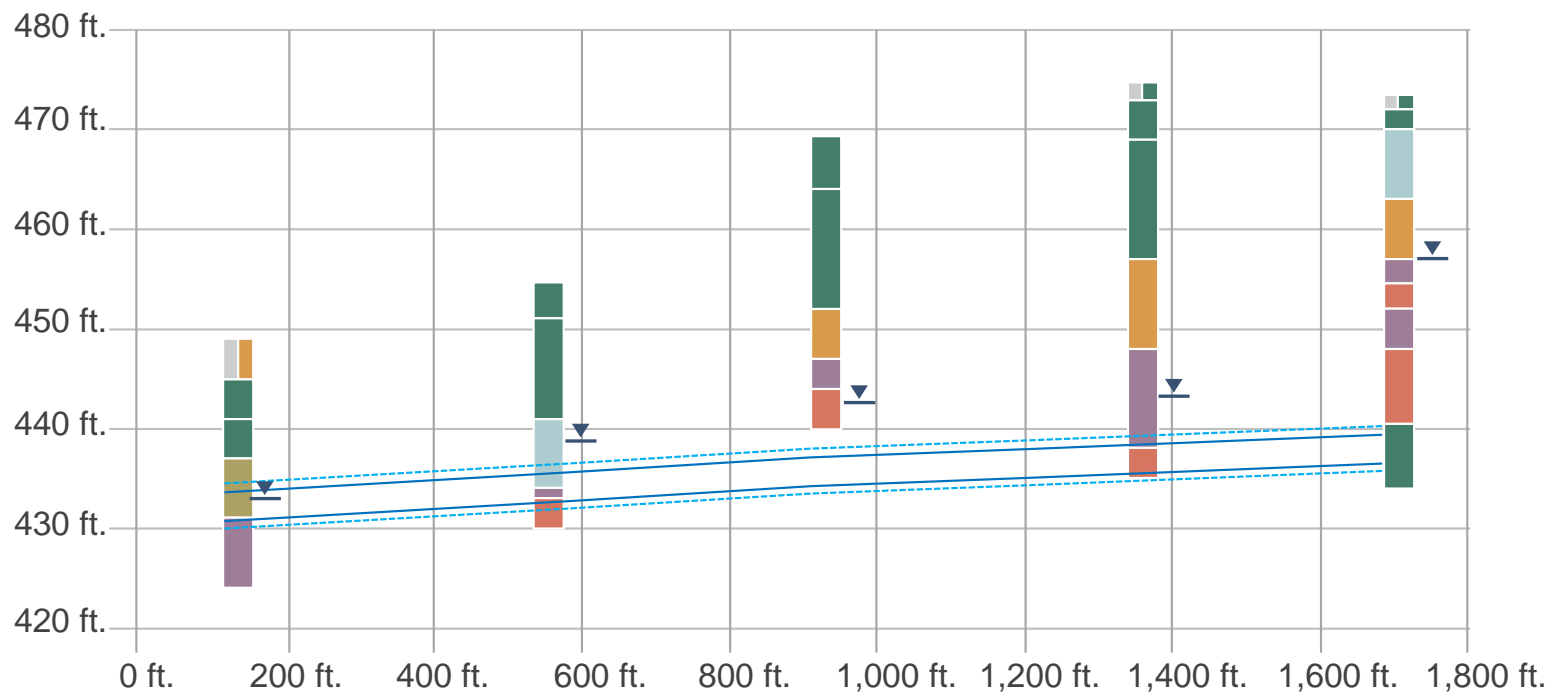
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## Ground Water

### Legend

- Sandy lean clay
- Fat clay
- Lean clay
- Clayey Sand
- Lean clay with sand
- Poorly-graded sand with gravel
- 36" pipeline
- 54" tunnel







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## Dewatering







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## TBM

Tunnel Boring Machine – Open Faced





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## MTBM

Micro Tunnel Boring Machine – Closed Face







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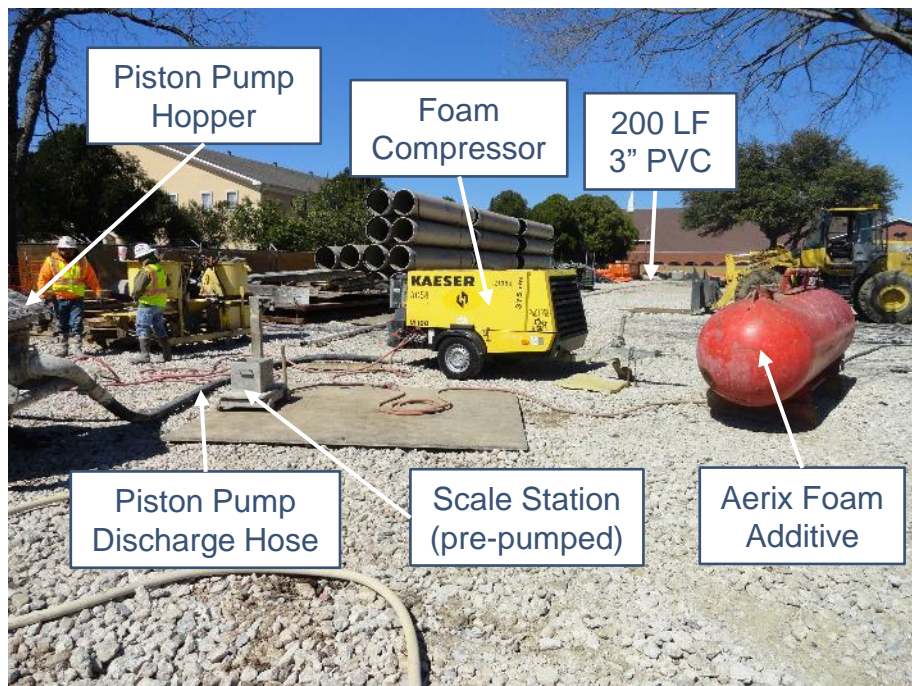
## Sheet Piling





## Pipe Backfill Grouting Demonstration

- Low-Density Cellular Concrete







## Pipe Backfill Grouting Demonstration

- Low-Density Cellular Concrete
- Installation Goal:  $80 \pm 5$  pcf after pumping
- Testing to determine if there is significant density loss before / after pumping through 200 LF 3" PVC

	Density (before pumping) pcf	Density (after pumping) pcf	Density (after pumping additional 5 minutes) pcf	Percent Difference %
Trial 1	94	92	Not Taken	-2.1%
Trial 2	87	80	Not Taken	-8.0%
Trial 3	76	70	78	-7.9% / +2.6%
Trial 4	71	63	72	-11.3% / +1.4%
Trial 5	62	69	Not Taken	+11.3%
Trial 6	52	51	Not Taken	-1.9%







## Challenge: High Accuracy Areas



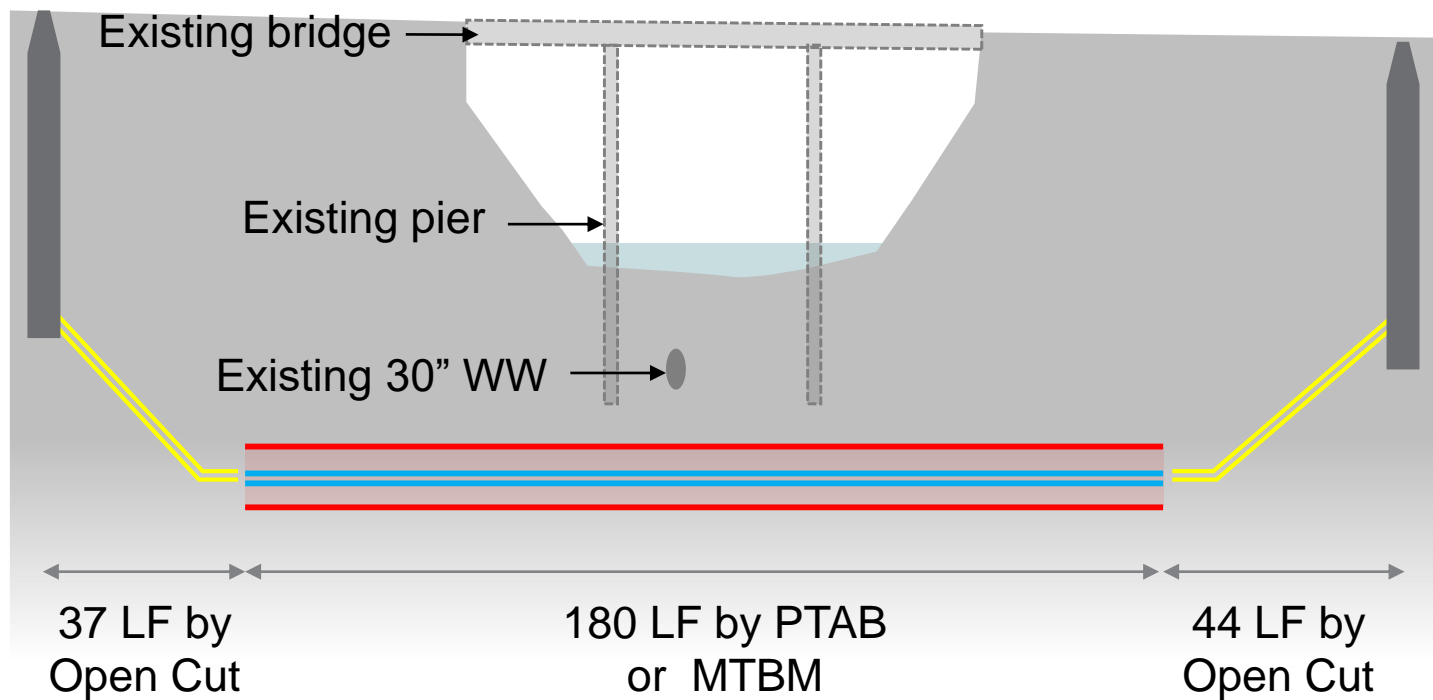
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## PTAB

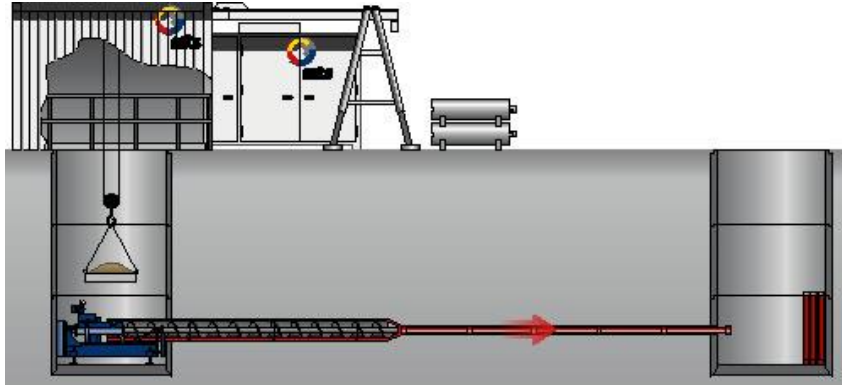
Line E

— Two 8" PVC wastewater — 42" steel casing





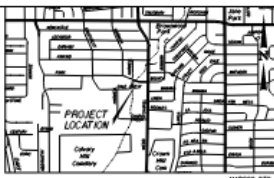
## Pilot Tube Auger Boring for Tight Clearances



- High Line & Grade Accuracy
- Multi-Stage
- Hybrid Technique (HDD, Jack & Bore, & Microtunneling)

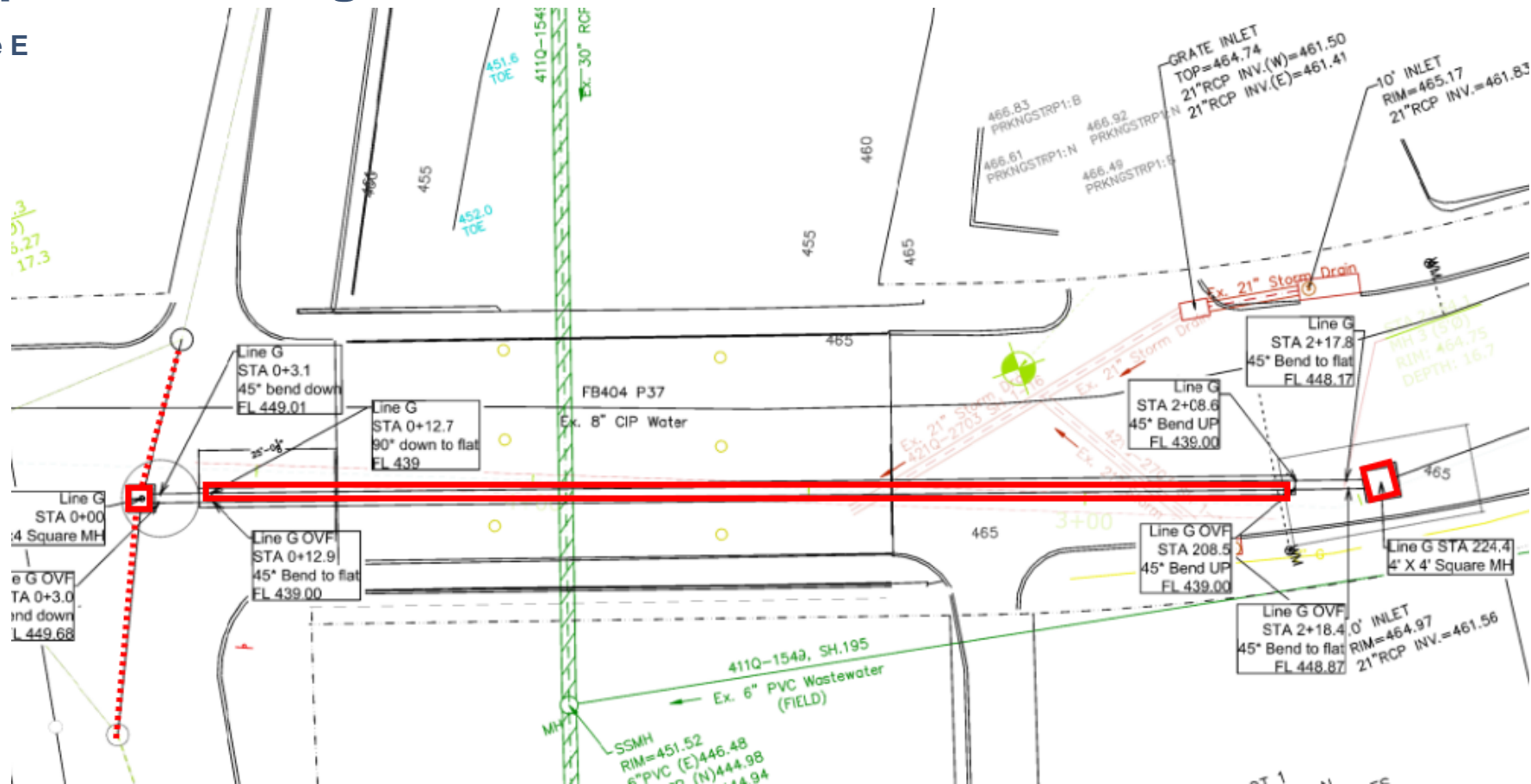


## Line E



# Siphon Redesign

### Line E





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## PTAB

Line E



Pilot Tube





## Siphon Connection

Line E



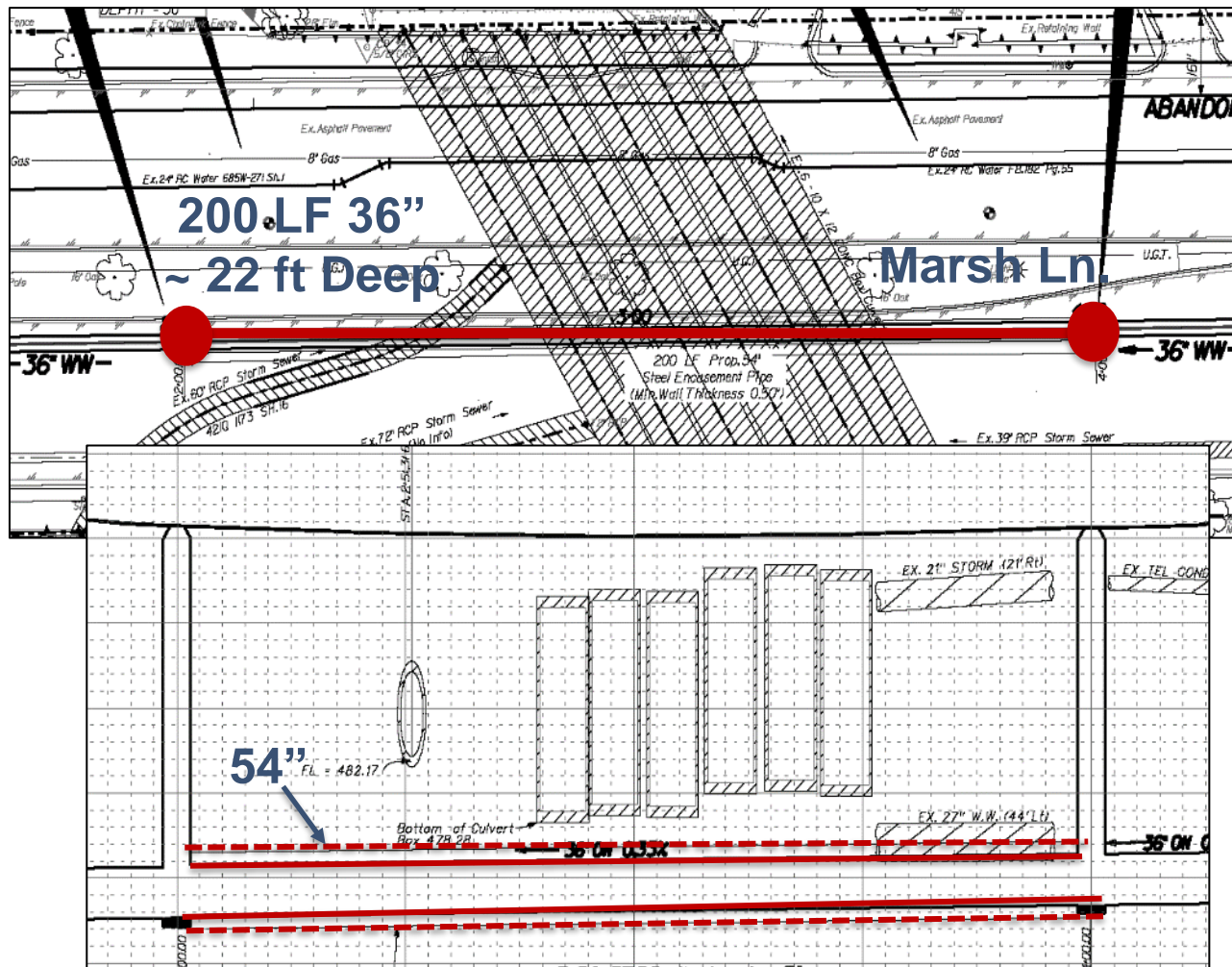


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## PTAB

Line J





## Challenge: Narrow Corridors





## Narrow Corridors

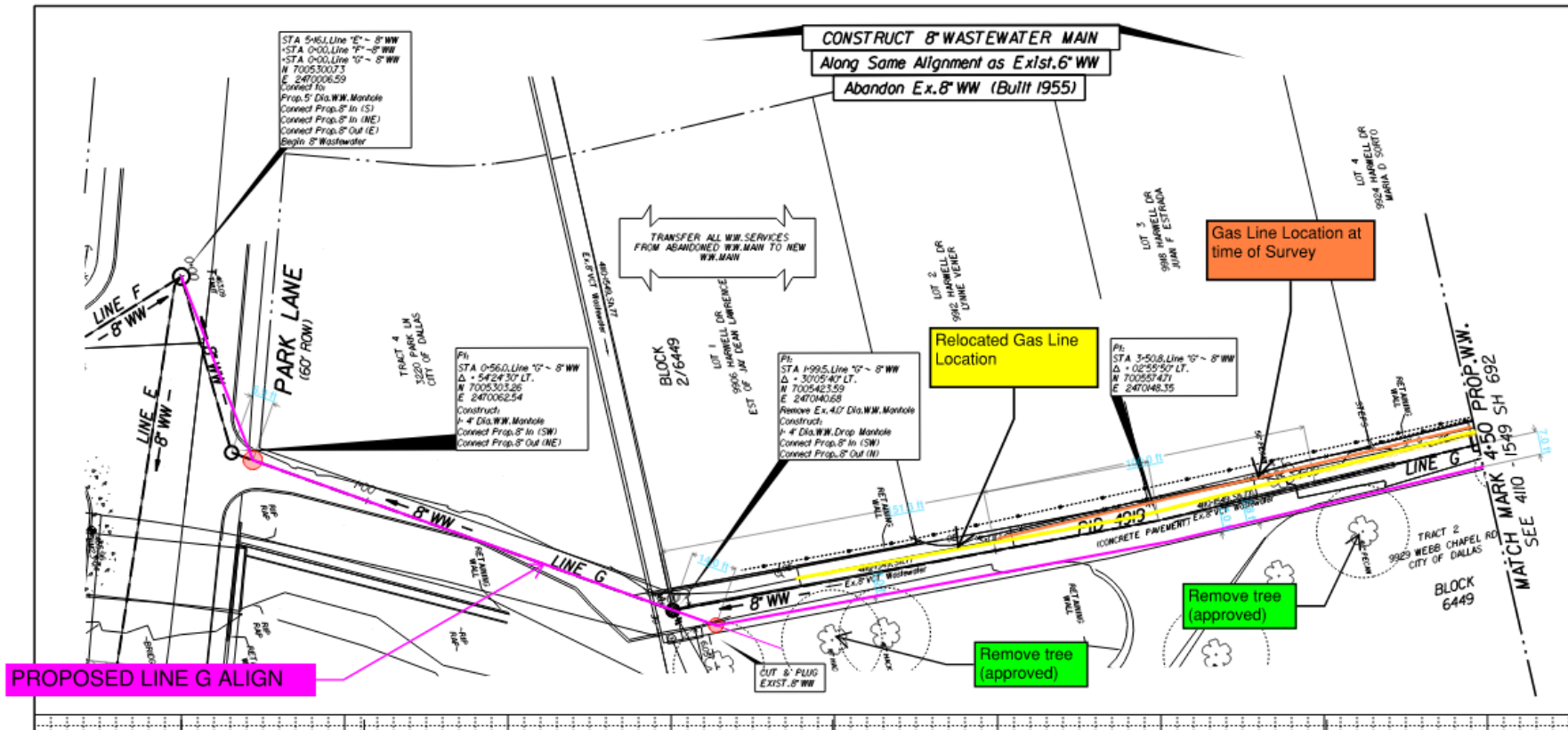
Line G





## Challenge: Franchise Utilities

### Line G







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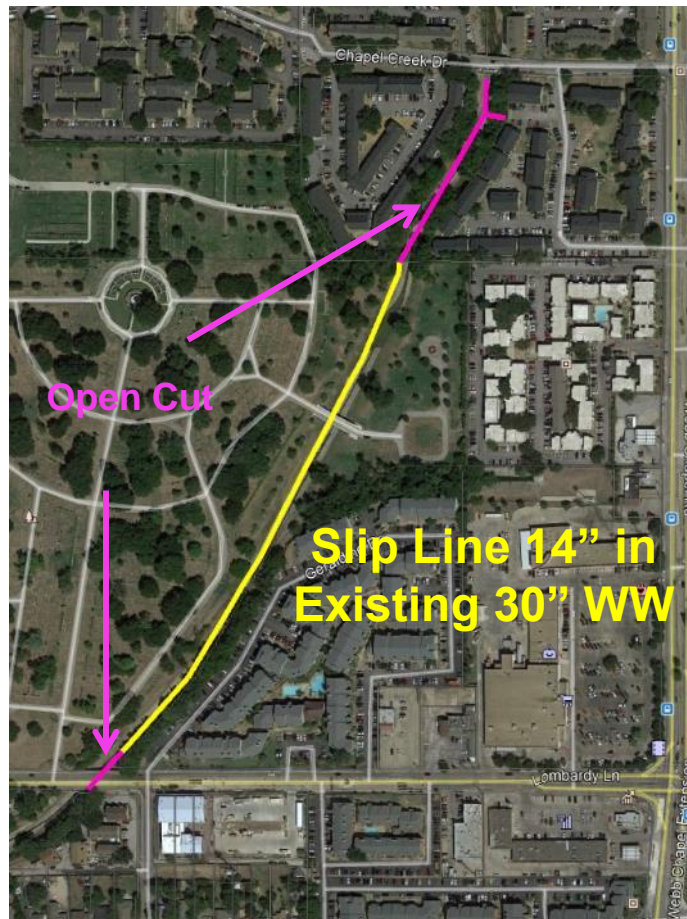
## Still to Come



## Slip Lining

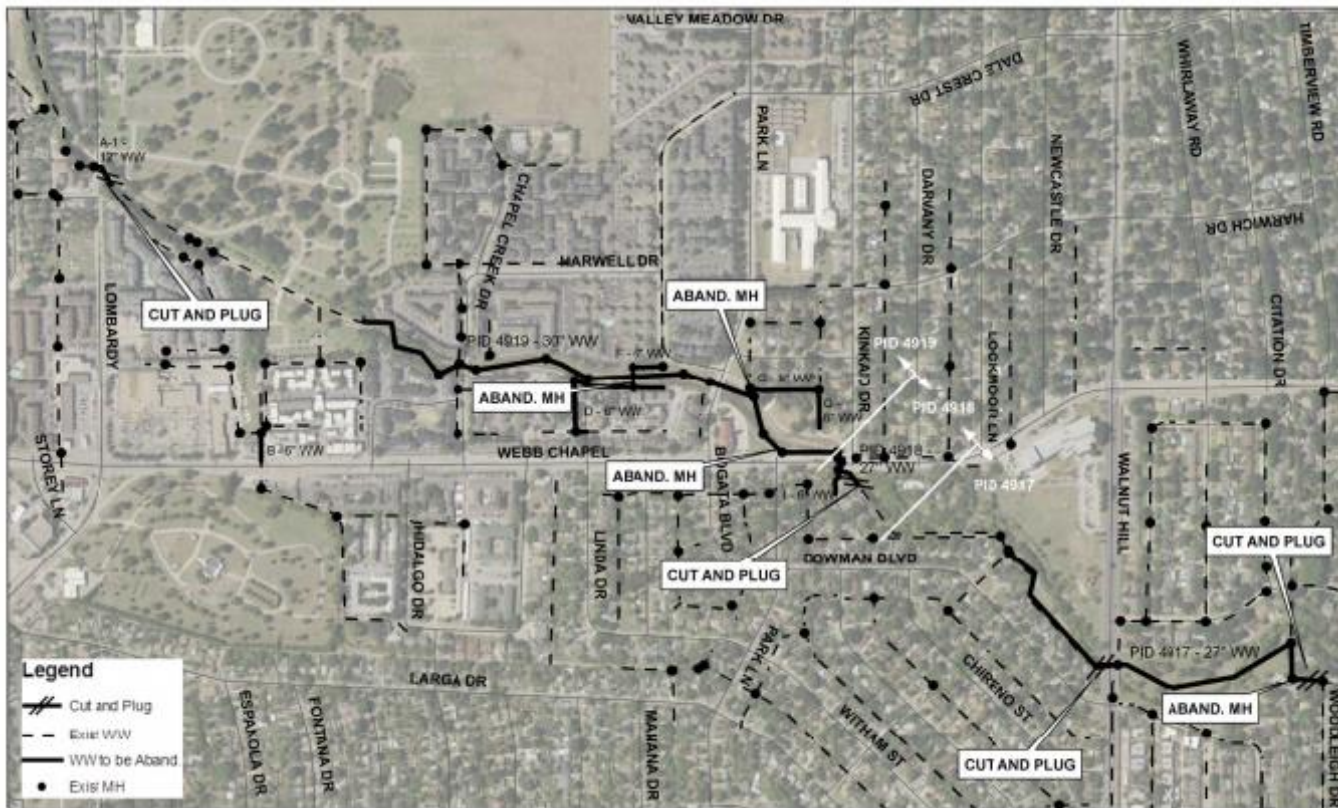
Line A-1 - From South to North along Bottom of Creek

- Lombardy Lane Bridge
- Calvary Hill Cemetery Private Bridge
- Chapel Creek Drive Bridge





## Abandonment Plan







## Completed to Date

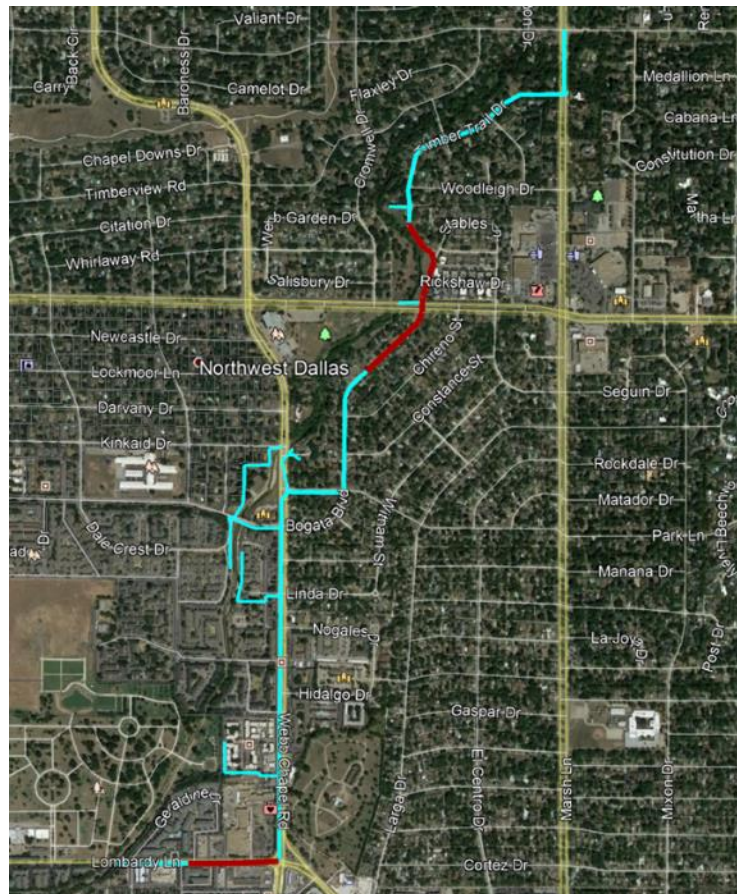
Notice to Proceed – January 7, 2019

Original Completion Date – June 10, 2021

Total Length 17,470 LF

**Project Completion – 95%**

**Anticipate Final Completion – June 2022**





## Questions?

**Tracey Long, PE – Hazen and Sawyer**

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