

# CITY OF FRISCO UTILIZES HORIZONTAL DIRECTIONAL DRILLING WITH 20-INCH FUSIBLE PVC PIPE TO MITIGATE CONSTRUCTION IMPACT

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Julio Olvera, P.E.  
Kimley-Horn and Associates, Inc.  
Dallas, TX





## Outline

- Project Team Introductions
- Project Background
- HDD Design Considerations
- Bidding
- HDD Construction Phase



## Project Team Introductions

- Kimley-Horn
  - Julio Olvera, P.E.
  - James Bryan, P.E.
  - Kyle Sanderson, P.E.
- City of Frisco
  - Arthur Hartle, P.E.
  - Shawn Halle, P.E.

Kimley»»Horn





# UNDERGROUND CONSTRUCTION TECHNOLOGY

THE UNDERGROUND UTILITIES EVENT | JANUARY 25-27, 2022 | FORT WORTH, TEXAS

## More About Me



- Julio Olvera, P.E.
  - Born in MX but East Texas Native
  - Texas A&M Class of 2016
  - Licensed Professional Engineer (TX)
  - Passionate about industry



Kimley»»Horn



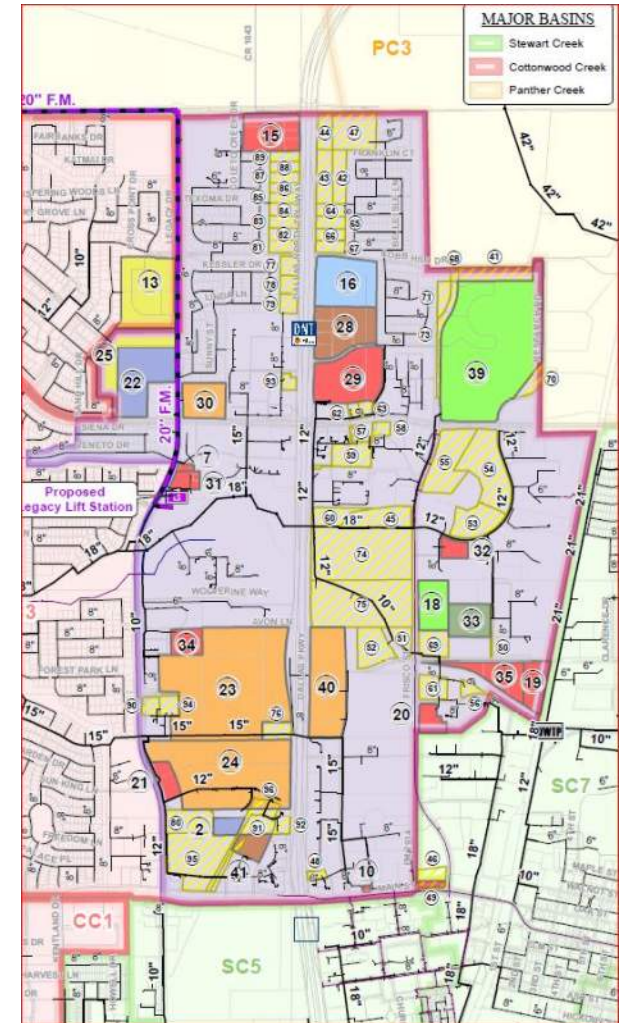
# UNDERGROUND CONSTRUCTION TECHNOLOGY

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## Project Background: *Location*

### City of Frisco, TX

- City experiencing tremendous growth
- City planned progressively
- Expanded Cottonwood Creek Basin by 1,900ac ~ 10 MGD







## Project Background: *Overview*

### Legacy Force Main South

- One of three projects designed concurrently
- Design of ~10,300 LF of 20-inch PVC force main
- 1,700 LF of HDD





## Design Phase: *Why HDD?*

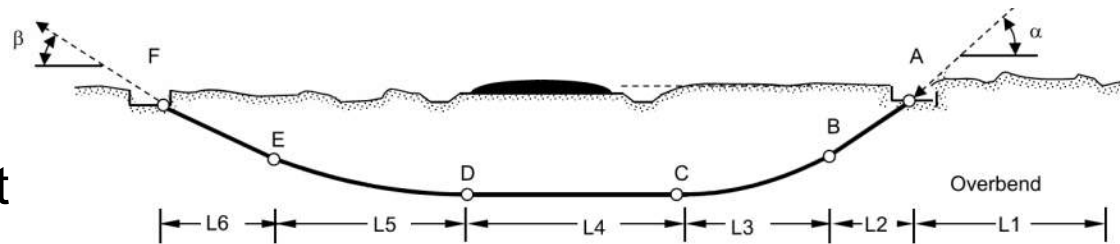
- Evaluated Project Constraints:
  - Existing utilities
  - Traffic disruption/pavement condition
  - TxDOT permitting
  - Horizontal curve
- Evaluated Various Methods
  - Open cut
  - Auger bore
  - **Horizontal directional drill**





## Design Phase: *HDD Design Considerations*

- Must understand:
  - Pipe material
  - Staging, stringing and traffic control
  - Horizontal and vertical alignment
  - Soil conditions
  - HDD spec





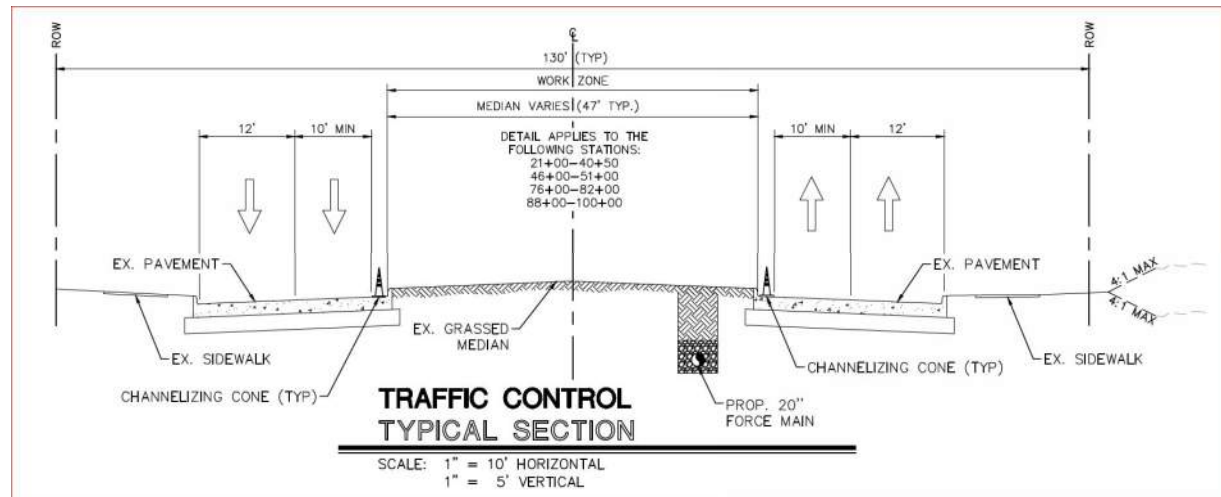


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## Design Phase: *HDD Design Considerations*

- Pipe Material
  - HDPE
  - Restrained PVC
  - **Fusible PVC**
- Staging, stringing and traffic control
  - Limited median: **50'x100'** working area
  - No lane closures
  - String pipe North of Eldorado Pkwy

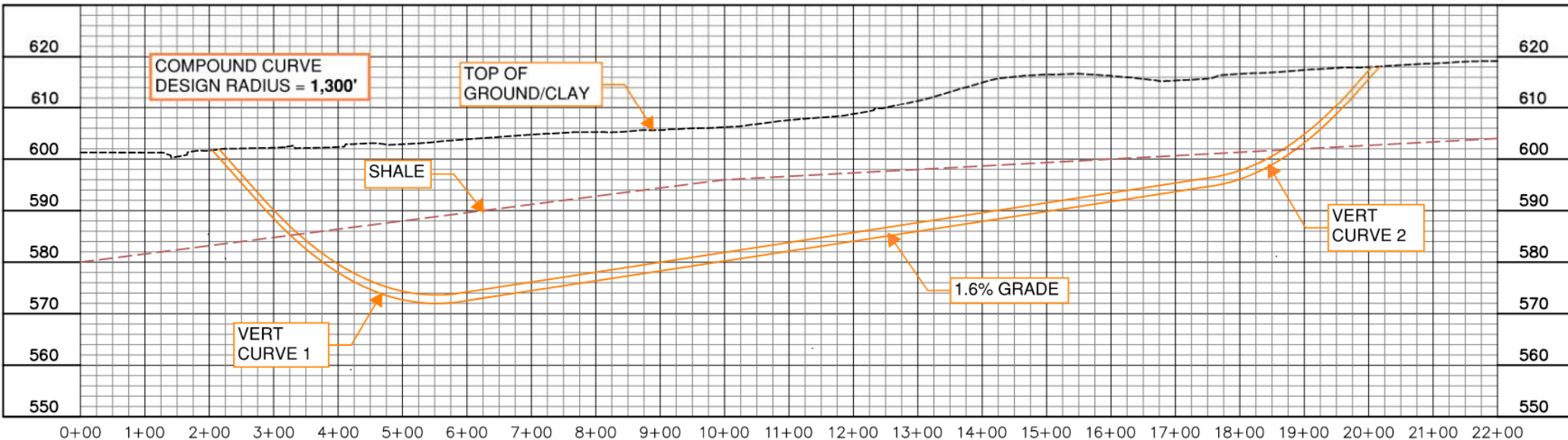
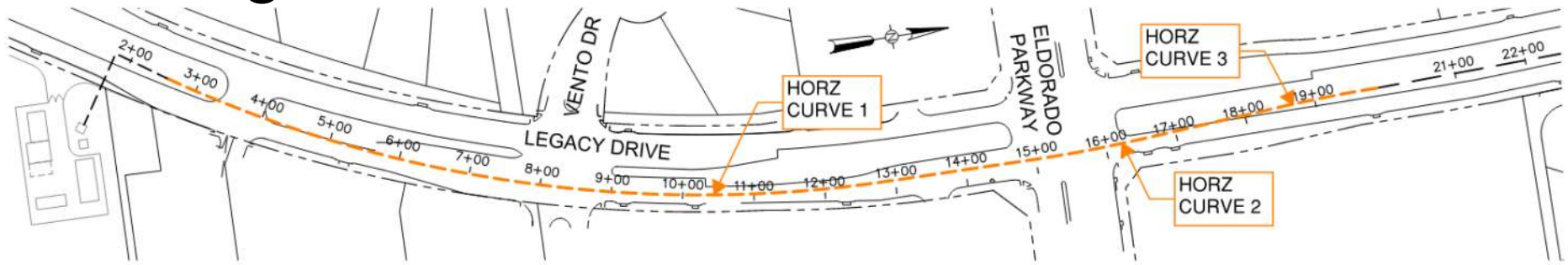




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## Design Phase: *HDD Plan and Profile*





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## Design Phase: *HDD Spec*

- Contractor qualifications
- Submittals/shop drawings
- **Signed and sealed design calculations**
- **Pre-bore plan and profile**
- Installation tolerances
- Safety plan

PATH DESIGN CALCULATIONS																																																																													
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# UNDERGROUND CONSTRUCTION TECHNOLOGY

THE UNDERGROUND UTILITIES EVENT | JANUARY 25-27, 2022 | FORT WORTH, TEXAS

## Bidding Phase

- Advertised July – Aug 2019
- Single bid item on per linear foot basis
- HDD Bid price: **\$370/LF, ~\$630k total**
  - HDD Low: \$300/LF
  - HDD Average: \$390/LF
  - Open Cut: \$124/LF
  - Auger Bore: \$530/LF

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price
7		20" FPVC C900 DR-18 Force Main by Horizontal Directional Drill	1,700	LF	
	02344	Complete in Place, for the Sum of			
	15065				
	-				
	-				
		Dollars and			
		Cents per unit			\$

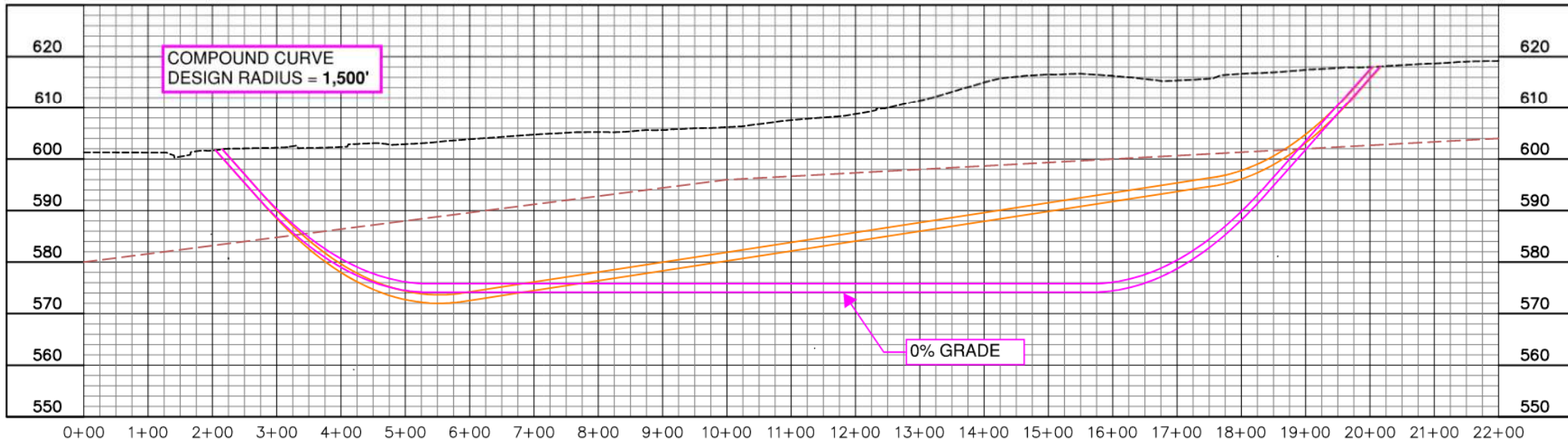
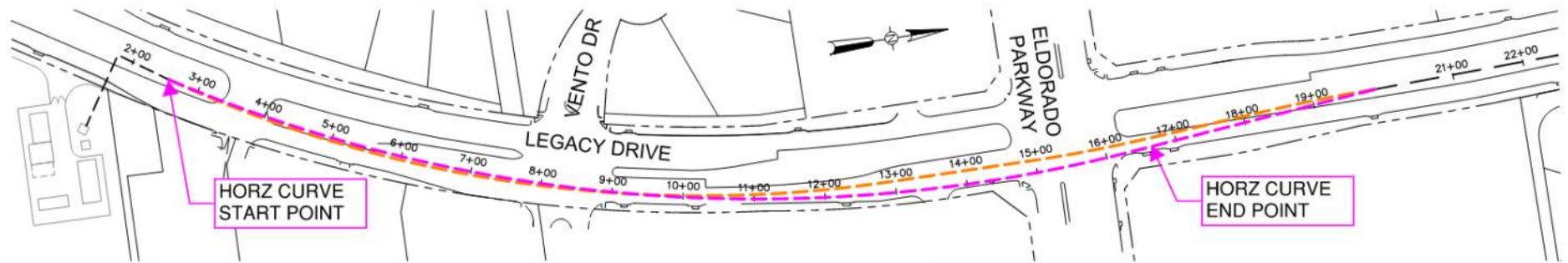




# UNDERGROUND CONSTRUCTION TECHNOLOGY

THE UNDERGROUND UTILITIES EVENT | JANUARY 25-27, 2022 | FORT WORTH, TEXAS

## Construction Phase: *Pre-Bore Plan and Profile*





# UNDERGROUND CONSTRUCTION TECHNOLOGY

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## Construction Phase: *Project Layout and Pipe Stringing*





## Drill Rig Staging Entry Pit



## Drill Rig Staging Exit Pit



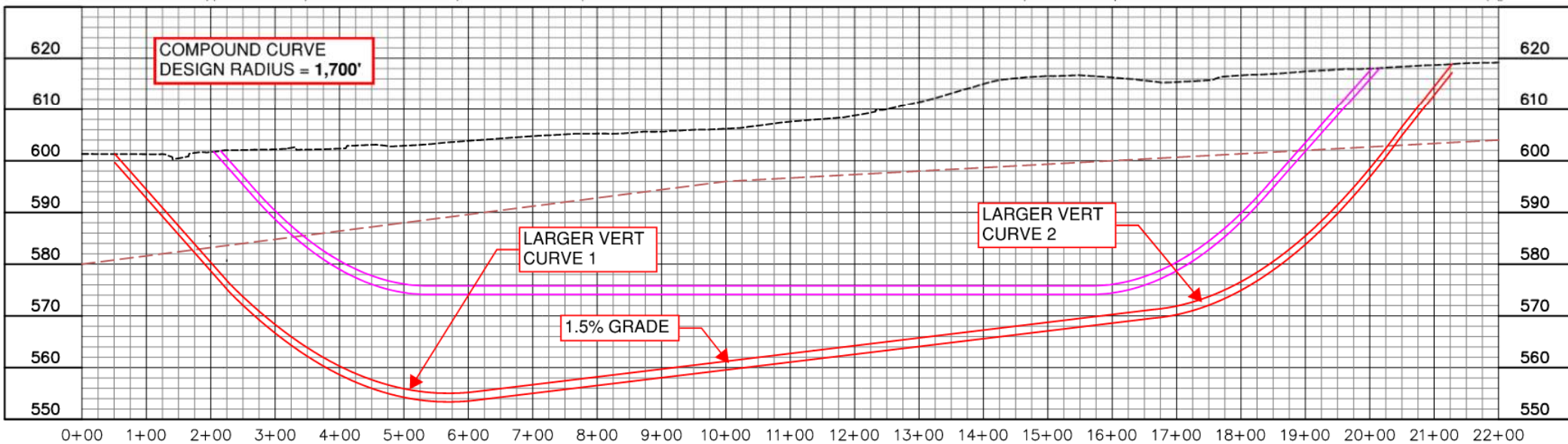
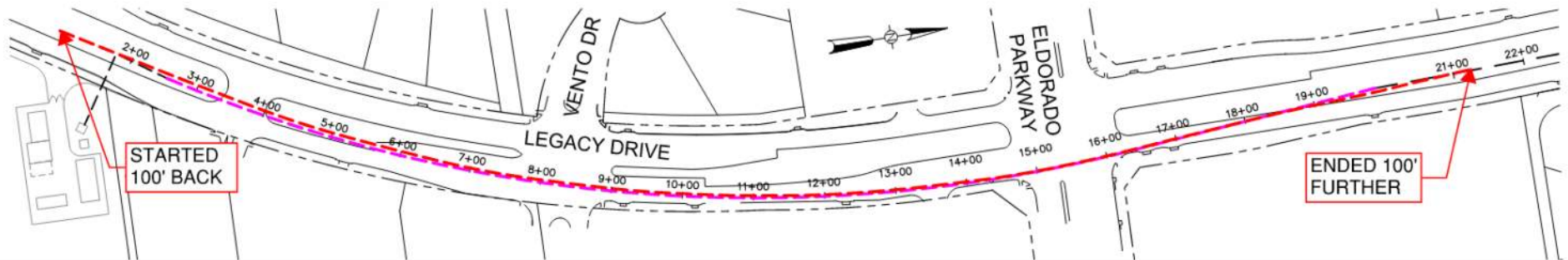




# UNDERGROUND CONSTRUCTION TECHNOLOGY

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## Construction Phase: *Installed Plan and Profile*







## Construction Phase: *HDD Timeline*

- Prepping bore hole: ~6 weeks
  - 6" pilot hole, 30" reamer
  - Fused PVC
- Pipe pull-in: ~8-hour duration
  - Ballasting
- Hydrostatic testing: 4 hours
  - 150 psi
- Field connections: ~2 week
- Total HDD length: ~ **8 weeks**





## Closing

- HDD can be great **solution**
- **Vet out key items** during design
- Final install **likely different** but should **meet design intent**



## UNDERGROUND CONSTRUCTION TECHNOLOGY

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# Presenter Contact Information



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**Q&A**

**Kimley»Horn**