



**37<sup>TH</sup> INTERNATIONAL  
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## **SHARING PERSPECTIVE: HOW BID ITEMS AFFECT THE COST AND CONSTRUCTION OF A PIPE BURSTING PROJECT**

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# OVERVIEW



- Typical Costs of Pipe Bursting
  - What Costs Must Be Accounted for in the Bid Process
- Typical Bid Items
- The Importance of Clearly Defined Bid Items
- Typical Design/Bid/Build Approaches
  - Lump Sum
  - Unit Price Contracts
    - Individual Bid Items For Various Potential Items
    - Per LF Completed Cost Approach
  - Annual Contracts
- Project Examples
  - Example 1 - Pipe Bursting Line Item Includes All Restoration
  - Example 2 – Correction of Sags After Pipe Bursting – To Pay or Not To Pay?
  - Example 3 – Pit Excavations Paid for Separately



# TYPICAL COSTS OF PIPE BURSTING

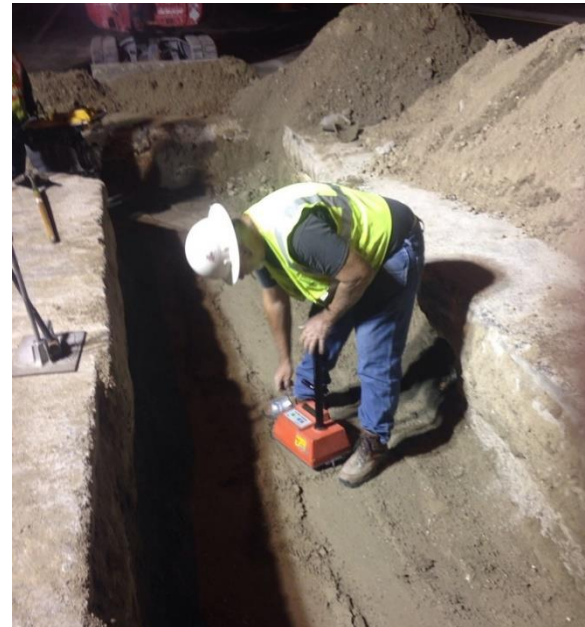
- Preliminary Work
  - Access to the Segment
    - Clearing
    - Fence Removal
      - May Create Post Pipe Bursting Costs
  - Pre-CCTV Survey
    - Obstruction Removal
    - Point Repairs
  - Utility Conflicts





# TYPICAL COSTS OF PIPE BURSTING

- Pit Excavations
  - Couplings – Tie-in Materials
  - Connections to the Manhole
  - Bedding Material
  - Backfill Material
    - Native Material
    - Select Material
    - Sand
    - Cement Stabilized Sand
    - Flowable Fill





# TYPICAL COSTS OF PIPE BURSTING

- Pit Excavations (Continued)
  - Haul Off
  - Compaction
  - Restoration
    - Asphalt Restoration
    - Concrete Restoration
    - General Surface Restoration
      - Seeding
      - Sod
      - Landscaping



# TYPICAL COSTS OF PIPE BURSTING

- Labor & Equipment
  - Productivity = Labor
    - How many feet can be installed per day on average
      - Run Length - Average Length – The Longer the Average Run, The More Footage Installed for Each Burst
  - Obstacles to Productivity
    - Depth
    - Public
    - Traffic Control
    - Layout
    - Type of Material
    - Static or Pneumatic (Reversible Tools)





# TYPICAL COSTS OF PIPE BURSTING

- Pipe Material
  - HDPE
  - Fusible PVC
  - Restrained Joint PVC
  - Restrained Joint Ductile Iron Pipe
- Pipe Fusion
  - HDPE
  - Fusible PVC
- Restrained joints for final connections





# TYPICAL COSTS OF PIPE BURSTING

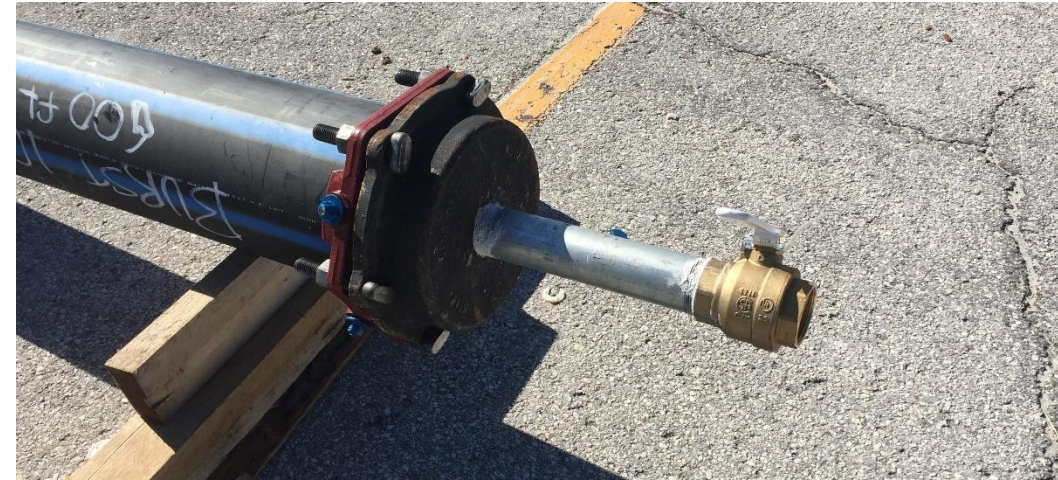
- Temporary Bypass Systems
  - Materials
  - Placement
  - Length
  - Duration
- Traffic Control
  - Signage
  - Arrow Boards
  - Message Boards





# TYPICAL COSTS OF PIPE BURSTING

- Additional Cost Considerations – If Necessary
  - Service Reconnects
  - Manhole Rehab
  - Manhole Replacement
  - Additional Connections – Tees, Fire Hydrants
- Post Construction Costs
  - Post CCTV
  - Testing – If Necessary
    - Low Pressure Air Test
    - Hydrostatic Testing
    - Bacteria Testing





# TYPICAL BID ITEMS

- Preliminary Items
  - Clearing
  - Fence Removal
  - Pre-CCTV Survey
  - Obstruction Removal (If Necessary)
  - Point Repairs (Rarely Necessary)
  - Utility Conflicts (If Necessary)
- Construction Items
  - Pipe Bursting (Various Sizes)
  - Backfill Material
    - Native Material
    - Select Material
    - Sand
    - Cement Stabilized Sand
    - Flowable Fill





# TYPICAL BID ITEMS

- Post Construction
  - Restoration
    - Asphalt Restoration
    - Concrete Restoration
    - General Surface Restoration
      - Seeding
      - Sod
      - Landscaping
  - Post CCTV
- Additional Bid Items – If Necessary
  - Service Reconnects
  - Manhole Rehab
  - Manhole Replacement
  - Additional Connections – Tees, Fire Hydrants



# TYPICALLY NOT BID ITEMS (INCIDENTALS)

- Labor & Equipment
- Material
- Fusion
- Couplings
- Connections To Manhole
- Haul Off
- Compaction
- Testing/Post CCTV





# WHY CLEARLY DEFINED BID ITEMS ARE IMPORTANT



- Clearly Define What is Considered Incidental to the Bid Item
- Clearly Define What is Paid for Separately from the Bid Item
- Clearly Define Units of Measure
- Note: When Bid Items are Included in the Bid Form But Considered Incidental to Some of the Items Makes for Confusion – Clarity Becomes More Important

1. Replace 6" AC by Pre-Chlorinated Pipe Bursting with 6" HDPE DR11, 2,835 linear feet at a unit price of \$\_\_\_\_\_/ LF :

\$\_\_\_\_\_

1. Replace 8" AC by Pre-Chlorinated Pipe Bursting with 12" HDPE DR11, 1,929 linear feet at a unit price of \$\_\_\_\_\_/ LF :

\$\_\_\_\_\_

(In Words)

# WHY CLEARLY DEFINED BID ITEMS ARE IMPORTANT

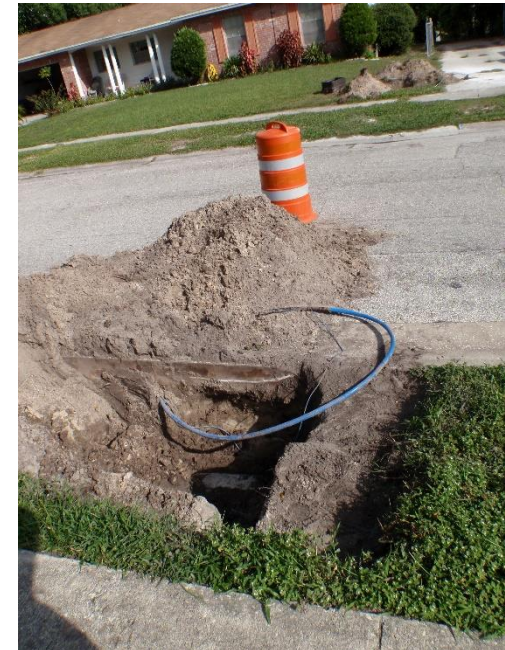
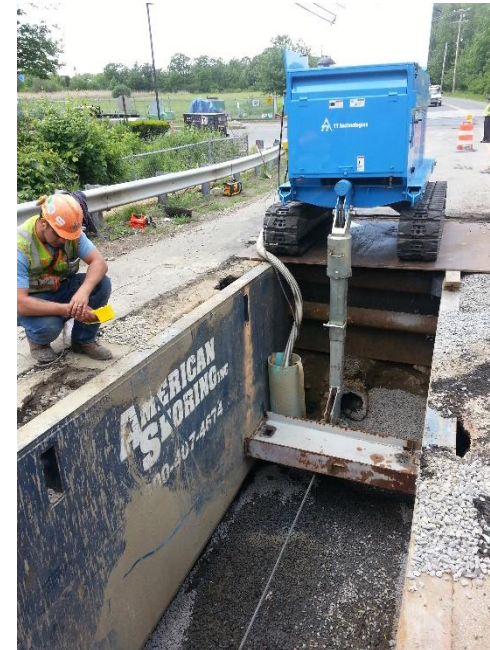
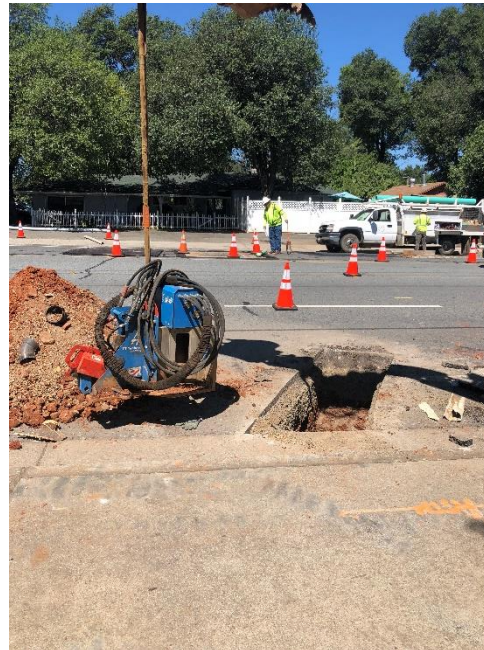


- Examples of Lack of Clarity & the Ensuing Debate – Shreveport, LA
  - Pipe Bursting Item – Stated that Restoration was Incidental to Pipe Bursting Activities
  - There Were Bid Items for Restoration Items Provided in the Bid Form
  - There Were Bid Items for Service Connections & Manholes
  - Question – Some Project Representatives Paid for All Restoration Items, Others Paid for Restoration Items Associated with Services & MH's but Not Pit Excavations, Others Paid for No Restoration



# APPROACHES

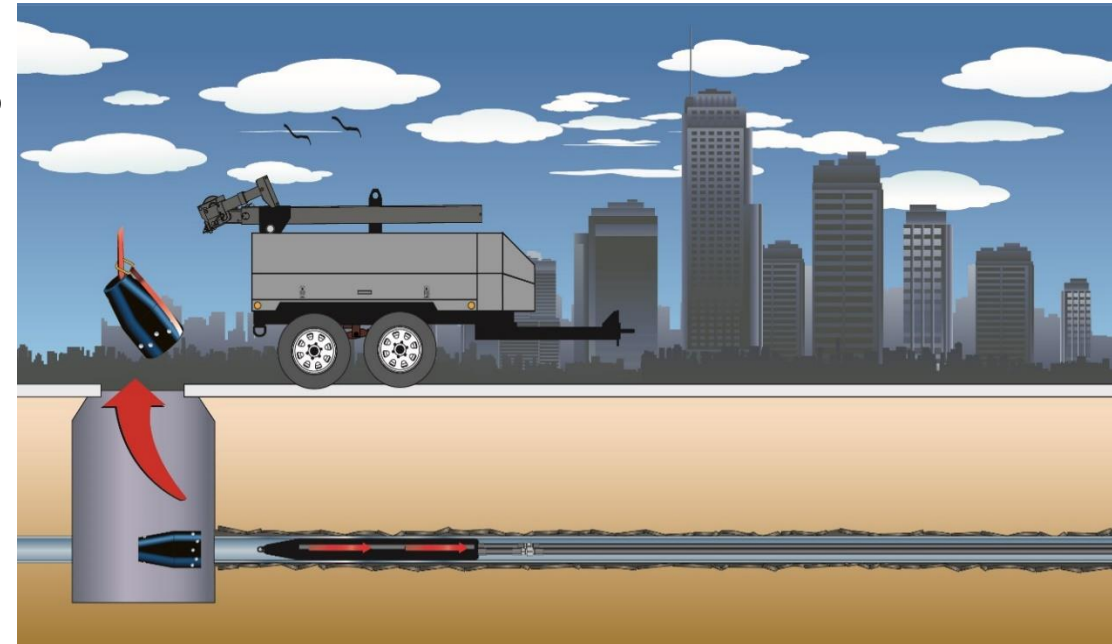
- Lump Sum
- Unit Price Approach
  - Traditional Unit Price – Separate Bid Items for Pipe Bursting & Most other Items Including, Restoration Items
  - LF Completed Costs – Bid Item for Pipe Bursting Only, Most Everything Else is Incidental
  - Annual Contracts



# APPROACHES

## Considerations –

- Risk – Who is liable for quantity take-offs and quantity over-runs?
  - Removing the Risk from the Contractor can Positively Effect Pricing
- Accuracy of the Plans
- Potential Adjustments for Unforeseeable Work & Potential Added Work
- Incentives – How is the contractor incentivized?
  - Eliminate Excavations
    - Reversible Tools Vs Static Bursting
  - Mitigate Risk For Potential Excavations
    - Newer Equipment, Hoses, & Cables





## EXAMPLE 1 – PIPE BURSTING LINE ITEM INCLUDES ALL RESTORATION



- Designer does not need to take-off quantities for potential restoration items
- Potential to use Geographical Information Systems (GIS) rather than Computer Aided Draft (CAD) drawings
- Contractor is incentivized to eliminate or reduce restoration items
- Risk is transferred to the Contractor
- Potential Change Order for Unknown/Unexpected Conditions
- Potentially Reduces the Ability to Add Additional Work

# EXAMPLE 1 – PLANS FROM GIS





## EXAMPLE 2 – SAG CORRECTION AFTER BURSTING

- Project Called for Upsizing from 8" VCP to 16" HDPE (Triple Upsize)
- Any sag found in the new pipe installed by Pipe Bursting that did not exist before installation of the new pipe shall be eliminated to the satisfaction of the Engineer at no additional cost to the City.

### Class C Pipe Burst

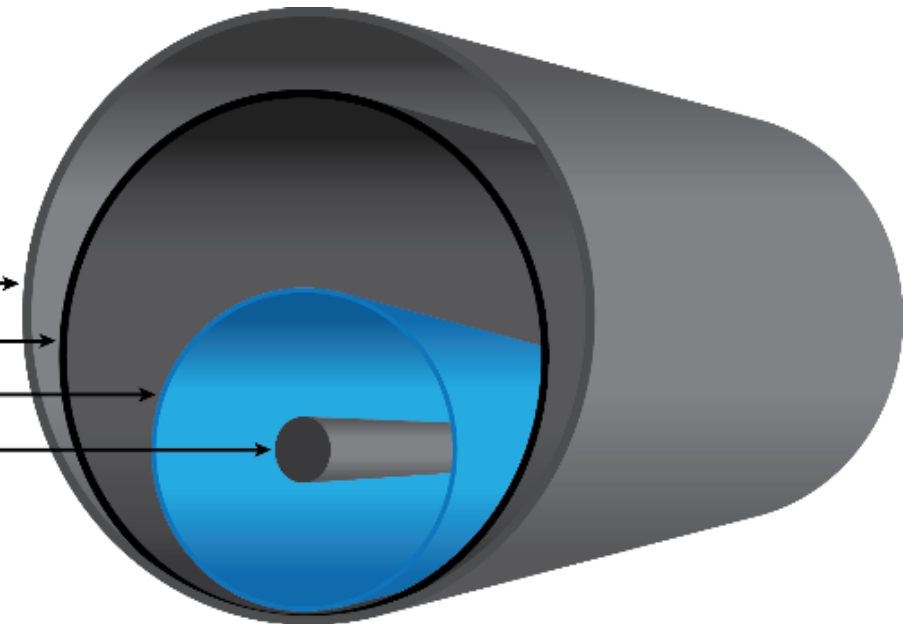
10" to 16" (Triple Upsize)

Expander OD: 18.50" →

New Pipe OD: 16.00" →

Existing Pipe ID: 10.00" →

Connection Center Point →



## EXAMPLE 2 – SAG CORRECTION AFTER BURSTING

- Eleven new sags ranging in Size from 2" to 4" were discovered after the new pipe was installed by Pipe Bursting.
- Contractor made a claim for additional compensation.
- Result – City changed specifications to pay for sag elimination so long as it was outside of pit excavations & service connections on a T&M basis.





## EXAMPLE 3 – PIT EXCAVATION PAID FOR SEPARATELY

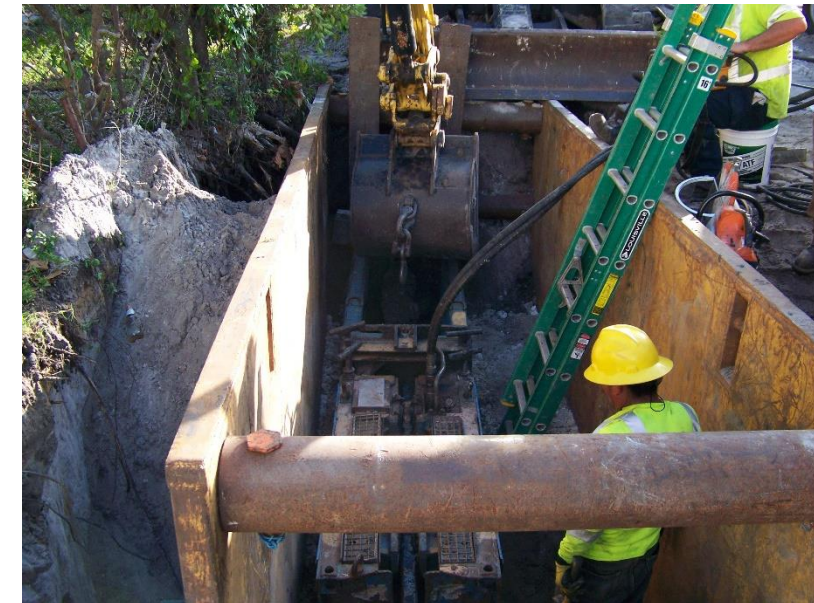
- Project Paid for Pit Excavations Separately
- Estimated Quantities in the Bid Form Accounted for Only 20 Pits for 47 Pipe Burst Segments
- Contractor Recognized the Potential for Extra Pits – Therefore, the Bid Price was on High End





## EXAMPLE 3 – PIT EXCAVATION PAID FOR SEPARATELY

- Upon the start of construction Project Representative realized the potential for overrun on the Item. Contractor worked with Owner to minimize pit excavations whenever possible, by using a reversible hammer. Using Only 30 to complete the project
- Contractor could have taken advantage of the situation by installing one pit excavation per run, which is typical, or by using a static pipe burst system.





QUESTIONS?



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