

The CPM logo is a red rounded rectangle with the letters 'CPM' in white, bold, sans-serif font. The background of the entire slide is a black and white photograph of a large industrial pipe flange with several bolts. A white hard hat is placed on a surface in the foreground on the right side of the image. A diagonal watermark is visible across the center of the image.

CPM

PIPELINES

**VALUE PROPOSITION FOR
REHABILITATING vs
REPLACING PIPELINES**



Reduce Total Project Cost and Risk



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Aging Pipeline Infrastructure



- 50 Million Olympic sized swimming pools of water lost every year in the US.
- Infrastructure owners urged to emphasize asset management and extend lifespan of assets



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Traditional Dig-and-Replace: Cost Drivers



Excavation



Traffic Control

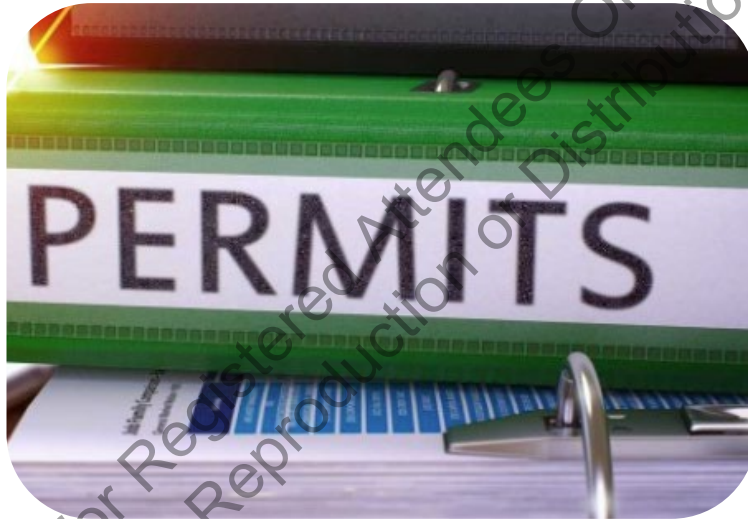
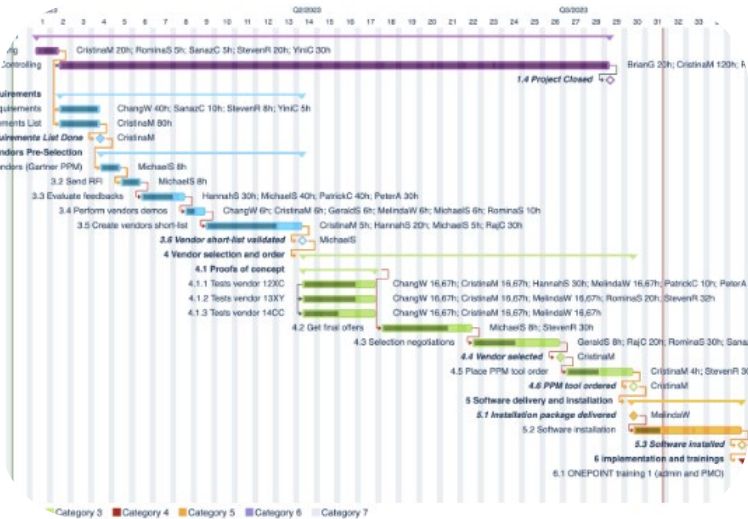


Restoration

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Constraints of Dig-and-Replace



Extended Schedules

Permitting

Public Disruption

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Common Trenchless Technologies

- Sliplining
- Close Fit Sliplining (Swage Lining)
- Pipe Bursting
- CIPP Pressure
- Loose Fit FFRP

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Flexible Fabric Reinforced Plastic Pipe

- AWWA Class III (As per AWWA M28)
- Close Fit
- Complex Pipe Geometry (multiple bends of up to 45-degree)
- 50-year Design Service Life



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Flexible Fabric Reinforced Plastic Pipe

- Create access points
- Clean and inspect
- String tag lines and winch cables
- Connect liner and pull in place
- Install flange adapters to host pipe



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Flexible Fabric Reinforced Plastic Pipe

- Clamp ends, inflate pipe back round
- Terminate fittings
- Pressure test (air or hydro)
- Final tie-ins
- Return to service



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Flexible Fabric Reinforced Plastic Pipe

- Small footprint
- Access pits typically 8'x8' or 10'x10'
- 40-70% reduced excavation and backfill
- 30-50% reduced construction labor, equipment



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FFRPP Environmental Benefits

- Smaller equipment on site
- Smaller overall footprint
- Using air

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Community, Safety and Scheduling

- Less impact
- Less traffic control, detours
- Weather & utility delay exposure reduced
- Schedule duration
- Elimination of surface restoration
- Change Orders

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Where Most Value is Delivered with FFRPP

- Urban Corridors
- Railroads
- Bridge crossing over waterways, ports
- Heavy industrial sites
- Major roadway/highway crossings
- Areas with high restoration costs
- Tight schedules
- Public sensitivity

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Total Cost and Lifecycle Savings of FFRPP

50-75% Overall capital cost savings

- 50-90% reduced surface restoration
- 30-40% reduced permitting & admin costs
- 40-60% shorter construction duration
- 30-60% lower lifecycle cost

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New Technology and Vetted

- Trenchless Technology Center
- Xinyuan Mining Brine Pipeline Test
- UL Cyclic Testing

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When Dig and Replace is Needed

- Structural failure beyond host pipe capacity
- Diameter/Capacity upsizing requirements
- Host pipe backfill envelope compromised
- Service connection density

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QUESTIONS?



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