REVISITING PAST DFW STREAM STABILIZATION PROJECTS

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Urban Riparian Symposium

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Agenda

• Jackson Creek – Colleyville
• Lorean Branch – Hurst
• Kirby Creek – Grand Prairie
• Lennox Lane – Arlington
Stream Erosion in DFW

• Increased development over time in urban watersheds
• Higher stream flows
• Channel Evolution Process
  – Downcutting
  – Meandering
  – Widening
Stream Erosion in DFW

• New infrastructure being built within urban riparian corridors
• Development pushing the limits along floodplains and erosion hazard areas
• Resulting stream erosion over time is a threat to properties and infrastructure
Jackson Creek - Colleyville

- Study - 1999
- Construction – 2001
- Revisited - 2009
- Revisited – 2018
Jackson Creek - Colleyville

• Overview
Jackson Creek - Colleyville

• Challenges

Approx. 600 LF of natural channel downstream of U-shaped concrete-lined flume
Jackson Creek - Colleyville

• Post-Construction 2001

Gabion & Riprap Protection at CLC outfall

Gabion mattress side slopes

Box culverts @ Sherwood Lane = 100-yr flood protection

Slopes laid back & TRM and pretty trees!
Jackson Creek - Colleyville

HOW HAS IT CHANGED OVER TIME?
Jackson Creek - Colleyville
Jackson Creek - Colleyville

• 2009

• 2018
Jackson Creek - Colleyville
Wildlife!
Lorean Branch - Hurst

- Revisited - 2009
- Revisited – 2018
Lorean Branch - Hurst

• Overview
Lorean Branch - Hurst

• Challenges

Approx. 2,000 LF of natural, eroded channel
Lorean Branch - Hurst

• Challenges

Approx. 2,000 LF of natural, eroded channel
Lorean Branch - Hurst

• Post-Construction – 2001

- Notice 3’x3’ toe wall (only top is exposed)
- Gabion mattress side slopes
Lorean Branch - Hurst

HOW HAS IT CHANGED OVER TIME?
Lorean Branch - Hurst
Lorean Branch - Hurst
Lorean Branch - Hurst

• 2009

• 2018
Lorean Branch - Hurst
Wildlife!
Kirby Creek – Grand Prairie

• Overview
• Channel Stability Assessment – 2004
• Construction – 2007
• Revisited – 2009
• Revisited – 2018
Kirby Creek – Grand Prairie

• Overview
Kirby Creek – Grand Prairie

• Overview
Kirby Creek – Grand Prairie

• Channel Stability Assessment - 2004

Toe Failures

Downcutting

Knickpoints
Kirby Creek – Grand Prairie

• Channel Stability Assessment - 2004

Severe Scour

Undercut Bank and Wedge Failure

Downcutting
Kirby Creek – Grand Prairie

• Channel Stability Assessment - 2004

Windhurst Drive – Natural Root Protection!

96” RCP Outfall near Christopher Drive (Pipe separated from headwall)
Kirby Creek – Grand Prairie

• Construction - 2007
Kirby Creek – Grand Prairie

• Construction - 2007

At 96” RCP Outfall near Christopher Drive
Kirby Creek – Grand Prairie

HOW HAS IT CHANGED OVER TIME?
Kirby Creek – Grand Prairie

At 96” RCP Outfall near Christopher Drive
Kirby Creek – Grand Prairie

• 2018

At 96” RCP Outfall near Christopher Drive
Kirby Creek – Grand Prairie

• 2018

At 96” RCP Outfall near Christopher Drive
Kirby Creek – Grand Prairie

• 2018

At 96” RCP Outfall near Christopher Drive
Kirby Creek – Grand Prairie
Wildlife!
Lennox Lane - Arlington

- Overview
- Erosion after May-June 2015 floods
- Temporary rock riprap protection
- Gabion MSE wall construction
- Relocation of sanitary sewer line
Lennox Lane – Challenges
Lennox Lane – Challenges
Lennox Lane – Challenges
Lennox Lane – June 2015
Lennox Lane – Jan 2016
Lennox Lane – May 2016
Lennox Lane – 2018
CLOSING THOUGHTS FROM AN ENGINEER

• Variety of Solutions available
  – Gabions / Rock Riprap
  – Pre-Cast Block Walls
  – TRMs / Reinforced Earth Structures
  – Rock chutes, vanes, riffle pools

• Important things:
  – Contractor experience is important
  – Geotechnical Recommendations
  – Geomorphologic Analysis
  – Environmental Permitting
  – Construction Access/Easements

• “Green” can overtake hard armor

• Plan Ahead
  – Consider public versus private
  – Establish erosion hazard setbacks for new development
  – Consider how streams change when placing new infrastructure near them

• Many challenges but we have the tools to solve them!
Questions?

Future Urban Riparian Enthusiasts!