Storm Sewer Improvements within the Lindale Branch Watershed in the City of Richardson

By

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Outline

- City of Richardson Location
- Watershed Information
- Stormwater Studies
- Detailed Stormwater Analysis
- Risk Reduction Alternatives
City of Richardson
City of Richardson Location

- Dallas & Collin County
- Richardson = 28.5 sq. miles
- Population: 100,000
- Land Use:
  - 74% residential
  - 26% (commercial/industrial)
City of Richardson Watersheds

- Four Drainage Basins
  - Cottonwood Creek
  - Prairie Creek
  - Spring Creek
  - Duck Creek
Stormwater Studies

- Stormwater Inventory - 1986
- Floyd Branch
- Huffhines Creek – 2014
- Lindale Branch - 2015
Stormwater Studies

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Stormwater Studies

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Lindale Branch Watershed

- Sub-basin of Cottonwood Creek
- West of US HWY 75
- Between Campbell Rd & Belt Line Rd
- Approximately 0.44 sq. miles
Lindale Branch Watershed

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- West of US HWY 75
- Between Campbell Rd & Belt Line Rd
- Approximately 0.44 sq. miles
Study Scope

- Create a full dynamic model
- Identify problem areas
- Develop alternatives
- Develop cost estimates
Lindale Branch Basin

- Drains to the west to Cottonwood Creek
- 15,000 LF of Storm Sewer
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Storm Sewer System Modeled

- Approximately 0.3 sq. miles
- Total Storm Sewer = 11,000 LF
- 79 Storm Sewer Inlets
- 44 sub-basins
Sites to be developed

Site No. 1

Site No. 1
1.8 acres

Site No. 2

Site No. 2
4 acres

Northrich Baptist Church

Site No. 1

Site No. 2
Storm Sewer Modeling

- 1D / 2D Modeling
- 1D = Evaluate Pipe Capacity
- 2D = Define Surface Flow
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Storm Sewer Modeling
Problem Areas

Drainage Boundary

Flood Depths (ft)
- 0.25 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1
- 1 - 2
- > 2
Problem Areas

No. 1

No. 2

Drainage Boundary

Flood Depths (ft)

- 0.25 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1
- 1 - 2
- > 2

HALFF
Problem Area No. 1
Problem Area No. 1
Problem Area No. 1

- Custer Road
- Malden Drive
- Drainage Boundary
- Rockingham Road
- Vernet Street
- Lowell Lane

Flood Depths (ft):
- 0.25 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1
- 1 - 2
- > 2
Problem Area No. 1
Problem Area No. 1

- Lowell Lane
- Vernet Street
- Alley
- Rockingham Road

Lowell Lane
Problem Area No. 2

Drainage Boundary

Flood Depths (ft)
- 0.25 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1
- 1 - 2
- > 2

HALFF
Problem Area No. 2

[Map showing drainage boundary, Jolee Street, and flood depths in feet]
Problem Area No. 2

Drainage Boundary

Custer Road

Jolee Street

Arapaho Road

Flood Depths (ft)

- 0.25 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1
- 1 - 2
- > 2

HALFF
Problem Area No. 2

Drainage Boundary

Custer Road
Jolee Street
Problem Area No. 2
Storm Sewer Assessment Results

- Storm Sewers
- Habitable Structures
  - 2 Commercial Buildings
  - 15 Homes
- Street Flooding
  - Lowell Lane – 2 to 2.5 ft.
  - Vernet Street – 3 ft.
  - Custer Road – 1 to 2 ft.
Site No. 1
Site No. 1
Existing Floodplain with Pipe Clogged
Site No. 1
Existing Floodplain with Pipe Clogged
Site No. 1
Existing Floodplain with Pipe Clogged
Storm Drainage Improvements

- Installation of new trunk mains
- Parallel Systems
- Storm Water Diversion
- Additional Inlet Capacity
Criteria

- 100-Year flows shall be contained within the road R-O-W
- Drainage easements
- Use existing systems as much as possible
Storm Drainage Improvements
Storm Drainage Improvements

- Malden Drive
- Lowell Lane
- Rockingham Lane
- Vernet Street

Legend:
- Black: Existing Storm Drainage
- Orange: Proposed Storm Drainage (Parallel)
- Red: New Proposed Storm Drainage
- Yellow: Replacement of the Existing Storm Drainage
- Green: Diversion
Storm Drainage Improvements

- Custer Road
- Arapaho Road
- Lowell Lane
- Vernet Street
- Rockingham Lane
- Jolee Street
- Hanbee Street
Storm Drainage Improvements

- Sub-Project A1 = $4,390,000
- Sub-Project A2 = $650,000
- Sub-Project A3 = $940,000
- Sub-Project A4 = $1,030,000
- Sub-Project A5 = $4,580,000

Total Cost = $12,240,000
Summary

- 11,000 LF of storm sewer system were analyzed
- 17 structures at risk of flooding
- 3 severe street flooding
- 5 capital projects identified
Questions?

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