Huffhines Creek Watershed Drainage Relief Study

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Overview

- Watershed Information
- Study Scope
- Watershed Assessment
- Risk Reduction Alternatives
- Priority Improvement Projects
- Summary
Watershed Information

Huffhines Watershed

- Approximately 2.1 sq. miles
- Sub-basin of Duck Creek
- 23 Miles of Storm Sewer
- 680 Storm Sewer Inlets
- 7,300 feet of Open Channel
- 4 Major Road Crossings
  - Yale Blvd
  - St. Johns Drive
  - Plano Road
  - Glenville Drive
Study Scope

- Create a full dynamic, 2-D storm sewer model.
- Identify deficiencies in the stormwater collection system.
- Provide street flood mapping and flood depths.
- Develop conceptual alternatives for flood risk reduction.
- Prioritize alternatives for capital project consideration.
- Develop probable construction cost estimates.
2-Dimensional Analysis

Utilized a 2D model to perform the comprehensive basin assessment.

- Provides an accurate representation of basin storage, overland flow and the performance of the overall drainage network.
- GIS layers utilized to develop 2D model:
  - 2010 TNRIS Topography → Terrain → 2D Grid Mesh
  - Storm Sewer Mains and laterals → 1D links
  - Inlets → 1D nodes
Watershed Assessment - Criteria

- Pipes < 5 acres basin area not evaluated
- Evaluated for 2-, 5-, 10-, 50-, and 100-year storm events
- Capacity criteria: HGL above ground elevation
- High Risk: 1% annual chance flood (100-year)
  - Capacity determined by < 0.5 feet of overflow into the streets
Watershed Assessment - North

Existing Flooding Conditions

Yellow – Storm Sewer <= 5-year

Blue = 0.5’- 0.8’
Red = 0.8’ - 2.0’
Purple = 2.0’- 3.0’
Watershed Assessment - South

Existing Flooding Conditions

Yellow – Storm Sewer <= 5-year

Blue = 0.5’- 0.8’
Red = 0.8’ - 2.0’
Purple = 2.0’- 3.0’
Watershed Assessment - Results

- Storm Sewers
  - 6 miles of trunk mains < 5-year storm capacity

- Habitable Structures
  - 4 High Risk Commercial Buildings
  - 30 High Risk Homes

- Severe Street Flooding
  - Windsong at Glenville – 3 ft.
  - College Park at Spring Valley -- 1.5 to 2 ft.
  - Villanova Sag – 2.5 ft.

- Road Overtopping
  - Yale, St. Johns, Plano, and Glenville overtopped by up to 0.8 ft.
Risk Reduction Alternatives

• Storm Sewer Diversion
• Installation of new trunk mains
• Additional inlet capacity
• Detention
Priority Improvement Projects
Priority Improvement Projects

Old Albertsons Site
- Flood Depth over 2 feet
- 4 High Risk Commercial
- Contributing Factors
  - Backwater from Huffhines Creek
  - Undersized Storm System

Glenville / Windsong Site
- Flood Depth Over 2 feet
- Contributing Factors
  - Undersized Storm System
  - Focal point of surface drainage

Huffhines (2C7) Existing Conditions Flooding

Blue = 0.5' - 0.8'
Red = 0.8' - 2.0'
Purple = 2.0' - 3.0'

Black – Existing Storm Sewer
Priority Improvement Projects

Old Albertsons Site
- Flood Depth over 2 feet
- 4 High Risk Commercial
- Contributing Factors
  - Backwater from Huffhines Creek
  - Undersized Storm System

Proposed Glenville Bypass
- 1,850 ft. of 12x6 Box Culvert
- Permanently redirects Windsong drainage
- Reduces flooding at Windsong by 0.5 feet
- Can be phased

Green – Proposed
Black – Existing Storm Sewer
Priority Improvement Projects

Old Albertsons Site
- Depth over 2 feet
- 4 High Risk Commercial
- Contributing Factors
  - Backwater from Huffhines Creek
  - Undersized Storm System

Proposed Glenville Detention
- 20 Ac-ft. of Detention
- Addresses all High Risk Commercial
Priority Improvement Projects

Beltline and Island Drive

- House and Street Flooding
- 4 High Risk Homes
- Flood Depth up to 1.5 feet
- Contributing Factors
  - Local drainage
  - Undersized trunk mains

Black – Existing Storm Sewer

Huffhines (2C7) Existing Conditions Flooding

Blue = 0.5' - 0.8'
Red = 0.8' - 2.0'
Purple = 2.0' - 3.0'
Priority Improvement Projects

Beltline and Island Drive
- House and Street Flooding
- 4 High Risk Homes
- Flood Depth up to 1.5 feet
- Contributing Factors
  - Local drainage
  - Undersized trunk mains

Proposed Beltline Main
- 1,550 ft. of 8x5 Box Culvert
- 150 ft. of 42” Concrete Pipe
- Addresses all High Risk Homes

Green – Proposed
Black – Existing Storm Sewer
Priority Improvement Projects

Fairview, LaSalle, Terrace & Rorary
- House Flooding
- Flood Depths up to 2 feet
- 22 High Risk Homes
- Contributing Factors
  - Apollo Road Overflow
  - Local Drainage
  - Low-Point Cul-de-Sac
  - Ditch Backwater
Priority Improvement Projects

Fairview, LaSalle, Terrace & Rorary
- House Flooding
- Flood Depths up to 2 feet
- 22 High Risk Homes

Contributing Factors
- Apollo Road Overflow
- Local Drainage
- Low-Point Cul-de-Sac
- Ditch Backwater

Apollo Storm Main Enlargement Option
- Beltline system must be constructed first
- 10 High Risk Homes Remaining

Green – Proposed
Black – Existing Storm Sewer

Huffhines (2C7) Proposed
Conditions Flooding
Blue = 0.5' - 0.8'
Red = 0.8' - 2.0'
Purple = 2.0' - 3.0'
Priority Improvement Projects

Fairview, LaSalle, Terrace & Rorary
- House Flooding
- Flood Depths up to 2 feet
- 22 High Risk Homes
- Contributing Factors
  - Apollo Road Overflow
  - Local Drainage
  - Low-Point Cul-de-Sac
  - Ditch Backwater

Grove Detention Option
- 20 Ac-ft. of Detention
- 810 ft. of 8x4 Box Culvert
- Addresses all High Risk Homes
- Beltline does not have to be constructed first

Green – Proposed
Black – Existing Storm Sewer
Priority Improvement Projects

Park, Highland and Townehouse
- House and Street Flooding
- 4 High Risk Homes
- Flood Depths up to 1.8 feet
- Contributing Factors
  - Local Drainage
  - Undersized Mains

Black – Existing Storm Sewer

Huffhines (2C7) Existing Conditions Flooding

Blue = 0.5' - 0.8'
Red = 0.8' - 2.0'
Purple = 2.0' - 3.0'
Priority Improvement Projects

Park, Highland and Townehouse
- House and Street Flooding
- 4 High Risk Homes
- Flood Depths up to 1.8 feet
- Contributing Factors
  - Local Drainage
  - Undersized Mains

Proposed Storm Main Enlargement
- 1,100 ft. of 36/48” Concrete Pipe
- Addresses all High Risk Homes
- Utilizing storage in railroad ditch

Green – Proposed
Black – Existing Storm Sewer
Summary

6 miles of existing storm sewer < 5-year capacity
34 structures at risk of flooding
20 capital projects identified

• Cost totaling $27,340,000 including:
  • Trunk main bypass
  • Pipe and culvert enlargement
  • Detention

5 projects have been identified as high priority.

• Glenville Bypass (Huffhines Branch to Windsong)
• Glenville Detention (at Windsong)
• Beltline Main Upgrade (Railroad to Huffhines Branch)
• Apollo Main Upgrade (Railroad to west of Grove Road)
• Park, Highland Main Upgrade
Questions?

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