Premature Storm Drainage System Repairs and Replacement

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Agenda

- Storm Water Infrastructure
- Identifying Problems (Before and After) Infrastructure is Installation
- Common Premature Problems and Failures
- What is Storm Water Doing on Our Projects?
Stormwater Infrastructure

- Stormwater infrastructure consists of pipe, inlets, junctions, creeks, and ditches
- Systems in public rights-of-way
- Systems on private property in public drainage easements
- Connected as a system
- Access and easements (private/public versus City)

Steele Creek Landing Subdivision
Stormwater Infrastructure

Service Life Expectations (examples)

- Reinforced Concrete Pipe (RCP) – 100+ years
- High Density Polyethylene Pipe (HDPE) – 50 years + TBD
- Corrugated Metal Pipe (CMP-no longer allowed) – 25-30 years
- Aluminized (other new coatings) Corrugated Pipe – 75 years
  - Life Expectancy comes from different sources ACPA, FHWA, FLH, NASPD, local experience, etc. and assumes appropriate installation. The actual life can be influenced by local conditions, environmental characteristics, installation, use, etc.
Identifying Problems During and After Infrastructure is Installed

- Construction inspection
- Testing (compaction and materials)
- Closed Circuit Television (CCTV - video) inspection
- Confined space entry (Manual Entry)
Identifying Problems During and After Infrastructure is Installed

Images from Astonboro Drive (Built 2002)
Identifying Problems During and After Infrastructure is Installed

- HDPE (plastic pipe egged shaped) loss of structural integrity
- Sanitary sewer punched through the storm drain

Images from Mallard Landing Road
Built 2006
Identifying Problems During and After Infrastructure is Installed

- Reinforcing steel used to support frame and grate

Images from Mallard Landing Road
Built 2006

- Slab cut to move inlet position

Images from Mallard Landing Road
Built 2006
Common Premature Problems

- Premature failures impact public roads and private property
- Problems usually are not detected until several years have past.
- Streets settle
- Sinkholes form
- House foundations impacted
- Need structural shoring during repair construction.
Haines Mill Road
The Villas at Laurel Valley
Built 2006

- Precast catch basin leaking around joints
- Sinkholes formed
- System is in backyards and access is limited
- Shoring will be needed to protect the foundations of nearby homes
Provincetowne Drive
Reavencrest
Built 2001

• Separated pipe joints
• Sinkholes formed
• Shoring will be needed to protect the foundations of nearby homes
Common Premature Problems

Cozen Way
Drawley Farms
Built 2004

- Sinkholes formed
- Non-standard structures
- Poor pipe installation
- Public safety and liability concerns for the City
Clementine Court
Providence Pointe
Built 2002

- Missing brick in catch basin
- Sinkholes formed
- Precast structures leaking
- Presents a public safety concern to the property owner
- Limited access to enter and repair system
- Shoring will be needed to protect the foundations of nearby homes
Sahalee Lane
Claiborne Woods
Subdivision
Built 2000

- Sinkhole formed due to pipe being damaged (egged shaped and joints failed) during installation
- Pipe damage allowed backfill material to migrate away and created a sinkhole
- Shoring will be needed to protect the foundations of nearby homes
Common Premature Problems

Astonboro Drive
Chastain Parc
Built 2002

- Broken and cracked pipe
- Road is settling and rutting
- Potential cavities under the road
- Estimated $100,000 repair
Steele Creek Landing
Mallard Landing
Built 2006
- Broken pipes and separated joints
- Sinkholes formed
- Pipe holding water
- Estimated $500,000 repair

Note: Steele Creek Landing was presented to the City for a voluntary annexation consideration.
Common Premature Problems

Oasis Lane  
Belmeade Green Subdivision  
Built 2006

- Separated joints, broken pipe, poor compaction
- Sinkholes formed
- Shoring will be needed to protect the foundations of nearby homes
- Estimated $250,000 repair costs
Challenges (Correcting Problems on Existing Infrastructure)

- Inconveniencies to traffic and property owners
- Shoring houses, reconstruction of road infrastructure, restoring landscaping, additional costs
- Working around utility infrastructure (gas, communication, electric, poles, sewer, etc.)
- Estimated approximately $2M of the $10M annual Storm Water Budget is needed to repair premature failures
- Takes away from intent of program

Shoring is not installed during the development phase, but is required during repairs.
What is Storm Water Doing on Our Projects

• Increased level of inspection
• Increased training of inspection staff and contractors
• CCTV (pipe video) inspection after work is complete and at end of warranty period
• Longer warranty periods from contractor on questionable infrastructure
The End