This presentation premiered at WaterSmart Innovations

watersmartinnovations.com

watersmart
INNOVATIONS

WaterSmart Innovations Conference-October 8th, 2014

CITY OF LAFAYETTE

North Street Reconstruction & Integrated Stormwater Management System

WILLIAMS CREEK CONSULTING

Value Statement

For growing municipalities to be perceived as world class communities, each must move past the era of single objective spending and invest in programs and policies with multiple benefits. Learn how Green Infrastructure (GI) approaches to wet weather management create a range of benefits for the social, economic, and environmental health of a community.

North Street: A Case Study for High Performance Infrastructure

What happens when a community goes "ALL IN" with Green Infrastructure?

Lafayette GI Feasibility and Prioritization Study

Capital Improvement Project Integration

- Right of Way
- Open Space
- Neighborhood revitalization

Result:

- **North Street** (9th to Erie) best capital investment per annual gallon removed and **overall #1 ranking** (TBL Analysis, not USA Today Coaches poll).

Why North Street?

Deteriorated Pavement Conditions

Interesting Drainage Conditions

Safety and Accessibility / ADA

Right of Way / Utility Issues

North Street Reconstruction: High Performance Infrastructure

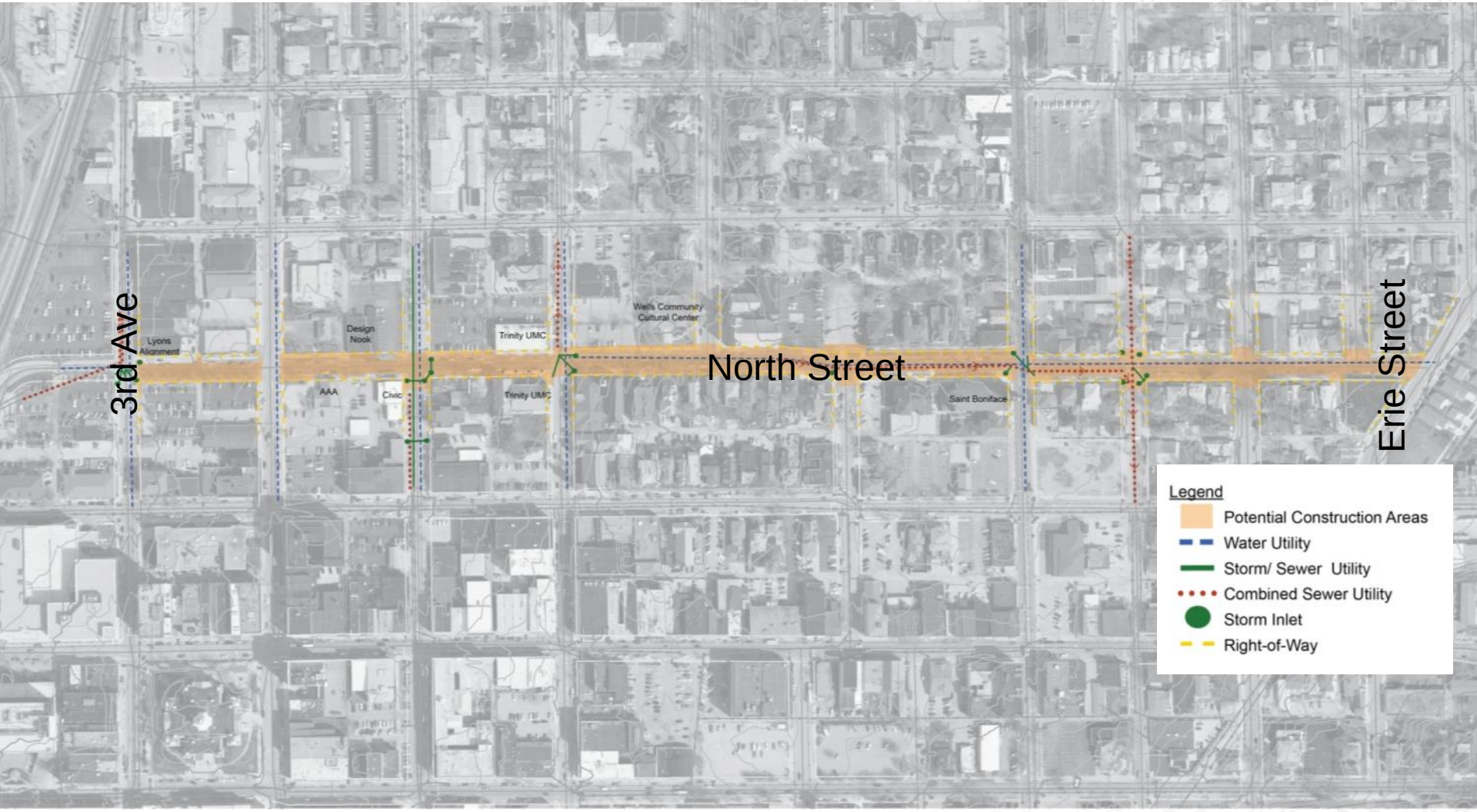
Project Goals

- Improve approximately .60 mile existing street
- Maintain & enhance historic neighborhood character
- Replace trees identified for removal in City Tree Survey
- Eliminate raw sewage overflows at regulator
- Replace existing water services and update meters
- Improve handicap accessibility
- Enhance existing parking
- Complete design work for summer 2012 initial phase
- Plan for multiple phase construction

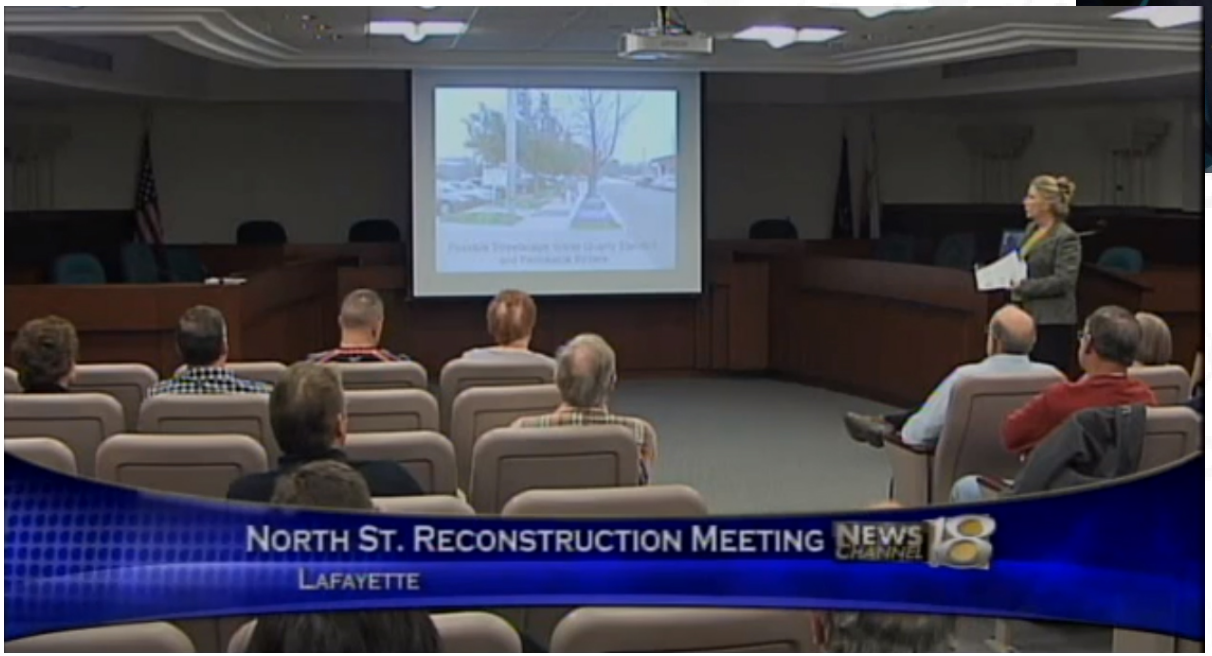
Project Opportunities

- Potential to remove 6.6 Million gallons of stormwater from the combined system annually
- Reduce pumping and treatment costs
- Provide data for inclusion of GI in future LTCP
- Use the Wells Community Cultural Center for outreach opportunities
- Connect to multi-modal transportation nodes
- Improved community connectivity
- Improve streetscape to support revitalization
- Increase Tree Canopy within corridor

North Street Reconstruction Concept Development



Community Outreach and Education



North Street Reconstruction Construction Documents

Material selection

- “Historic” aesthetic -Community desire to maintain look and feel of street
- Paver qualities – porous, durability, warranty, color & texture options

Existing Condition North Street at 3rd Street

Streetscape Water Quality and Permeable Pavers

Existing Condition
Between 4th St. and 5th St.

Streetscape Water Quality Element with Historic Brick and Permeable Pavers

Existing Condition at 6th St.

Streetscape Water Quality Element and Permeable Pavers

Existing Condition at 8th Street

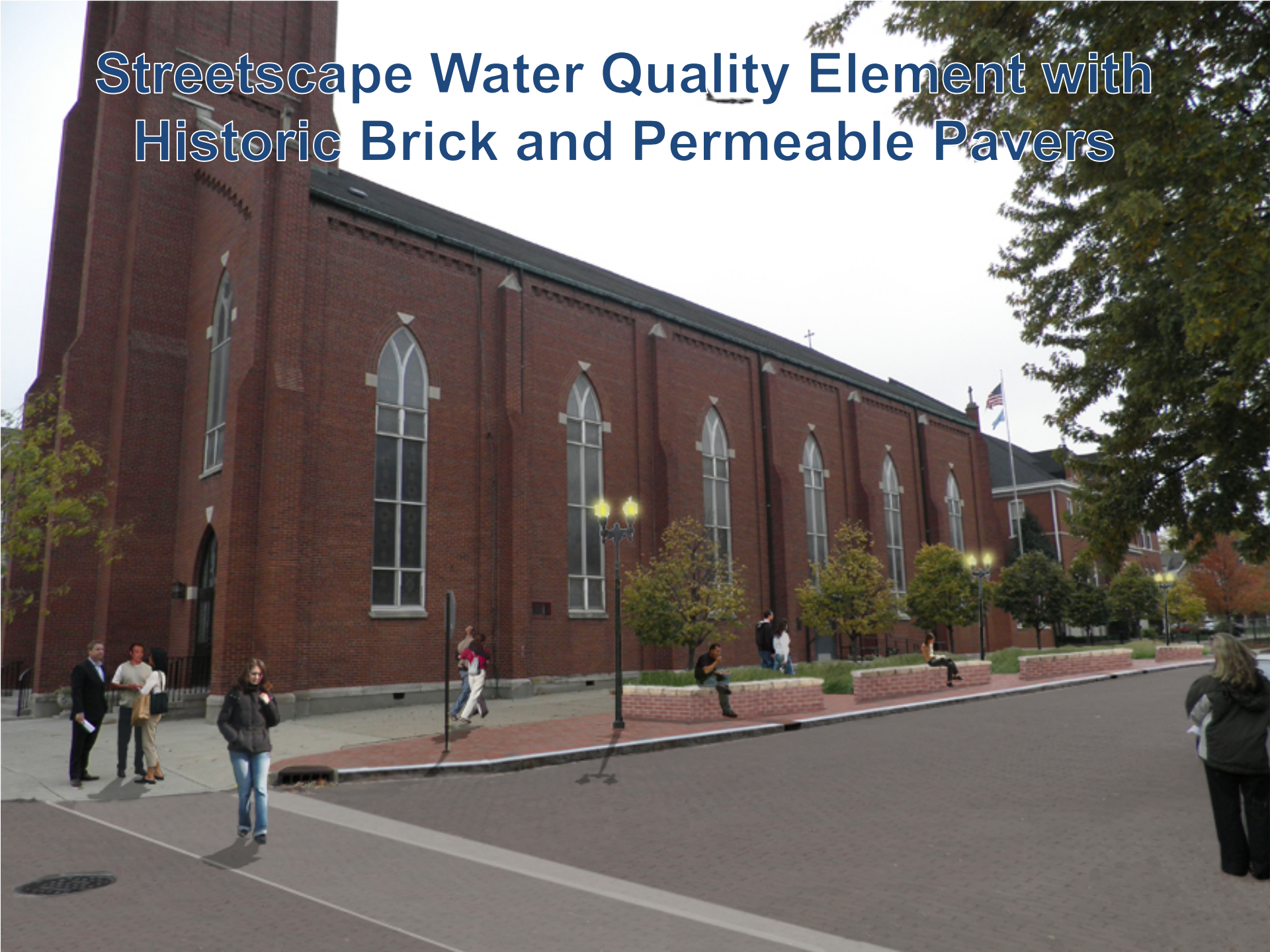
Streetscape Water Quality Element with Historic Brick and Permeable Pavers

Existing Condition at 9th St.

Streetscape Water Quality Element and Permeable Pavers

Existing Condition an St. Boniface Church

Streetscape Water Quality Element with Historic Brick and Permeable Pavers

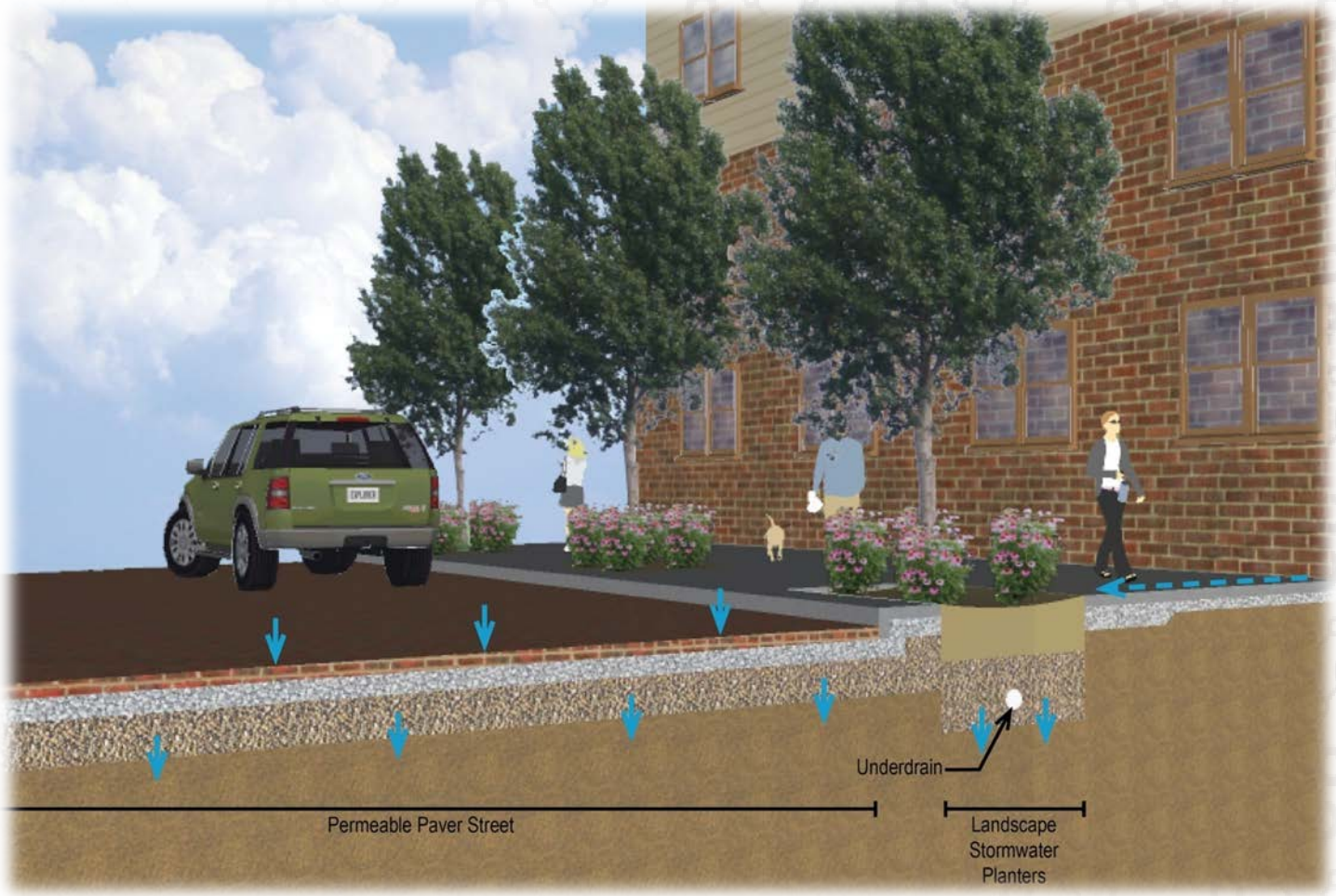


Existing Condition at 10th St. Intersection

Streetscape Water Quality Element and Permeable Pavers

North Street Chosen Final Design Option

"Full" cross section for pavers with intermittent "deep" storage sections

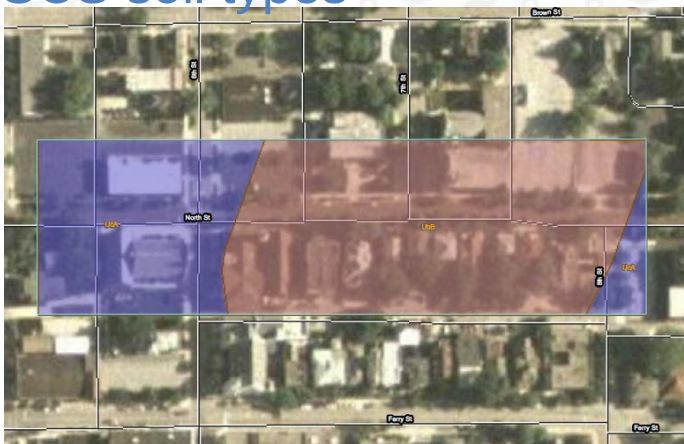


North Street Reconstruction Design Development

SWMM Modeling - Hydrology

- Microwatersheds delineated by inlet
- Topography from GIS
- Connectivity refined during field recon
- Both continuous annual storm and individual events modeled

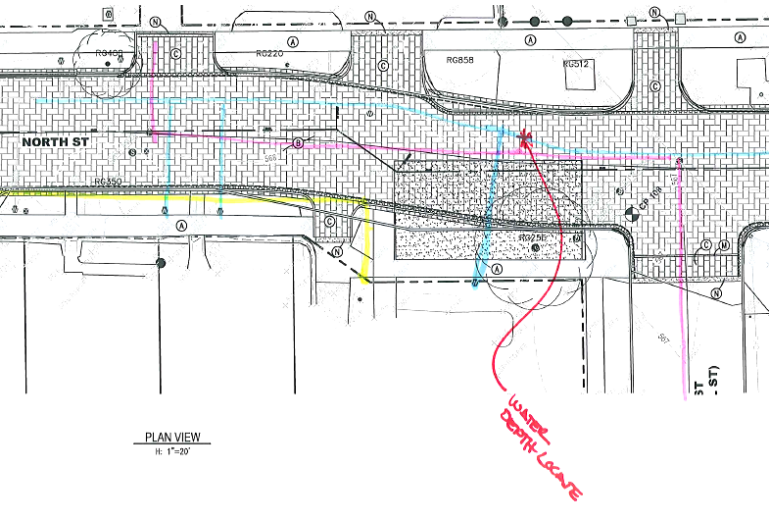
Soil infiltration characteristics taken from existing city combined sewer SWMM model for areas with similar SCS soil types



North Street Reconstruction Design Development

SWMM Modeling - Storage

- Full street permeable paver section
- Standard 11 inch paver section with washed subgrade
- App. 24 “deep section” storage cells
- Supplemental rain gardens where practicable
- Utilities located, surveyed, mapped, and potholed
- Deep storage zones and underdrains placed to minimize conflicts



North Street Reconstruction Design Development

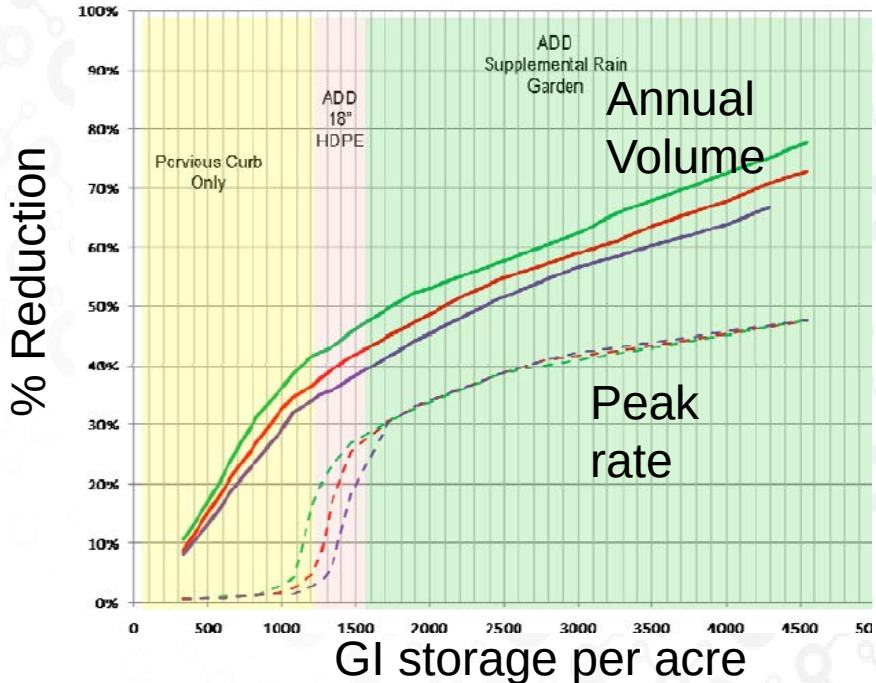
SWMM RESULTS

		Existing	Proposed
Volume Removal (MGAL)	Annual Runoff	8.8	2.2
Peak rate (CFS)	Annual Storm	5.5	4.5
	10yr, 24-hr Huff	4.1	3.2

SWMM Modeling – Results

Peak Rate reductions up to 40% in some areas, less than 10% in others.

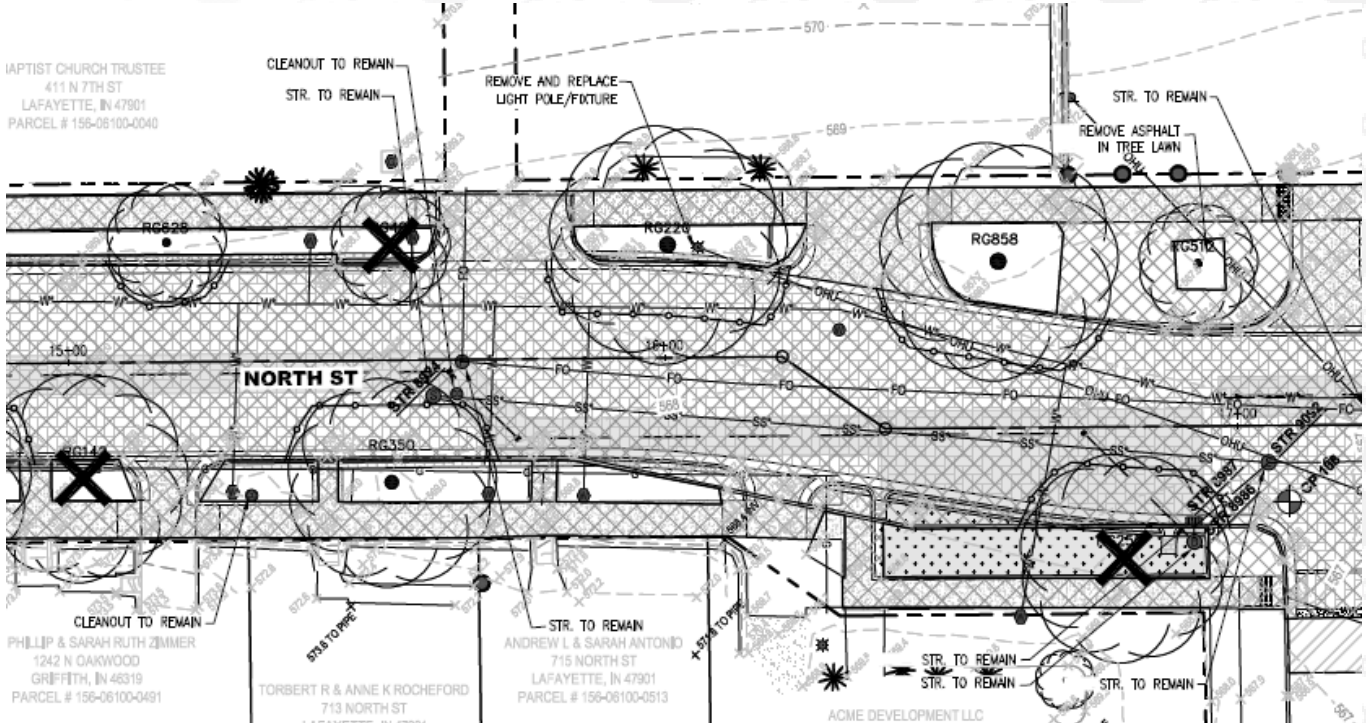
Avg Rate Reduction app. 30%



North Street Reconstruction Construction Documents

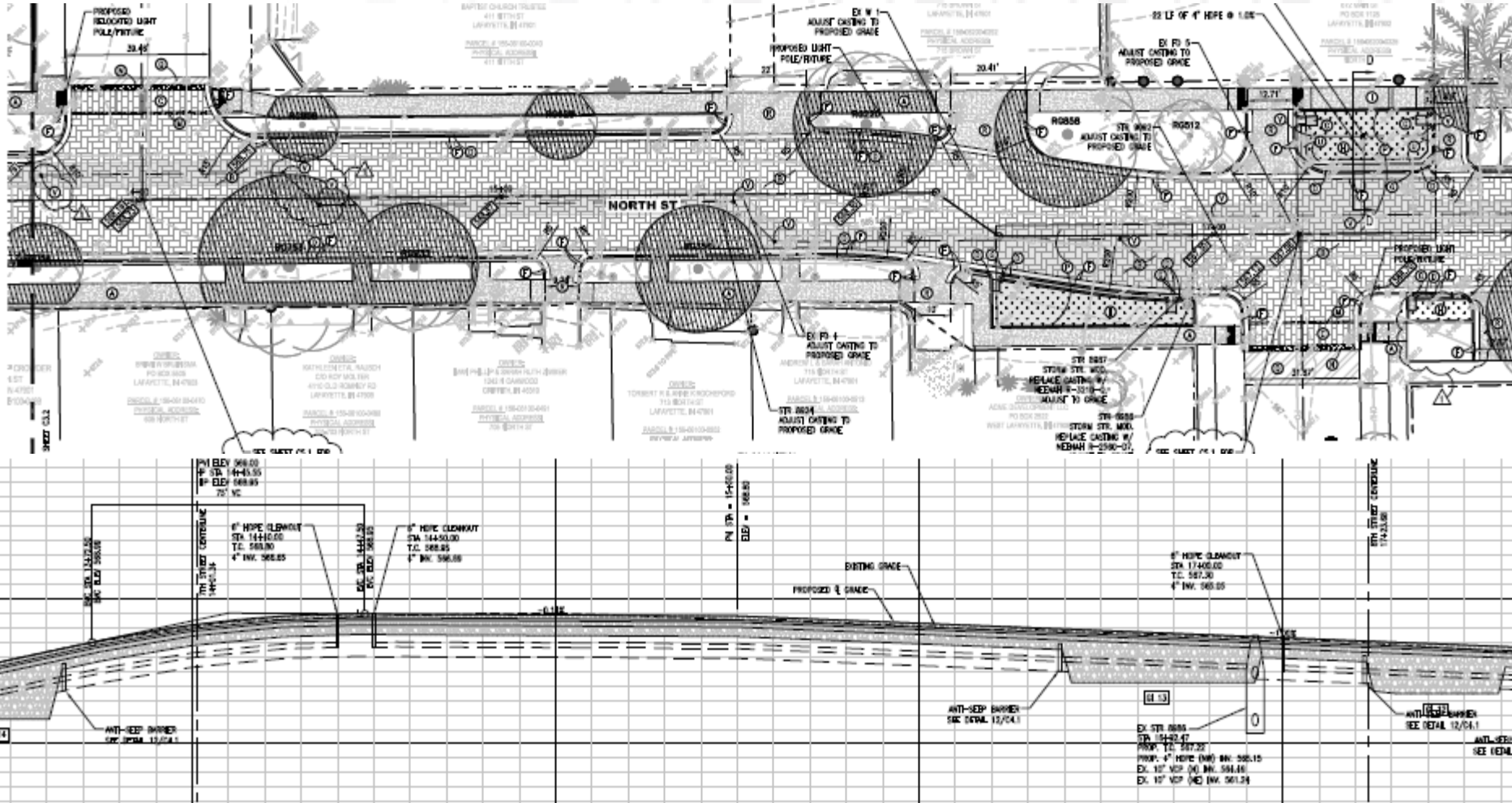
Deconstruction Plan

- “Everything Must Go” (Almost everything)
- Bricks to be saved from landfill
- Trees to keep/to remove designated by city ecologist (ash borer, disease, or general unhealthiness)



North Street Reconstruction
Construction Documents

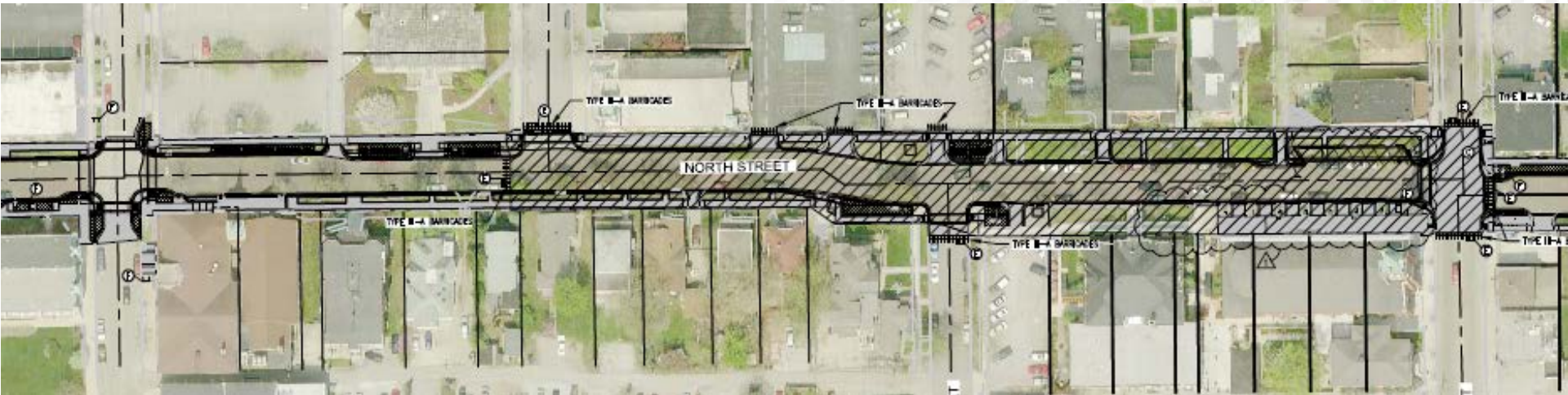
"Transportation" engineering set, not just stormwater design



North Street Reconstruction Construction Documents

Maintenance of traffic and property access

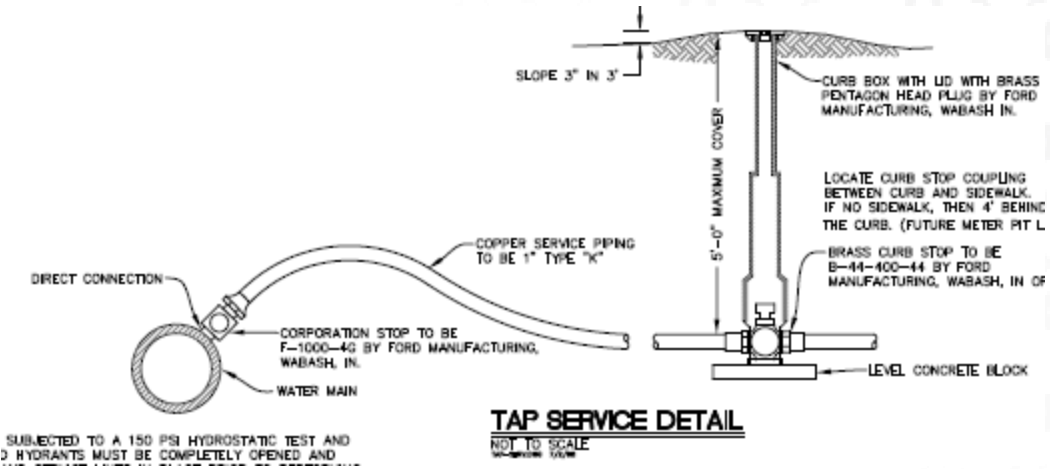
- Alley loading
- Temporary drives
- Unique commercial (glass) delivery issues
- Pedestrian wayfinding

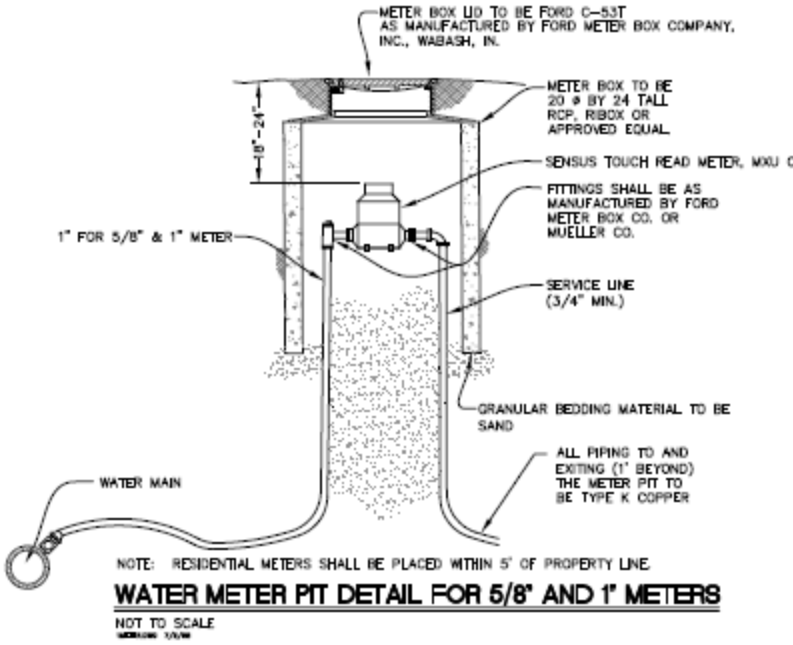


North Street Reconstruction
Construction Documents

Resolve utility conflicts and improve existing connections

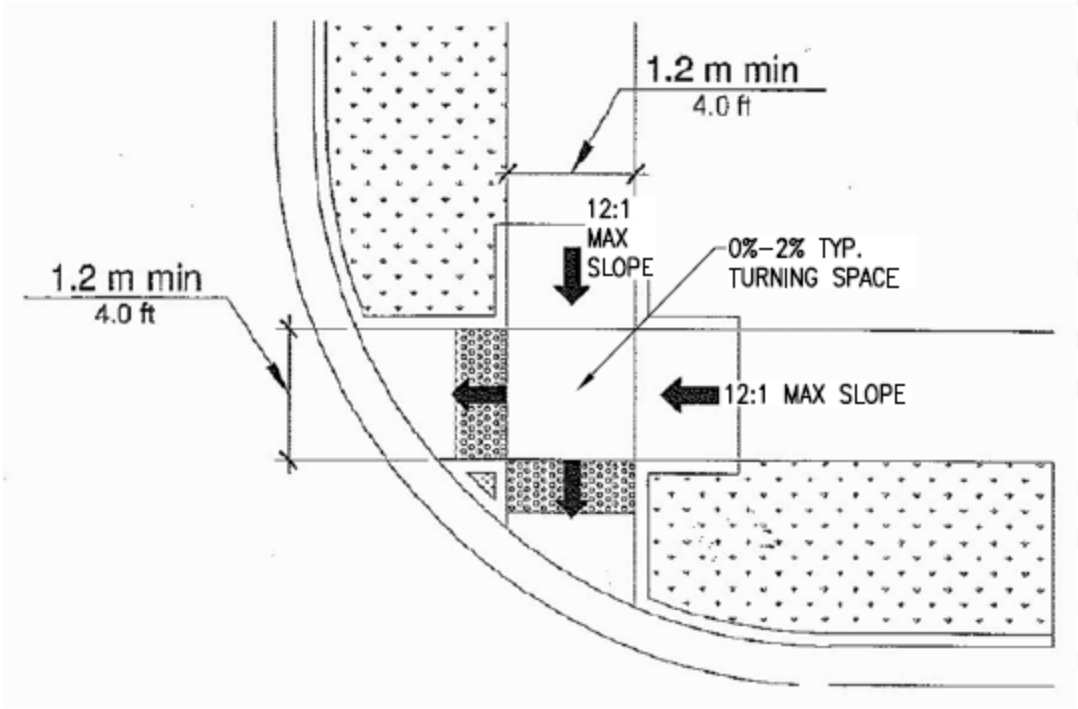
Unknown condition and exact number of existing services





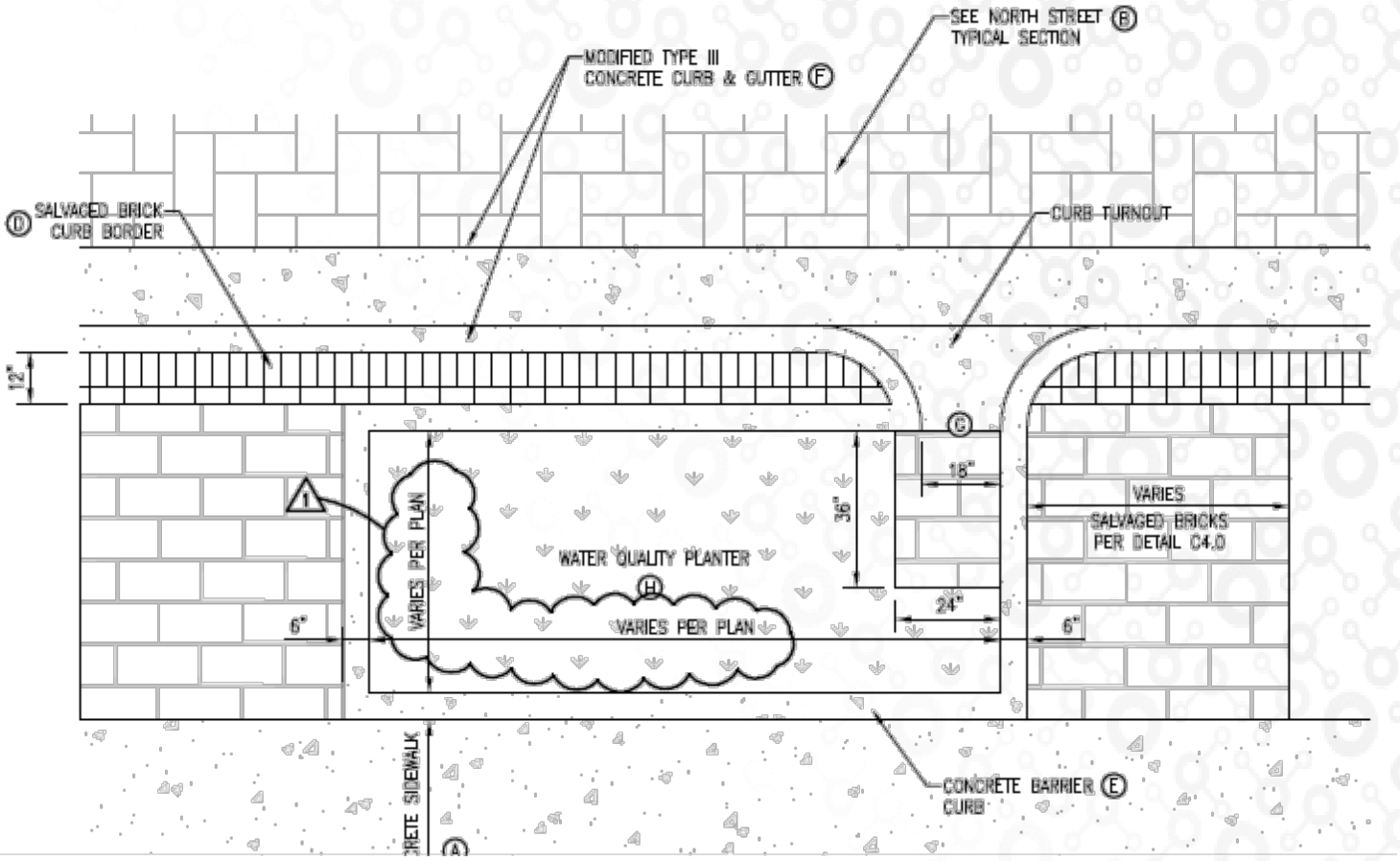
North Street Reconstruction Construction Documents

Meet ADA 2012 requirements



North Street Reconstruction Construction Documents

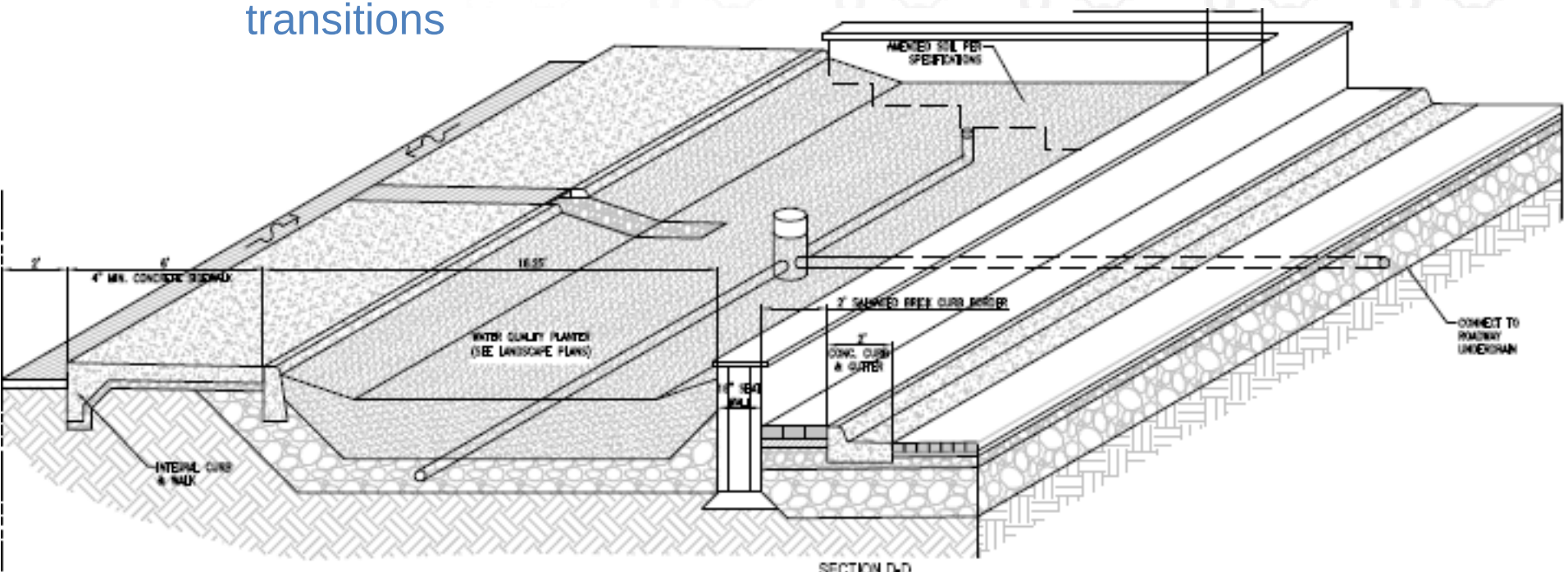
Generate plan, profile, cross-section, perspective, and rendering of many features for “instructional” level CDs



North Street Reconstruction Construction Documents

"Landscape architecture" level of custom details and specifications

- Reuse of historic bricks between street and walk
- Non-standard (lack of) subgrade compaction
- Seat walls with rain gardens with roof drain connections
- New Brick to Old Asphalt/Concrete/Brick intersection transitions



North Street Reconstruction
Construction Phase 1

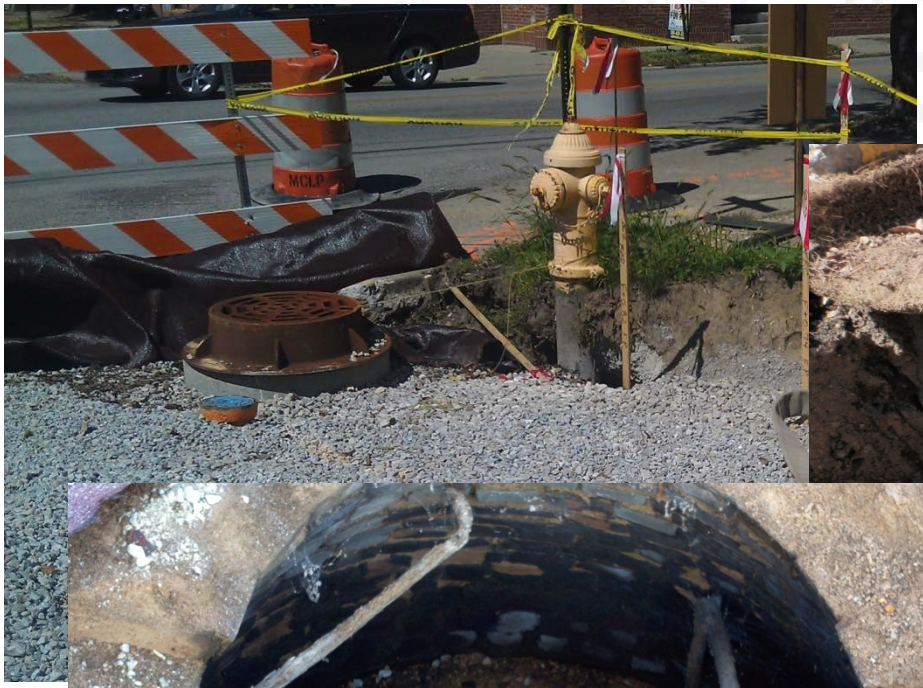
Very few poorly drained areas, but here's one! (needs to be cleaned out prior to stone backfilling)

North Street Reconstruction
Construction Phase 1

Unknown Conditions (even after excavating?)

North Street Reconstruction
Construction Phase 1

Manhole replacement



North Street Reconstruction
Construction Phase 1

Downspout disconnection clean-out

North Street Reconstruction Construction Phase 1

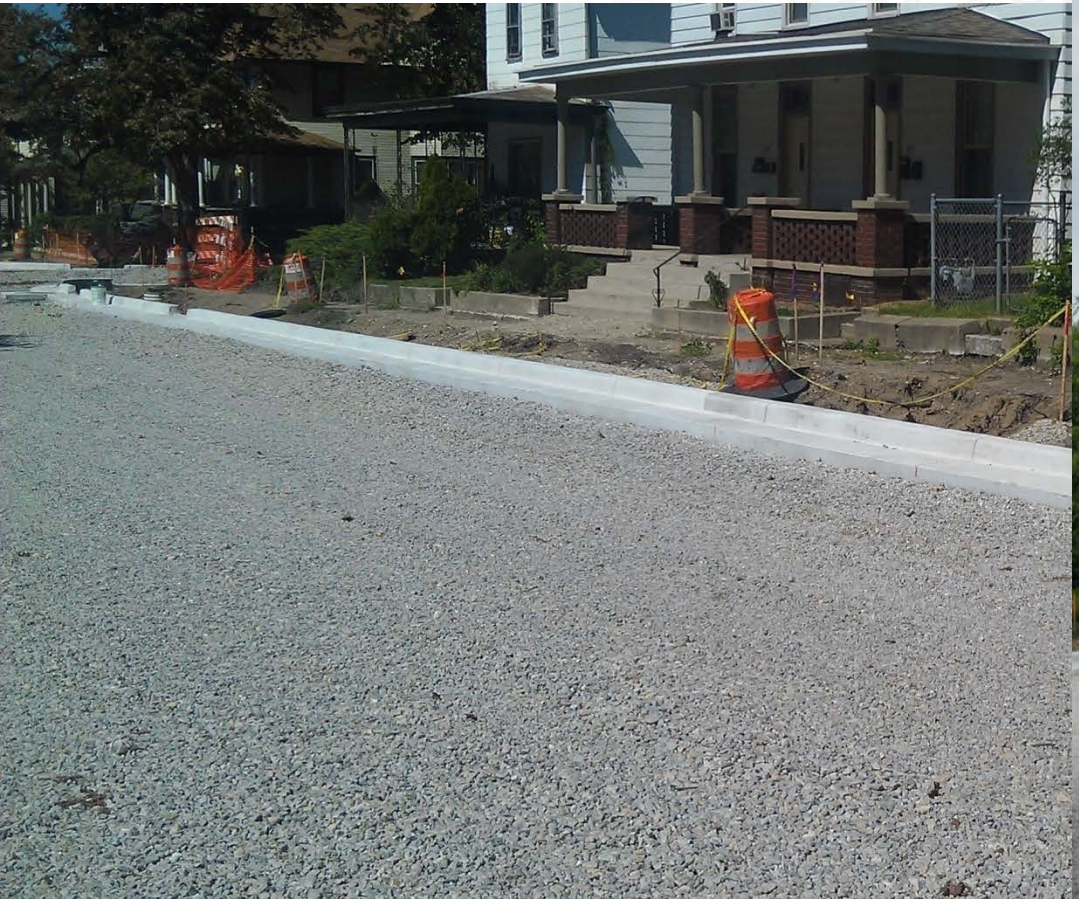
Flow through rain garden design

North Street Reconstruction
Construction Phase 1

Filter fabric installation

North Street Reconstruction
Construction Phase 1

Almost ready for pavers



North Street Reconstruction
Construction Phase 1

Paver Installation

Post Construction - Streetscape Water Quality Element and Permeable Pavers


Post Construction - Streetscape
Water Quality Element with Historic
Brick and Permeable Pavers


Post Construction - Streetscape
Water Quality Element with Historic
Brick and Permeable Pavers


Post Construction - Streetscape
Water Quality Element with Historic
Brick and Permeable Pavers
HISTORIC CENTENNIAL
NEIGHBORHOOD

Post Construction - Streetscape Water Quality Element with Historic Brick and Permeable Pavers

Post Construction - Streetscape Water Quality Element with Historic Brick and Permeable Pavers


Post Construction - Streetscape Water Quality Element and Permeable Pavers


Post Construction - Streetscape
Water Quality Element and
Permeable Pavers


Post Construction - Streetscape Water Quality Element with Historic Brick and Permeable Pavers
NOW LEASING!
742-0195


Post Construction - Streetscape
Water Quality Element with Historic
Brick and Permeable Pavers

Post Construction - Streetscape Water Quality Element with Historic Brick and Permeable Pavers

Post Construction - Streetscape Water Quality Element with Historic Brick and Permeable Pavers

North Street Reconstruction: High Performance Infrastructure

- Project Estimate = $3.2M
- Phase 1 (~ 2000 lf) = $1.7M
- 76% of runoff removed from combined system equivalent to 6.6M gallons annually
- 30% Peak Flow Reduction
- >$0.50 per gallon treated capital investment
- Net Annual Cost of Treatment Reduction = $44K

Additional Benefits:

1. Reuse of existing materials
2. Improved pedestrian connectivity
3. Increased traffic and vehicular control
4. Restorative impact on regional water quality
5. Positive capital return on investment
6. Reduced energy usage at publically owned wastewater treatment plant
7. Improved community corridor and streetscape
8. Enhance public health and safety
9. Goodwill establishment within neighborhood

North Street Reconstruction: High Performance Infrastructure

Lessons Learned:

1. Stakeholder outreach opportunities are a premium

2. Integrate utility upgrades wherever possible

3. Additional detail in construction documents needed to keep bids in line with engineering estimates and change orders to a minimum during construction

North Street Reconstruction
Online Information

CITY OF
LAFAYETTE

www.lafayettenorthstreet.com

Neil B. Myers
+1.317.423.0690
nmyers@williamscreek.net

John Hazlett
+1.317.423.0690
jhazlett@williamscreek.net