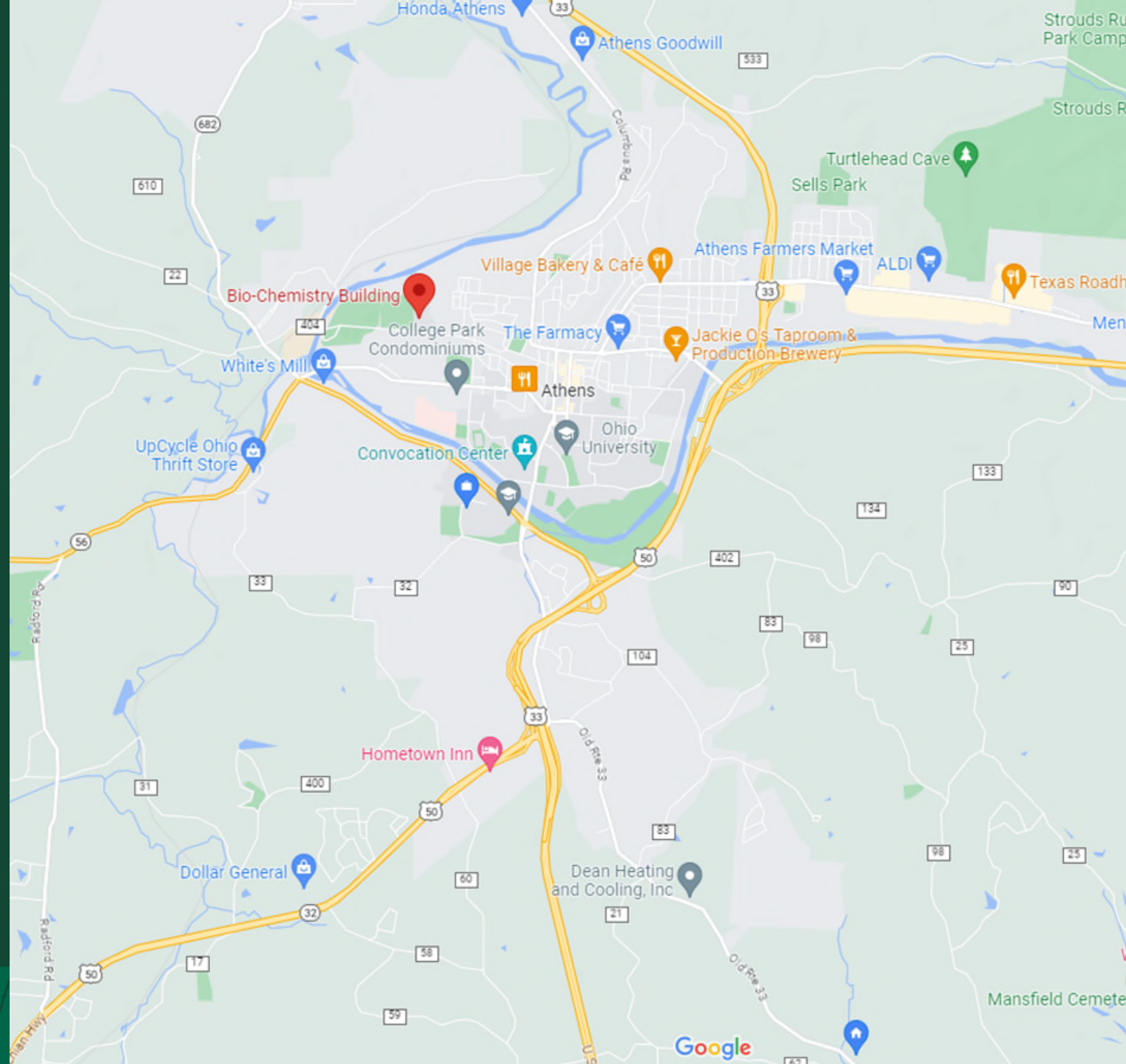


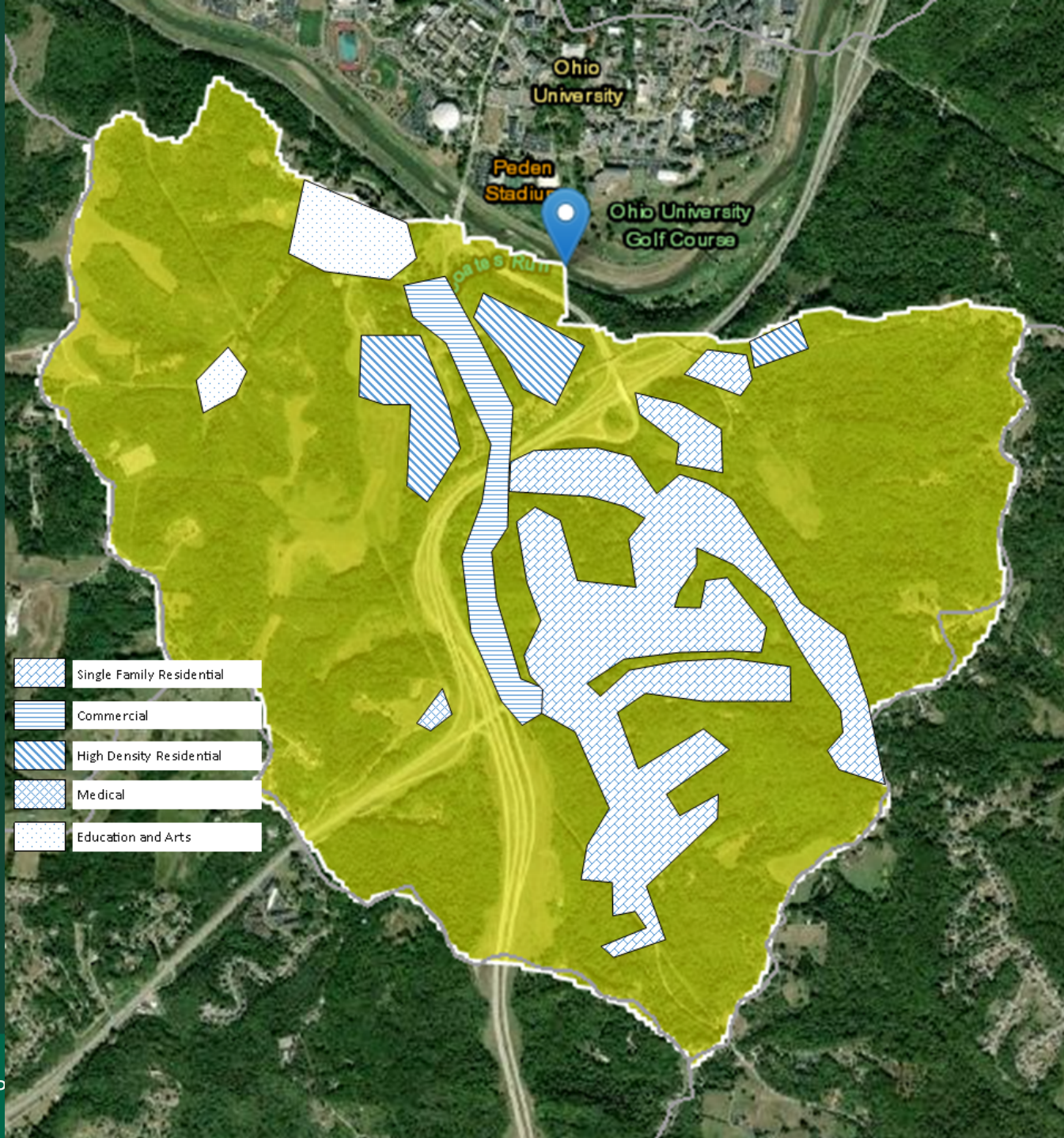
Making the Case for Urban Stream Restoration and Urban Stream Channel Management

Dr. Natalie Kruse Daniels
Ohio University

Urban Setting

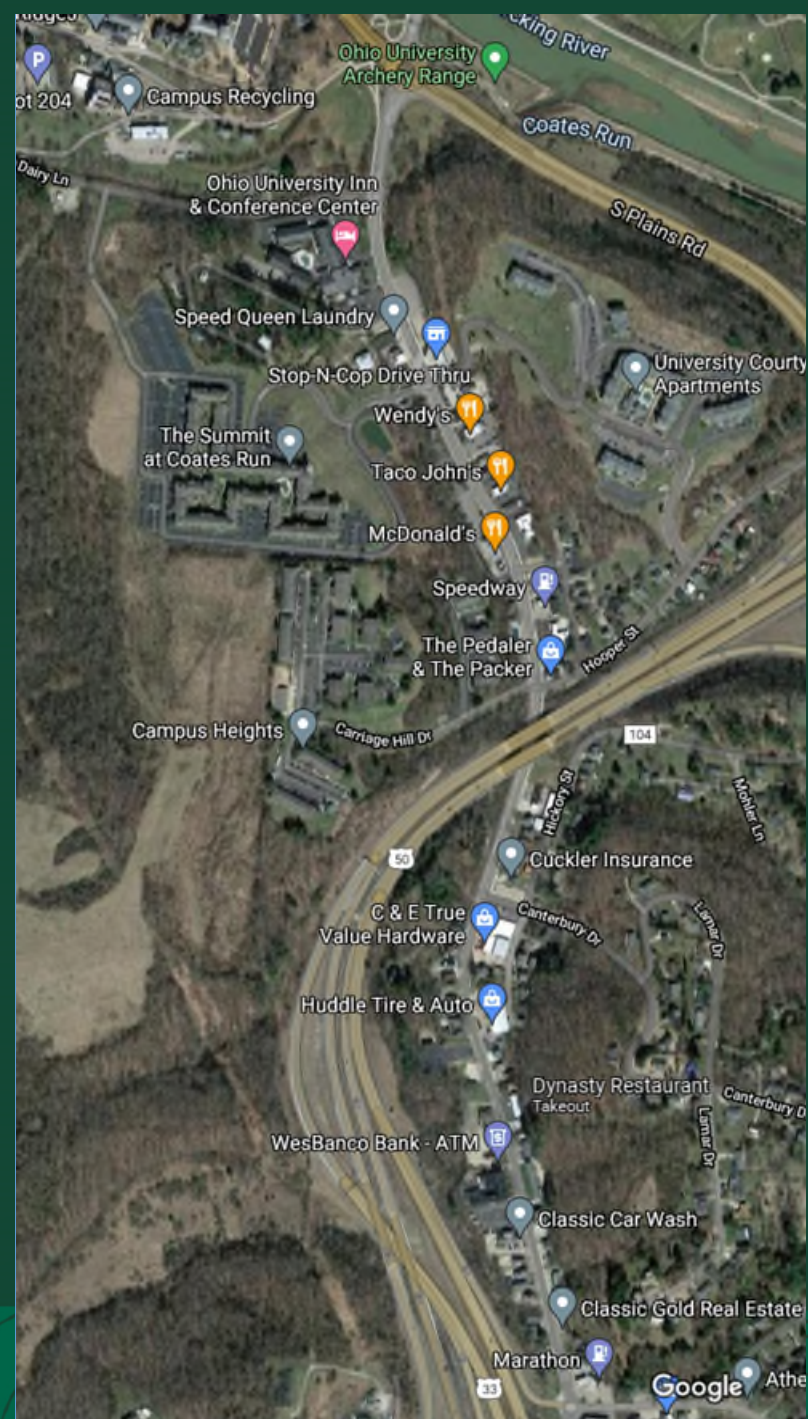
- Athens, Ohio has a population of about 30,000, 45,000 including students
- A city in rural Appalachian, Ohio
- Development concentrated in floodplain and ridgetops
- Recent (past decade) construction in Richland Avenue corridor

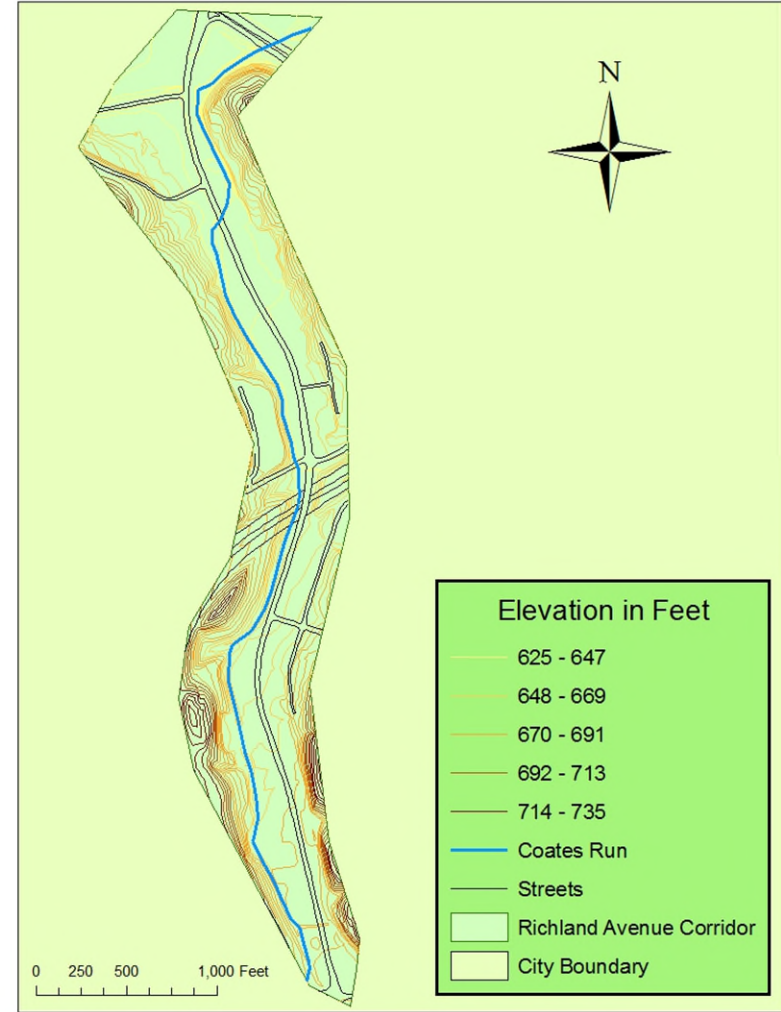
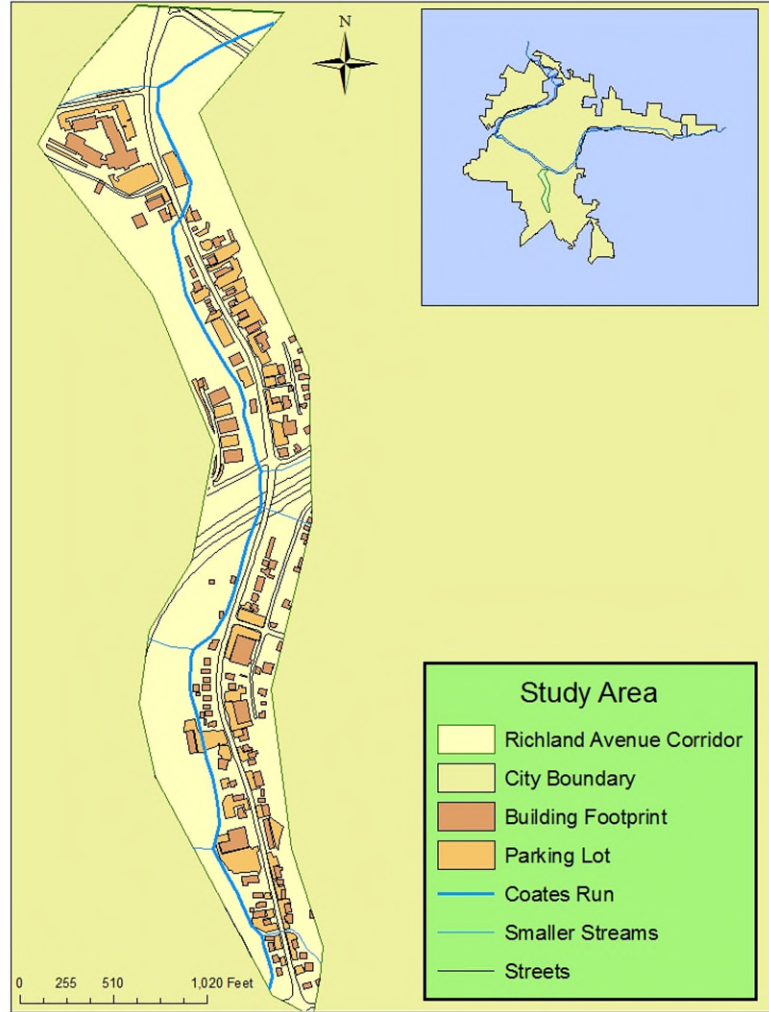


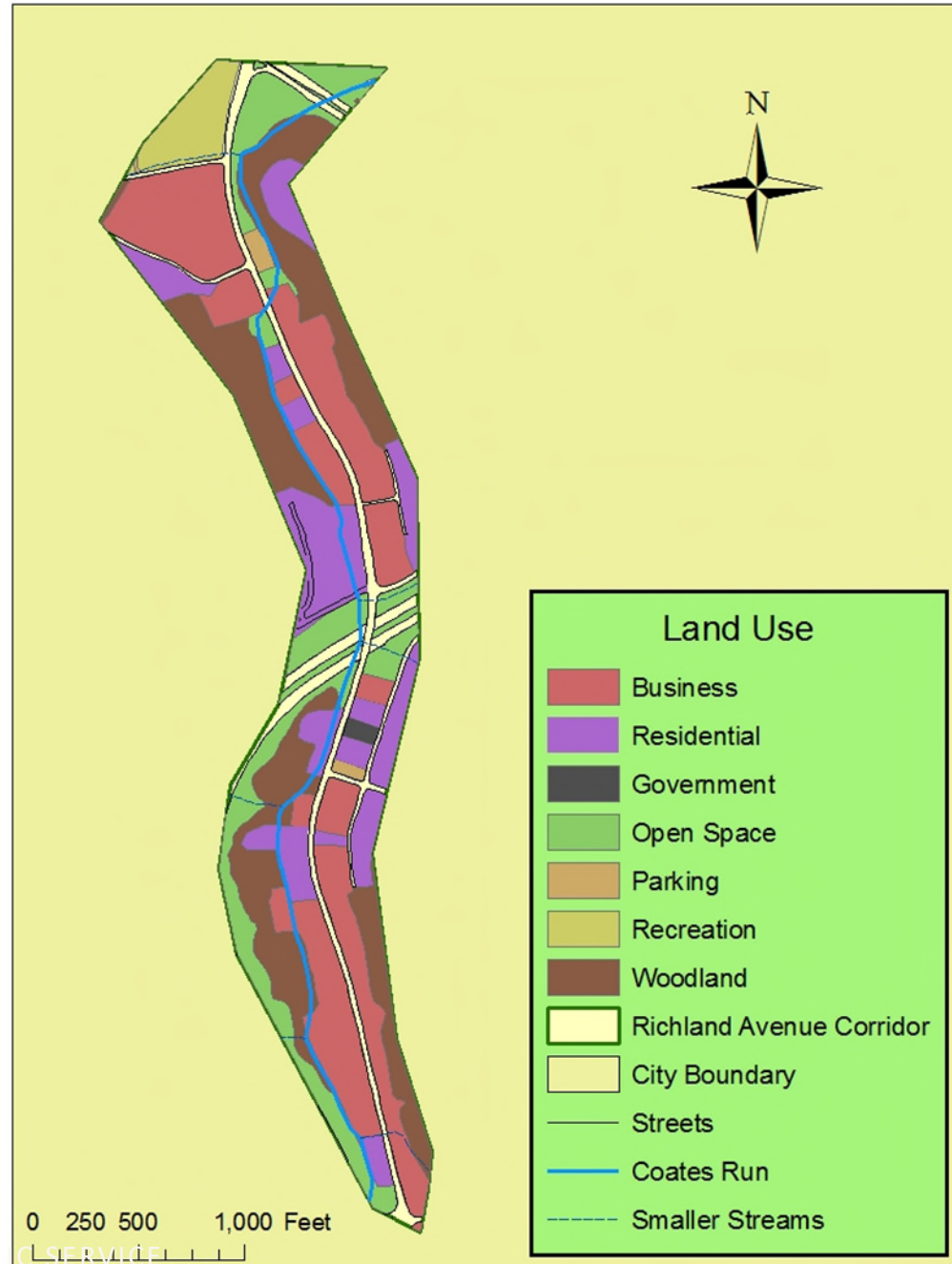


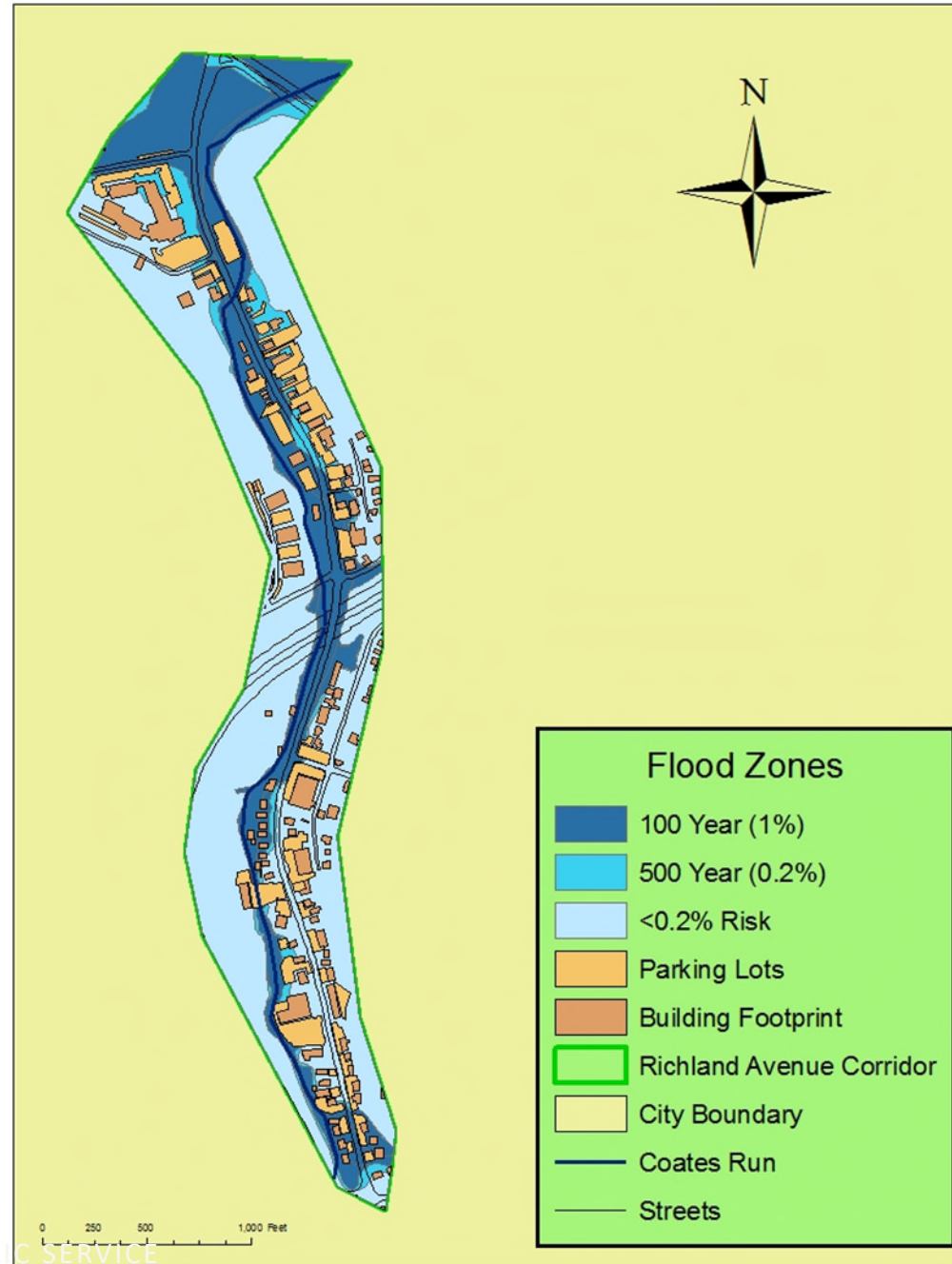
Floodplain and Ridge Top Development

- Major thoroughfare
- Student and affordable housing
- Multi-use commercial and residential use









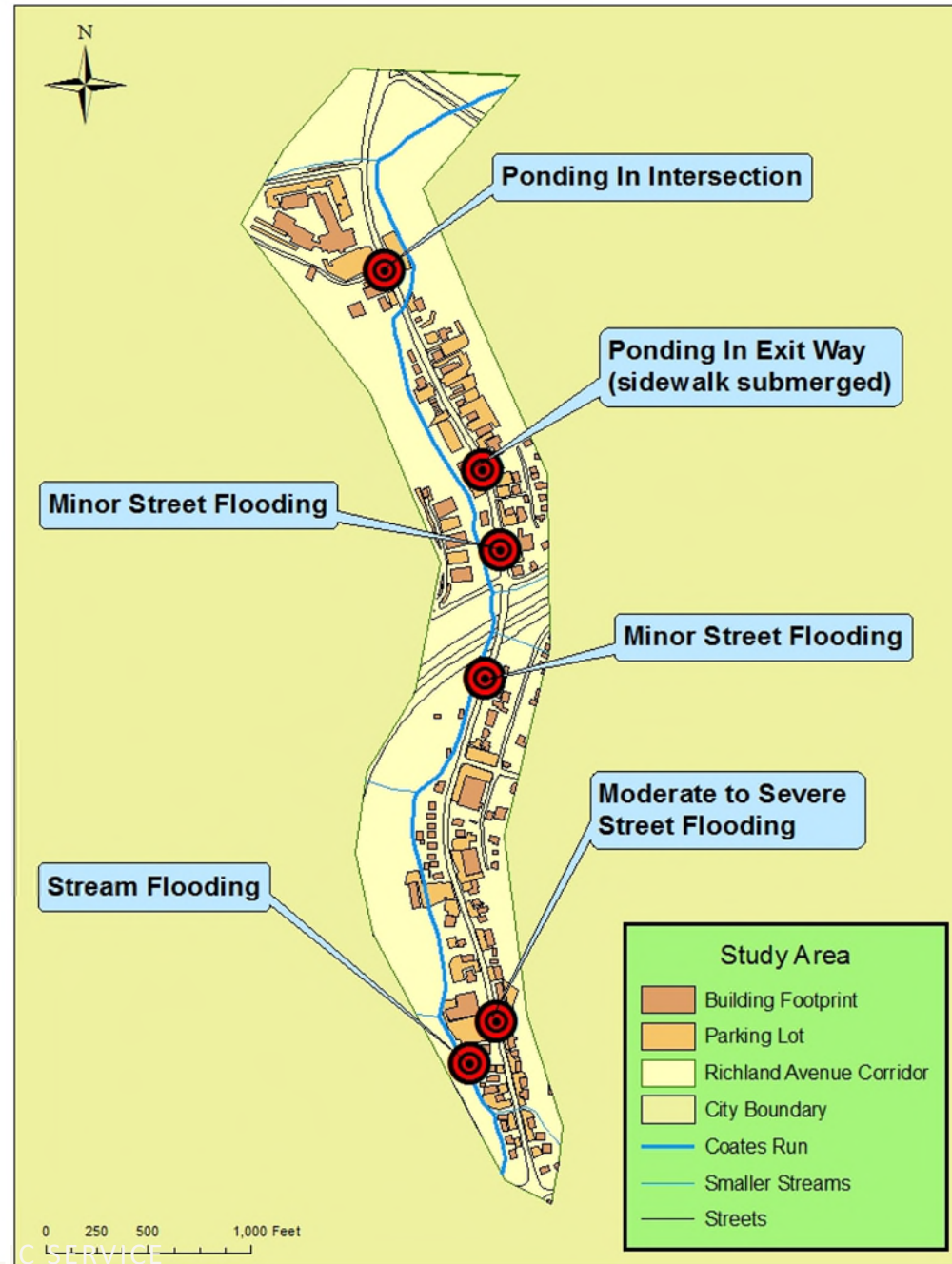
Development History



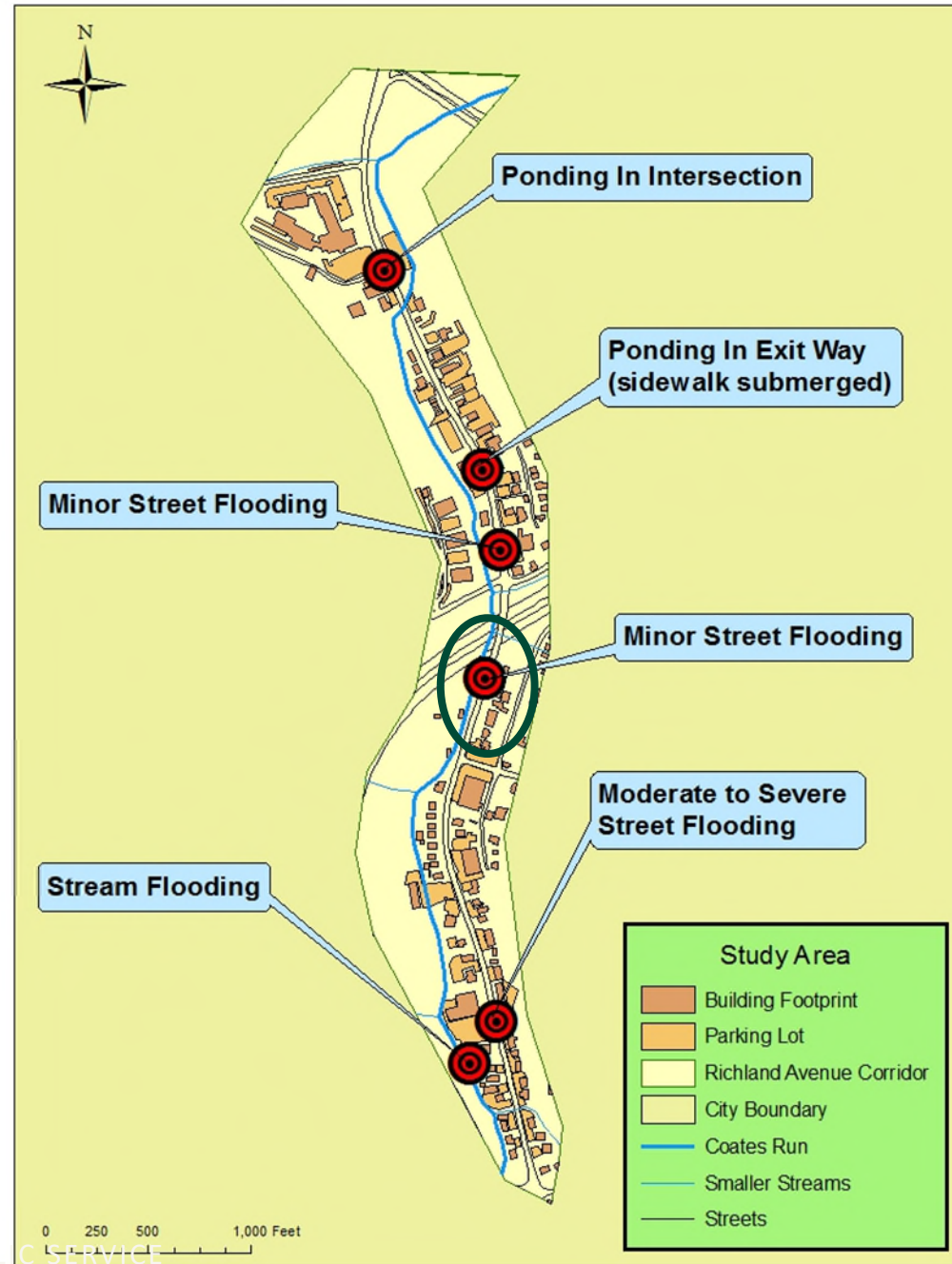




Roadway Flooding



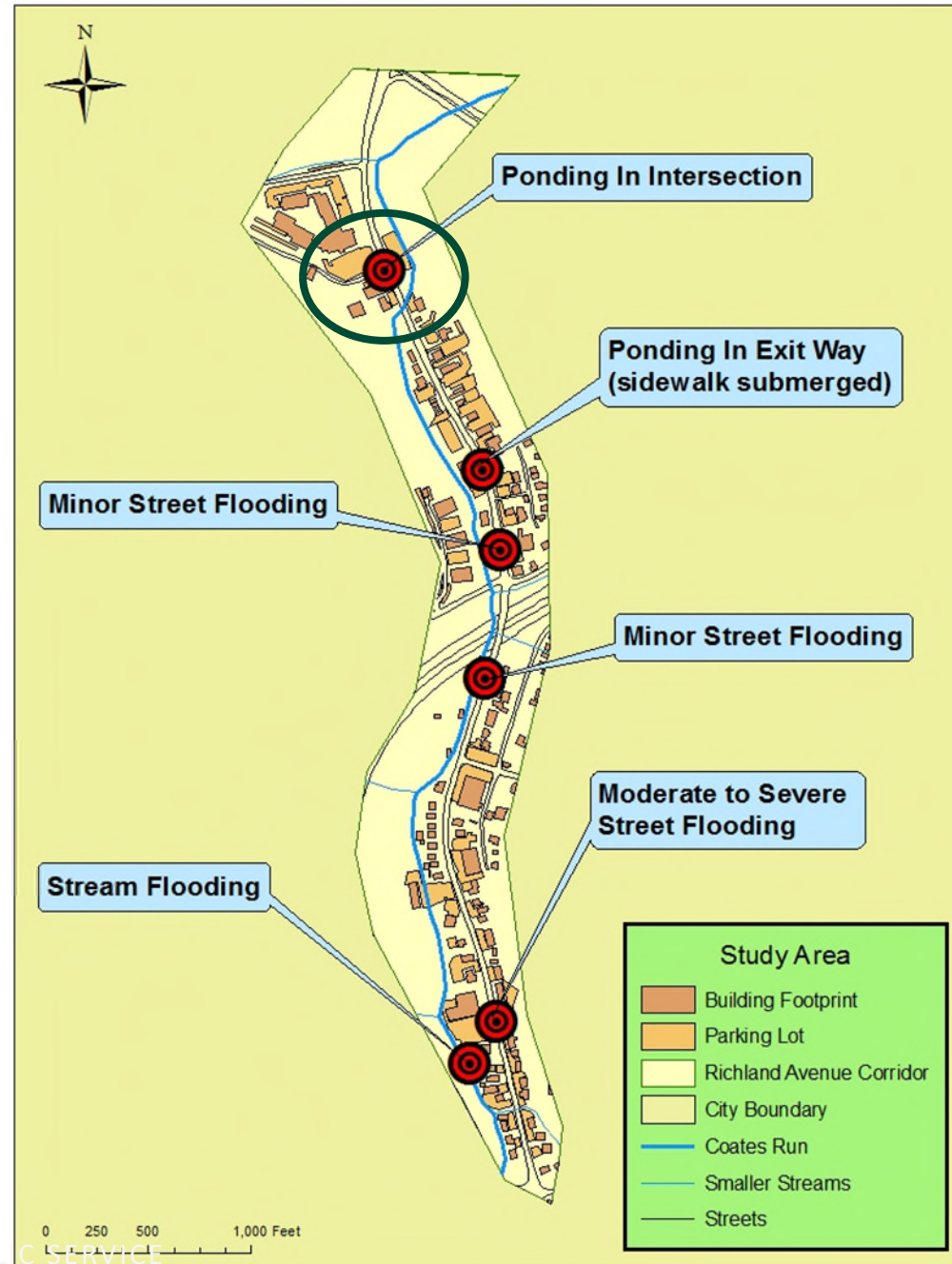




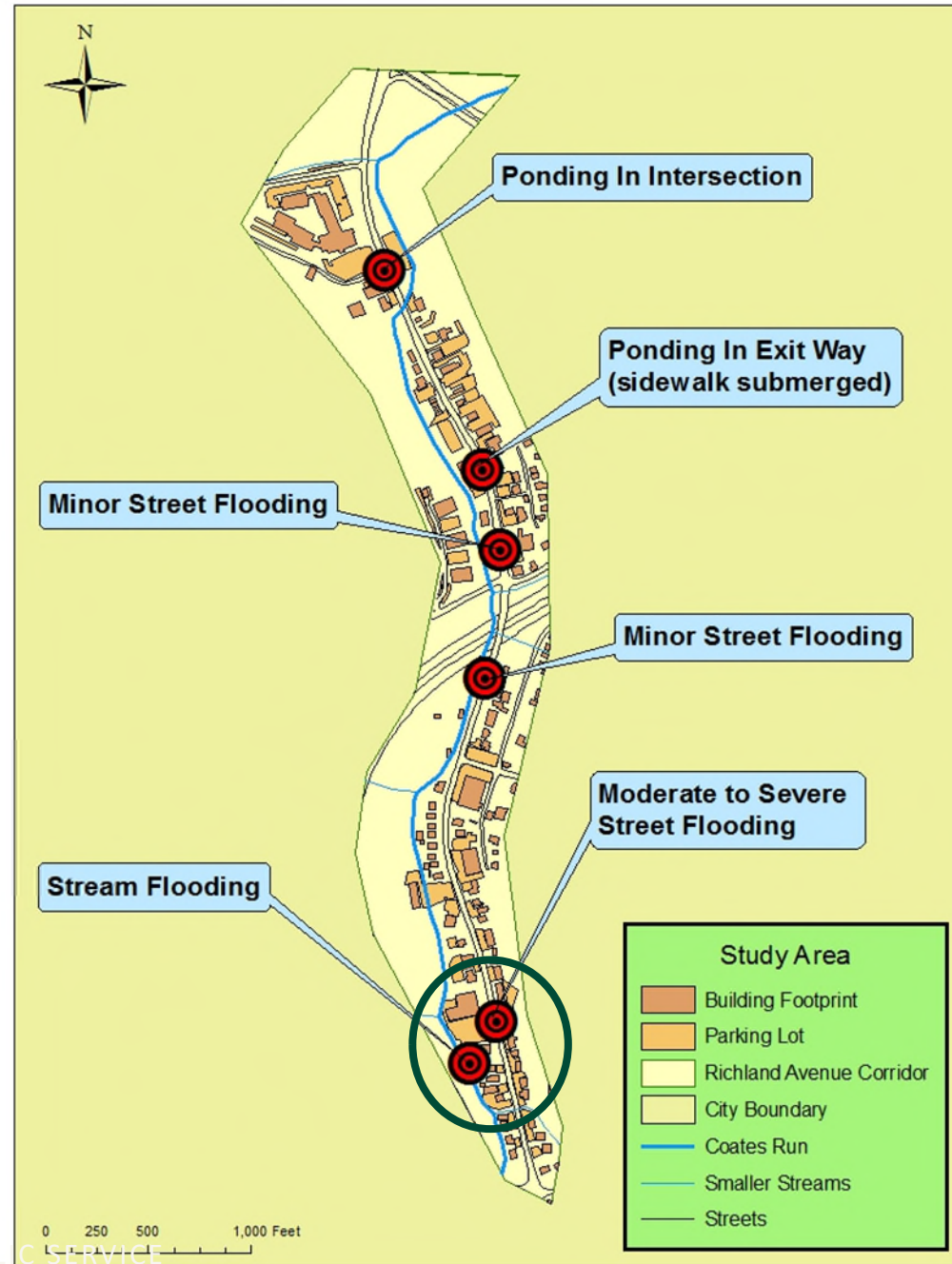














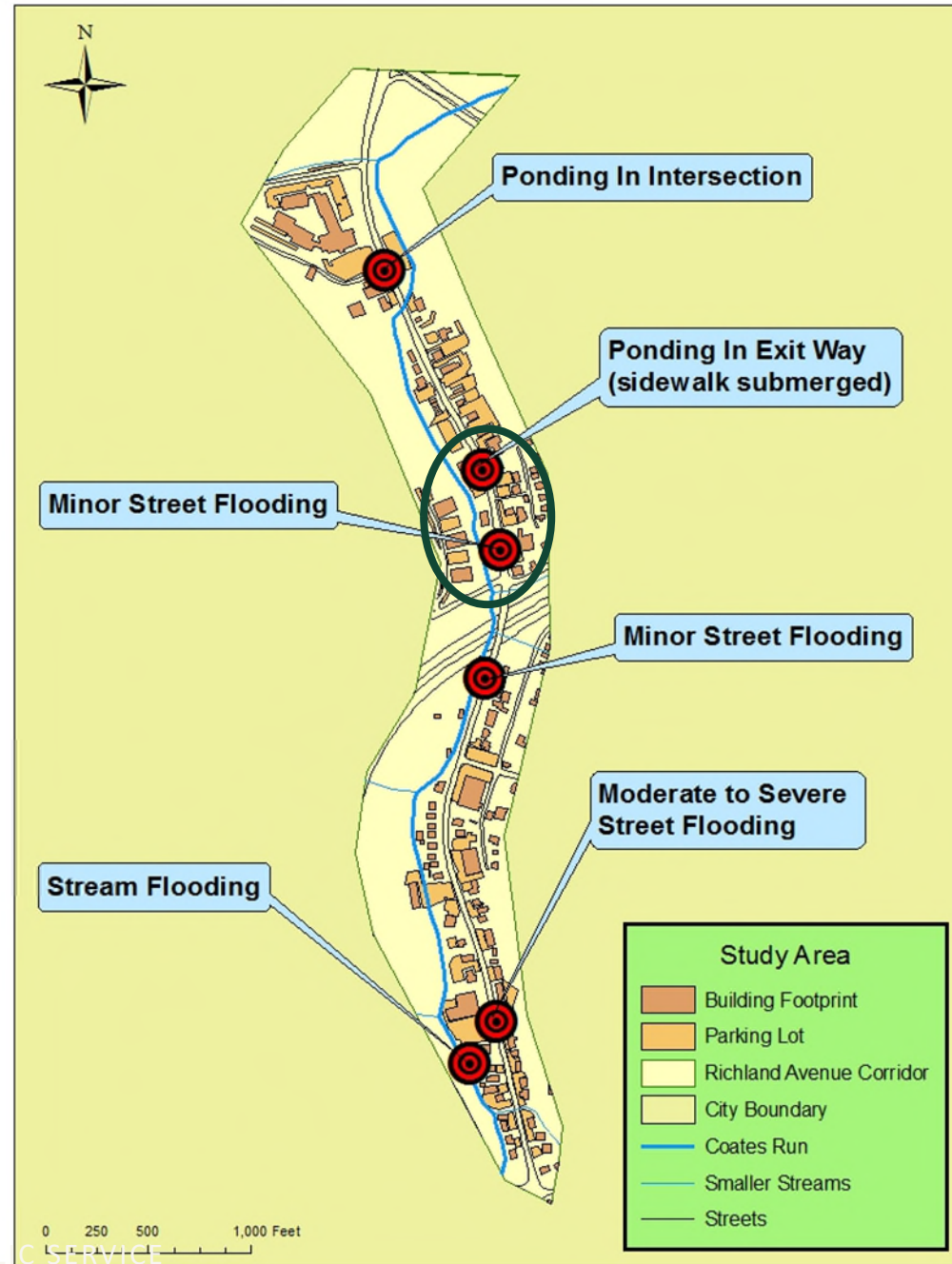




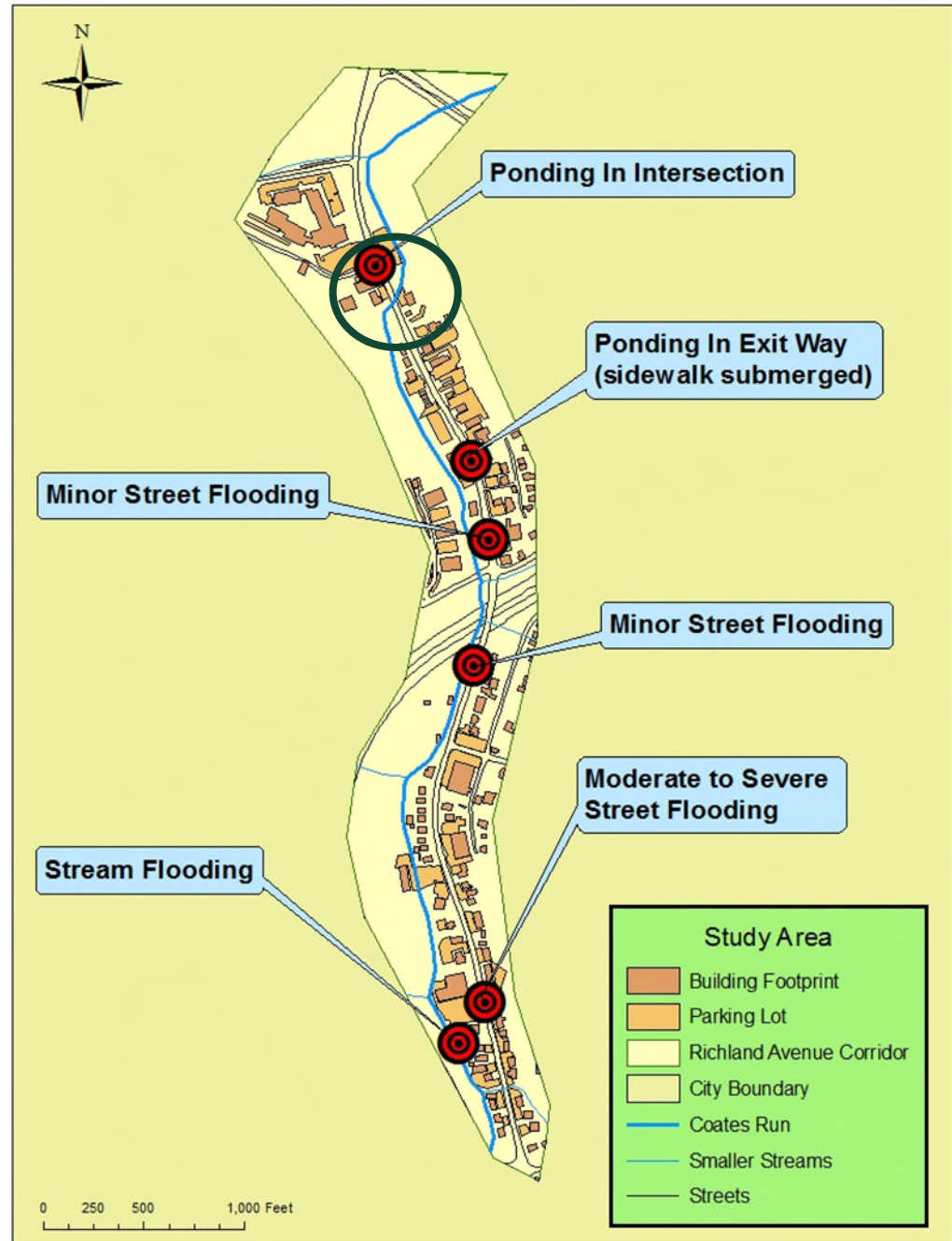


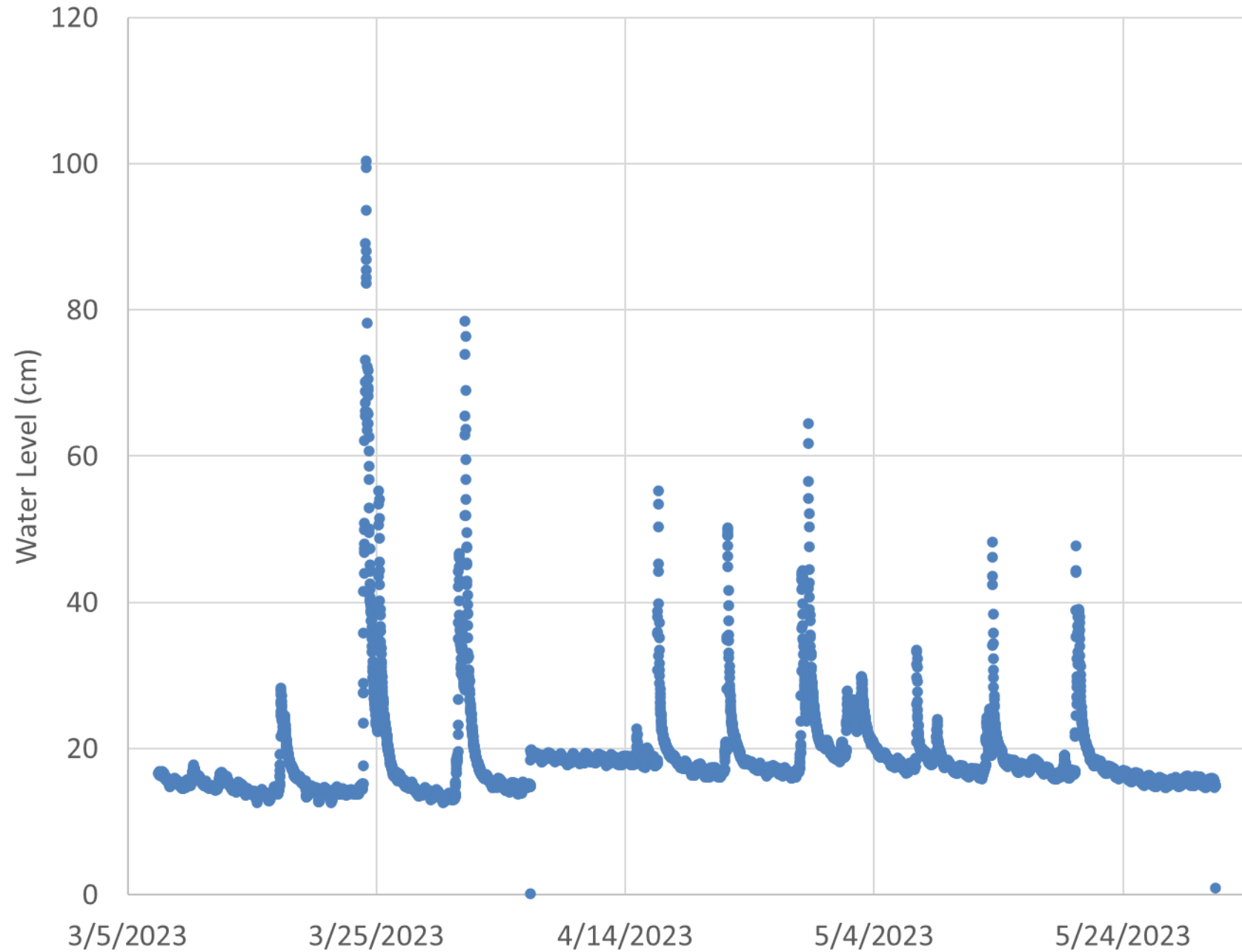






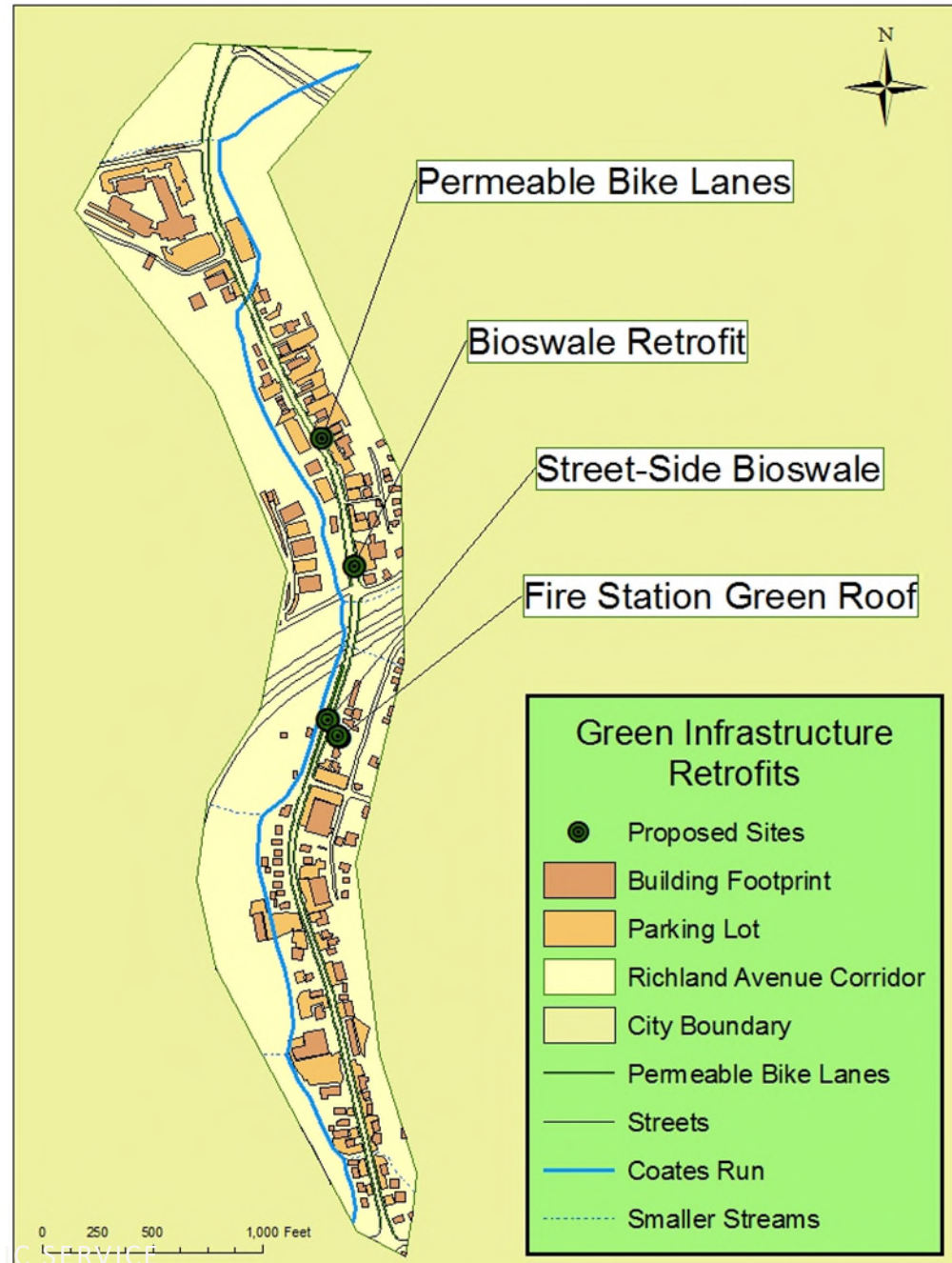
Water Level Monitoring

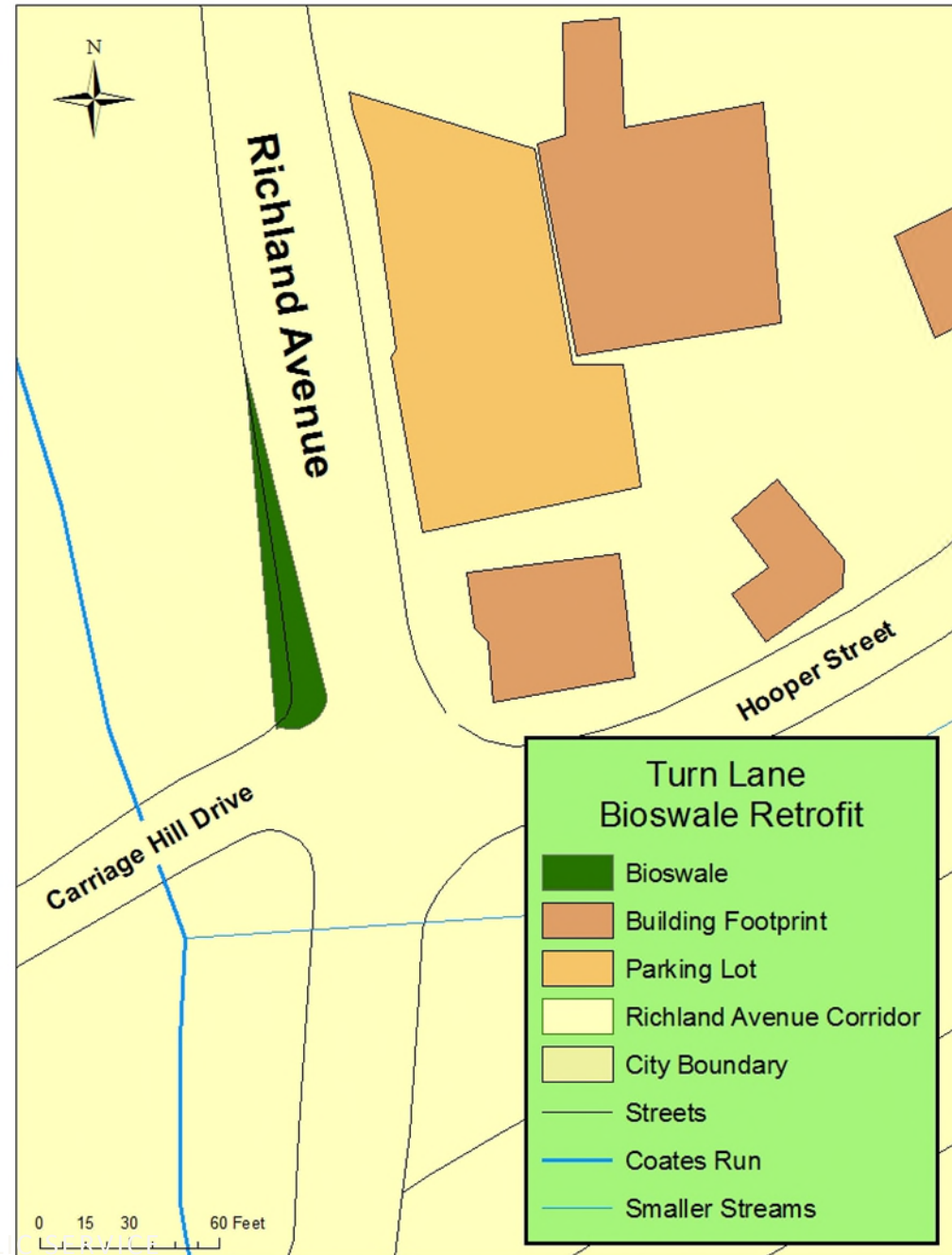




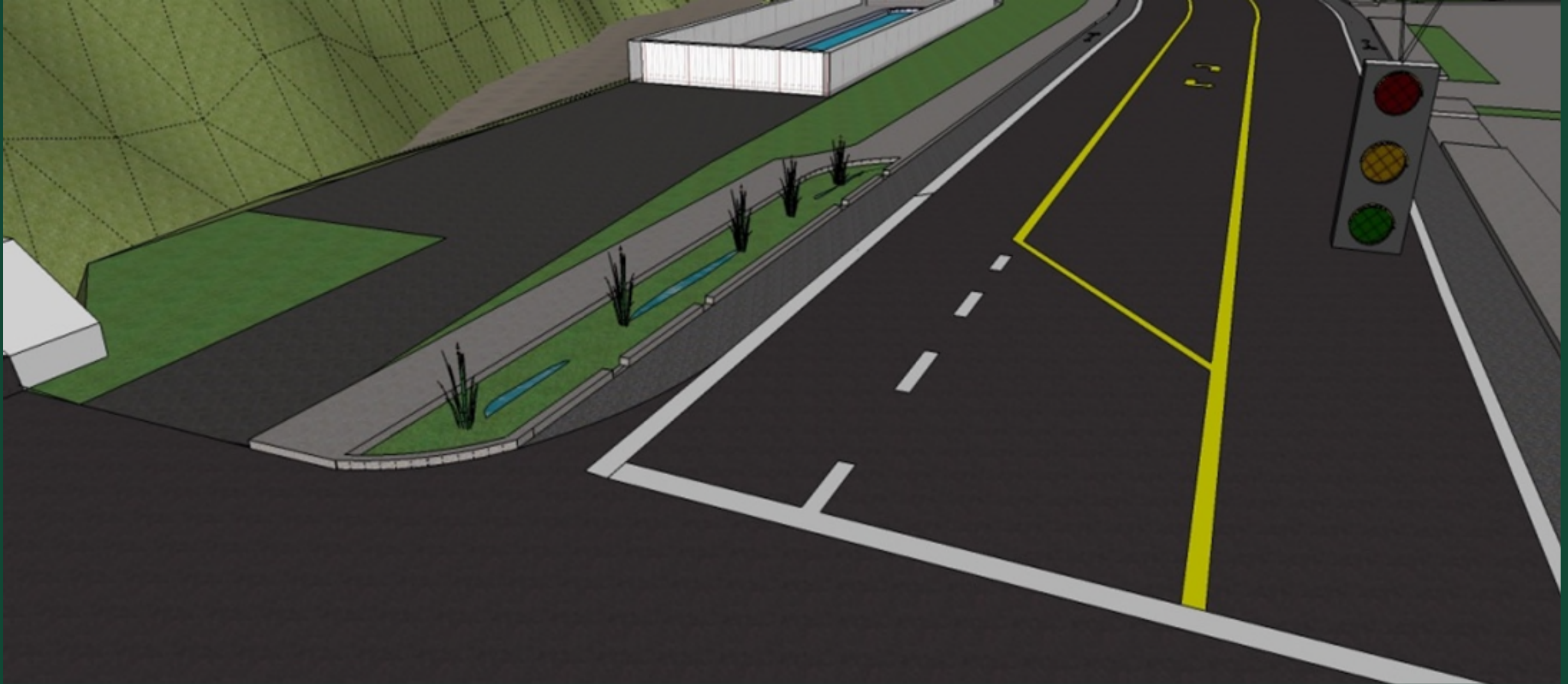
Management Approaches

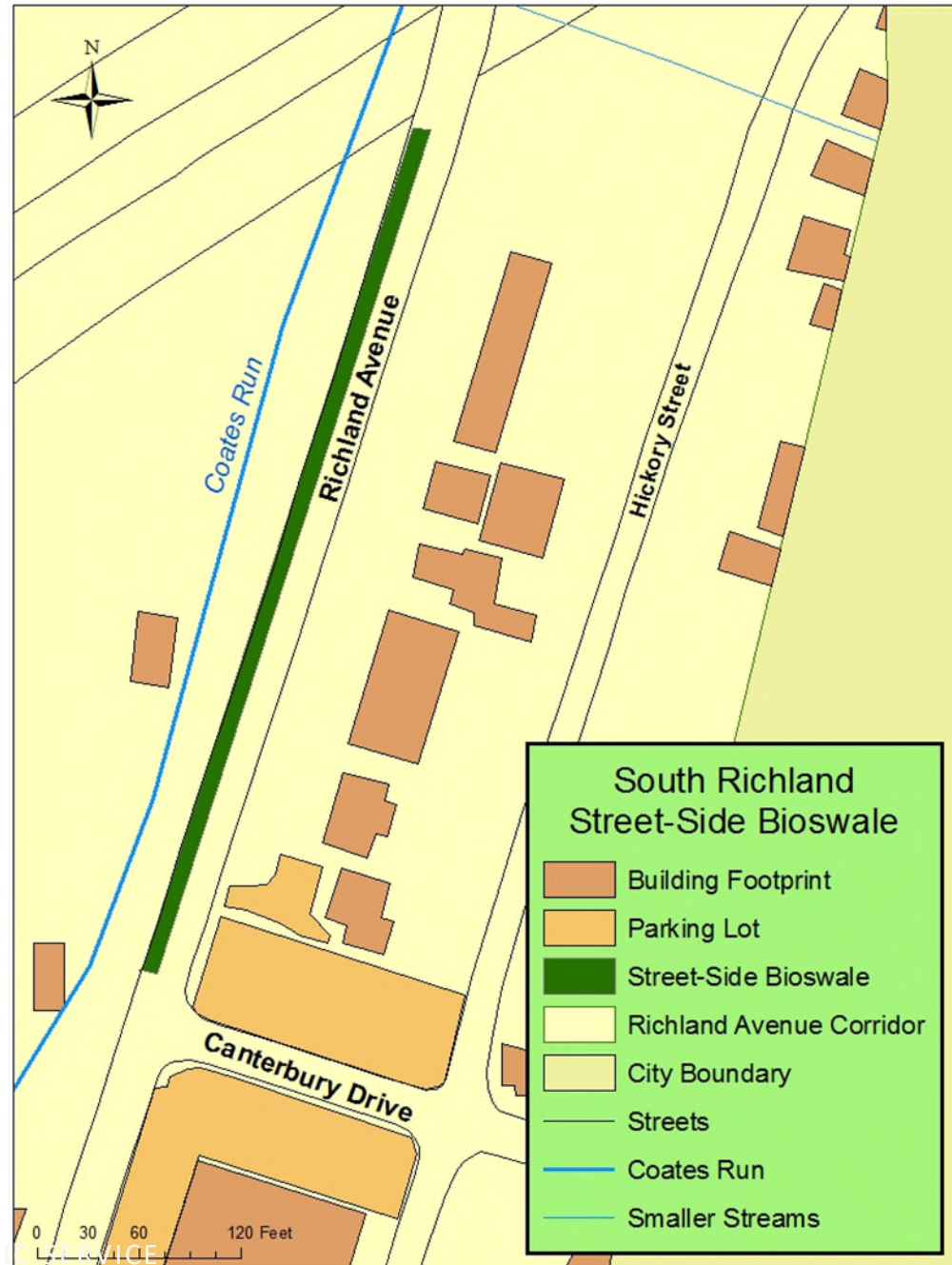
- After road renovation, storm drains were inadequate, bridges led to hydraulic restrictions
- Green infrastructure options on public lands

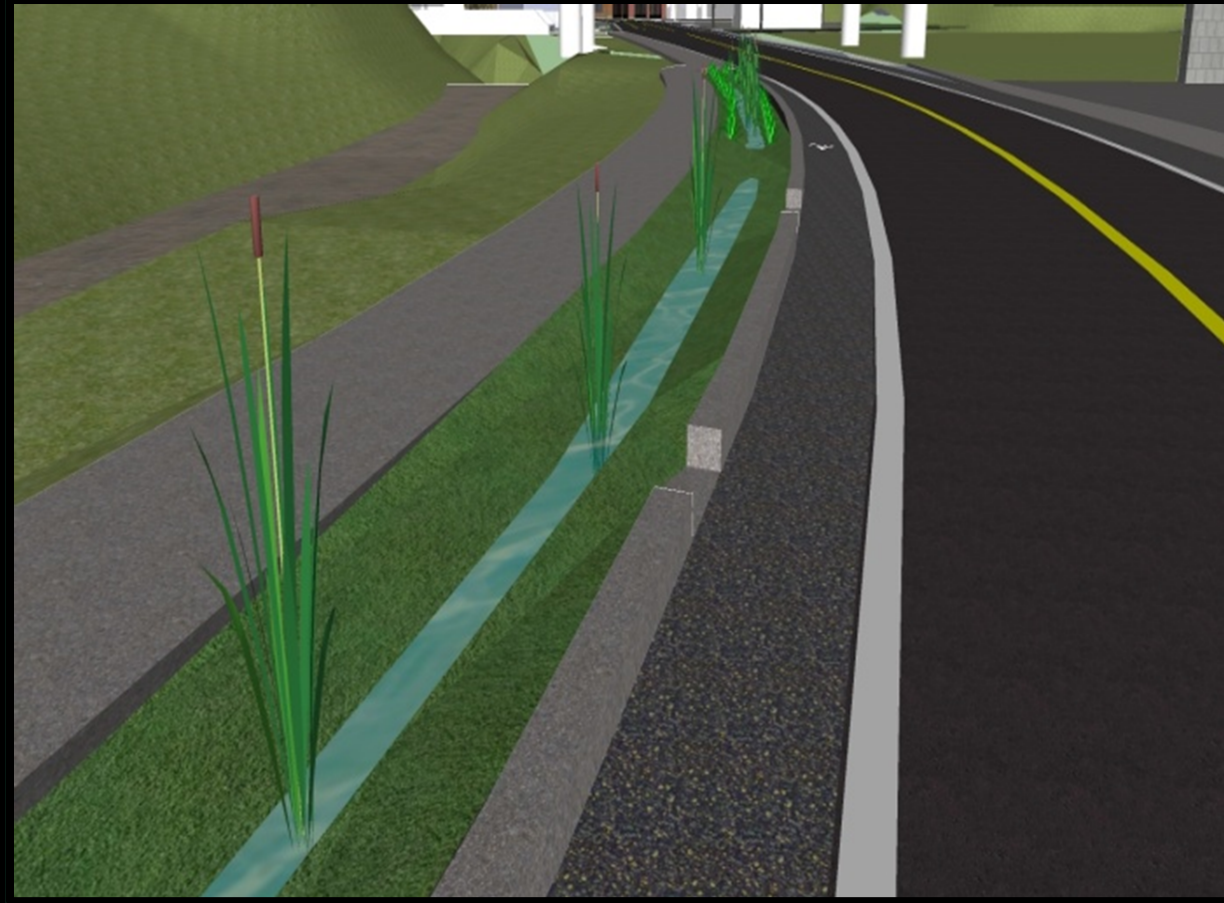


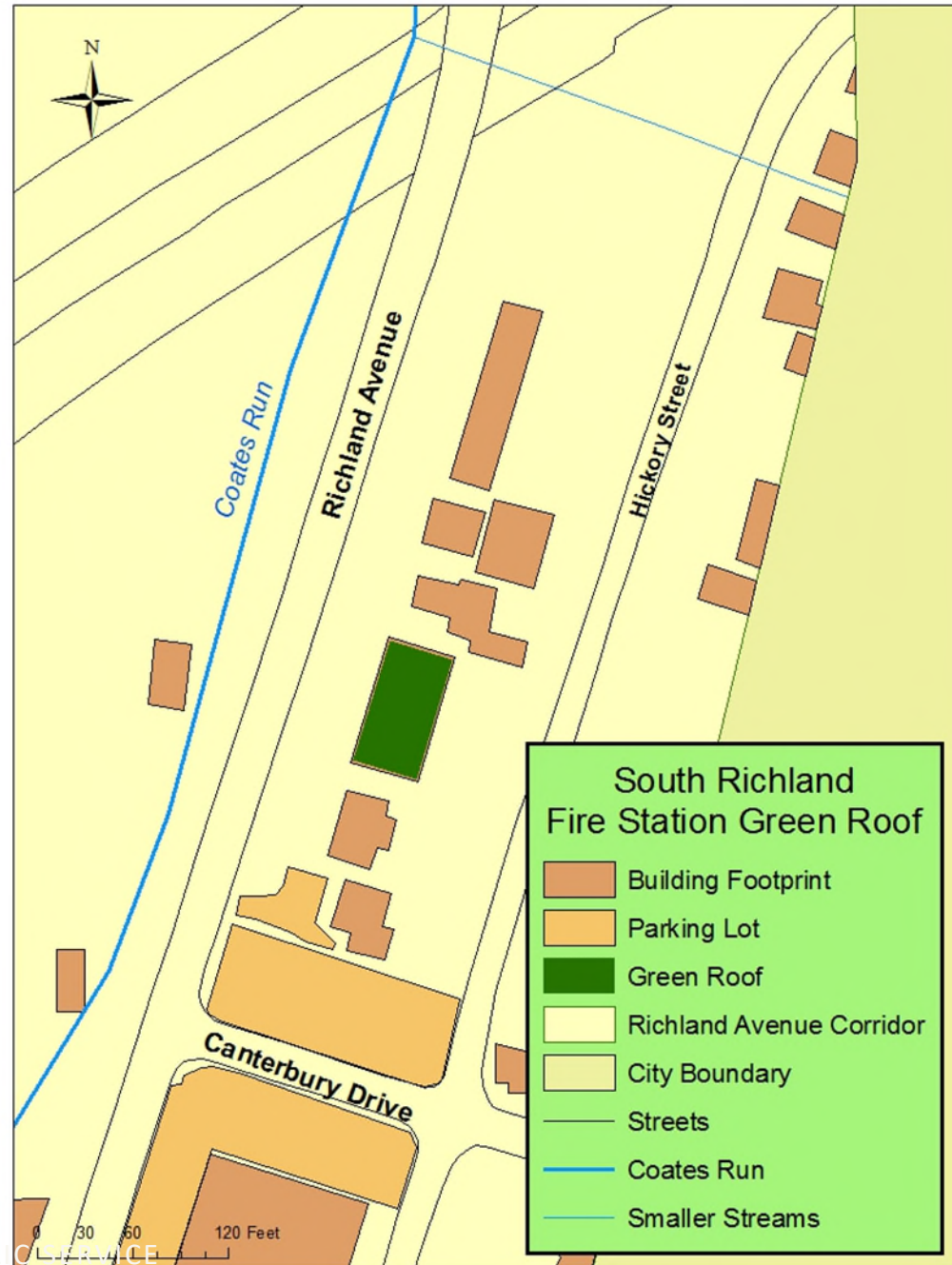














Incentives for Change

- Businesses are being flooded
- Major thoroughfare inaccessible during $>1.5''$ events
- Most development before MS4 designation
 - Both ridgetop and floodplain
- Storm drain improvement has not ameliorated flooding
- Potential for structures restricting flow
- Incised, isolated channel

Conclusions

- Need a watershed approach to managing water
- Bridges not culverts
- Bridges sized for climate change induced events
- Green infrastructure – will help, but require public land or private buy in
- MS4 permitting drives green infrastructure
- Zoning came too late

Thank You!

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