



## **Intersection of Green and Gray Stormwater Infrastructure: Hybrid Solutions Improve Water Quality and Reduce Flooding**

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# Today's Presenter



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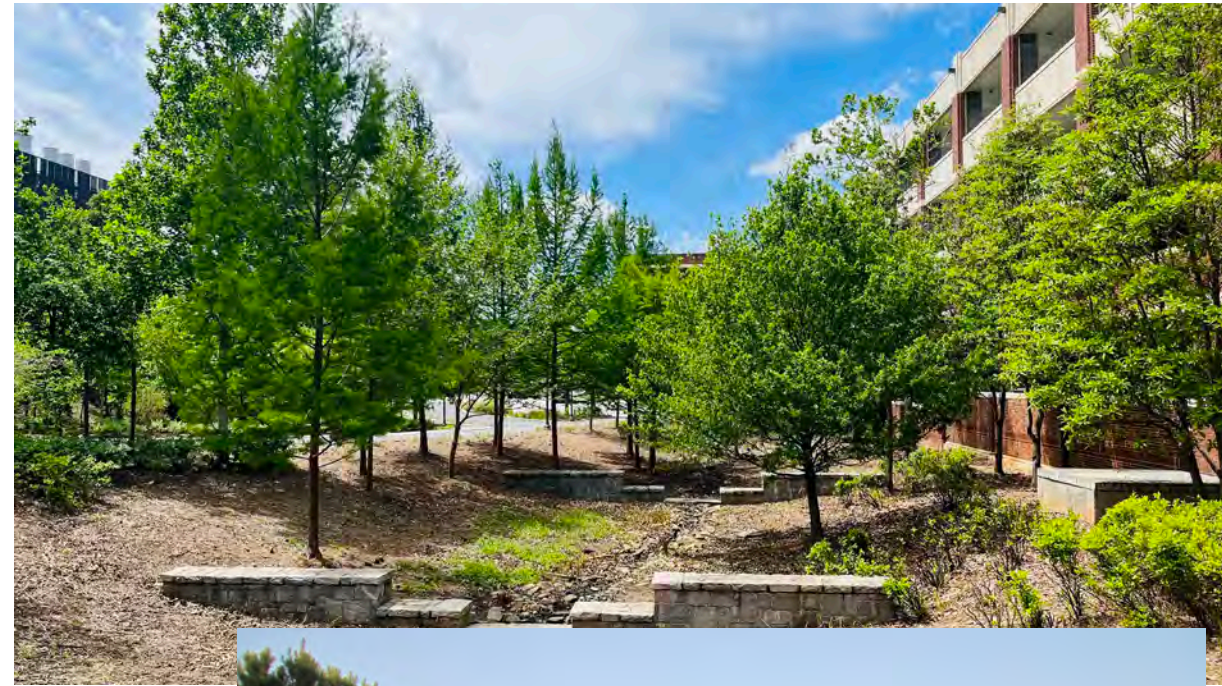
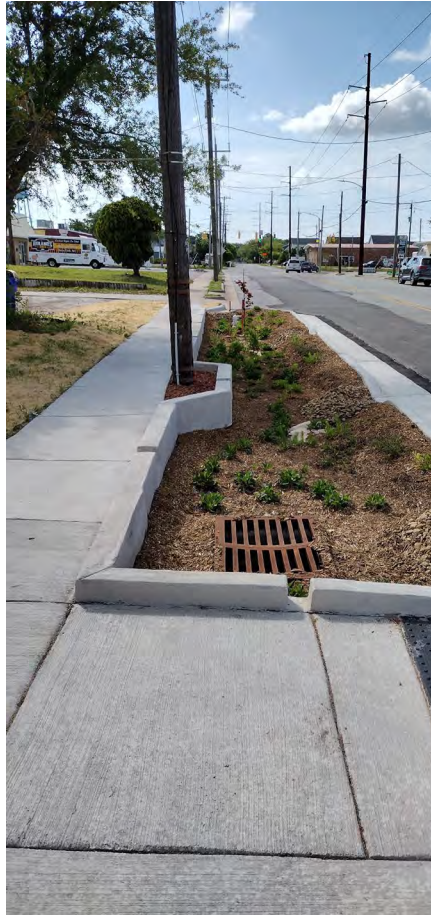


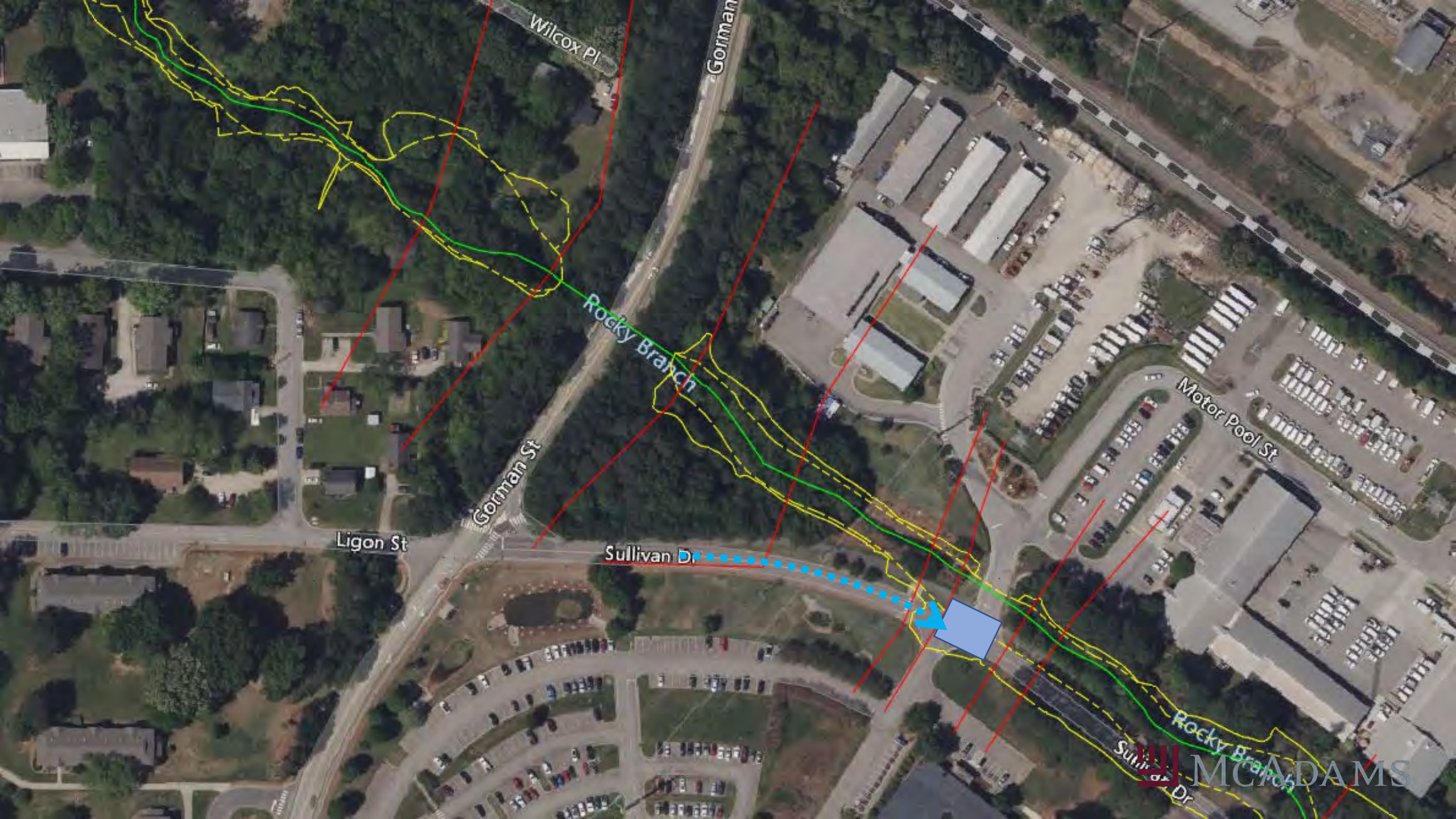
# At the Intersection of Gray and Green Stormwater Infrastructure

HYBRID SOLUTIONS TO IMPROVE WATER QUALITY AND REDUCE FLOODING









Wilcox Pl

Gorman

Rocky Branch

Gorman St

Ligon St

Sullivan Dr

Motor Pool St

Rocky Branch  
Sullivan Dr

MCADAMS

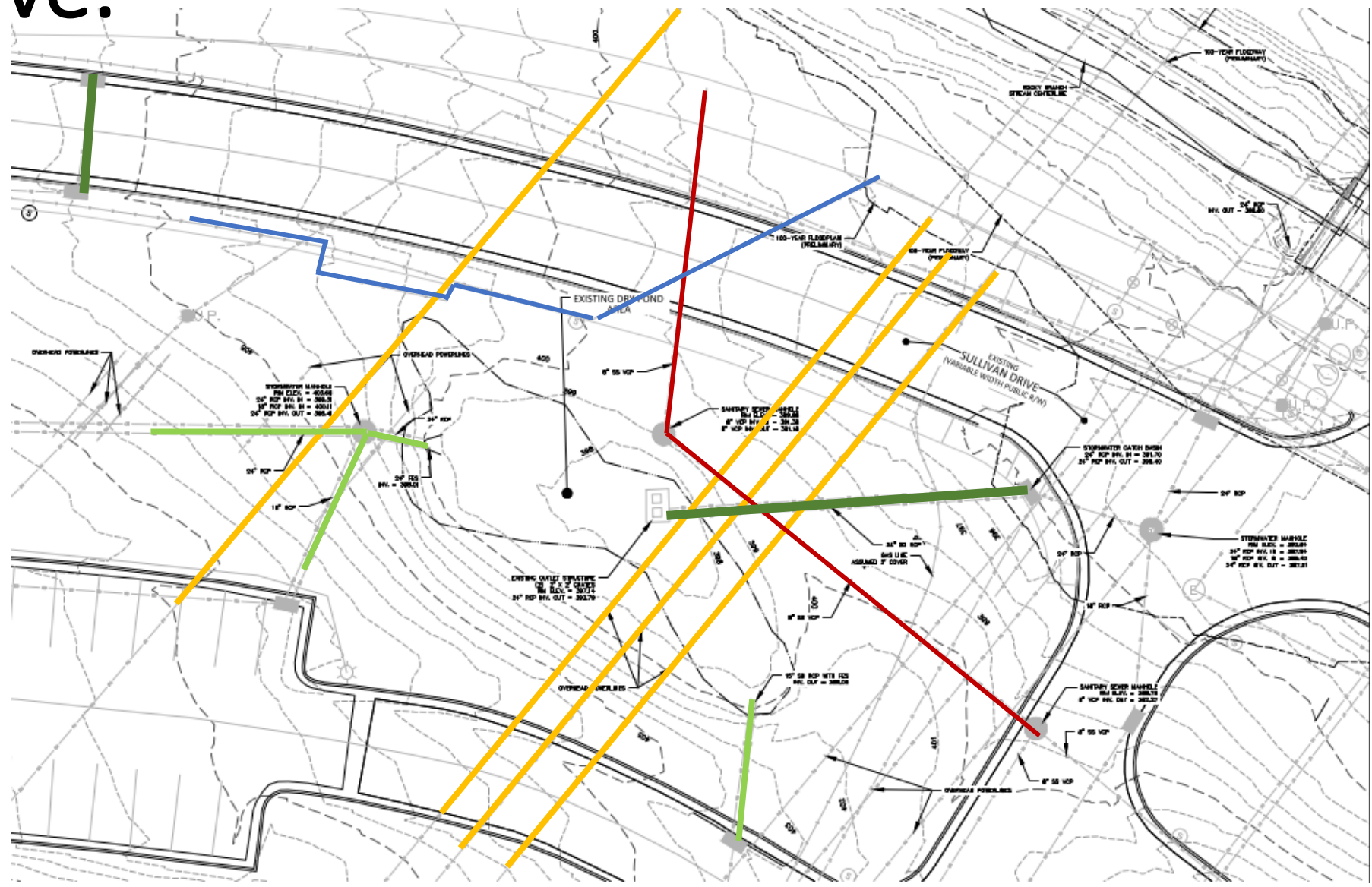
# Sullivan Drive: Pre-Project Conditions

- Excess road drainage bypass causing flooding along Sullivan Dr during flashy storm events.
- Ineffective SCM

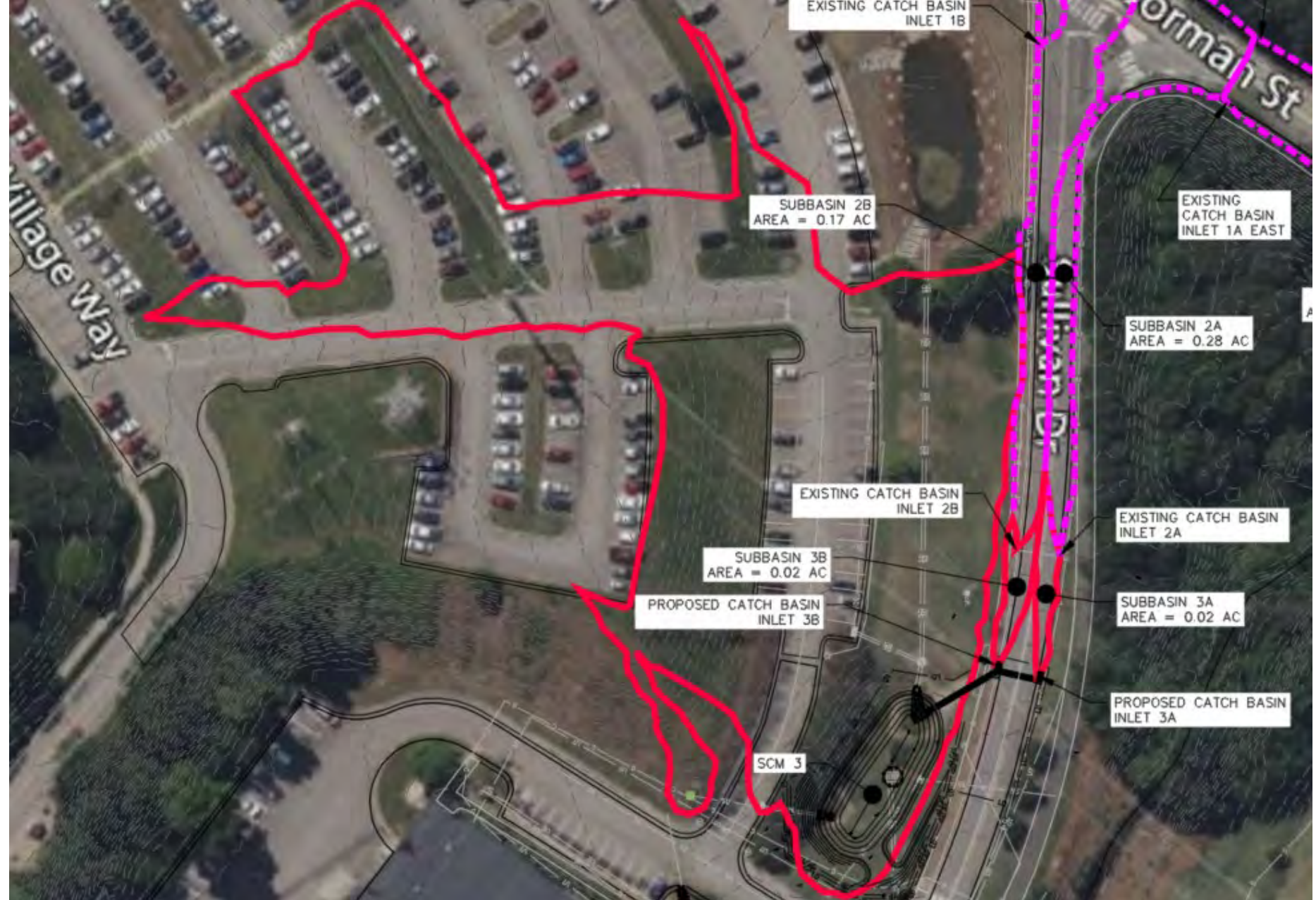




# Sullivan Drive: Utility Conflicts

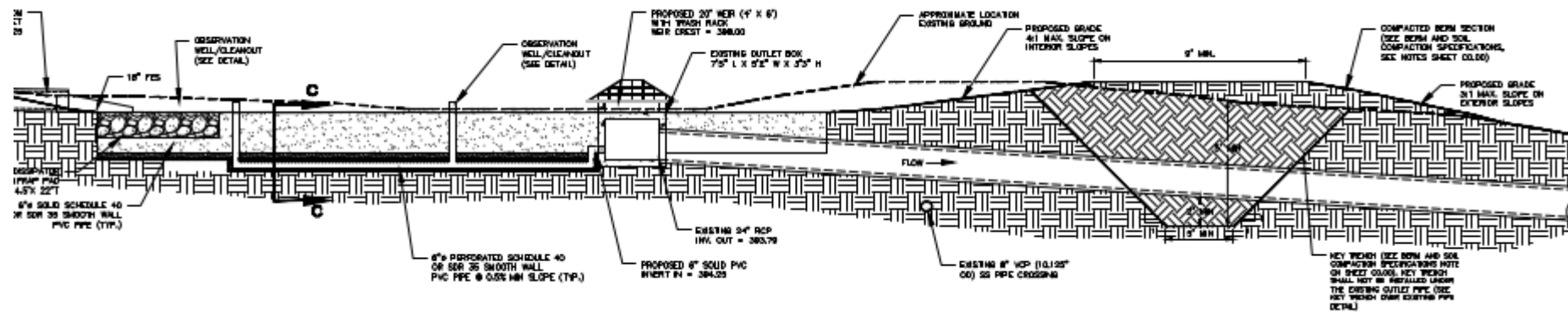
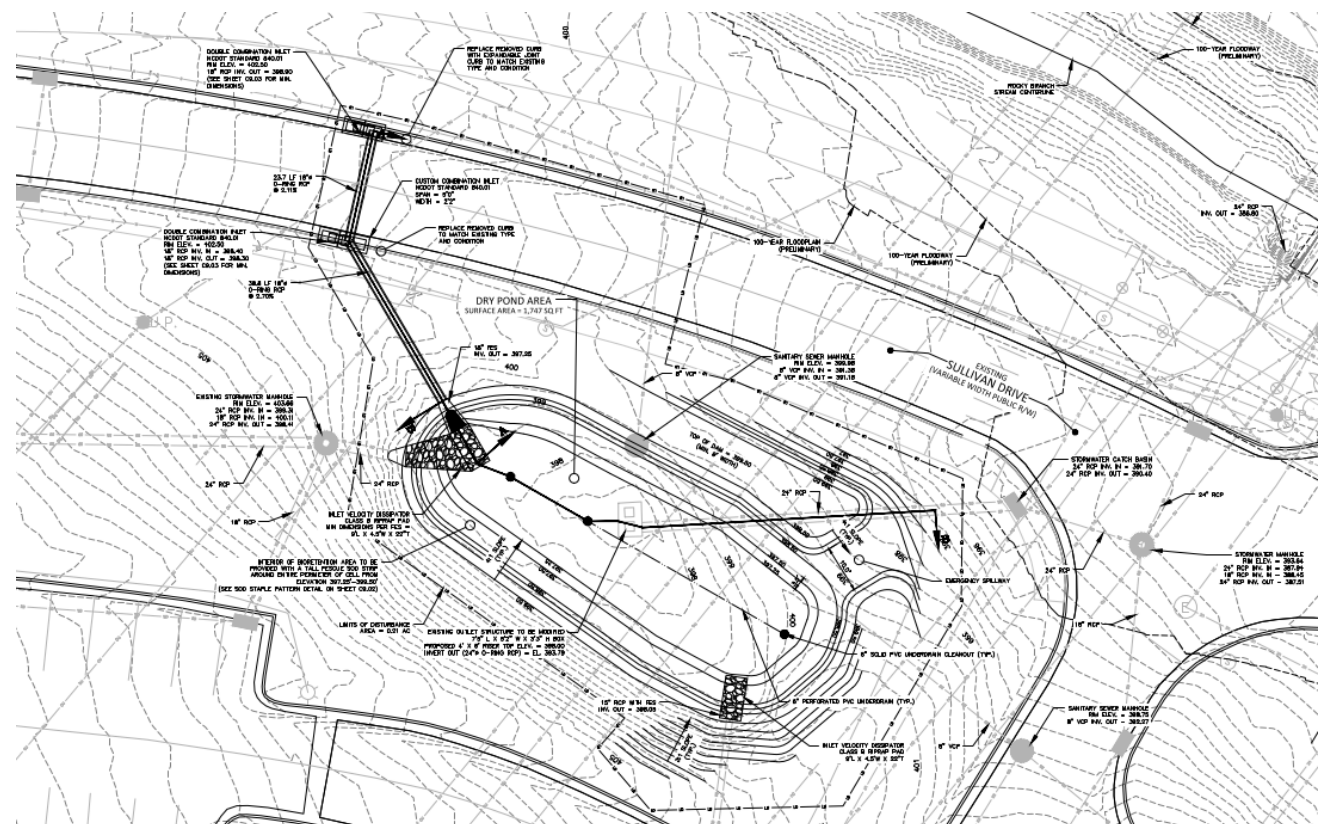


# Sullivan Drive: Upstream Drainage



# Sullivan Drive Design

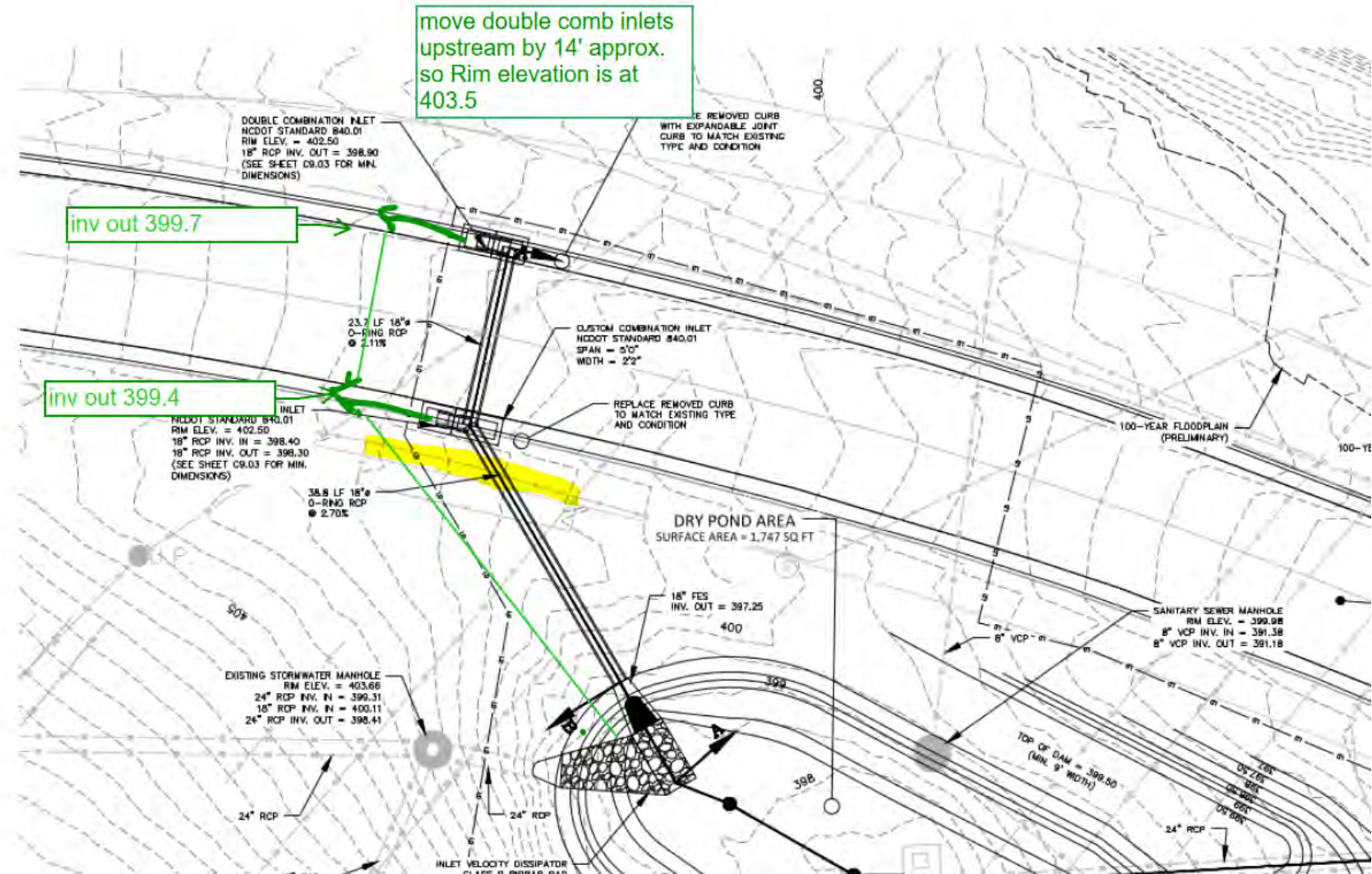
- Capture more water from street.
- Expand SCM footprint and increase depth.
- Modify existing outlet structure.
- Convert to bioretention.



DRY POND AREA CROSS SECTION VIEW 'B-B'

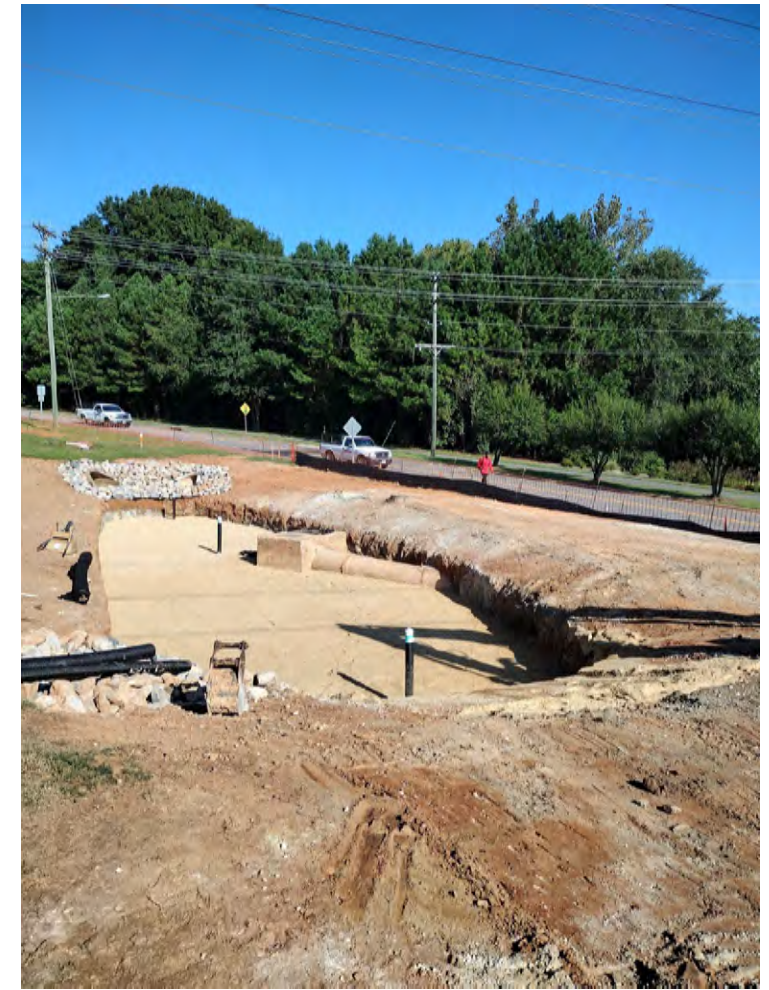
# Construction Level Flexibility

- Utility conflicts
  - Main water line













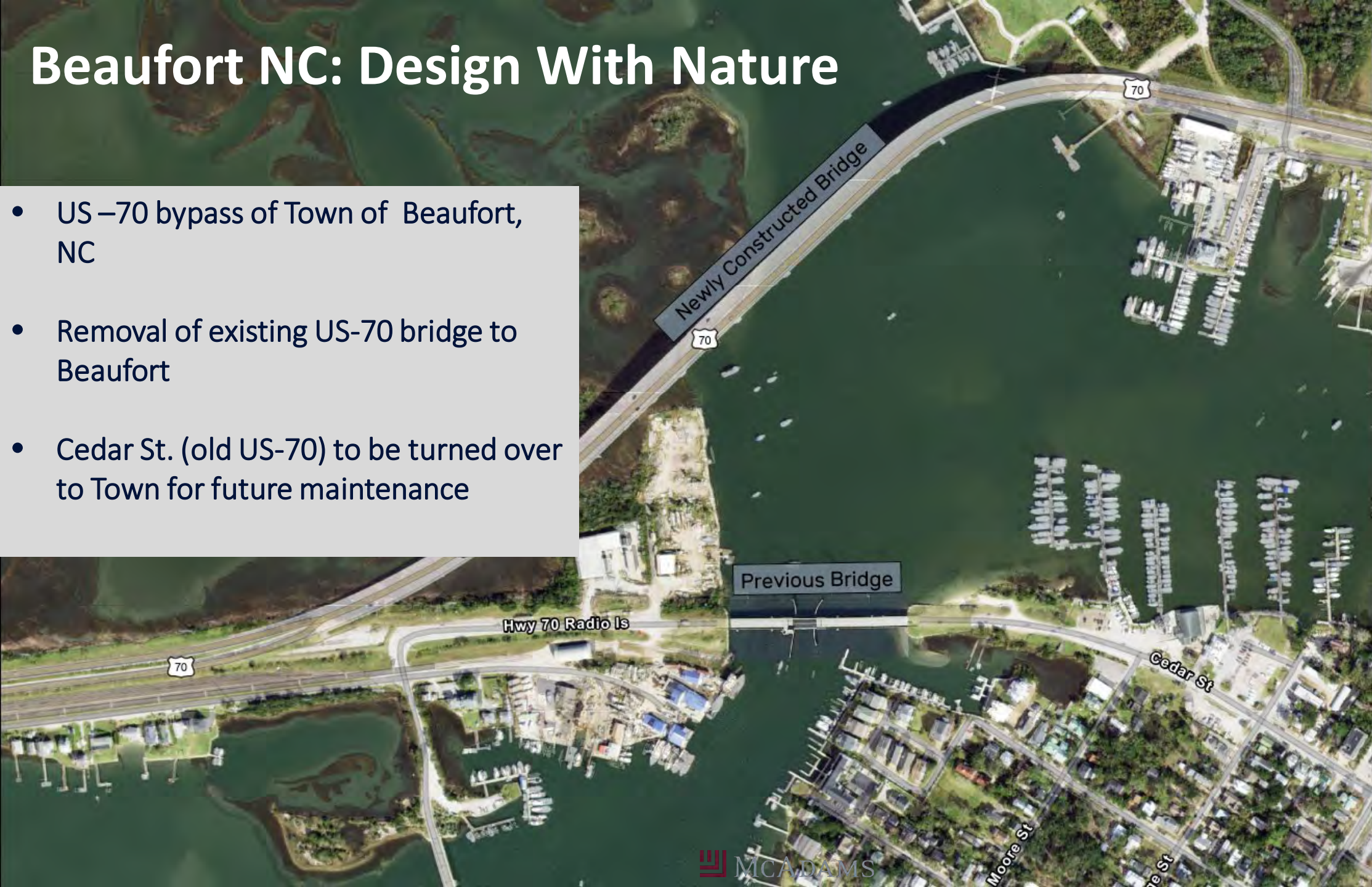


# Two weeks after construction wraps up...



# Beaufort NC: Design With Nature

- US –70 bypass of Town of Beaufort, NC
- Removal of existing US-70 bridge to Beaufort
- Cedar St. (old US-70) to be turned over to Town for future maintenance



# Existing Conditions

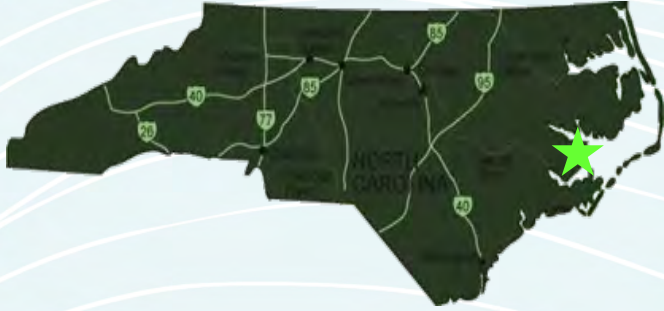


- NCDOT to make repairs to failing stormwater infrastructure
- NCDOT to resurface Cedar St.
- Town of Beaufort to make capital improvements along Cedar St. (water and sewer)

# Retrofit Opportunity – With Challenges...

- Urbanized with many overhead utilities
- Many businesses and homes with multiple driveways
- Historical Properties
- Coordination between Division staff, Town of Beaufort, and HSP Staff





## Town of Beaufort + NCDOT – Cedar Street Retrofit

Fourteen bioretention bumpouts will be installed adjacent to the roadway to collect + treat stormwater and improve the streetscape funded by the NCDOT's Highway Stormwater Program.

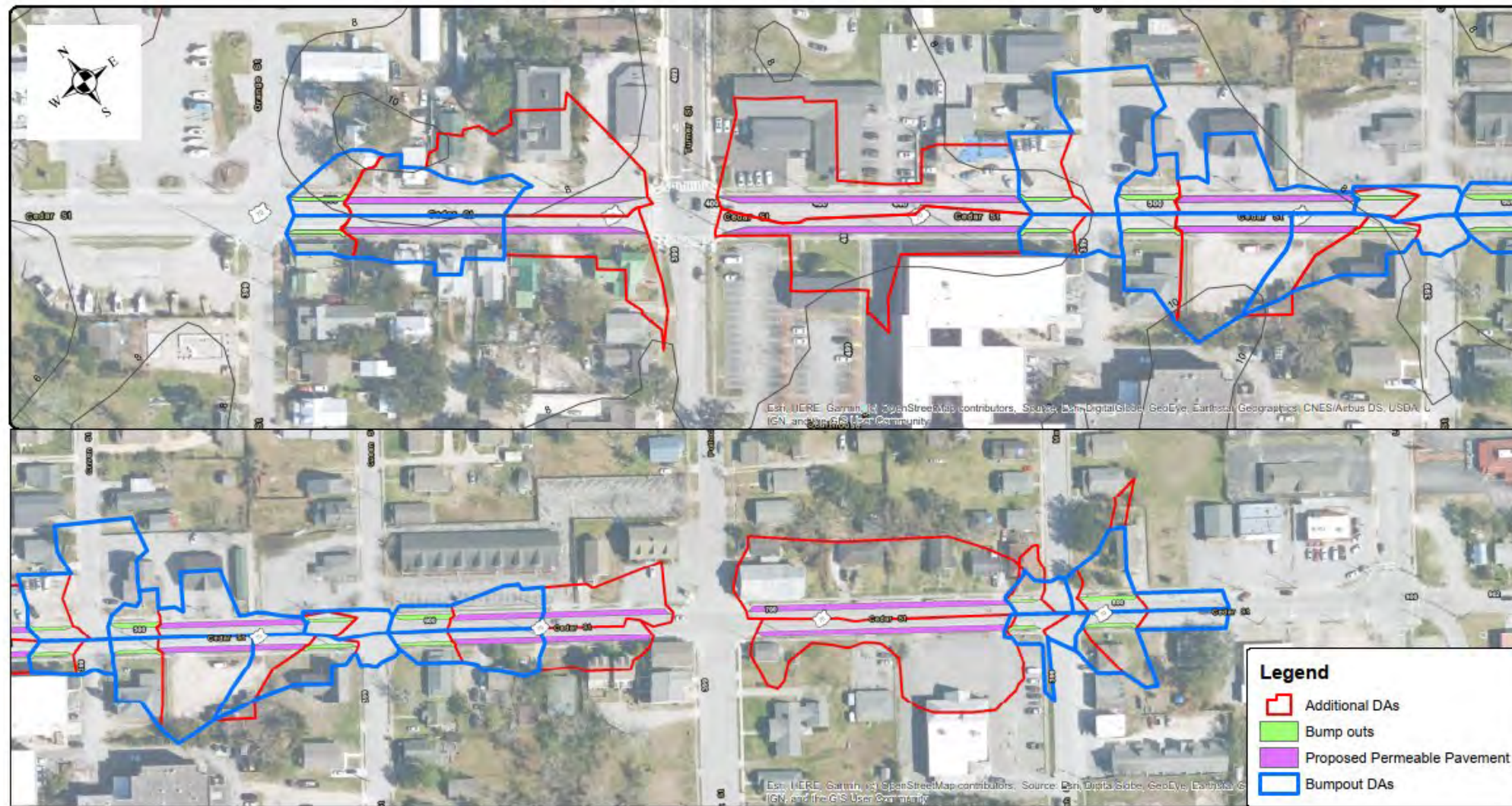




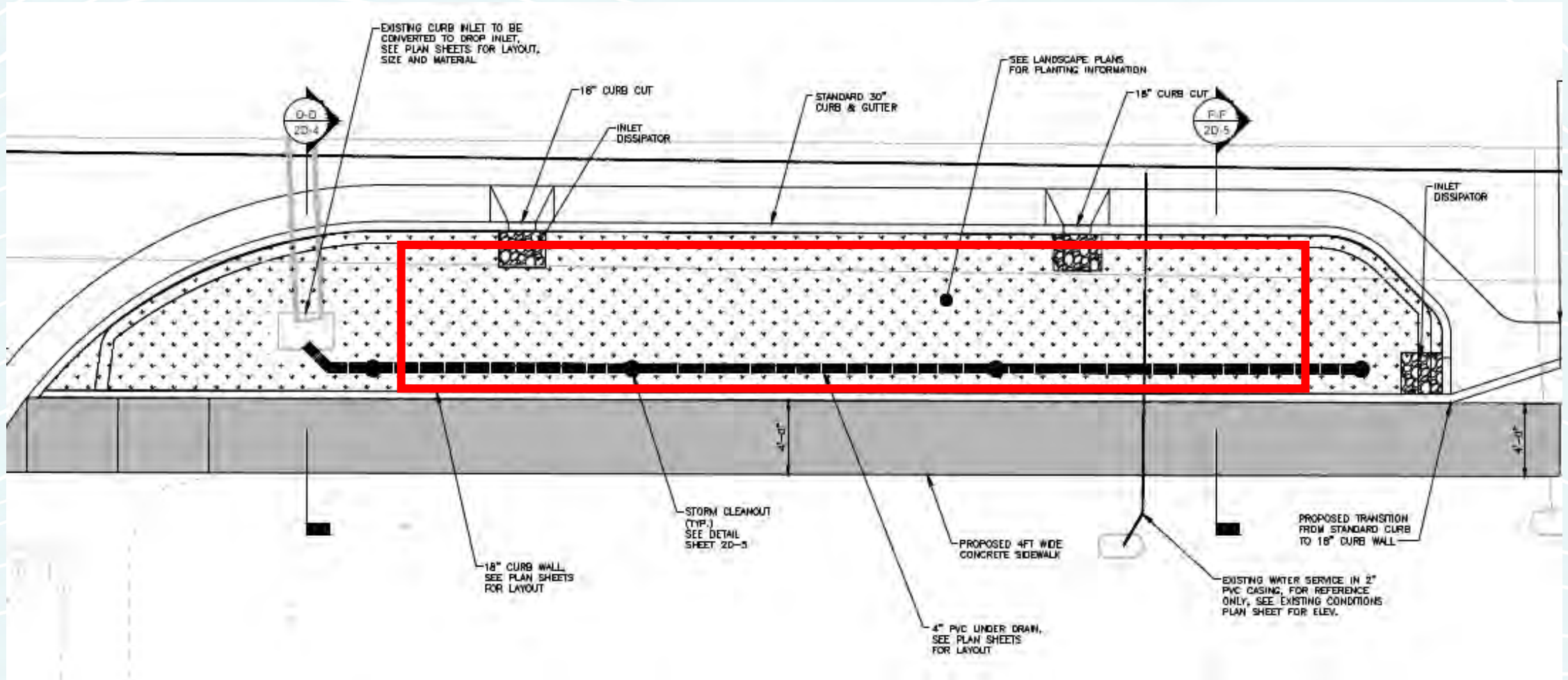




# Reassessing Opportunities-Use of Permeable Pavement

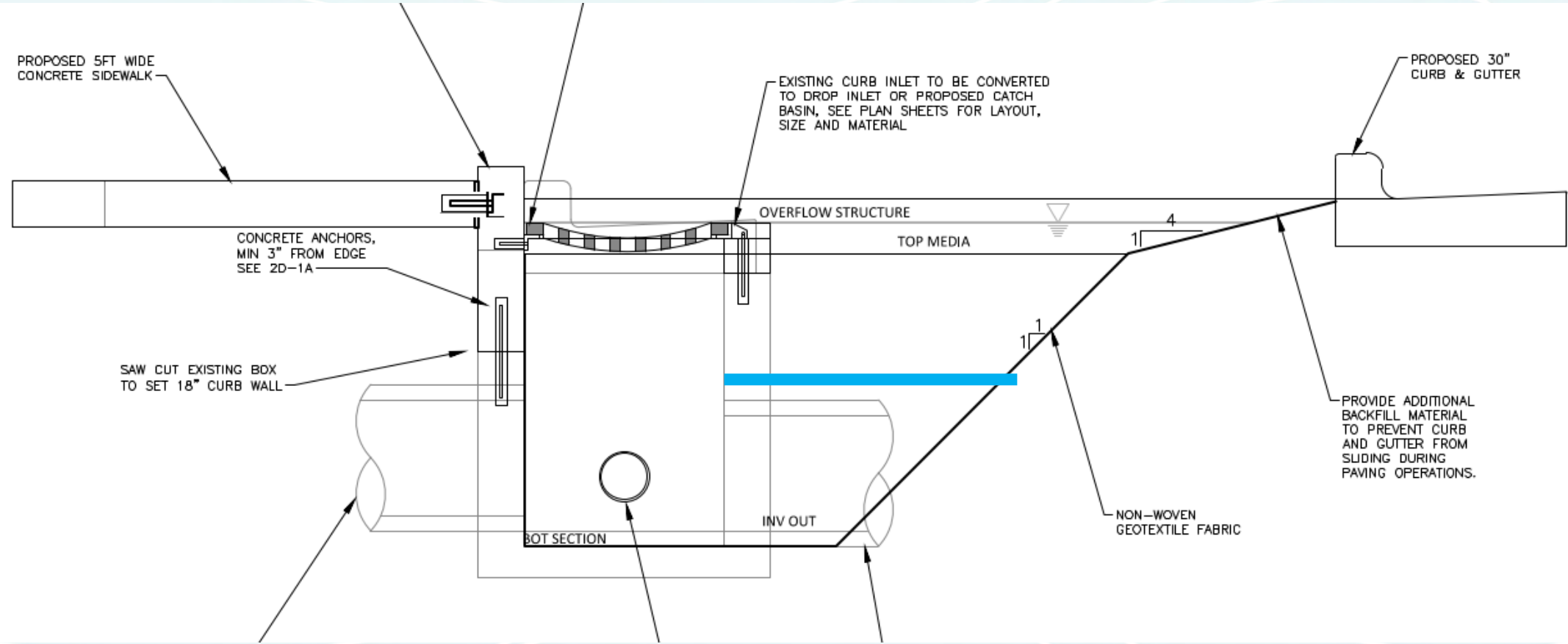


# AMTAP- As Much Treatment As Possible



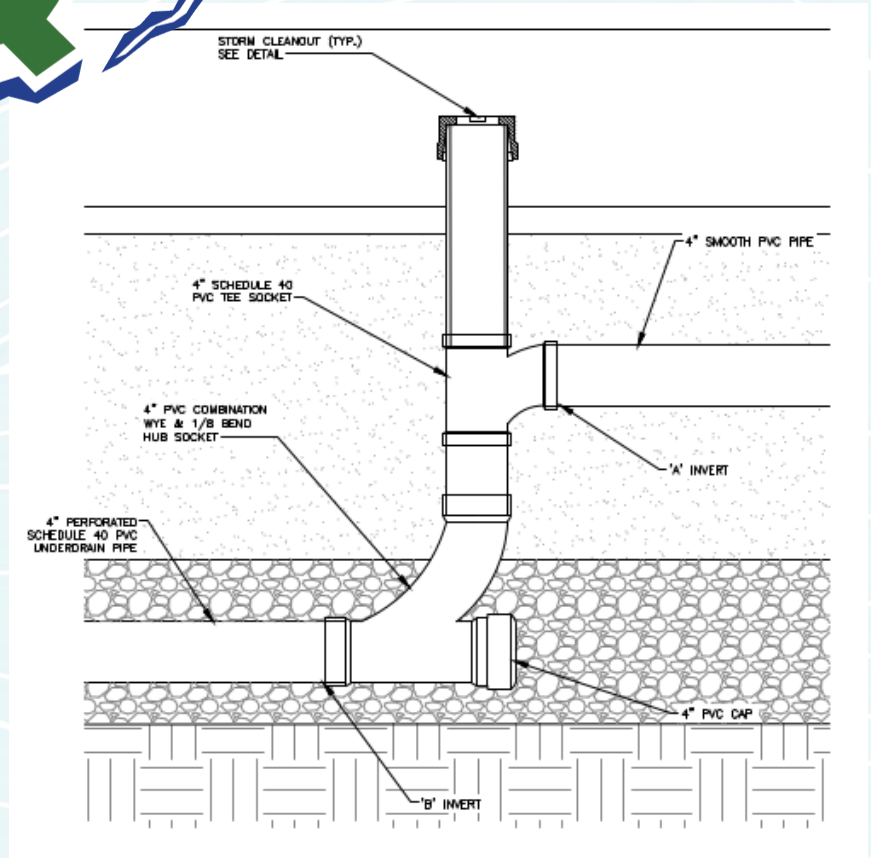
# New Design Considerations

- Water Table Concerns
- How to keep perimeter walls up
- Close to Traffic – Need shallower ponding





# Leaning on Partnerships



North Carolina  
Coastal Federation













# DISCUSSION