



TOWN OF
HILLSBOROUGH

Ditch to Garden

Community
Driven Green
Infrastructure



HILLSBOROUGH

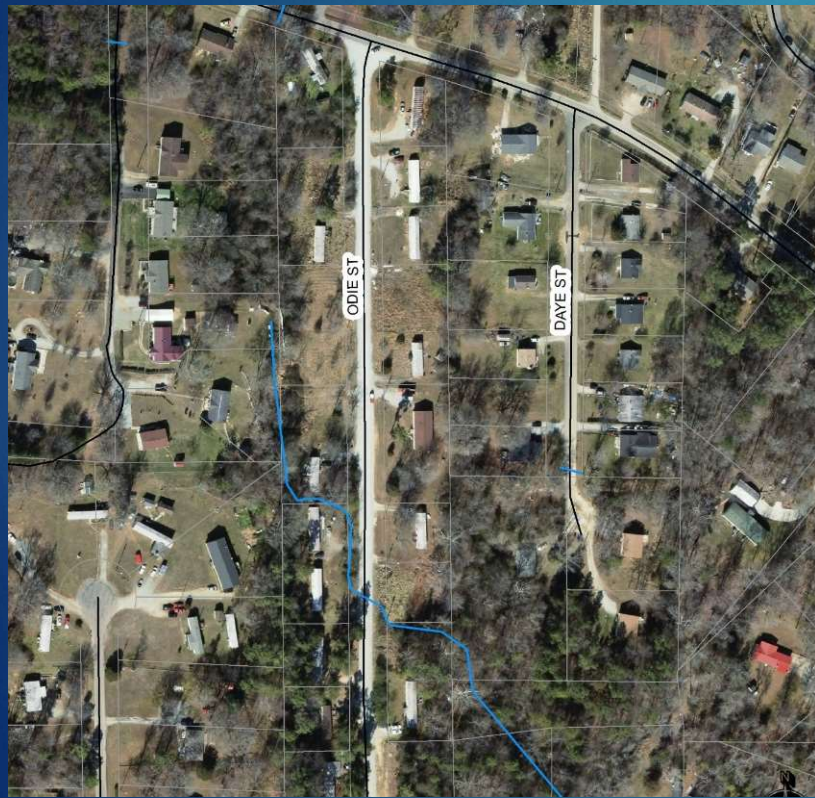
Hillsborough Stormwater and Environmental Services

- ▶ Terry Hackett, Stormwater and Environmental Services Manager
- ▶ Heather Fisher, Stormwater Program Coordinator



Existing Conditions

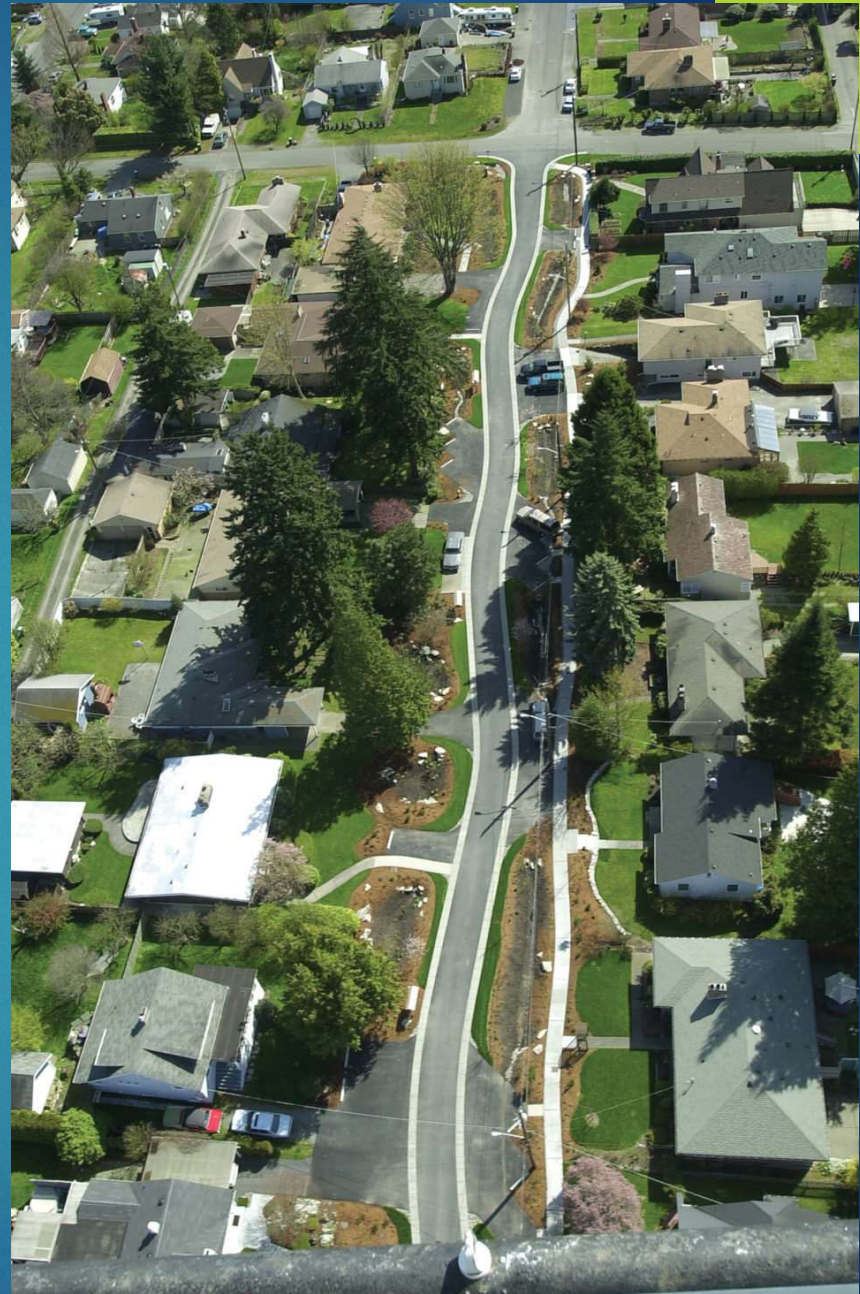
- ▶ Re-development Project by Habitat for Humanity



New York City Bioswales



Seattle Street Edge Alternatives



The Neighbors



Burnt Mill Creek Watershed Restoration



Photo Credit:
NC State BAE



HILLSBOROUGH

Odie Street Green Infrastructure

- ▶ 5 bioswales, 6 treatment swales, 6 check dams
- ▶ 20 rain barrels and 4,000 SF native plant gardens
- ▶ Led by Piedmont Conservation Council
- ▶ Partners included:
 - ▶ Town of Hillsborough Stormwater and Environmental Services
 - ▶ Habitat for Humanity, Orange County
 - ▶ Fairview Community Watch
 - ▶ NC State BAE Stormwater Group



Partnering with Habitat

- ▶ Volunteer network
- ▶ Community engagement
- ▶ Construction resources



Piedmont Conservation Council

PCC = RC&D RESOURCE CONSERVATION & DEVELOPMENT



FEDERALLY AUTHORIZED

RC&Ds Established in the Agriculture Act of 1962 as program, no permanent federal funding; Public-Private-Partnership model through RC&D's (locally-led)

501c3 Nonprofit

Locally-led through representation at County level: Soil & Water Conservation Districts, County Commissioners and members-at-large

NC RC&D State Association

Incorporated in 1990; promote visibility & accomplishments of NC RC&D's; idea exchange; project partnerships & development



Odie Street Green Infrastructure

- ▶ Funding:
 - ▶ NC Environmental Enhancement Grant (EEG) Program
 - ▶ NC Resource Conservation and Development (RC&D) Association
- ▶ Design: KCI Associates of NC
- ▶ Construction: Backwater Environmental
- ▶ Education: Outdoor Science Labs



Why Community-Driven Design?

- ▶ Achieve community acceptance
- ▶ Promote long-term stewardship
- ▶ Identify direct benefits to the community



The Message

TOWN OF HILLSBOROUGH NORTH CAROLINA
Habitat for Humanity

What is a Rain Garden?

Rain gardens are special cultivated areas that collect rain water where it is filtered by plants and soil to help keep our local water sources clean from contaminates.

Soon in your community, rain gardens and other green infrastructure - like bioswales - will be implemented to help keep your community safe.

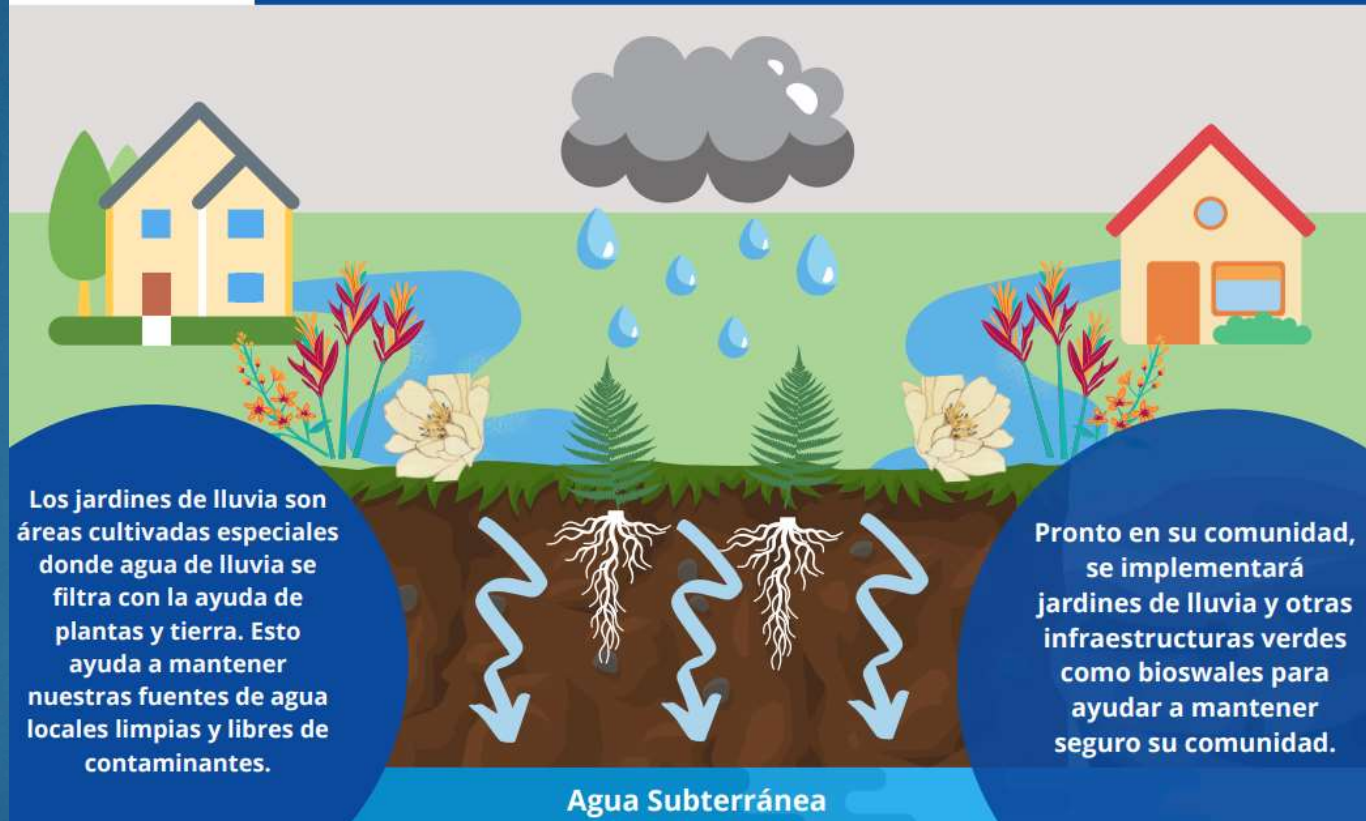
Groundwater Aquifer

The infographic illustrates the process of rainwater infiltration. A grey cloud with a sun behind it is shown raining onto a green lawn. Two houses, one yellow and one orange, are on either side of the lawn. In the foreground, a rain garden contains various plants including red flowers, white flowers, and ferns. Below the ground surface, three blue arrows point downwards, showing the path of rainwater through the soil and plant roots into a blue layer labeled 'Groundwater Aquifer'.

The Message



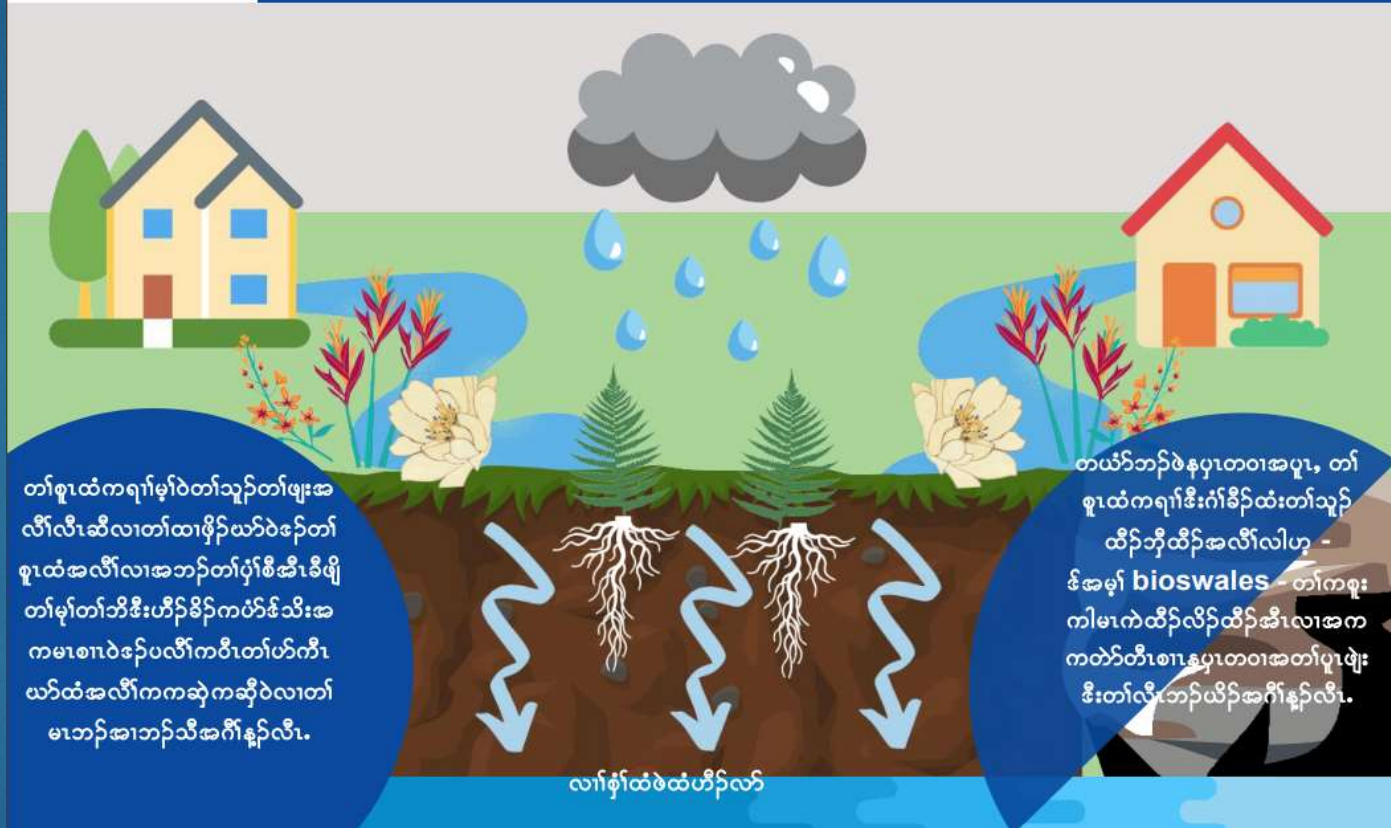
¿Que es un Jardín de Lluvia?



The Message



တၢ်စူထံကရၢ် (Rain Garden) မ့ၢ်မနုၤလဲၣ်.



The Message

**** Community Swale Project ****

Introductory Zoom meeting with Richard Turlington & Tyler Wallace

Spanish Interpreter: Alyn Valdivia

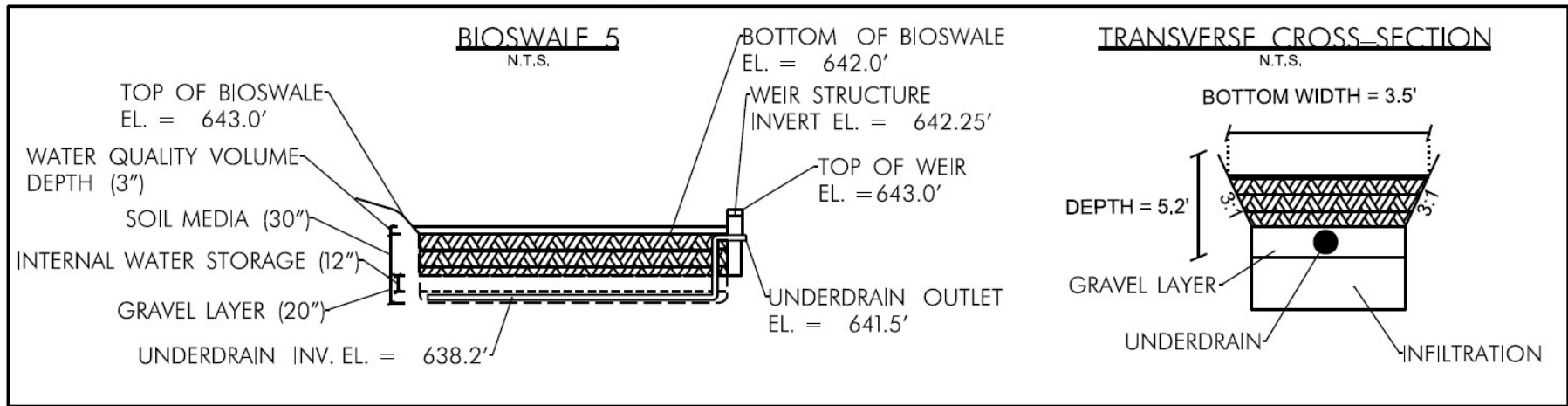
**** Community Swale Project ****

Presentation by Engineers

Site Meeting at Odie Street Community Tent

Design Options

10 BIOSWALE 5

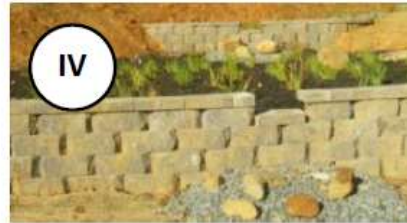


Design Options

- ▶ Weir Wall/Check Dam Material
- ▶ Dissipater Pad Material
- ▶ Vegetation (Planting, Sod, etc.)
- ▶ Rain Barrels as on-lot Option
- ▶ Native Plant Garden as on-lot Option



Weir Wall/ Check Dam Options



Planting Options

Option 1: Turf Grass Sod

Aesthetics

- Grass similar to lawns

Maintenance

- Mow weekly during the summer

Water Care

- Water occasionally during dry periods

Seasonal Changes

- Grass dries during winter (dormant)



Planting Options

Option 2: Native Plantings with Mulch

Aesthetics

- Landscaping beds with ornamental plants and hardwood mulch

Maintenance

- Replace mulch once per year
- Remove weeds and prune regularly

Water Care

- Water occasionally during dry periods

Seasonal Changes

- Most plants will dry up in the winter (dormant)



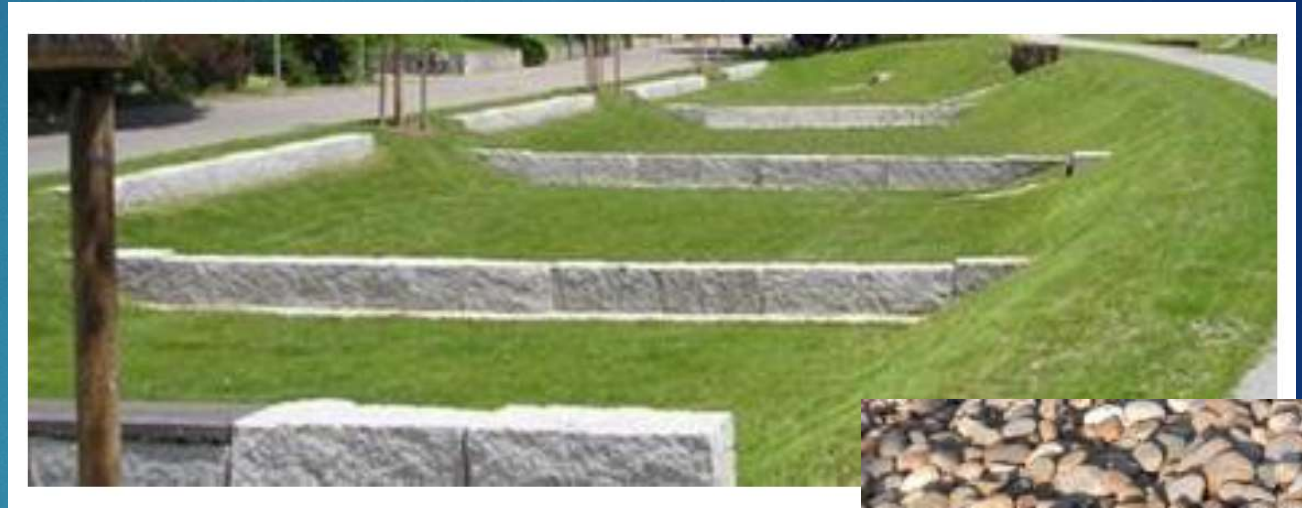


2 Saturdays, One Month Apart

#1: Introduce Concepts and Options
#2: Gather Detailed Feedback



Design Results



- ▶ 20 rain barrels
- ▶ 4000 square feet of native plant gardens



BIOSWALES

- Promotes infiltration and treats pollutants through absorption, evaporation and plant uptake
- Smaller footprint allows to be inside Right-of-Way



DESIGN APPROACH

- Multiple Constraints
 - Stay within existing ROW
 - Design around new driveways, pipes & existing utilities
 - Existing stream within project limits
- Series of bioswales & treatment swales
- Seven bioswales utilized underdrains with upturned elbows
 - Create anaerobic conditions for better nutrient pollutant removal
- Five treatment swales
- Community approved check dams aesthetics



TOWN OF
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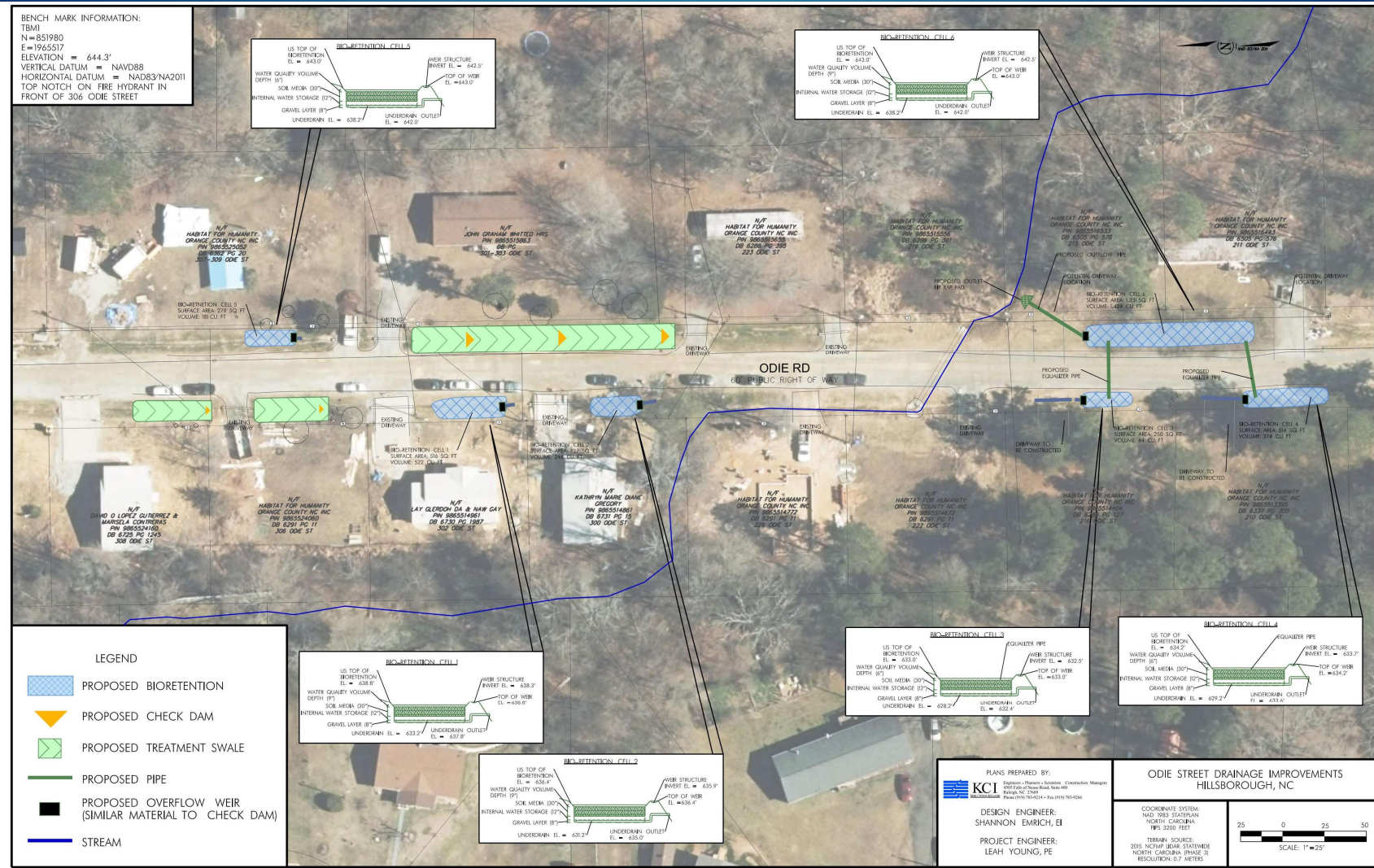


KCI



HILLSBOROUGH

DESIGN APPROACH





Construction



Bioswale Construction



Utilities Conflicts



Hands-On Education Events



Native Plants and Pollinators Event



Bioswale Education Event



Longterm Stewardship Strategy

- ▶ Low-Maintenance Design
- ▶ Homeowner Maintenance Training
- ▶ Annual Maintenance Support:
 - ▶ Mulch Delivery
 - ▶ Volunteer Workday during Creek Week
- ▶ NCSU Monitoring



Acknowledgements

- ▶ Leah Young, PE, KCI Associates of NC
- ▶ Jason Doll, CPSWQ, KCI Associates of NC
- ▶ Richard Turlington, Habitat for Humanity – Orange Co.
- ▶ Brenda Palacios Rodriguez, UNC Ecostudio
- ▶ Backwater Environmental
- ▶ Hillsborough Public Works Department
- ▶ 50+ Volunteers



What's Next?

- ▶ NC State BAE Stormwater Group Monitoring Begins
- ▶ First annual volunteer workday during Creek Week 2024
- ▶ Odie Street Green Technology Tour
- ▶ Release of Promotional Video



Questions?



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