



Greening the Greenway Ecological Restoration Along the Trail



The Pennsylvania Environmental Council (PEC) protects and restores the natural and built environments through innovation, collaboration, education and advocacy.



PEC believes in the value of partnerships with the private sector, government, communities and individuals to improve the quality of life for all Pennsylvanians.

Greening the Greenway: Ecological Restoration Along the Trail



Add more “Green” to the
Greenway



Enhance public use and
enjoyment of land/water
trails



Restore fish/wildlife habitat
on adjacent waterways and
uplands



Agenda

- **Why Green?**
- Where to Green?
- Prioritizing Ecological Restoration Opportunities
- Case Studies Philadelphia Area
- Opportunities on the Bensalem Greenway
- Funding Sources



People Enjoy Green

Greening the Greenway
Ecological Restoration Along the Trail



“Nature is good for us
and has both long
and short term
mental and physical
health benefits.”

American Society of Landscape Architects

<https://www.asla.org/healthbenefitsofnature.aspx>

<https://dirt.asla.org/2016/02/02/we-must-better-communicate-the-health-benefits-of-nature/>



Habitat for Fish and Wildlife

- Atlantic Coastal Plain forest
- Freshwater tidal wetlands
- Delaware River and shoreline
- Tributary streams

Threatened, endangered,
and special concern
plants in each habitat

Priorities

Where will the trail go; get property, route,
actual path



Think about the greening and related benefits

Recreation

Health

Habitat

Viewscape

Shading



Security and safety



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Where to Green

- Green directly adjacent to trail
 - Rain gardens, trees/shrubs, vegetated bump outs
- Greening along the trail corridor
 - Riparian buffer, trees and shrubs
- Green Parks Nodes Including Restoring Brownfields
 - Intertidal wetlands, forest/meadows, palustrine wetlands, recreational space

Indianapolis Cultural Trail, Indiana

Greening
Directly
Adjacent to
Trail



Figure 2. Cyclist riding the Indianapolis Cultural Trail alongside stormwater planters. (Source: Clark Wilson, USEPA)

Murfreesboro Greenway System; Stones River and Lytle Creek Trails, Tennessee



Greening
Along Trail
Corridor



www.visitsouth.com/2016/01/14/murfreesboro-tennessee-greenway-system/

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Greening
Along Trail
Corridor

Little Sugar Creek Greenway, North Charlotte, North Carolina



2006



2012

Mecklenburg County, NC

Greening the Greenway
Ecological Restoration Along the Trail

Wildcat Creek Restoration and Greenway Trail, City of San Pablo, CA

Greening
Along Trail
Corridor



Restoration Design Group

Greening the Greenway
Ecological Restoration Along the Trail

Lardner's Point Park

Greening
Parks and
Restoring
Brownfields



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Agenda

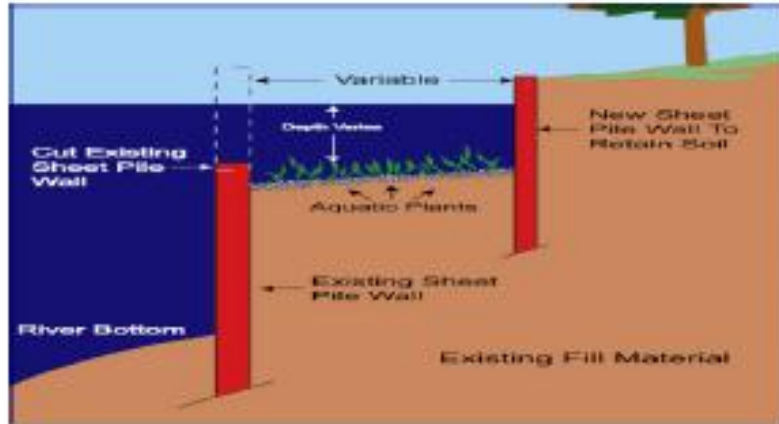
- Why Green?
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Habitat Restoration Types

- **Uplands**
 - Plant trees/shrubs
 - Enhance forest lands
 - Create meadows
- **Stream bank**
 - Planting
 - Regrade and plant
- **Off channel aquatic**
 - Wetlands in upland matrix
 - Backchannels, floodplains and wetlands
- **Intertidal shoreline**
 - Enhance/create wetlands (fringe)
 - Soften, regrade, or excavate bank
 - Marsh sill or breakwater
- **Subtidal**
 - Enhance structure and diversity



Shoreline and Bank Protection Options



Tiered Wall Configuration



Marsh Sill



Breakwaters



Pocket Wetland

Living Shoreline:

A method of shoreline stabilization that protects the coast from erosion while also preserving or enhancing environmental conditions.

From Kurt Cheng, PDE, 10/12/2017 Presentation





April 2010



May 2010



June 2010





June 2011

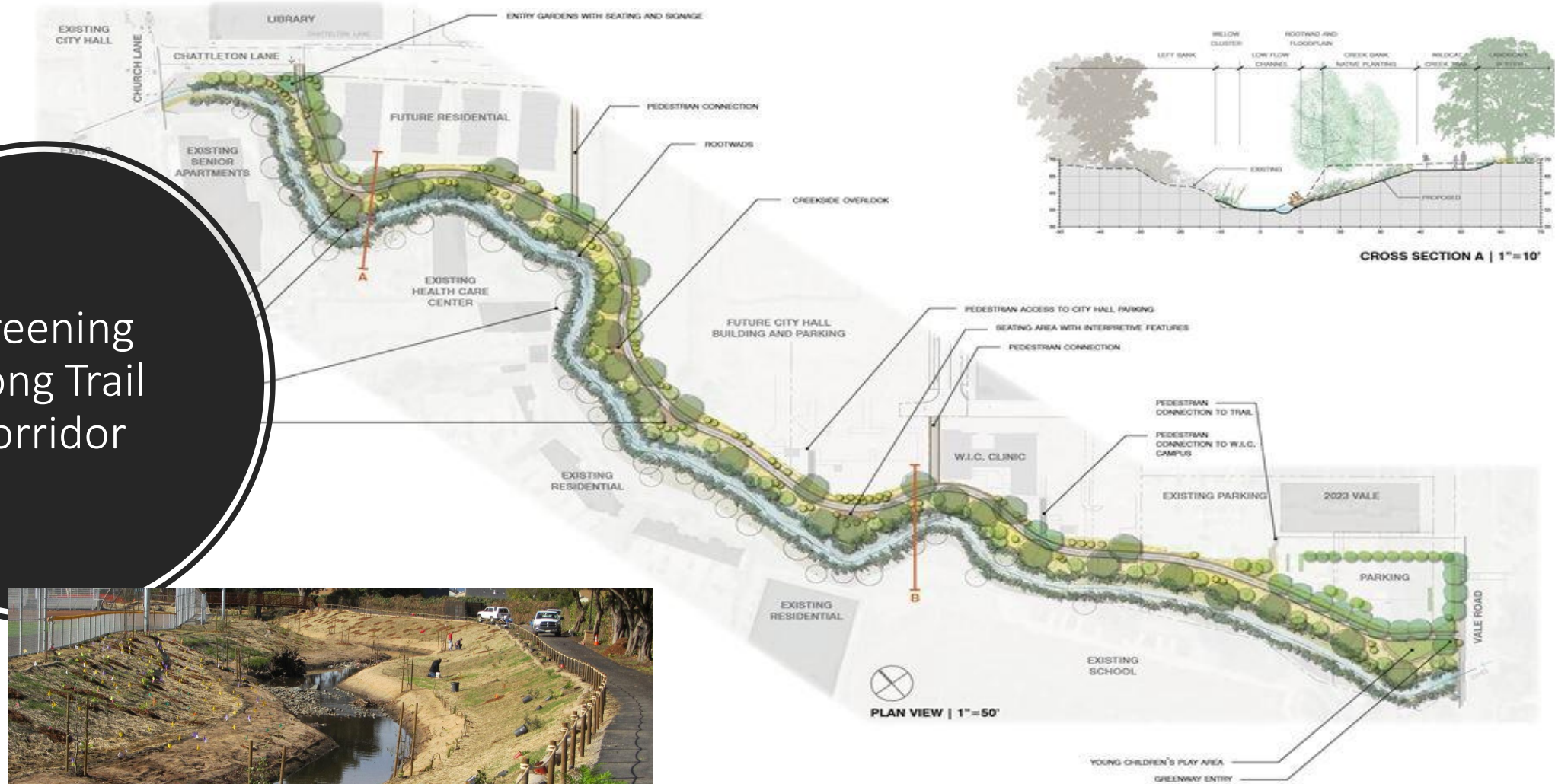


Lardner's Point Living Shoreline



Wildcat Creek Restoration and Greenway Trail, City of San Pablo, CA

Greening
Along Trail
Corridor

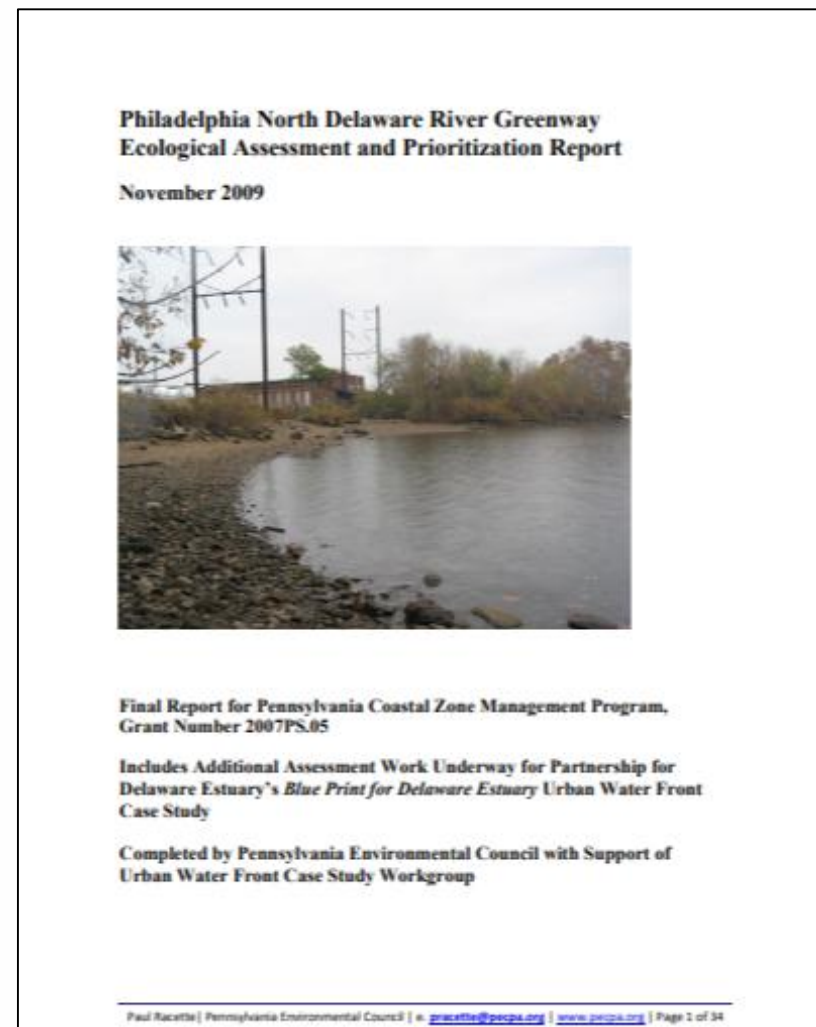
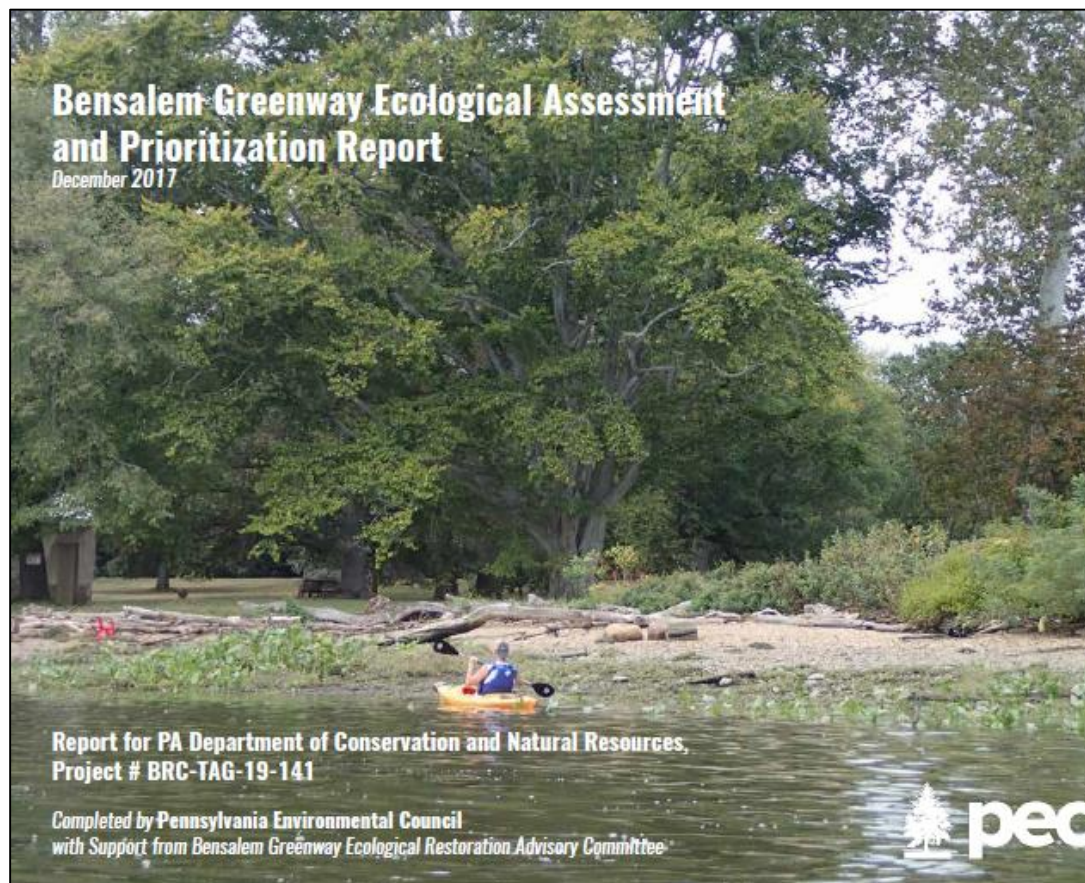


Fort Washington Park Flood Plain Back Channel



Upper Dublin Township Trail – trees and green stormwater management





Reports can be downloaded at <http://pecpa.org/DRWI>
Scroll down to **Tidal Delaware River Restoration** to see report download buttons.

Greening the Greenway
Ecological Restoration Along the Trail

Prioritization Criteria

- **Habitat:**

- Parcel size
- Diversity of vegetation
- Natural resource features
- Connectivity
- Riverbank (vegetated, armored, stable)
- Intertidal (vegetated, protected)

- **Site Wide:**

- Landowner interest
- Contaminant potential
- Accessibility
- Ability to maintain

- **Recreational:**

- Public access

- **Habitat Uplift**



Consult Background Resources

- Pennsylvania Natural Heritage Program Interactive Map
- Pennsylvania Natural Areas Inventory Updates
- Open Space and Greenways Plans
- River Conservation Plans
- Waterfront Revitalization and Master Plans
- Comprehensive Plans
- Pennsylvania Natural Diversity Inventory (PNDI)
- Pennsylvania Wildlife Action Plan

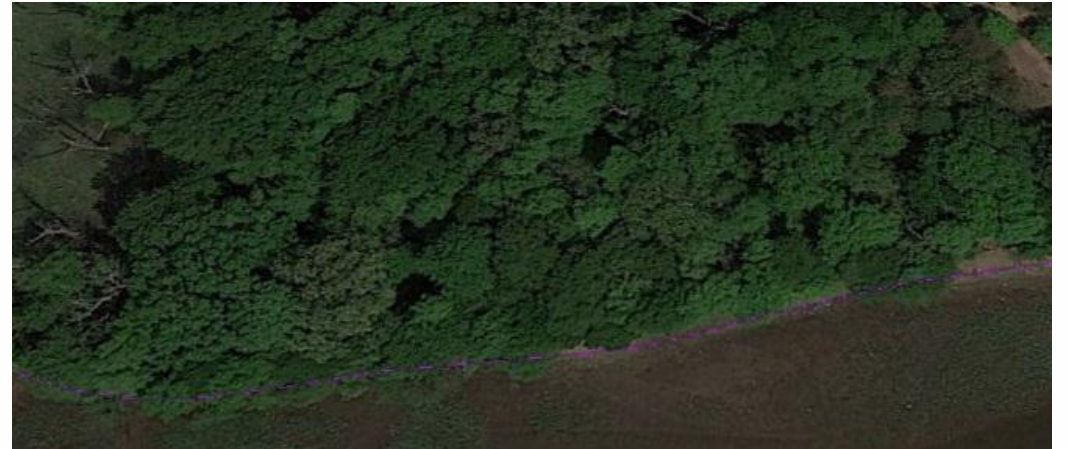
Use Google Earth

Riverbank vegetation

Score of 1 (Spotty or no trees/shrubs)



Score of 3 (extensive shoreline cover)



Riverbank (armored)

Score of 1 (75-100% bulkhead/riprap)



Score of 3 (lower armoring; 0 to 25%)



Natural resource features

Score of 1 (limited to turf/forest patches)



Score of 3 (high value; wetlands, mature forest)



Appendix H. Detailed Score Sheet

PEC Coding	Parcel Name/Owner	Address	Habitat Criteria Total	Site Wide Criteria Total	Recreation Criteria Total	Current Score	Uplift Potential	Total uplift
R-34	Commonwealth of Pennsylvania	State Rd	29	15	8	52	60	8
R-4	Maryelizabeth Rybas (Mud Island)	301 Tennis Ave	33	11	5	49	49	0
R-35	Commonwealth of Pennsylvania	State Rd	27	13	8	48	51	3
R-36	Commonwealth of Pennsylvania	State Rd	28	14	6	48	54	6
R-33	Commonwealth of Pennsylvania	Herr St	26	14	6	46	52	6
R-14	Bucks County	State Rd	24	11	8	43	52	9
R-19	Waterside Phase 1 LLC	2233 State Rd	26	9	6	41	47	6
R-20	Redevelopment Authority Bucks County	2375 State Rd	25	9	6	40	48	8
R-15	Bucks County	Station Ave	23	12	5	40	44	4
R-13	James Biddle	State Rd	27	9	4	40	46	6
R-3	Bucks County Economic Development Corp.	State Road	27	9	4	40	45	5
R-37	Torresdale Manor Improvement Association	River Rd	24	11	4	39	46	7
R-26	Columbus Country Club	2909 State Rd	26	8	4	38	48	10

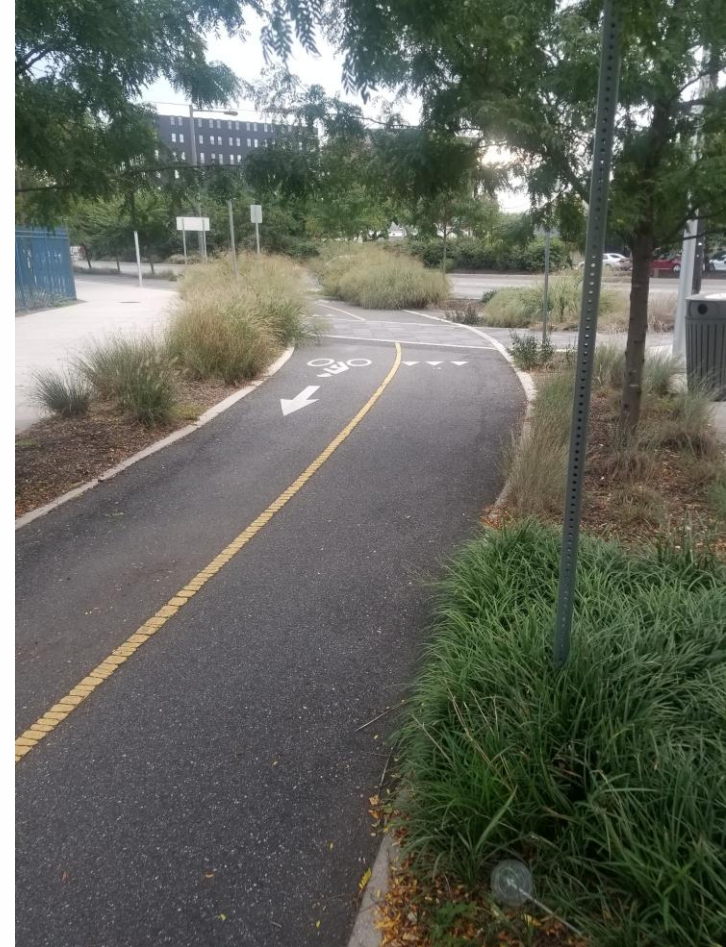
A map of Bucks County, Pennsylvania, illustrating the current scores for different regions. The map uses a color gradient from light yellow to dark red to represent score values. Specific regions are labeled with codes: R-3, R-4, R-14, R-15, R-19, R-20, R-33, R-34, R-35, and R-36. Geographical labels include "Glen Foerd" on the left, "Bucks County Park/Station Ave" in the center, and "Neshaminy State Park" on the right. A legend at the bottom shows a horizontal bar with numerical values ranging from 12 to 53, corresponding to the color scale. A north arrow and a scale bar indicating distances up to 0.5 miles are also present.



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Central Delaware River Trail, Philadelphia



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Ecological Restoration Along the Trail

Delaware River Waterfront Corporation



Section at Pier 38-40 viewing south

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Spring Garden Street Greenway Plan



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Indianapolis Cultural Trail, Indiana



Stormwater Planters

500 new street trees

25,400 ft² of stormwater planters.

Reducing stormwater runoff rate and volume

Reduce water pollution



8-mile bike and pedestrian path

Indianapolis Cultural Trail Inc



NORTH DELAWARE RIVERFRONT GREENWAY

- ① Pulaski Park
- ② Future Riverfront Park in Bridesburg
- ③ Frankford Boat Launch
- ④ Parcel 35
- ⑤ Lardner's Point Park
- ⑥ Tacony Boat Launch
- ⑦ Pennypack on the Delaware
- ⑧ Pleasant Hill Park
- ⑨ Glen Foerd on the Delaware
- ⑩ Pennypack Park and Trail
- ⑪ Frankford Creek Greenway

Trail Section Status

- Completed
- In Design
- - - In Planning

North Delaware Riverfront Greenway

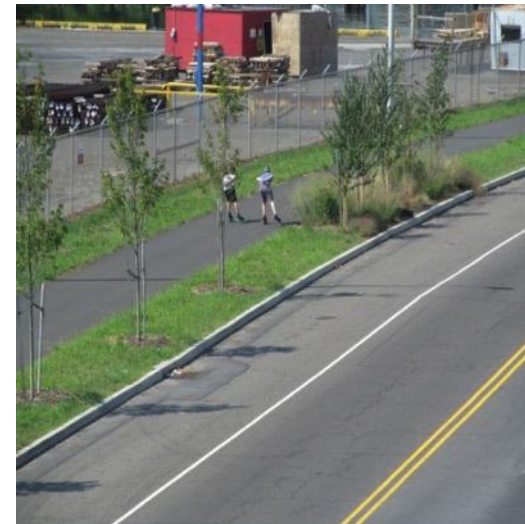


Port Richmond
Trail

Riverfront North Partnership

Background

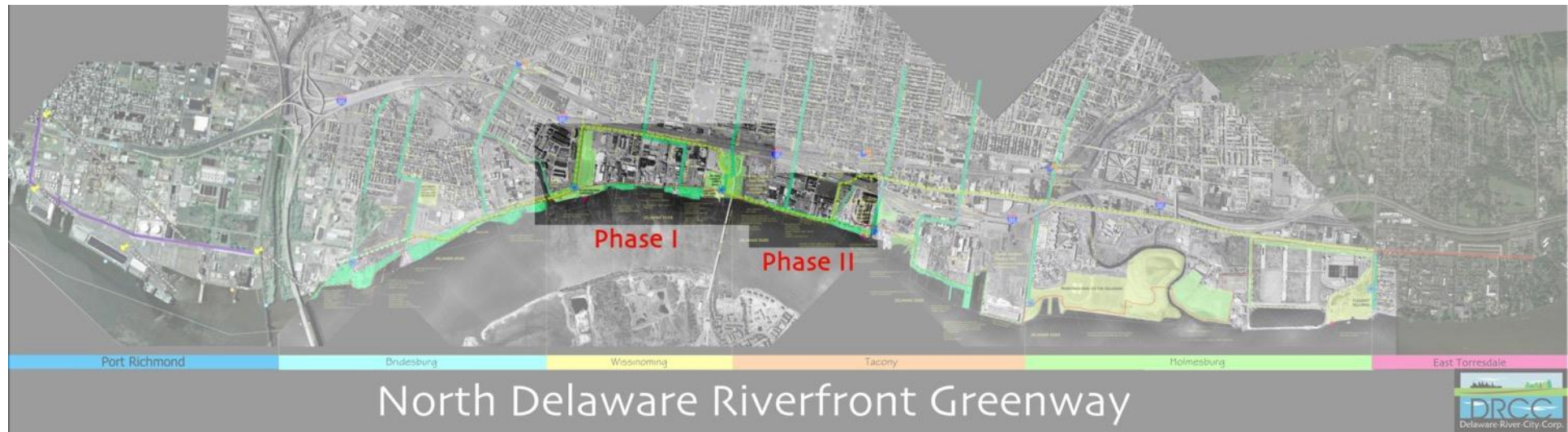
- Opened in October, 2013
- Part of East Coast Greenway
 - 30' wide x 1.6 mile linear open space & trail
 - Pulaski Park clean-up
 - 200+ trees, 1800 native grasses & shrubs
 - Weekly bed maintenance



Riverfront North Partnership

North Delaware Riverfront Greenway

Greenway Stewardship



Riverfront North Partnership

K&T Trail

Background

- Opened Trail in 2017
- Links 3 open space/park spaces
 - 1.1 mile trail (Phase 1)
 - Links Lardner's Point Park to Frankford Boat Launch (± 12 acres)
 - New 4.5 acres of open space along river
 - New 3 acre open space parcel on the river
 - 80 trees, 1200 shrubs, 3300 grasses



Riverfront North Partnership

North Delaware Riverfront Greenway

Greenway Stewardship



Riverfront North Partnership

Lardner's Point
Park

Background

- Trailhead Park opened Spring 2012
 - Restroom facility, picnic areas, drinking fountain, trails, fishing pier
- Restored Ecological Resource
 - 7 habitat zones
 - Coastal Plain Forest, Wet and Dry Meadows & Scrub-shrubs, High and Low Freshwater Tidal Marshes
 - Shoreline and upland restoration projects
 - 100 native plant species
- Active Monitoring
 - Athos 5-year monitoring
 - Weekly work days

Riverfront North Partnership



Lardner's Point Park



Before Restoration



After Restoration

PlanPhilly Eyes on the Street photos

Greening the Greenway
Ecological Restoration Along the Trail

Lardner's Point During Construction



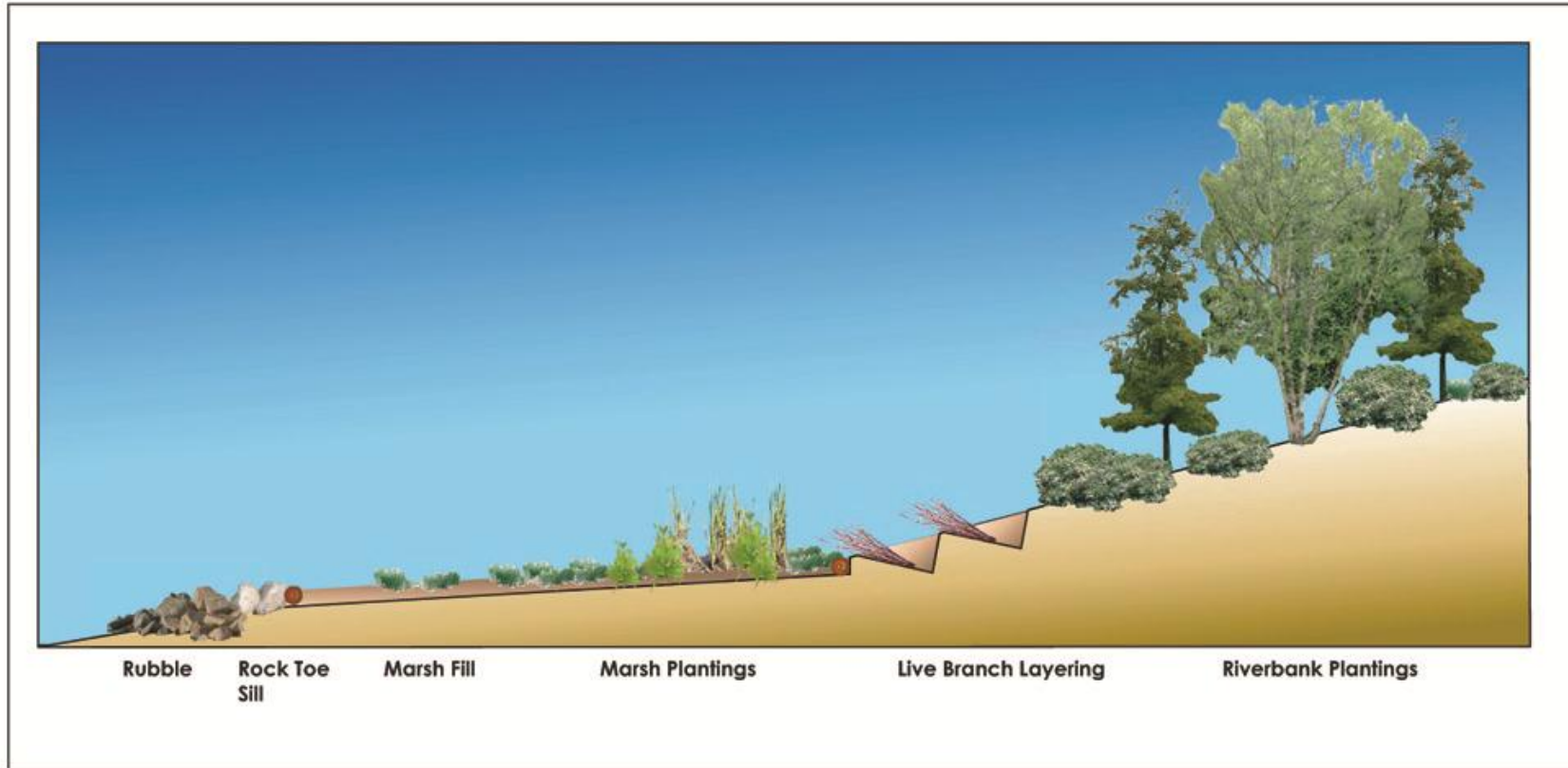


Greening the Greenway

Ecological Restoration Along the Trail

Lardner's Point Park Physical Condition

Transformed to fringe wetlands plus restored uplands



CROSS SECTION (TYPICAL)

Biohabitats

Background

- 2015 DCNR/PRPS
Green Park of the Year



Riverfront North Partnership



Bridesburg Site



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PIDC



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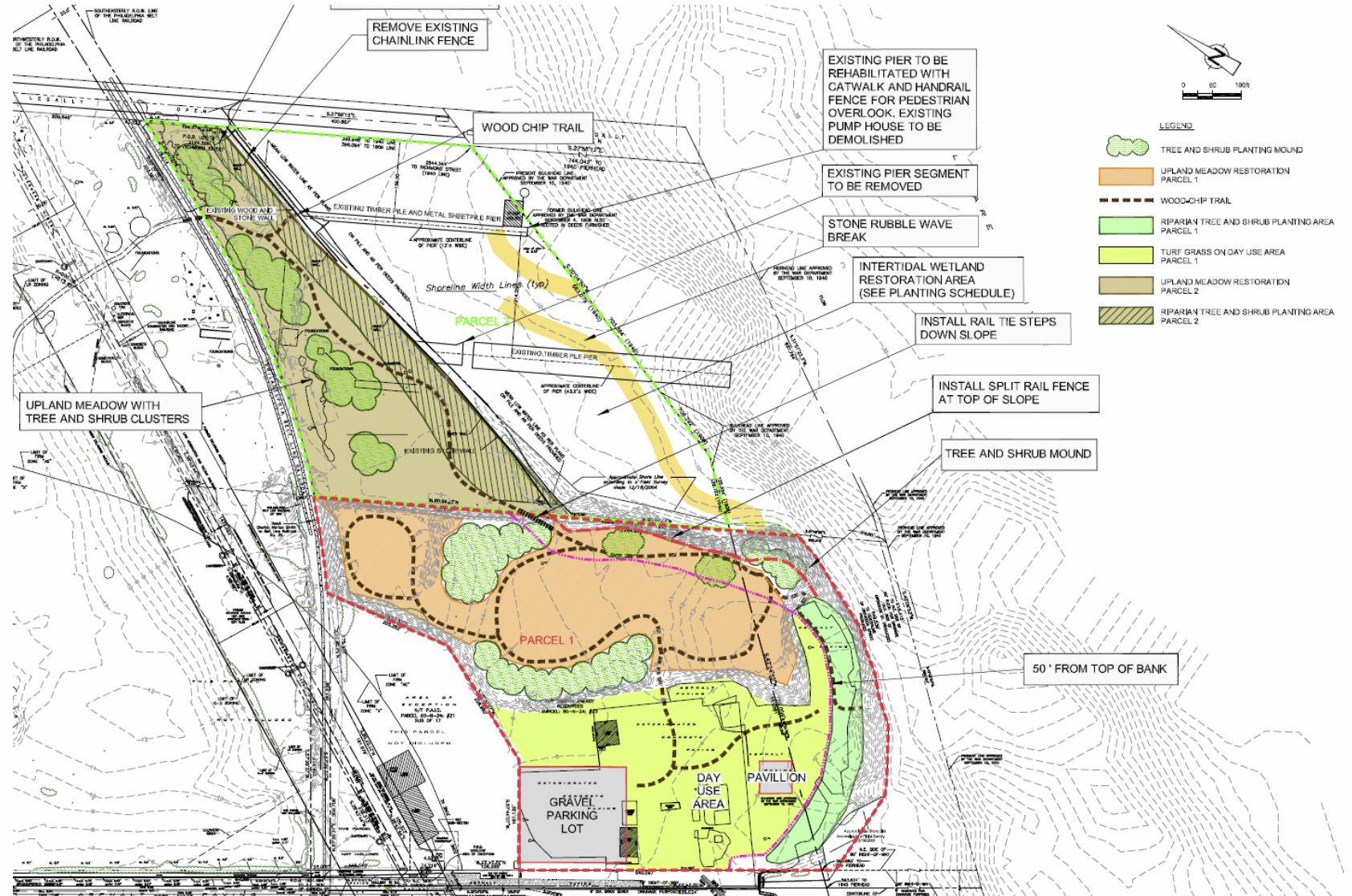


Greening the Greenway

Ecological Restoration Along the Trail

Option C, full restoration

3 Acres Enhanced Wetlands
12.5 Acres Restored Upland
Cost: \$3.3 Million



Greening the Greenway
Ecological Restoration Along the Trail

Design by:

Locus
Partners

Parks and
Recreation

Riverfront
North

Bridesburg
Residents



Locus Partners

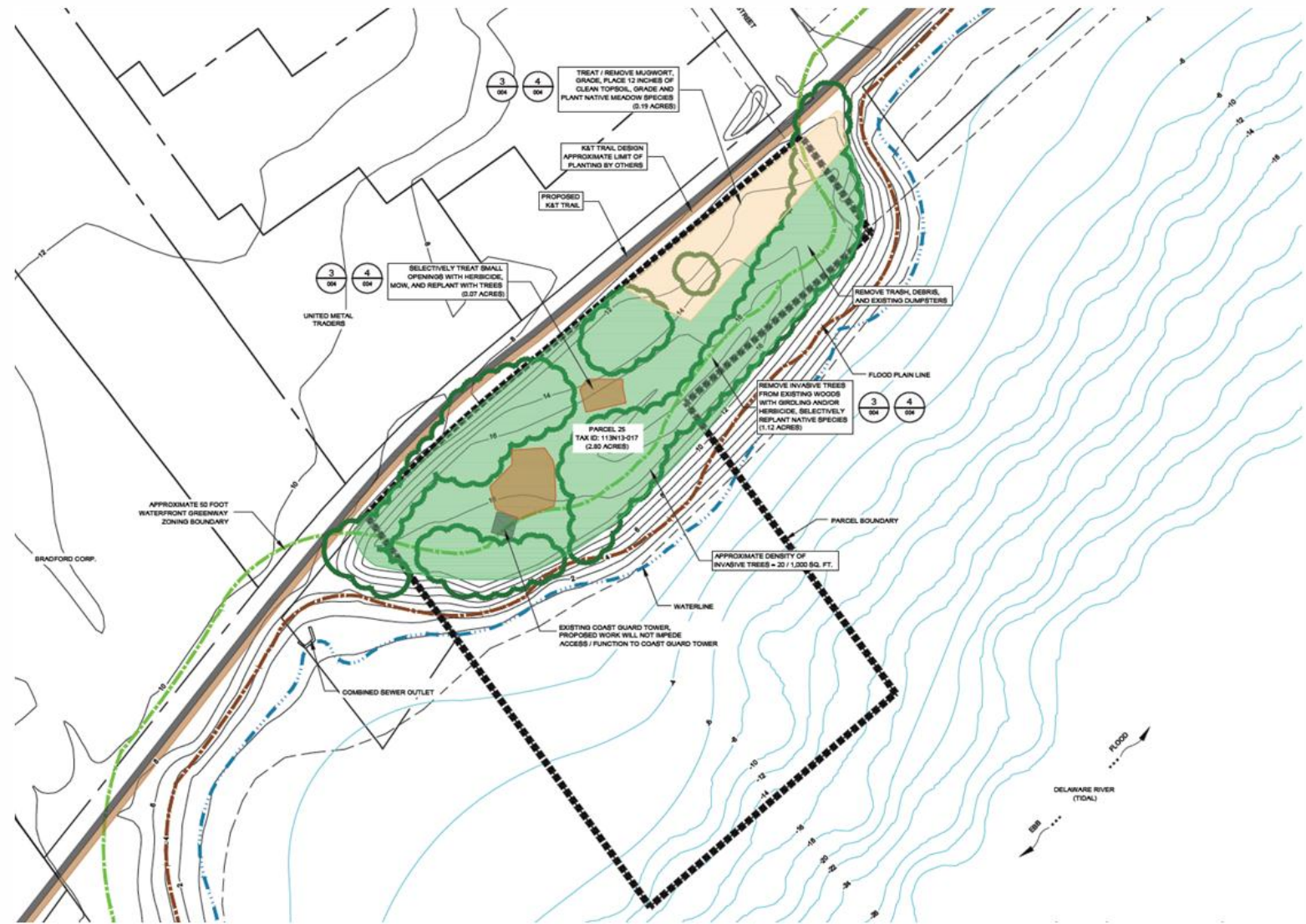
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Ecological Restoration Along the Trail

Parcel 24
~ 1 acre





Parcel 25
~2.8 acres



Mondauk Park Trail - Meadow and Woodlands



Greening the Greenway
Ecological Restoration Along the Trail

Route 202 Parkway Trail – meadows, shrubs, green stormwater management



202 Parkway Trail – Stormwater BMPs

- Bioretention
- Infiltration trenches
- Vegetated swales
- Riparian plantings
- Volume control basins.
- Vegetated islands
- Extensive native plantings.

Urban Engineers





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Bensalem Greenway
Ecological Assessment and Prioritization Study
December 2017

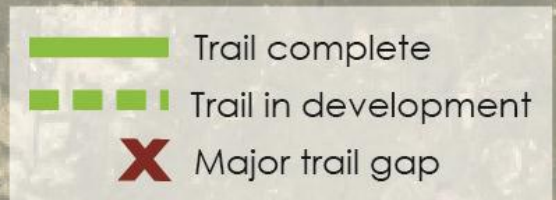


East Coast Greenway in Pennsylvania



Bensalem Greenway

- Part of the East Coast Greenway
- 3000 mile trail from Maine to Florida
- Bensalem Greenway is missing link



Bensalem Greenway

- A spine trail and community amenity from Bristol to Philadelphia
- Targeted for revitalization





Neshaminy State Park

Wetland expansion and Delaware River shoreline restoration



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Ecological Restoration Along the Trail

Neshaminy State Park



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Ecological Restoration Along the Trail

Restoration at Jack's Marina Site



Ecological Issues/Opportunities

- **Area 1:** Tidal wetland creation opportunities (*mitigation for trail impacts*)



- **Area 2:** Vernal pool creation opportunities



Neshaminy State
Park

Neshaminy State Park

Ecological Issues/Opportunities

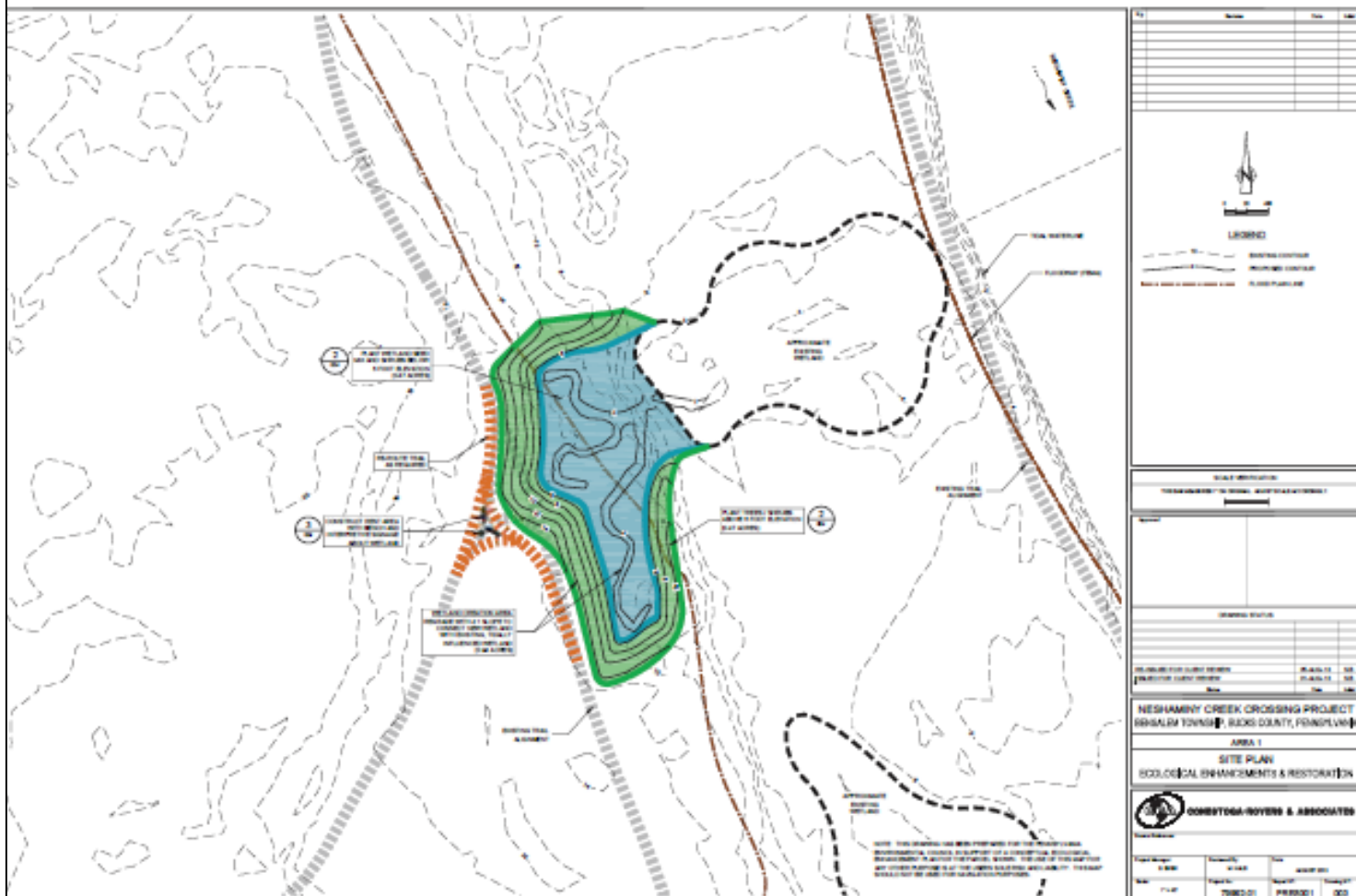
- **Area 3:** Soil factory area - underutilized



- **Area 4:** Erosion along Delaware River bank

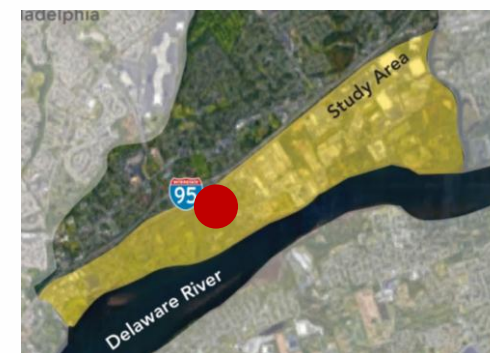


A1 - Wetland Creation/Mitigation



Neshaminy State Park

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Ecological Restoration Along the Trail



Andalusia and Bucks County Park

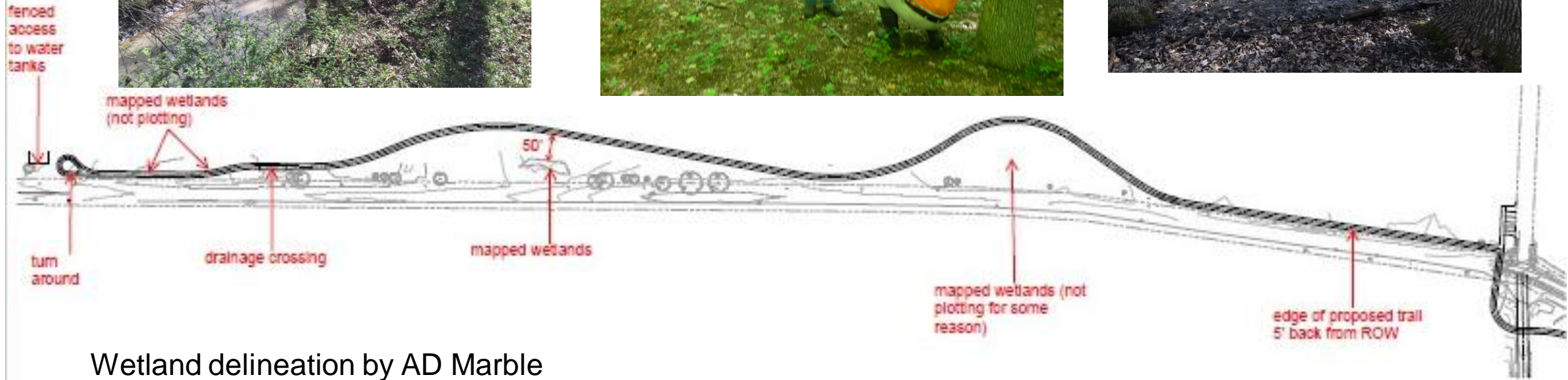
Enhance Atlantic Coastal Plain Forest

Greening the Greenway
Ecological Restoration Along the Trail

Wetland delineation

Locate trail on
Bucks County Park
and Andalusia
Foundation lands



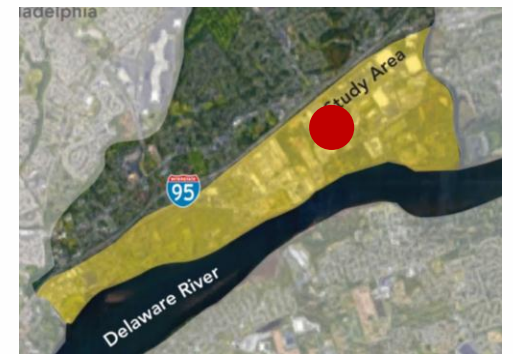


Wetland delineation by AD Marble
Trail Design by Gilmore & Associates



State and Street Road Wetlands

Green Gate Way to Bensalem Waterfront



Greening the Greenway
Ecological Restoration Along the Trail



Bucks County Park Shoreline

Potential Delaware River “living shoreline” restoration



Greening the Greenway
Ecological Restoration Along the Trail



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Project Funders



pennsylvania
DEPARTMENT OF CONSERVATION
AND NATURAL RESOURCES

William Penn
W I L L I A M P E N N
F O U N D A T I O N



pennsylvania
DEPARTMENT OF ENVIRONMENTAL
PROTECTION



Schuylkill Action Network Grants Page

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https://www.schuylkillwaters.org/resources/grants

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GRANTS

Area of Interest

Recreation

▼

Apply

Area of Interest

- Any -

- Any -

Abandoned Mine Drainage

Agriculture

Education and Outreach

Pathogens and Point Source

Recreation

Stormwater

Watershed Land Protection

Grant Program

Funder

Area of Interest

Eligible Region

Eligible Applicants

Award Amount

Date Due

Paul Racette
Program Manager - Watersheds
Pennsylvania Environmental Council
Southeast Office
1315 Walnut Street, Ste. 532
Philadelphia, PA 19107
215-545-4570 x112
www.pecpa.org



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