green ribbon trail
cedarbrook passage
contextually, the multipurposed significance of the Cedarbrook Passage is clearly defined. In its most obvious use, the passage serves as a connection piece on a trail that was previously disjointed. The central location of the Cedarbrook site should not be overlooked. Located within a one-mile radius of the site are four areas under the stewardship of the Wissahickon Valley Watershed Association (WVWA). All other areas that the WVWA tends to are within a five-mile radius. Welcoming to public access the passage is within one mile of two regional rail stations.
Vegetation inventory is necessary to identify exotic invasive species to remove and valuable native species to keep.

**Summary**

Located in suburban Montgomery County, Pennsylvania, the site is characteristic of a Northern Piedmont forest ecosystem within the Triassic Lowland; it includes gentle slopes, close proximity to streams and open fields. The Cedarbrook Passage is situated among a golf course, railway, industrial grounds, and a housing development. Topography changes are minor with a wet-mesic lowland and a mesic upland. Vegetation types range from wetlands, young woodlands, remnants of recent mature forest and small open parcels. The plant communities identified on the site include Jean Fike’s description for a Tuliptree-Beech-Maple forest (upland section) and a Sycamore-River Birch-Box Elder floodplain forest (lowland section). The site is in relatively good condition with many natives standing strong, particularly at the canopy level, however, there is extensive exotic invasion at the shrub and herb layer. Heavy deer browse is evident as scant examples of successional sapling development exist, thus increasing vulnerability to exotic invasion.

**Prevalence**

<table>
<thead>
<tr>
<th>High</th>
<th>Medium</th>
<th>Low</th>
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</thead>
</table>

**Note:** Assessment was done during the month of October; thus, inventory is likely missing many spring and summer ephemerals that would typically be associated with the plant communities listed above. Likely missing species: Podophyllum peltatum (may-apple), Sanguinaria canadensis (bloodroot), Botrychium virginianum (rattlesnake fern), Diocarpa cucullaria (dutchman’s breeches), D. canadensis (squirrel corn), Allium tricoccum (wild leek), Claytonia virginica (spring-beauty), Arisaema triphyllum (Jack-in-the-pulpit), Circaea lutetiana ssp. canadensis (broadleaf enchanter’s nightshade) and Maianthemum canadensis (bloodroot), Botrychium peltatum (may-apple), Sanguinaria canadensis (bloodroot), Podophyllum peltatum (may-apple), Ailanthus altissima (tree-of-heaven) and Fallopia japonica (false lily-of-the-valley).

**Vegetation inventory**

<table>
<thead>
<tr>
<th>Upland</th>
<th>Mesic</th>
<th>Canopy</th>
<th>Understory</th>
<th>Herbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red maple (Acer rubrum)</td>
<td>Norway maple (Acer platanoides)</td>
<td>Multiflora-rose (Rosa multiflora)</td>
<td>Japanese stiltgrass (Lysimachia nummularia)</td>
<td></td>
</tr>
<tr>
<td>Black oak (Quercus velutina)</td>
<td>Callery pear (Prunus calleryana)</td>
<td>Callery pear (Prunus calleryana)</td>
<td>Garlic mustard (Alliaria petiolata)</td>
<td></td>
</tr>
<tr>
<td>American beech (Fagus grandifolia)</td>
<td>American sycamore (Platanus occidentalis)</td>
<td>European bird cherry (Prunus padus)</td>
<td>Common buckthorn (Frangula alnus)</td>
<td></td>
</tr>
<tr>
<td>Hairy joint grass (Onoclea sensibilis)</td>
<td>Arrowhead (Sagittaria lancifolia)</td>
<td>Tartarian honeysuckle (Lonicera tatarica)</td>
<td>American bittersweet (Celastrus orbiculatus)</td>
<td></td>
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<tr>
<td>턴</td>
<td></td>
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<td></td>
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</tbody>
</table>
The hydrology of the Cedarbrook Passage is directly affected by its immediate surroundings. To the west, the trail is bordered by the Cedarbrook Country Club Golf Course, which is separated from the trail by the Wissahickon Creek. To the east of the trail is a suburban housing cul-de-sac with a significant amount of impervious pavement and lawn. The runoff from this development is handled by a culvert and appears not to affect the trail.

As shown in this floodplain map, both a 100-year and 500-year storm would affect portions of the trail. In 2011, Hurricane Irene and Tropical Storm Lee did reach 100-year flood levels as did Hurricane Floyd in 1999.

Hydrology is an important factor within this flood plain site. Flood information directly informs the design of elements such as the boardwalk and vernal pools.
wildlife
The Green Ribbon trail is located in the Wissahickon watershed, the home of various fauna, including all kinds of mammals, birds, reptiles, amphibians, and insects. White-tailed deer has a vast presence in this area, which becomes a sizable threat to the forest. Measures to protect seedlings from this threat should be taken into consideration when carrying out a restoration plan. Every year since 2006, WVWA has launched a birdathon event. For the year of 2013, 140 species were identified and recorded. This event offers important data for a better understanding of natural habitat with wildlife. It serves as an excellent educational strategy as well.

mammals
White-tailed Deer
Gray Squirrel
Eastern Chipmunk
Cottontail Rabbit
Marmot

birds
Sparrow
Cedar Waxwing
Pileated Woodpecker
Green Heron
Mourning Warbler
American Robin

reptiles
Ringneck Snake
Black Racer
Eastern Garter Snake
Red-eared Slider (invasive)
Eastern Painted Turtle

amphibians
Green Frog
American Toad
Redback Salamander
Two-lined Salamander

One goal of the Green Ribbon Trial is to attract wildlife by providing a healthy habitat. This analysis identifies existing and missing species, which will guide design of habitat improvements.
restoring the link between people and place

Envisioning design that fosters community awareness, appreciation and involvement with a restored woodland and wetland environment

design goals

To increase understanding of native environments through programming and signage

To enhance trail experience by highlighting areas of interest and improving circulation

To use restoration practices to eliminate invasive species, install native species, and stabilize wildlife habitat

To complete the missing half-mile link on the Green Ribbon Trail
The symbology of the area signs are comprised of pictographs that define the corresponding points of interest in the Cedarbrook Passage Trail.

Signage links the community to the WVWA mission, fostering a sense of appreciation and ownership of the site.
The restoration plan is based on a healthy reference plot in nearby Chester County. This aids in development of a native species list, planting density, and spacing.
Several invasive eradication methods are proposed, including goats, manual removal, and plastic sheeting.
This detail design addresses the existing erosion caused by a stormwater culvert. Proposed erosion control measures include large rocks and vegetation as well as an additional bridge.
The planting plan proposes herbaceous, understory, and canopy layers for several native forest associations.

### Tuliptree-Beech-Maple Forest
- Common Name
  - Red Maple
  - Sugar Maple
  - *Sweet Birch
  - *Mockernut Hickory
  - *American Beech
  - Tuliptree
  - Cucumber-birch
  - Black-gum
  - *Red Oak
  - Eastern Hemlock
- Latin
  - Acer rubrum
  - Acer saccharum
  - Betula lenta
  - Carpinus caroliniana
  - Fraxinus americana
  - Ostrya virginiana
  - Ailsa serrata
  - Podophyllum peltatum
  - Botrychium virginianum
  - Dicentra cucullaria
  - Dicentra eximia
  - Dicentra canadensis
  - Podophyllum peltatum
  - Botrychium virginianum
  - Dicentra cucullaria

### Red Oak - Mixed Hardwood Forest
- Common Name
  - Red Maple
  - Yellow Birch
  - *Sweet Birch
  - *Shagbark Hickory
  - *Mockernut Hickory
  - *American Beech
  - White Ash
  - Tuliptree
  - *Spicebush
  - *Hop-hornbeam
- Latin
  - Acer rubrum
  - Betula alleghaniensis
  - Betula lenta
  - Carpinus caroliniana
  - Fraxinus pennsylvanica
  - Platanus occidentalis
  - Ulmus rubra
  - Cornus amomum
  - Cornus sericea
  - Liriodendron tulipifera
  - Prunus serotina
  - Liriodendron tulipifera
  - Prunus serotina

### Upland/Wetland Transitional Forest
- Common Name
  - *Red Maple
  - Yellow Birch
  - Black Birch
  - *American Beech
  - Tuliptree
  - *Red Oak
  - *American Hornbeam
  - Flowering Dogwood
  - *Witchhazel
  - *Spicebush
  - *Hop-hornbeam
- Latin
  - Acer rubrum
  - Betula alleghaniensis
  - Betula lenta
  - Carpinus caroliniana
  - Fraxinus americana
  - Ostrya virginiana
  - Ailsa serrata
  - Podophyllum peltatum
  - Botrychium virginianum
  - Dicentra cucullaria
  - Dicentra canadensis
  - Podophyllum peltatum
  - Botrychium virginianum
  - Dicentra cucullaria

### Sycamore - River Birch - Box-Elder Floodplain Forest
- Common Name
  - Boxelder
  - Red maple
  - Silver Maple
  - River Birch
  - Red Ash
  - Sycamore
  - Black Willow
  - Red Elm
  - Swamp Dogwood
  - *Spicebush
  - Silky Willow
  - Frost Grape
- Latin
  - Acer negundo
  - Acer rubrum
  - Acer saccharinum
  - Betula nigra
  - Fraxinus pennsylvanica
  - Platanus occidentalis
  - Salix nigra
  - Ulmus rubra
  - Cornus amomum
  - Cornus sericea
  - Liriodendron tulipifera
  - Prunus serotina

Note: Other common Montgomery County native species may be used in formalized areas and within the edge design to accommodate site-specific programming and to allow for richer biodiversity.

Key:
- Tuliptree-Beech-Maple Forest
- Red Oak - Mixed Hardwood Forest
- Upland/Wetland Transitional Forest
- Sycamore - River Birch - Box-Elder Floodplain Forest
- U-0: Upland Patch Phase
- L-0: Lowland Patch Phase

The planting plan proposes herbaceous, understory, and canopy layers for several native forest associations.
Helical pile systems consist of a tubular shaft with a helical steel plate fixed to the bottom. These devices are then screwed into the ground using hydraulic rotary drivers. Although available in a wide range of sizes, the piles necessary for this project would be relatively small; thus necessitating smaller machinery to install. Helical piles are beneficial for this project because they can be installed quickly, they require minimal manpower to install, and their installation requires minimal disturbance of plant material below the ground plane.

Due to the sensitive nature of the wetland, a helical anchor boardwalk was designed to avoid heavy natural disturbance. The boardwalk was designed to protect existing trees and to be ADA accessible.
Vernal pools provide a valuable breeding habitat that many reptile, amphibian, and invertebrate species depend upon. Through simple changes in topography and soil compaction, vernal pools can be created to increase the biodiversity of the site while simultaneously creating valuable education opportunities. Although they receive little attention, these pools are important in maintaining viable wildlife communities in the forest ecosystem.

Because of the ecological value of vernal pools, this design proposes the enhancement of existing pools and addition of new pools in the forest floodplain area.
A Space for Children to Play and Learn

The Woodland Classroom offers children a place to explore, play and learn. The theater is made of reclaimed Norway Maple and Oriental Bittersweet vines, and provides a stage for children to be the star of their own production.

Plan View

The Woodland Classroom is located next to Mathers Road and the railroad. Frost Grape is planted along the fence to provide a screen, paired with Black Willow, Red Maple, Slippery Elm, Spicebush, Silver Maple, and Witch Hazel. Ground cover includes native ferns and woodland asters.

This open space classroom provides an opportunity for environmental education and recreation. Early education is the first step towards environmental stewardship.
To comply with the wishes of Cedarbrook Country Club, a series of berms consistent with the golf club aesthetic were designed.

grading

To connect with the topography of the golf course and provide a screen for the trail, subtle grading changes were used to create a series of berms ranging from 2'-0" - 4'-0" in height.

using convex and concave slopes and organic lines, these elevation changes will provide an attractive view for golfers and pedestrians on the trail.

when planted with a mix of vegetation ranging from 1'-0" to 4'-0" in height, the berm will provide gentle screening up to 7'-0" high.

A vegetated screen

4'-0" tall berm

sand trap

hole

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Herbs, grasses, sedges, and ferns were selected to bridge the conditions from the trail and shaded forest interior to the sunny golf course edge.