Master Plan

Reverend Evers Park - Camden New Jersey

Exercise + Ecology

June 1, 2015

Prepared by:
John Nystedt, RLA, LEED AP BD+C

Funded by:
Foundation for a Better Tomorrow

Newton Creek at Reverend Evers Park

DELAWARE RIVERKEEPER NETWORK™

Page intentionally left black

Contents

GOALS AND OBJECTIVES	4
EXECUTIVE SUMMARY OF SITE PROGRAM	4
EXISTING CONDITIONS	5
FACILITIES MASTER PLAN	12
ECOLOGICAL MASTER PLAN	15
Appendix i – Proposed Planting By Zone (plant lists)	18
Appendix ii – Invasive Species and Management Recommendations	21
Appendix iii – “Fitness in Disguise” (excerpted)	22
Appendix iv – Definitions	28

Acknowledgements

The Delaware Riverkeeper Network worked closely with the Morgan Village Circle Community Development Corporation in the development of this Master Plan, and appreciates the collaboration and/or input from the following groups during the Master Planning and outreach process.

- Morgan Village Circle Community Development Corporation
- New Jersey Shade Tree Commission
- Coopers Ferry Partnership
- City of Camden
- Camden County
- Camden Greenways
- Newton Creek Watershed Association
- Melissa Boffa and Sally Reynolds, Landscape Architects
- Department of Landscape Architecture at Philadelphia University
- OLIN

Special thanks go to the Foundation for a Better Tomorrow for funding this effort, enabling DRN to develop the Master Plan and strengthen collaborations.

Foreward

This Master Plan builds upon concepts in the “Conceptual Landscape Master Plan: Strategies for Greening and Revitalization”, completed in 2012 by the Department of Landscape Architecture at Philadelphia University, led by Richard Newton, Sally Reynolds and Katy Martin of the Olin Partnership in close collaboration with the Morgan Village Circle Community Development Corporation (MVCCDC).

The Delaware Riverkeeper Network, MVCCDC, and Sally Reynolds selected applicable concept strategies from the “Conceptual Landscape Master Plan” for the park, including “Fitness in Disguise,” by Melissa Boffa, and ecological themes.

This Master Plan integrates and rationalizes the selected strategies in order to provide a solid framework for phased implementation.

Goals and Objectives

Exercise + Ecology:
Enhancing the health and well-being of residents while improving the environment

1. Enhance health and well-being

- Design paths and trails for varied lengths of walking/running/biking
- Integrate exercise areas into landscape features
- Provide low, medium and high impact areas of exercise
- Maintain existing sports areas and improve areas in disrepair
- Increase variety of exercise, for instance, tennis
- Coordinate with regional trail plans
- Improve community garden facilities
- Improve the neighborhood by improving the park

2. Raise ecological awareness and encourage environmental stewardship

- Provide paths and boardwalks adjacent to Newton Creek and in the riparian woodland to provide opportunities for education
- Educate through ecological signage along paths, trails and boardwalks
- Invite neighbors, students, park users, and watershed partners to particpate in restoration projects and cleanups
- Encourage job training and volunteerism to build skills needed to maintain parks and green stormwater infrastructure
- Renovate the existing unused community center to create an Environmental Center

3. Improve water quality in Newton Creek while improving habitat

- Clean and infiltrate runoff from roads and pavements, using green stormwater infrastructure techniques
- Widen the woodland riparian zone, converting lawn and unused areas into woodland
- Remove plants in the riparian zone that can stifle native diversity and habitat for native species, and replace with native species
- Remove trash, litter and debris from the riparian woodland

Executive Summary of Site Program

Active Recreation
- Exercise equipment (proposed equipment based on “Fitness in Disguise”)
- Three tennis courts (at existing defunct basketball courts)
- Three existing basketball courts
- Existing playground and splash area
- Improved existing softball/little league field close to Morgan Street
- Multi-purpose field: soccer, football, baseball (at existing baseball)
- Existing community garden – consolidated
- Fishing pier

Circulation
- Pathways/trails, in park and along river; connect to Mt. Ephraim Ave
- Boardwalk(s) along Newton Creek
- Future footbridge over Newton Creek – lower priority
- Improved driveway and parking at community garden/multi-purpose field

Site Furnishings
- Lighting – repaired and new
- Site furnishings – benches, litter receptacles, picnic tables
- Seating areas – integrated with exercise locations for multi-function use
- Signage focusing on ecological education

Buildings
- Work Shed for gardeners (replace existing shed)
- Environmental Center – renovate the existing unused community center

Habitat Improvement
- Riparian woodland management/planting
- Conversion of selected open areas and unused garden plots into riparian woodland
- Vegetated swales and rain gardens collecting street & site runoff
- Park trees
- Tidal wetland enhancements

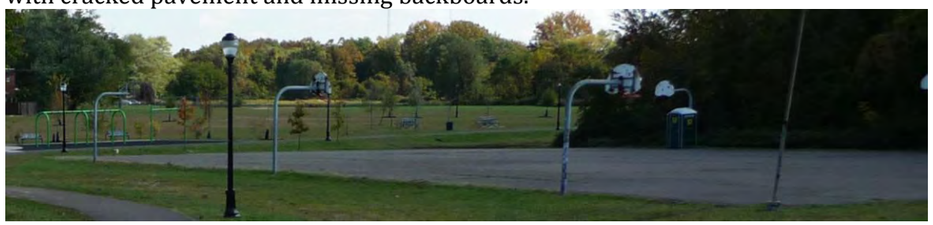
Existing Conditions

The park is located in Morgan Village between a neighborhood of residences and Newton Creek, just southeast of the new Creative Arts Morgan Village Academy. The park study area addressed in this report comprises of approximately 32 acres of land plus 8 acres of freshwater tidal marsh north of the Creek and Morgan Boulevard, and bounded by Morgan Street and homes on the north side of the park.

Sports & Active/Passive Recreation - Existing

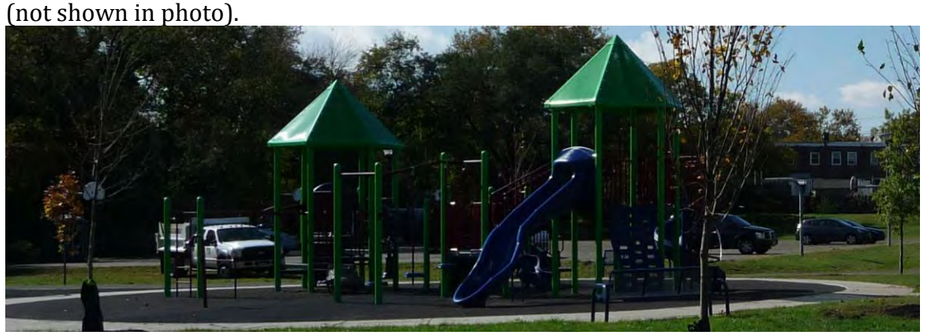
Three basketball courts near Morgan Street are in good/fair condition.

Three defunct basketball courts (near Morgan Boulevard homes) are in poor condition with cracked pavement and missing backboards.



Splash area is in good condition (mechanics/plumbing not reviewed)

Children's play equipment is in good condition, though the rubber play surface is starting to fall apart in limited areas. Swings are missing/removed from swing set (not shown in photo).



Little league/softball field near Morgan Street is in fair good condition, though the playing field has non-level areas.

Baseball field in center of the park is in poor condition (no sand infield, poorly graded)

Former lawn area that has partially become a meadow; it appears to be mowed occasionally; may have been used in past for sports activities. A gravel driving lane passes through the field.

Walks – Existing

The asphalt walk below leads from a small parking lot (in the middle of the park at the community gardens) to the Newton Creek.

Walks in the park are primarily asphalt with some newer concrete walks and are mostly located on the northwest end of the park near Morgan Street and Morgan Boulevard. Most are in good condition.

Roads and Parking – Existing

Small and rarely used accessible parking lot connects to asphalt path to Newton Creek.

Gravel driveway from Lakeshore Drive to the small parking lot and community gardens.

Driving lane through the lawn/meadow adjacent to the community gardens (see tire tracks on the right side of the photo below)

Community Gardens – Existing

Community gardens have been an historically important feature of the park. They are located in the riparian woodland buffer zone. Photo below shows a gardener explaining his work to a DRN / Newton Creek Watershed Association tour.

Many community gardens are not being utilized, and are being overtaken by weeds and brush.

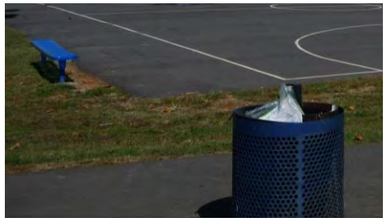
Site Furnishings & Lighting - Existing

Modern beautiful lighting has been installed around the park walkways. Many have been vandalized. The basketball court near Morgan Street is lit (system not reviewed).




Picnic area is in poor condition because tables have been vandalized.

Benches at the basketball court are in fair condition. Other benches and litter receptacles are in good-to-fair condition.




Surface Water Hydrology - Existing

Most of the surrounding street runoff is collected in the storm drainage system. A few areas of street and parking runoff flow into the park landscape. Grass swales collect stormwater runoff from the basketball area and direct it towards the riparian forest.

Opportunities exist for intercepting stormwater from curbside storm drains and diverting them into rain gardens in the park, but may be cost prohibitive due to the excavation, piping and site repair needed.

However, on Morgan Boulevard, curb-side rain gardens could be installed to clean runoff before entering Newton Creek – a "green streets" approach that would be cost-effective. Also, on Morgan Street opposite Lakeshore Drive, a storm drain captures significant street runoff; some of this runoff could be efficiently diverted to a rain garden northeast of the eastern entry to the parking school parking lot.

Legend

Street Runoff

Park Runoff

Storm Drain

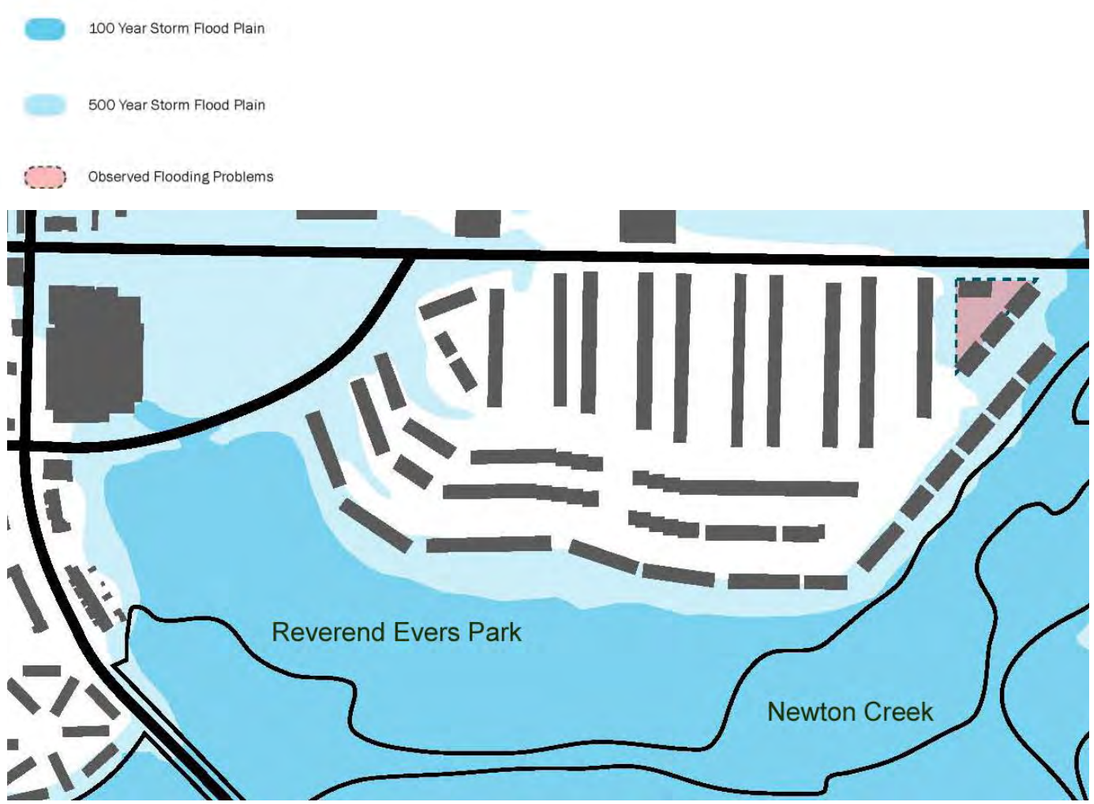
Swale

Storm Drain - minor

hp High Point

Surface Water Hydrology - Existing (continued)

Much of the park is in the 100 year floodplain as shown in the image below excerpted from the “Conceptual Landscape Master Plan: Strategies for Greening and Revitalization." Newton Creek, flowing east to west, is tidal along Reverend Evers Park, rising and falling with the Delaware River which is a less than a mile downstream to the west. Sometimes it inundates the community gardens, and occasionally during drought gardeners use the Creek water to add water to the gardens. In the future, sea level rise will have the effect of increasing flooding in the park.



Soils

According to the “Conceptual Landscape Master Plan: Strategies for Greening and Revitalization” the park is primarily historical fill. Soil in the riparian forest and community gardens has benefited from deposition during flood events and grows a rich variety of plants.

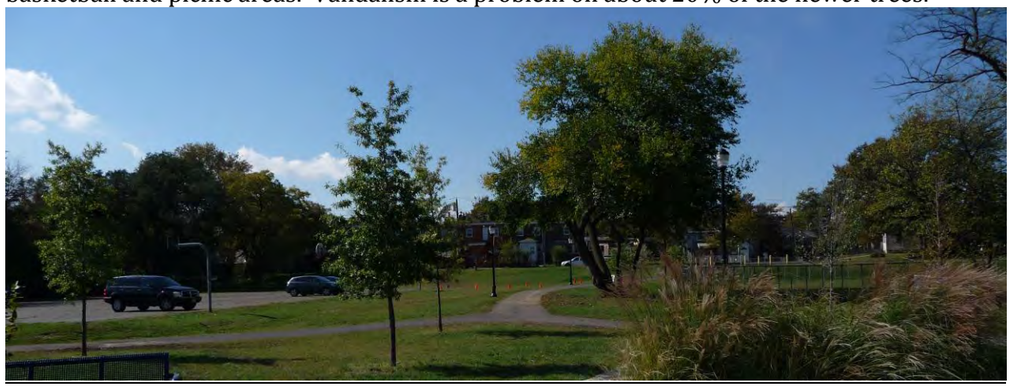
Vegetation - Existing

The riparian woodland has a good stand of native trees, but also has some invasives. Many invasives have invaded the unused community garden areas as shown in the photo below.

<u>Prominent Species in the Riparian Woodland and Abandoned Garden Plots</u>
Acer saccharinum - Silver Maple, Swamp Maple
Ailanthus altissima - Tree of Heaven*
Albizia julibrissin – Silk Tree, Mimosa*
Alliaria petiolate - Garlic Mustard*
Ambrosia artemisiifolia – Common Ragweed
Amorpha indica - Indigo bush
Artemesia vulgaris – Mugwort*
Fraxinus sp. – White/Green Ash
Ipomoea sp. - Morning Glory*
Juglans nigra - Black Walnut
Lonicera japonica - Japanese Honeysuckle*
Morus alba – White Mulberry*
Parthenocissus quinquifolia - Virginia Creeper
Persicaria perfoliata - Mile-A-Minute-Vine*
Platanus occidentalis - American Sycamore
Prunus serotina - Black cherry
Salix sp. – Willow (nativity to be determined)
*Invasive Species (non-native)

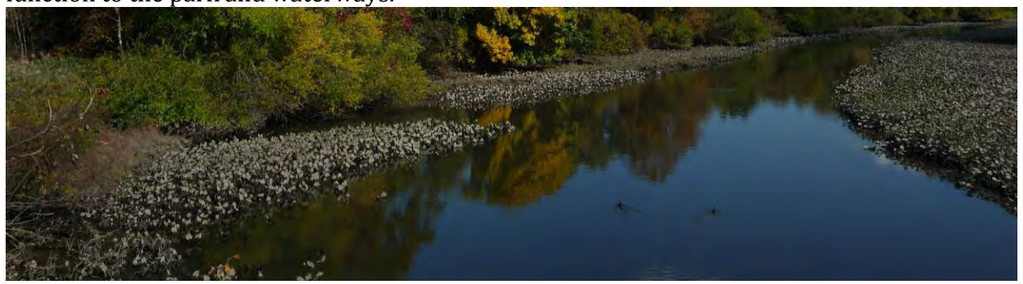
The open field at the east end of the park, next to the community gardens is a low quality meadow with many invasive species including Japanese Hops, an invasive vine that can overwhelm restoration efforts; it appears occasionally mowed.

Much of the park is lawn with trees. There are a few mature trees around the softball/little league field, and more have been planted around the playground, basketball and picnic areas. Vandalism is a problem on about 20% of the newer trees.



<u>Primary Tree Species in the Lawn Areas</u>
Amelanchier sp. – Shadblow
Nyssa sylvatica - Blackgum
Prunus serrulata ‘Kwanzan’ - Kwanzan Cherry (along Morgan Street)
Platanus x acerifolia - London Planetree
Quercus bicolor - Swamp White Oak
Ulmus americana ‘Princeton’ - Princeton American Elm

Newton Creek is lined by a Freshwater Tidal Marsh. Approximately 8 acres of marsh is on the north side of creek adjacent to the park, contributing important ecological function to the park and waterways.



Fauna

Species typical for the area are found at the park, including deer, raccoon, turkey, fox and opossum. The waterway is used by wading birds such as great egret and great blue heron, and is frequented by bald eagles and hawks.

FACILITIES MASTER PLAN

Master Plan Concept: Exercise + Ecology

Plan prepared for the Morgan Village Circle CDC; based on the 2012 "Conceptual Landscape Master Plan: Strategies for Greening and Revitalization", focusing on the "Fitness in Disguise" section by Melissa Boffa, and ecological themes.

Plan developed by John Nystedt, DRN with input from Sally Reynolds and Melissa Boffa

Site Program Elements

- Paths / Trails
- Boardwalk & Pier
- Site Furnishings & Lighting
- Environmental Education Signs
- Community Gardens (existing) and work shed
- Picnic Areas - existing
- Environmental Center - at exist. building indicated with E.C. on the plan
- 3 Basketball Courts - existing
- 3 Tennis Courts
- Softball / Little Leage field - refurbish existing
- Multi-Purpose Field: Baseball/Soccer/Football - rebuild
- Play: Splash Area and Playground - existing
- Exercise Stations - indicated with "E" on the plan; (E* indicates space will also function as a seating plaza)

Refer to the Ecological Master Plan for riparian buffer restoration, park plantings, green stormwater infrastructure, and habitat improvements.

Active Recreation - Sports, Exercise, Gardening, Fishing

Exercise Equipment
Exercise equipment should be integrated into the landscape based on "Fitness in Disguise" in the "Conceptual Landscape Master Plan: Strategies for Greening and Revitalization". Refer to excerpts in the Appendix of this Master Plan report.

Tennis Courts
Three proposed courts fit will approximately on the footprint of the existing defunct basketball courts near the houses at along Morgan Boulevard.

Existing Basketball Courts
Maintain courts.

Existing Playground and Splash Area
Maintain. Convert swing set area to exercise equipment if City Parks Department does not want swings. Play surface will need repair in near future as it has started to fall apart in some locations, and that type of soft synthetic surface is known to have a limited life span.

Existing Softball/Little League Field
This field close to Morgan Street is in fair condition. Re-grading and re-seeding is needed due to the prominent ridge and slope at the back of the infield, among other issues.

Multi-Purpose Field
The field should be re-built and maintained. It can accommodate: soccer, football, and baseball.

Existing Community Garden
Many of the plots are apparently unused, so it would be ecologically beneficial to consolidate the plots and restore contiguous sections (preferably the western plots) into riparian forest, though this needs approval by the gardeners first.

Fishing Pier
A pier is recommended to be installed to provide an opportunity for fishing and enjoyment of the Newton Creek. It may also be designed for small boat docking/launching. Educational signage should be added to support ecological education. The materials will need to be a vandal resistant wood and/or metal. The image below is excerpted from the "Conceptual Landscape Master Plan: Strategies for Greening and Revitalization."

Circulation

Paths/Trails
Pathways/trails as well as boardwalks will provide both exercise and ecological educational opportunities in the park and along the creek. A variety of distances will be available for different levels of exercise as described in the "Fitness in Disguise" strategy. As shown in the "Education through Ecology" strategy in the same report, the path system "will take the residents and students through different ecotypes allowing for them to learn about all about the plants and animals that exist in each space. The paths are also functional and connect the separate neighborhoods to one another…"

Paths/trails should connect to Mt. Ephraim Ave to provide a route to the businesses including the new PriceRite supermarket; however this connection will require a boardwalk paralleling the Newton Creek where it meets Mt. Ephraim Ave, due to the tight site constraints, and/or land acquisition. This connection also completes a link in regional bikeway/trail planning shown in the following images.

Circulation (continued)

Bike routes are proposed for Fairview and Reverend Evers Park in the 2014 "Camden County Bikeways Inventory" shown below.

The proposed trail network in the 2010 Camden Greenway Report by RBA includes Reverend Evers Park. The connection is included in the Facilities Master Plan in this report.

Boardwalk & Footbridge

A boardwalk will enhance educational opportunities, linking a new Environmental Center with the fishing pier and paths in the park, providing close interaction with Newton Creek as well as in the riparian woodland. Ecological signage is recommended along these boardwalks.

A footbridge over Newton Creek (shown as a dashed line in the Facilities Master plan is a future lower-priority connection to parkland across the Creek and to Mt. Ephraim Ave.

Improved driveway and parking

Because there is no driveway in good condition from Lakeshore Drive to the existing accessible parking spaces that were recently installed, an improved driveway and loop is recommended to allow reasonable entry and exit. This loop will also provide a reasonable driving route for anyone needing vehicular access.

Site Furnishings

Lighting

Replace existing lighting with more vandal-resistant lighting; and supplement with new lighting that is vandal-resistant. Utilize low glare fixtures.

Site furnishings

Add benches and litter receptacles to match existing, plus additional benches and seatwalls that support the "Fitness in Disguise" theme. Picnic tables have been badly vandalized so a more vandal-resistant type should be utilized. Enhance exercise areas with seating to create multi-use spaces that function as gathering plazas.

Signage

Install vandal-resistant signage focusing on ecological education. It can be free-standing as well as mounted on boardwalks and decks.

Buildings

Workshed for Gardeners

Remove existing shed and replace with new work shed for use by gardeners.

Environmental Center

Renovate the existing community center on Morgan Street to accommodate environmental exhibits, small meetings, and public restrooms.

Ecological Master Plan

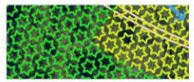
Legend (refer to report text for descriptions and Appendix for plants)

Recreational: Lawn, Plantings, and Sports
Increase tree canopy, improve park aesthetics

Community Gardens - Existing
Consolidate used areas

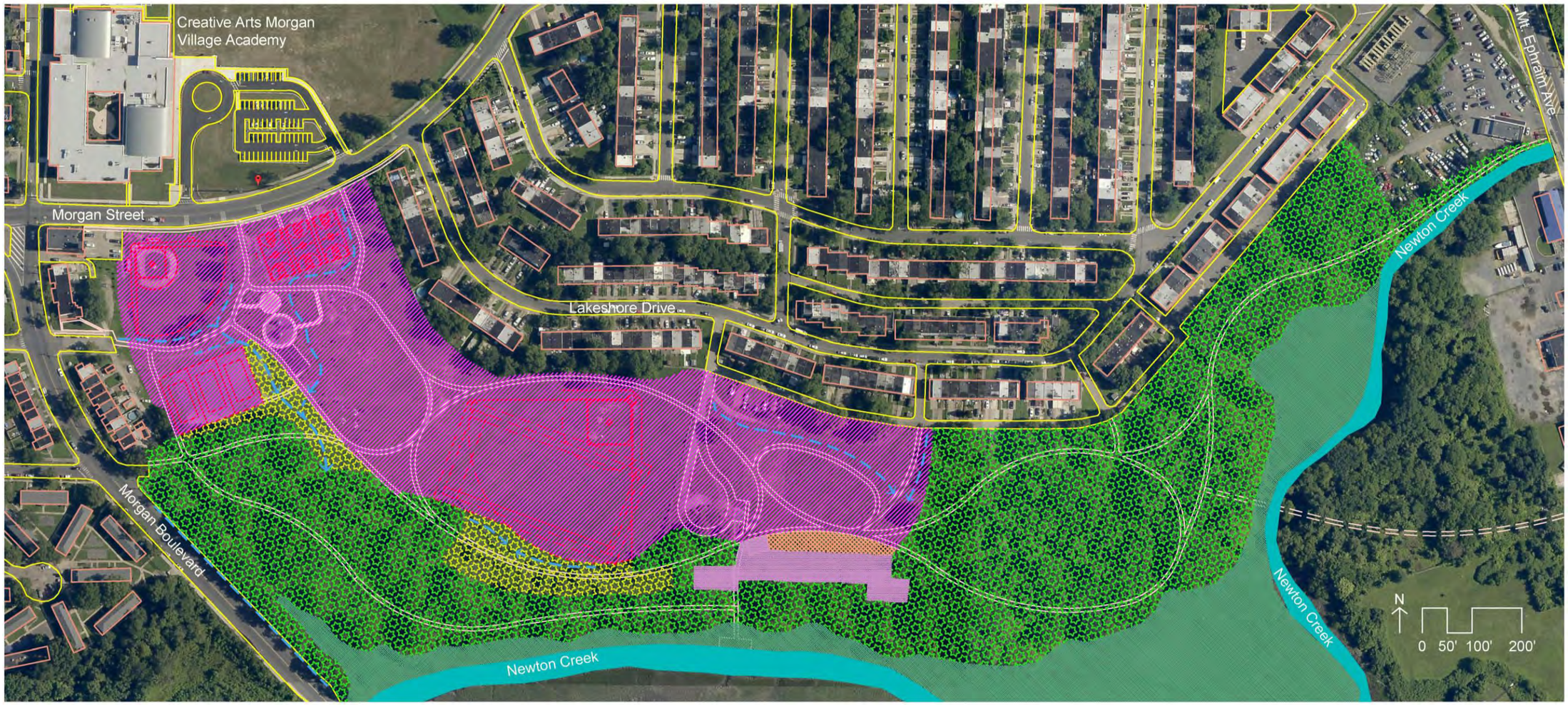
Green Stormwater Management (blue lines)
Slow and clean run-off with vegetated swales and rain gardens

Transitional: Meadows and Successional Woodlands
Improve native diversity and increase tree canopy



Riparian Woodland: Improve (green) and Restore/Expand (yellow)
Improve native diversity, restore gaps, widen

Tidal Freshwater Marsh
Improve native biodiversity



Zones

The areas indicated Ecological Master Plan on the previous page are described below. Refer to plant lists in the Appendix for additional information.

Recreational Area – Lawn, Plantings and Sports

Increase tree canopy by planting native trees appropriate for each area. Use shade trees that are 2" caliper minimum to help limit damage by vandalism. Include flowering trees to improve park aesthetics and plant diversity; use the trees as part of the sequence of bloom so something is flowering most of the growing season.

Community Gardens

These provide an important social and health role for the community. However, because there seem to be significant plots going unused, it would be ecologically beneficial to convert some areas to riparian woodland. It may be feasible to phase out the western plots and consolidate on the eastern side (east of the path that leads to the water). Coordination with the gardeners will be needed over the coming years.

Green Stormwater Management

Green stormwater management (such as vegetated swales and rain gardens) slows runoff, cleans it with planting and soils, improves infiltration, and can increase habitat value.

Ideally, street pavement runoff could be diverted into the park to keep it out of the combined stormwater/sewer system, taking pressure off the system during storms, helping to diminish combined sewer overflow discharges. However to accomplish this at the park, piping would be needed between street stormwater drains and the proposed swales/rain gardens in the park. For instance there is water flowing in storm drains on Lakeshore Drive, Morgan Boulevard, and Morgan Street that could be diverted to the park via pipe, using diversion chambers placed in storm drains, or installing additional diversion storm drains. This is a more expensive type of diversion than a simple curb-cut that lets water directly into a rain garden. Some of the stormwater from Lakeshore drive already is discharged into the park, for instance on the east end. A further review of the stormwater system is required to identify and quantify possibilities.

There is an opportunity to divert building downspouts that currently discharge stormwater into the streets and sewer system, and divert it to the park swales/rain gardens. However initial site review indicates most roof downspouts are already diverting water into the park.

An area of pavement behind the fire house (which may include roof runoff) discharges water into the Morgan Street; it could be collected at the corner of the baseball field and diverted to an infiltration trench; there is no room near the little league field to install a rain garden near the fire house.

Along Morgan Boulevard, there is an excellent opportunity to install a curb-side linear rain garden by converting pavement on the north side of the street into a depressed planting area, and diverting street runoff through the rain garden before entering the storm drainage system. Refer to the green area in the photo below, which can be planted with trees and perennials.

The Morgan Village Circle CDC has expressed its desire for the rain gardens and vegetated swales to be visually interesting and beautiful to a casual observer year-round. To accomplish this, the areas will need to include evergreen species, colorful stems in winter, colorful leaves where native cultivars are available, and a sequence of bloom extended spring to fall; native warm season grasses will be installed in large swaths in some areas, to provide fall and winter interest and strong structure to the landscape. Trees and shrubs need to be selected to give year-round structure to the green stormwater management areas, to avoid the "just-dead-perennials" look for the winter months.

Transitional: Meadows and Successional Woodlands

Increasing plant diversity and tree density in these areas will help extend the ecological function of the riparian buffer into the park. Selected lawn areas will be converted to meadow to help reduce mowing and improve habitat. Existing meadows should be managed to reduce invasive species and increase native species. Trees and some shrub masses will be installed to help reduce stormwater runoff, improve shade, and improve habitat.

Riparian Woodland
The riparian woodland will be widened and gaps will be filled in with new plantings. The preferred sequence is to fill in with trees first, then shrubs later when the tree canopy is increased significantly. By increasing the tree cover, it helps limit some invasive species, giving the natives a chance to get established.

Where green stormwater infrastructure (vegetated swales and rain gardens) abuts the riparian woodland, the swales and/or rain gardens are to be planted densely as a means to widen the riparian buffer.

Invasive species in the areas of new plantings will need to be managed to give the new plantings a reasonable chance of survival. For instance, invasive vines such as Japanese Hops could overtake smaller trees, and would need removal a couple times a year during plant establishment. Installing taller trees, for instance trees at least 10 feet tall rather than saplings, would help this process.

Deer are present in the woodlands, therefore deer protection will be needed for the new trees, including cages or tubes (to help prevent antler-rubbing damage), and to protect the trees from browsing. Planting trees that are about 14 feet high can help prevent browsing damage, because the lower branches can be above browse height.

Tidal Freshwater Marsh
Intensive management of the freshwater tidal marsh is not recommended during the early phases of site restoration. However to support the educational and ecological goals, future analysis may reveal certain species that would be ideal for planting for educational and ecological function. The plant list in the appendix includes possible species.

Ecological Education

Signage
Refer to "Site Furnishings" described in the Facilities Master Plan section above.

Job Training / Volunteering
The project should be utilized as part of a program to train individuals in installation and maintenance of green stormwater infrastructure and habitat restoration. This can be training for both job skills and for skilled volunteers.

Fauna

Pollinators
The new plantings should include a significant quantity of plants used by pollinators, including birds and butterflies. Refer to "Selecting Plants for Pollinators" by the Pollinator Partnership and NAPPC.

Wading Birds and Bald Eagles
Egrets, herons and bald eagles have significant opportunities for hunting for food in the Newton Creek Watershed. No special accommodation is anticipated to be needed for these species, though the waterside boardwalk will provide excellent opportunity for observing these species.

Bird Boxes
Bluebird and swallow boxes can be built as educational projects and installed at the park, though they are best installed high to limit vandalism. These species will help limit the insect population.

Deer
Deer pose a problem for planting establishment. If initial plantings experience difficulties with getting established due to deer browsing and rubbing, then a new approach should be implemented for protecting the plants.

Voles
Voles sometimes can damage entire tree plantings by nibbling the bark off of trees at the base of the trees, especially in grassy areas. Should this become a problem at the park, then advanced establishment/maintenance techniques will be needed to limit the growth of low vegetation around the trees until they get better established (the voles use the low vegetation to hide when approaching the trees).

Aquatic
Additional research will need to be done to identify opportunities for improving aquatic life, in conjunction with plant species biodiversity review, in later phases.

Other
A wide range of additional fauna live in the park including observed fox and turkey. These species are welcome as part of a healthy environment.

Appendix i – Proposed Planting By Zone

Botanical Name	Common Name	Notes	Recreational Area	Green Stormwater Management (full sun)	Transitional - Meadows and Successional Woodland	Riparian Woodland (fill gaps)	Freshwater Tidal Marsh
Trees							
Acer negundo	Box elder				X	X	
Acer rubrum	Red maple	Highly ornamental	X	X	X	X	
Acer saccharinum	Silver maple			X	X	X	
Betula nigra	River Birch	Highly ornamental	X	X	X	X	
Carpinus caroliniana	Ironwood		X				
Celtis occidentalis	Hackberry		X				
Cercis canadensis	Redbud	Highly ornamental	X				
Cornus florida	Flowering dogwood	Highly ornamental	X				
Fagus grandifolia	American beech	Highly ornamental	X				
Gleditsia triacanthos	Honey locust	Thornless in Rec. Area	X	X	X	X	
Juniperus virginiana	Red cedar	Evergreen	X		X		
Liquidambar styraciflua	Sweet gum	Fruitless in Rec. Area		X	X	X	
Liriodendron tulipifera	Tuliptreee		X		X		
Magnolia tripetala	Umbrella magnolia	Highly ornamental				X	
Magnolia virginiana	Sweetbay	Highly ornamental	X	X			
Nyssa sylvatica	Black gum	Highly ornamental	X	X	X	X	
Pinus strobus	White pine	Evergreen	X				
Platanus occidentalis	American sycamore	Highly ornamental		X		X	
Populus grandidentata	Bigtooth aspen					X	
Prunus serotina	Black cherry				X	X	
Quercus bicolor	Swamp white oak		X	X		X	
Quercus falcata	Southern red oak		X				
Quercus phellos	Willow oak		X	X	X	X	
Rhus copallina	Winged sumac		X				
Rhus typhina	Staghorn sumac		X				
Salix discolor	Pussy willow		X	X		X	
Salix nigra	Black willow			X		X	
Sassafras albidum	Sassafras		X				
Tilia americana	Basswood		X				
Ulmus americana	American elm	resistant variety		X		X	
Viburnum lentago	Nannyberry		X				
Viburnum prunifolium	Blackhaw		X				

Botanical Name	Common Name	Notes	Recreational Area	Green Stormwater Management (full sun)	Transitional - Meadows and Successional Woodland	Riparian Woodland (fill gaps)	Freshwater Tidal Marsh
Shrubs							
Amorpha fruticosa	False indigo			X		X	
Cephalanthus occidentalis	Buttonbush			X		X	
Clethra alnifolia	Sweet pepperbush	Highly ornamental	X	X	X	X	
Cornus amomum	Silky dogwood		X	X	X		
Cornus sericea	Red-twig dogwood	Highly ornamental	X	X	X		
Cornus sericea flaviramea	Yellow-twig dogwood	Highly ornamental	X	X	X		
Fothergilla gardenia	Dwarf fothergilla	Highly ornamental	X				
Hamamelis virginiana	Witch hazel		X				
Hydrangea arborescens	Wild hydrangea					X	
Ilex glabra	Inkberry	Evergreen	X	X			
Ilex verticillata	Common winterberry	Highly ornamental	X	X	X		
Lindera benzoin	Spicebush	Highly deer resistant		X		X	
Myrica pensylvanica	Northern bayberry	Semi-evergreen	X				
Parthenocissus quinquefolia	Virginia creeper					X	
Physocarpus opulifolius	Ninebark		X	X			
Rhododendron periclymenoides	Pink azalea	Highly ornamental	X				
Vaccinium corymbosum	Highbush blueberry	Highly ornamental	X	X	X		
Viburnum dentatum	Arrowwood		X	X	X	X	

Grasses

Botanical Name	Common Name	Notes	Recreational Area	Green Stormwater Management (full sun)	Transitional - Meadows and Successional Woodland	Riparian Woodland (fill gaps)	Freshwater Tidal Marsh
Andropogon glomeratus	Bushy Broomsedge	Winter interest		X	X	X	
Andropogon virginicus	Broomsedge	Winter interest	X	X	X	X	
Carex debilis	White-edged sedge			X			
Carex stricta	Tussock sedge			X			
Carex tribuloides	Blunt broom sedge			X			
Carex vulpinoidea	Fox sedge			X	X	X	
Chasmanthium latifolium	River Oats	Highly ornamental	X	X			
Cinna arundinacea	Wood reed					X	
Dichanthelium clandestinum	Deertongue grass			X	X	X	
Eleocharis ovata	Ovate spikerush			X			
Elymus hystrix	Bottlebrush grass			X			
Elymus virginicus	Virginia wild rye			X	X	X	
Glyceria striata	Fowl manna-grass			X			
Juncus effusus	Common rush			X		X	
Juncus tenuis	Path rush			X	X	X	
Muhlenbergia capillaris	Pink muhly grass	Highly ornamental	X				
Panicum virgatum	Switchgrass	Highly ornamental	X	X	X	X	

Note: Most of the grasses are highly deer resistant

Herbaceous

Botanical Name	Common Name	Notes	Recreational Area	Green Stormwater Management (full sun)	Transitional - Meadows and Successional Woodland	Riparian Woodland (fill gaps)	Freshwater Tidal Marsh
Ageratina altissima	White snakeroot			X	X		
Apocynum cannabinum	Dogbane			X	X	X	
Asclepias incarnata	Swamp milkweed	Highly ornamental		X		X	
Asclepias syriaca	Common milkweed	Highly ornamental			X		
Conyza canadensis	Horseweed				X		
Echinacea purpurea	Purple coneflower	Highly ornamental	X	X	X		
Eupatorium fistulosum	Joe-Pye weed	Highly ornamental		X		X	
Eupatorium perfoliatum	Boneset			X		X	
Euthamia graminifolia	Grass-leaved goldenrod			X		X	
Geranium carolinianum	Carolina geranium					X	
Geum laciniatum	Rough avens			X	X		
Heliopsis helianthoides	Oxeye	Highly ornamental			X	X	
Iris versicolor	Blue flag	Highly ornamental		X			
Juncus effusus	Soft rush			X		X	
Juncus tenuis	Path rush			X	X	X	
Juncus volpinoides	Fox sedge			X			
Liatris spicata	Gayfeather	Highly ornamental	X	X			
Lobelia siphilitica	Great lobelia	Highly ornamental		X			
Mimulus ringens	Monkeyflower			X		X	
Monarda fistulosa & didyma	Wild bergamot	Highly ornamental	X	X	X	X	
Polygonum pensylvanicum	Pennsylvania smartweed			X		X	
Polygonum punctatum	Dotted smartweed			X		X	
Rudbeckia fulgida	Orange coneflower	Highly ornamental		X	X		
Rudbeckia fulgida var fulgida	Black-eyed susan	Highly ornamental	X				
Rudbeckia hirta	Black-eyed susan	Highly ornamental		X	X	X	
Rudbeckia laciniata	Cut-leaf coneflower			X	X		
Rudbeckia triloba	Brown-eyed Susan	Highly ornamental			X	X	
Silene virginicus	Firepink	Highly ornamental	X		X		
Solidago canadensis	Canada goldenrod				X		
Solidago rugosa	Rough-stem. goldenrod	Highly ornamental		X	X	X	
Symphyotrichum l. "Bluebird"	Bluebird aster	Highly ornamental					
Symphyotrichum novae-angliae	New England aster	Highly Ornamental		X	X	X	
S. novae-angliae "Purple Dome"	Purple Dome aster	Highly ornamental	X				

Botanical Name	Common Name	Notes	Recreational Area	Green Stormwater Management (full sun)	Transitional - Meadows and Successional Woodland	Riparian Woodland (fill gaps)	Freshwater Tidal Marsh
Herbaceous (continued)							
Symphyotrichum novi-belgii	New York aster	Highly ornamental		X	X		
Symphyotrichum pilosum	Heath aster				X	X	
Symphyotrichum puniceum	Purple-stemmed aster			X	X	X	
Symphyotrichum racemosum	Smooth white oldf. aster				X		
Symplocarpus foetidus	Skunk cabbage					X	
Tradescantia ohiensis	Spiderwort			X	X		
Verbena hastata	Blue vervain	Highly ornamental		X		X	
Verbena urticifolia	White vervain			X	X		
Vernonia noveboracensis	New York Ironweed	Highly ornamental		X	X		
Viola cucullata	Marsh blue violet					X	
Zizia aurea	Golden Alexanders	Highly ornamental		X	X	X	

Botanical Name	Common Name	Notes	Recreational Area	Green Stormwater Management (full sun)	Transitional - Meadows and Successional Woodland	Riparian Woodland (fill gaps)	Freshwater Tidal Marsh
Emergent							
Amaranthus cannibinus	Salt-marsh water-hemp	Upper zone					X
Bidens bidentoides	Swamp beggar's ticks	Upper zone					X
Bidens laevis	Showy bur marigold	Upper zone					X
Echinochloa walteri	Walter's barnyard-grass						X
Heteranthera multiflora	Mud-plantain						X
Nuphar advena	Spatterdock	Middle zone					X
Peltandra virginica	Arrow-arum	Upper zone					X
Persicaria punctata	Water-pepper	Upper zone					X
Pontederia cordata	Pickerel-weed	Upper zone					X
Sagittaria subulata	Subulate arrowhead						X
Schoenoplectus pungens	Threesquare	Middle zone					X
Zizania aquaitica	Wild-rice	Upper zone					X

Appendix ii – Invasive Species and Management Recommendations

The goal with management is to identify the invasive species that pose the greatest threat to native diversity, and manage those species as is feasible and practical. A priority focus is the areas of new plantings -- keeping invasive species out of new planting areas. A second priority focus is identifying areas in the riparian woodlands that are more pristine, and helping those areas stay healthy by removal of invasive species that suppress natural regeneration of the native species.

Golden Rule: only remove / kill invasive species if native plants are budgeted and available for replacement in the same location, otherwise the area will be open for re-establishment with invasive species.

Wherever possible, avoid herbicide treatment if other options are viable. However, some non-native invasive species require herbicide treatment to kill root systems and prevent re-growth. Other species may be managed with vigilant and periodic manual removal.

When herbicides are required, utilize herbicide application methods that apply the least herbicide necessary. Do not overspray onto native species; use "paint" technique where invasive plants are among native species. Utilize certified and experienced applicators; consult with the applicators to refine the management regime for each species; consider non-herbicide alternatives rather than the easy route of herbicide application. Use herbicide mixes that are approved for riparian locations.

Follow regulations. For non-native invasive trees, treatment with an herbicide and oil mixture (painted on the trunk) is typically effective at causing tree death; girdling the tree trunk is also effective for many tree species and preferred because it avoids herbicide. It is desirable to let the treated/girdled trees decline and die in place, allowing the root systems to hold soil for the future as other tree root systems take over, providing habitat in the dead "stag" trees. However near trails it is best to cut off the tree branches and/or trunks that may potentially fall on trails; this can be done after tree death occurs, before branches/trunks are weakened. Trained volunteers should be monitored carefully during this process to prevent any mishaps. Root removal is critical when pulling invasive species such as invasive shrubs and perennials. Always replant with native species to fill in the ecological niche, soon after managing the non-native plants. See Appendix i for details.

Budgetary provisions should be made for management, combined with volunteer efforts. After initial invasive removal and plantings, areas should be maintained by monitoring and removal of any non-native species, and re-planting native species where needed.

Appendix iii –
"Fitness in Disguise" (excerpted)

Mel A B Boffa
LARCH-501: Design IX: Urban Design II
Fall 2012
Instructors: Richard Newton, Sally Reynolds, Katy Martin

FITNESS IN DISGUISE: INTEGRATION OF NATURE

Fitness, in its own right, represents an elusive concept. While some people may be predisposed to health problems, others are not. What is important is that communities are introduced to landscape architectural designs that will provide physical activities, that put into their lives, the good feelings and enjoyment that come from movement. Improved features for a community will provide for psychological and physiological well-being, health and wellness.

Connectivity is key. Whether it is with your personal goals or with other people, fitness provides connections and builds a rapport with others. It can also open social outlets; a means to network and learn about others' jobs, cultures, and lifestyles.

[FITNESS IN DISGUISE: INTEGRATION OF NATURE]

CONCEPT -

FITNESS, IN ITS OWN RIGHT, REPRESENTS AN ELUSIVE CONCEPT. WHILE SOME PEOPLE MAY BE PREDISPOSED TO HEALTH PROBLEMS, OTHERS ARE NOT. WHAT IS IMPORTANT IS THAT COMMUNITIES ARE INTRODUCED TO LANDSCAPE ARCHITECTURAL DESIGNS THAT WILL PROVIDE PHYSICAL ACTIVITIES, THAT PUT INTO THEIR LIVES, THE GOOD FEELINGS AND ENJOYMENT THAT COME FROM MOVEMENT. IMPROVED FEATURES FOR A COMMUNITY WILL PROVIDE FOR PSYCHOLOGICAL AND PHYSIOLOGICAL WELL-BEING, HEALTH AND WELLNESS.

CONNECTIVITY IS KEY -
WHETHER IT IS WITH YOUR PERSONAL GOALS OR WITH OTHER PEOPLE, FITNESS PROVIDES CONNECTIONS AND BUILDS A RAPPORT WITH OTHERS. IT CAN ALSO OPEN SOCIAL OUTLETS; A MEANS TO NETWORK AND LEARN ABOUT OTHERS' JOBS, CULTURES AND LIFESTYLES.

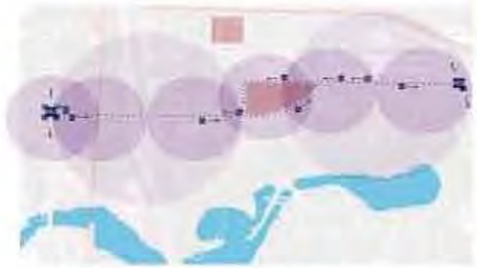
[CONCEPTUAL DIAGRAMS]

[EXISTING DIAGRAMS]

[BIKE ROUTES]

[POTENTIAL DIAGRAMS]

[BIKE ROUTES]

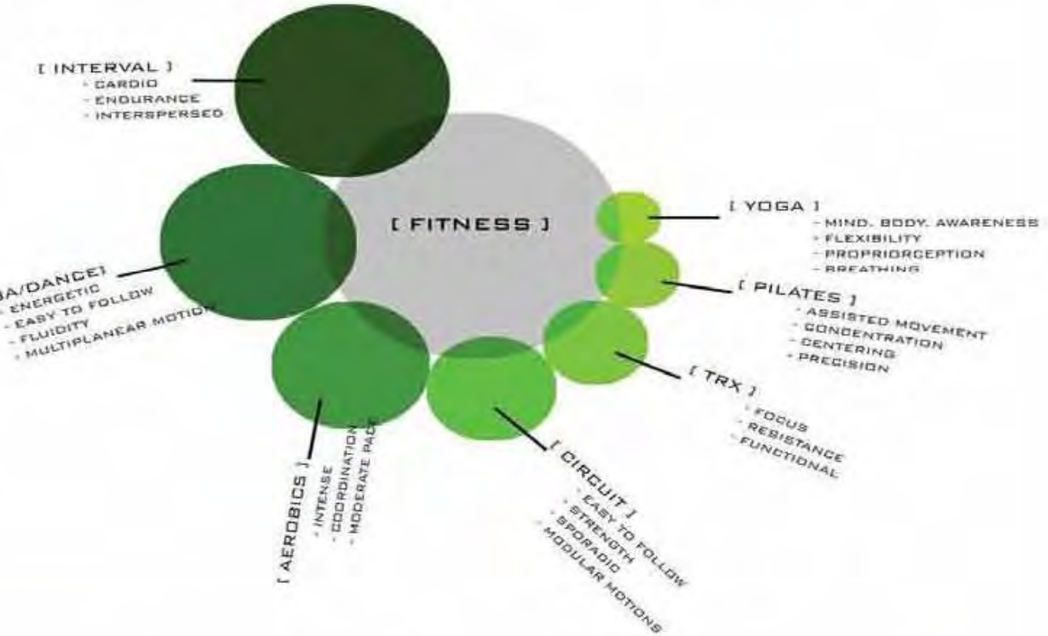


[PEDESTRIAN & BUS CIRCULATION]

[PEDESTRIAN & BUS CIRCULATION]

[ECOLOGIES]

[RESTORATION & ENHANCEMENTS]



[PATH INCLINE STUDIES]

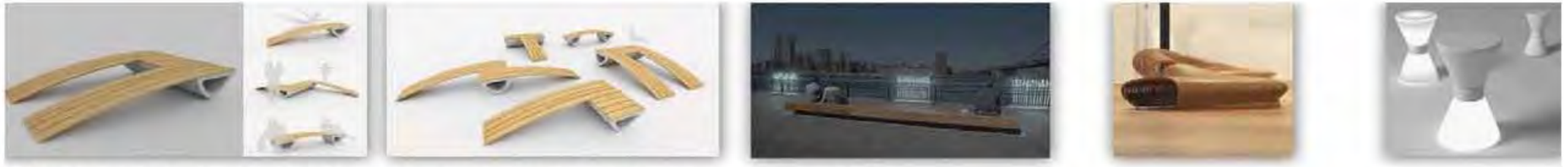

FOCUS
ENERGY
BALANCE
[PRECEDENTS]


SECTION
5 MINS
STRETCHING
15 MINS
WALKING/JOGGING
20 MINS
ABSESSION/CORE TRAINING
10 MINS
STRENGTH
TRAINING
10 MINS
CARDIO
5 MINS
STRETCHING
DIAGRAMMATIC SECTION

[FOCUS] SECTION

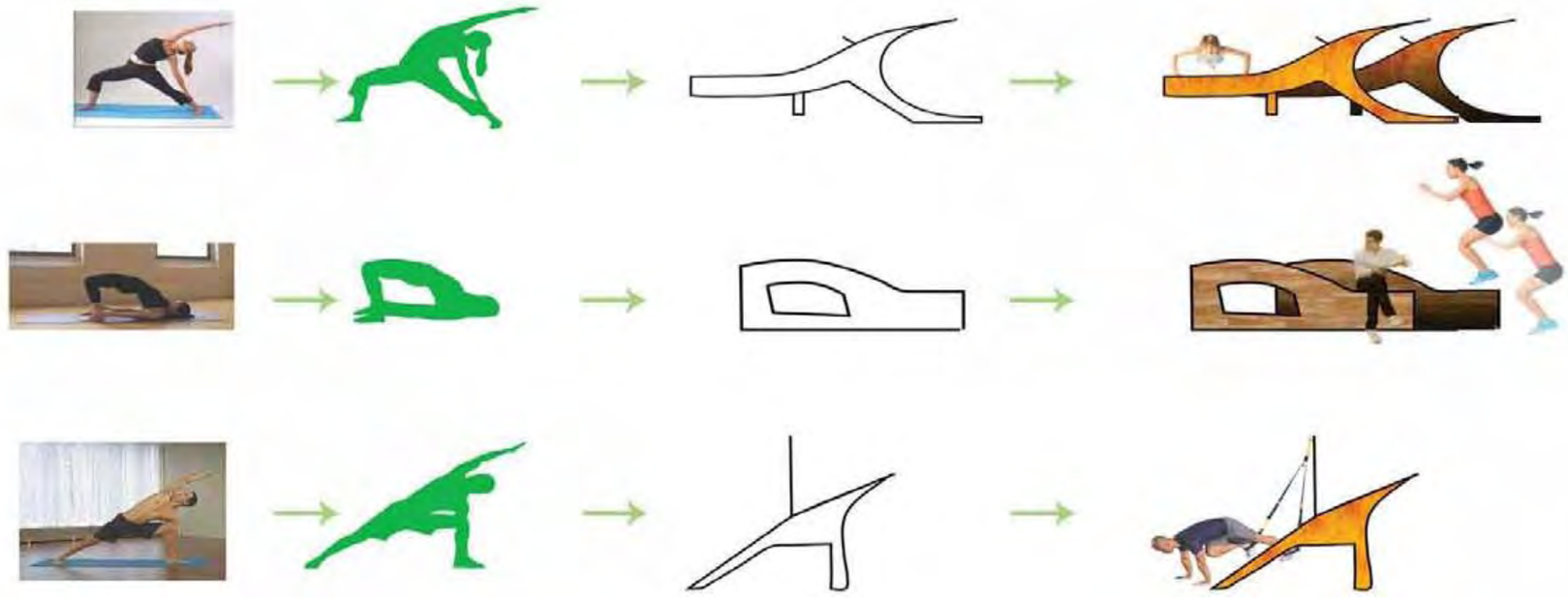
[ENERGY] SECTION

PERSPECTIVE VIEWS LEGEND



[STREET FURNITURE THAT TURNS INTO ENVIRONMENTAL ART]

[DIAGRAMS]



Appendix iv – Definitions

Invasive Species:
Federal Executive Order 13112 of 1999 defined an “invasive species” as a species that is 1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health. This definition covers all organisms, including vascular plants, animals (including invertebrates), fungi, bacteria and viruses. For the purposes of this report, “non-native” refers to plants not indigenous to our area prior to European settlement.