

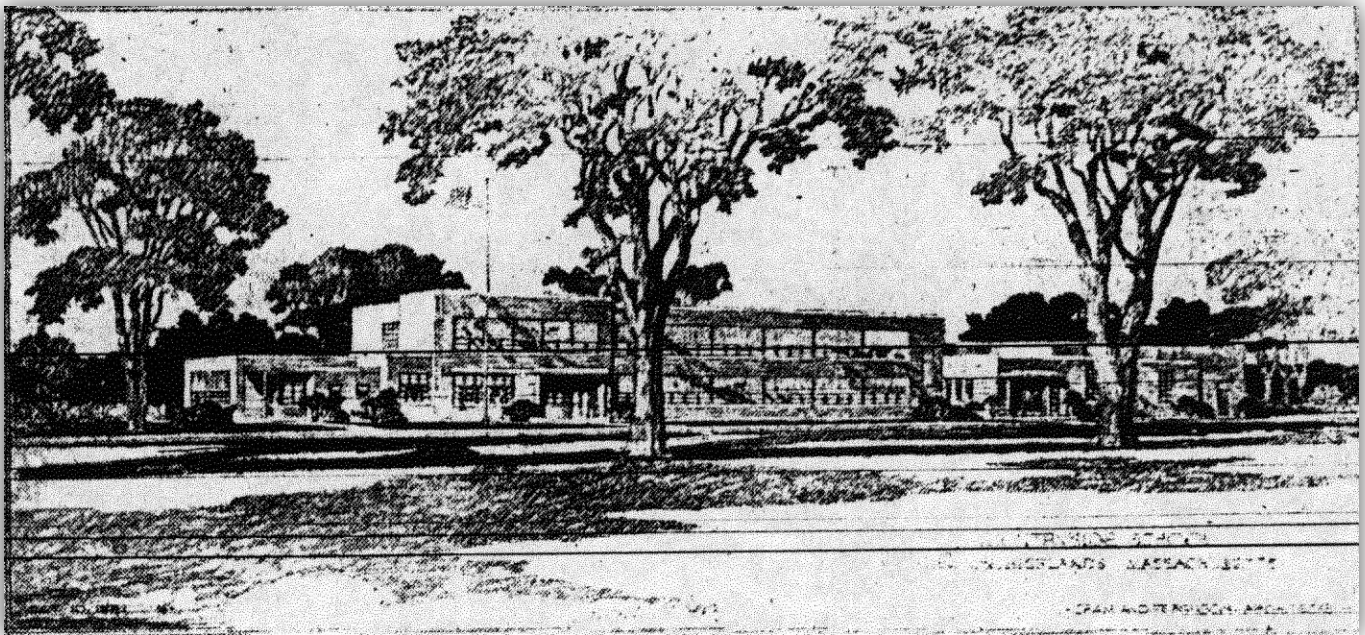
The Countryside Elementary School: Transformation from Traditional to Ecological School Yard

Project Proposal for Independent Thesis

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BAC, Landscape Institute

Olga Martins, Rebecca Kramer – Candidates for Landscape Design Certificate



Countryside School, Newton Highlands, MA. Sketch by Cram and Ferguson of Boston, 1951

INTRODUCTION

“Whatever landscape a child is exposed to early on, that will be the sort of gauze through which he or she will see all the world afterward”,
Wallace Stegner

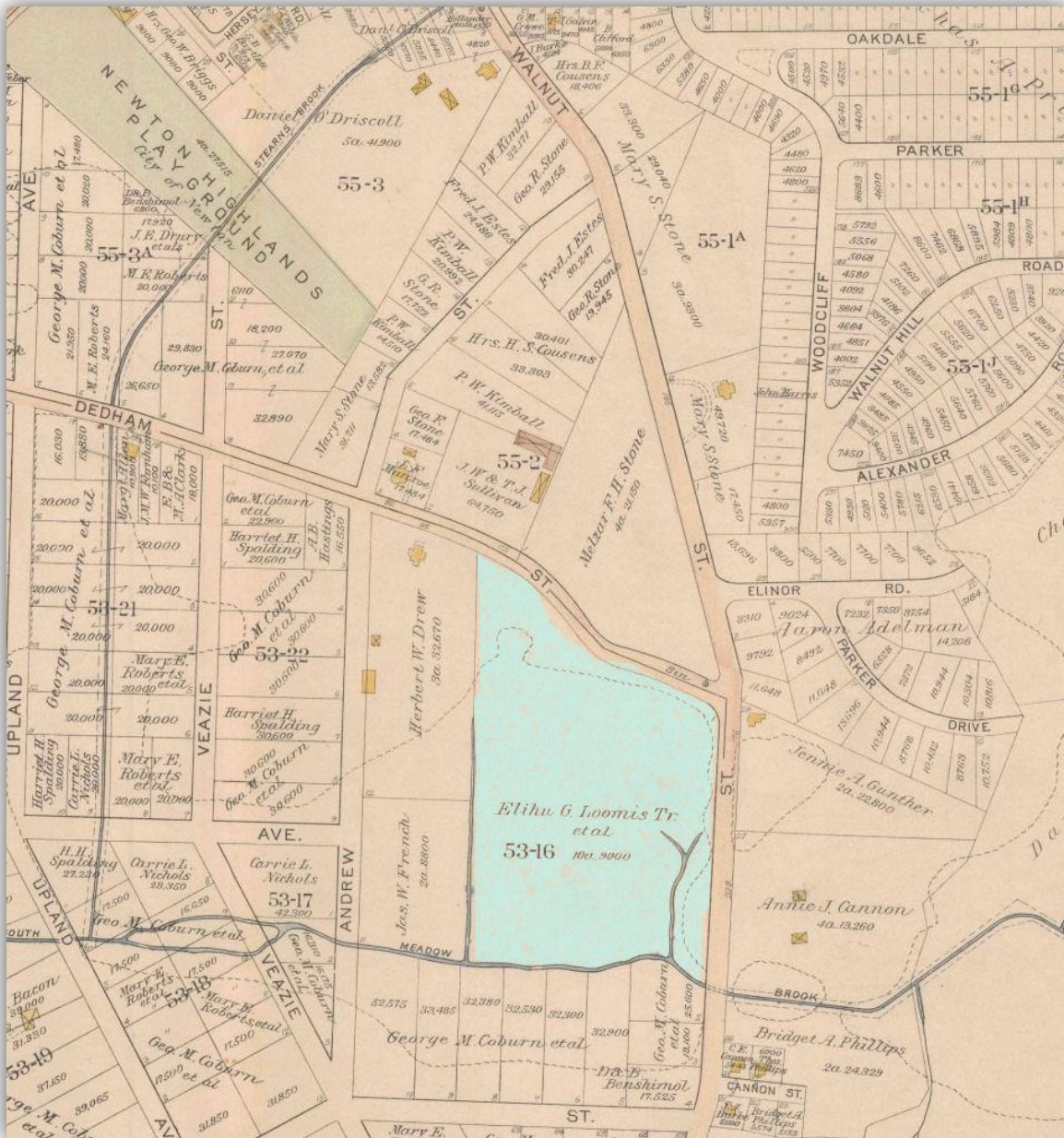
As words *green* and *sustainable*, *recycle* and *reuse*, *conservation* and *renewable energy* become important components of our lives, more emphasis is applied towards educating the public about ways to decrease our carbon foot print. More importantly, these new concepts and agendas are being adopted by schools and provide a great opportunity to educate the next generation of earth stewards. The knowledge children learn at school today gives them a chance to become creative leaders of tomorrow’s world and to shape our society in a way that benefits us all.

Following the Countryside Green Schools Initiative missionⁱ we are proposing to transform Countryside Elementary School’s traditional yard into a living demonstration of sustainable, ecological practices. By combining environmental improvements with learning goals, the school may provide educational and social spaces not only for the school but for a wider community, where people can observe and interact. A one acre partially forested wetland makes Countryside’s outdoor space unique amongst Newton’s many schools. Principal Emily Ostrower, Ph.D. and Scientist-in-Residence Eric Olson, Ph.D. would like to take advantage of this natural asset by making the area an outdoor classroom. Their goal is to address important environmental issues in a way that children can understand, and participate in its positive alteration to “become conscientious stewards of the environment”.ⁱⁱ To help them realize this goal, we would like to transform not just the wetland, but the entire schoolyard, into an ecologically sustainable learning ground.

Ecological school yards are multilayered and flexible, place-based and unique, memorable and inviting. They demonstrate creative ideas, functional design concepts and wisdom of their school communities. Besides providing outdoor learning spaces green school yards have many other benefits. In “Asphalt to Ecosystems: Design Ideas for Schoolyard Transformation” author Sharon Danks states that ecological school yards provide a variety of microclimates offering shade or exposure to sun and increase teachers’ job satisfaction by providing high quality teaching resources. Lastly, based on research studies, Danks suggests that schoolyard “nature play” areas promote imaginative play while reducing aggression and bullying at school.

PROJECT CONTEXT

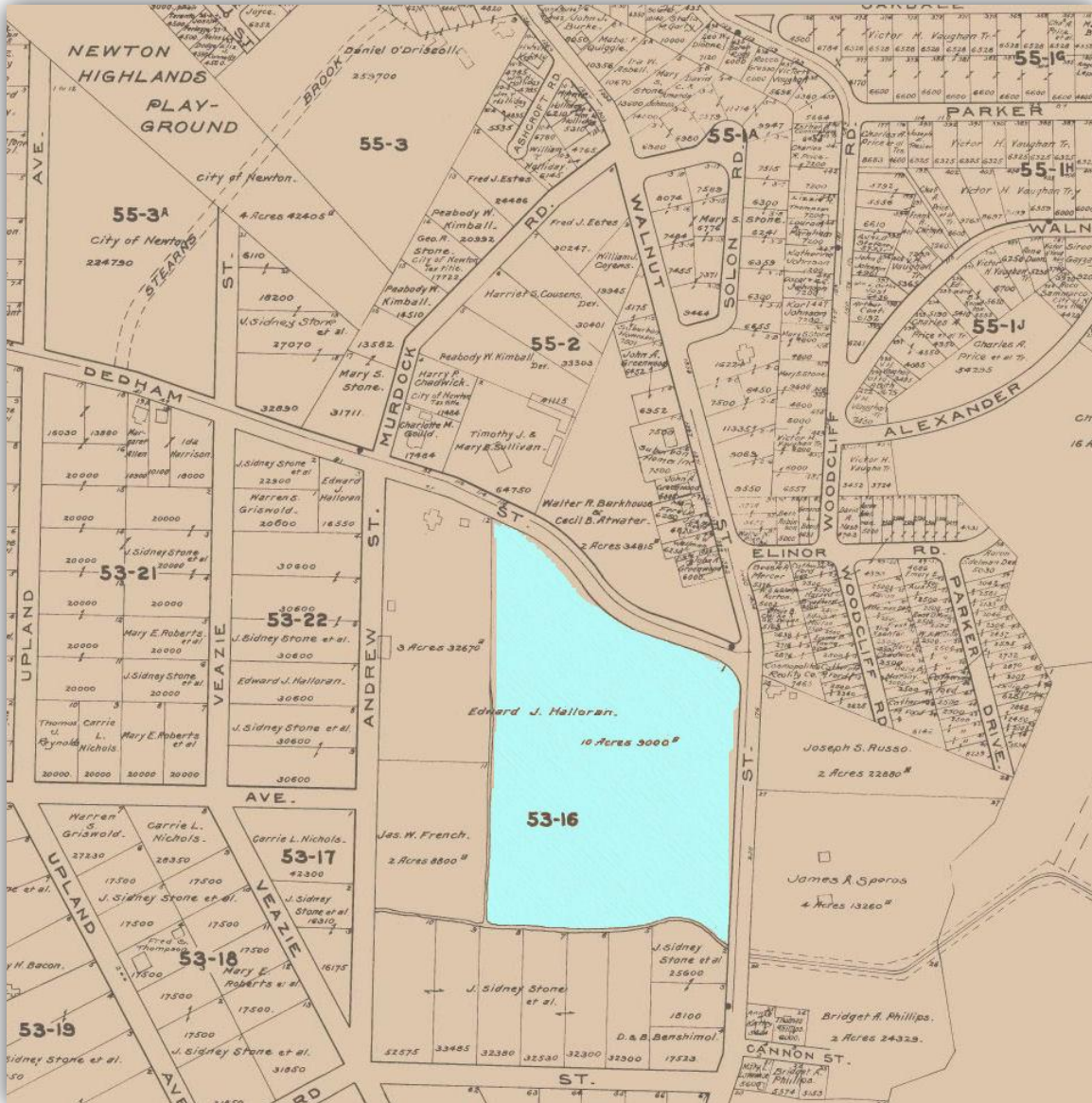
In the early 1800s the city of Newton was sparsely populated and comprised of a few farms with much open lands and forests. It wasn’t until the Boston and Worcester Railroad was built that Newton became a bedroom community: people were able to live in Newton and commute into Boston for work. By 1855 the neighborhoods of Newton Corner, Newtonville, West Newton and Auburndale were clearly established and subdivided, all being located along the commuter rail, with the heart of each village co-localized with a train stop.ⁱⁱⁱ



Newton Highlands Close-up, 1917

The Charles River Branch Railroad existed at this time; however it turned southward into Needham to pick up landfill that was allowing the creation of the Back Bay. Once fill was no longer needed in Boston, the line was put to other uses. In the early 1850s two things were done. First, a branch was created which diverged in Newton Highlands near the current site of Countryside School and terminated at Riverside. Secondly, both branches began to carry people instead of freight. Consequently, other Newton neighborhoods such as Newton Highlands and Waban began to develop in response to these advances in transportation. Within two decades, Newton Highlands was becoming subdivided. The property that Countryside sits on, however, remained open space without any buildings at least through

1929, changing hands throughout the years. Between 1917 and 1929 one of the brooks, which used to border the Countryside wetland, was filled and South Meadow Brook was channeled underground, with the exception of the portion that runs between Andrew and Dedham Streets.

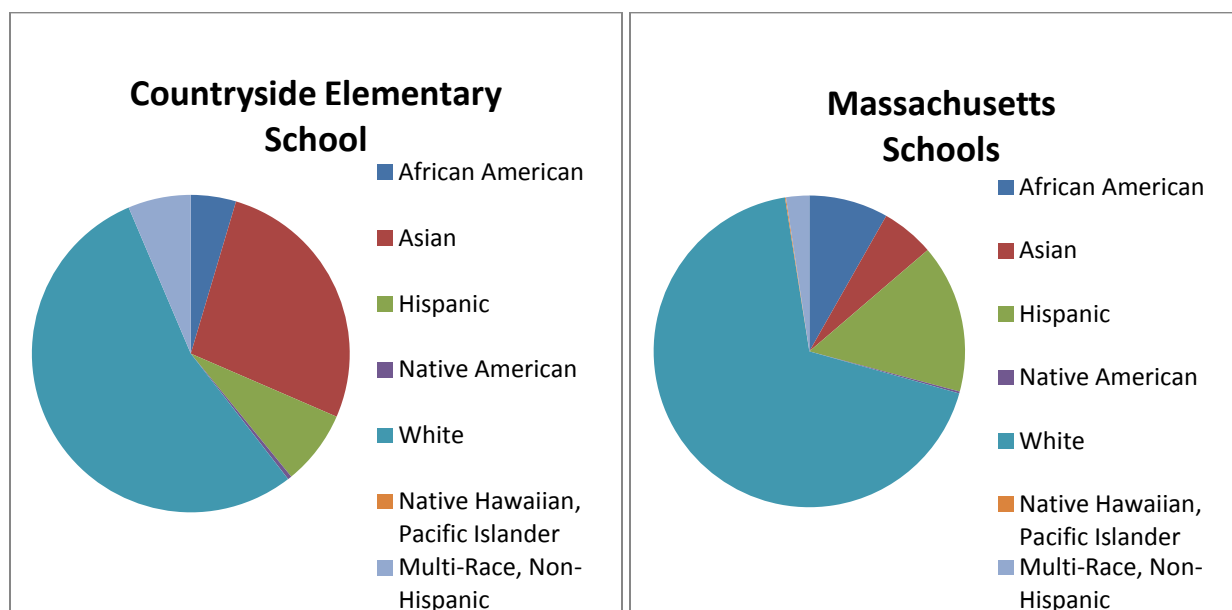


Newton Highlands Close-up, 1929

There are fifteen elementary schools in Newton, Massachusetts, with Countryside School being one of the two that serves the population south of Route 9^{iv}. Originally intended to enroll approximately 400 students^v, the number of children enrolled in 2010-2011 was 486, and the expected number of students for 2011 is 500. Between 13.8% and 20% of the students have special needs.^{vi} To address the overcrowding of Countryside, a city task force concluded that buffer zones should be created to divert a portion of the incoming kindergarten population to Angier, Bowen and Zervas Elementary Schools.^{vii}

Building additional schools to serve the increasing population is not an option. A new Newton North High School was recently constructed at a cost of nearly 200 million dollars, and there is a 6.5 million dollar budget gap for fiscal year 2012.^{viii}

According to the Massachusetts Department of Elementary and Secondary Education^{ix}, the diversity of Countryside population is reflective of the state on a whole, with two notable differences. The Hispanic population at Countryside is half that of the state's, while the Asian population is five times as large.



SITE DESCRIPTION

The Countryside Elementary School was designed by Cram and Ferguson of Boston in 1951, built in 1953, with an addition completed in 1958. It is sprawling, one and two story art deco brick building located on over seven acres of land. At least one modular classroom has been built to accommodate the school's expanding enrollment.

The school is situated at the intersection of Dedham and Walnut Streets. Walnut is one of the main town streets running in a north-south direction, crossing Route 16, Route 30, Route 9 and Beacon Street. Dedham Street provides easy access to regional Route 9 and Needham Street. The school is about 500 yards away from both Route 9 and Needham Street and only a half mile away from the nearest MBTA station. A baseball diamond is used by A, AA and AAA teams in the Newton South Little League. There are several Four Square courts painted onto the bituminous pavement, a basketball court, and a playground which serve students and visitors. The most interesting, and unique, part of the school grounds is a one acre wetland located in the southwestern corner of the property.



Countryside Elementary School, photo courtesy of Melanie Graham

Some attempts have been made to create gardens at Countryside, but the school grounds are missing cohesiveness and unity. A small area in the front of the school has been planted as a class project in 2007, and different tree species were installed along both sides of the parking lot. The courtyard located between the original school and a modular classroom was planted on the perimeter but has not been well maintained. It hosts several tables and has the alphabet painted on the bituminous pavement. The second larger court yard is underutilized partially due to accommodation of trash receptacles which discourage pedestrian flow from the side of the sport field and playground areas. Otherwise, the property provides open grounds with grass and asphalt but offering no shade with the exception of the wooded wetland.

The school is situated in a residential neighborhood and surrounded by single houses. The school grounds fall under the Conservation Commission Wetland Filings and River Protection Act. The school and most of the surrounding properties are in FEMA FIRM flood zone^x. There are three green open spaces in close proximity to Countryside School, however they differ in the ways the community uses them. Charles River Country Club is a private membership-based golf club located half a mile down Dedham Street. Newton Highlands Playground is approximately 300 yards up Dedham Street, while Oak Hill Playground is several miles away off Parker Street. Both playgrounds are equipped with traditional playground amenities and provide an open turf space. Transforming the Countryside grounds into an ecological school yard will make it different and more appealing for children than the other two playgrounds. There are 27 houses that abut the school grounds and many more that will benefit from its grounds improvements.



Photo Courtesy of Google Earth

SITE HYDROLOGY

Two streams border the property and surround the wetland: South Meadow Brook is dressed in concrete and on the southern side of the school, while another small stream travels along the school's western property line and empties into South Meadow Brook. South Meadow Brook is a tributary to the Charles River and drains into it near Needham Street. It has been identified as having high levels of E. coli, phosphorous and sedimentation, all of which could be indicative of sewer back up during heavy rains, illegal ties to storm water drains or illegal dumping of waste.^{xi}

The school grounds slope on a diagonal from the intersection of Walnut and Dedham Streets towards the south-west corner of the wetland. The steepest gradient is along Dedham Street. The parking lot along Walnut Street slopes toward the school and then changes direction to the wetland before reaching the building. The Eastern side of the property also drains in the direction of the school building. Numerous catch basins through the property intercept storm water; however during heavy storms some of the run off undoubtedly reaches the wetland. The main brick building has a flat roof and no visible downspouts except along both sides of the front door which discharge water to the ground surface. The modular additions have outside downspouts. Some of them are connected to the underground sewer system while others let water spill over the paved area. To deal with the high water table a sump pump was installed in the basement utility room. This pump discharges underground water outside over the paved surface next to the wetland. Further evaluation of the underground storm water system is needed to understand if the collected storm water is supposed to be discharged into the brook or it is a part of combined storm water and sewer system.

ONE ACRE WETLAND

The Countryside School was built on a fill next to a wetland. The distance between the west wing and the wetland was reduced to 70 feet when the addition was built. This side of the wetland is most accessible to people. The rest of it is separated by a fence from the school's playground and sport fields on the Northern side and from the surrounding neighborhood on the Western side. The Southern side of the wetland is bordered by South Meadow Brook separating it from the properties along the Bound Brook Road.

For most of the summer the wetland stays dry and fills in during spring and fall. Even during bad storms its most elevated part always remains above water level, as it drains to South Meadow Brook. According to Eric Olson, during the worst storm in March of 2010, when in 72 hours 10 inches of rain fell in the Boston area causing water damage or sewage back-up to over 700 properties in Newton, including Newton City Hall, the water level in the wetland did not exceed its maximum mark.

Fifth grade teacher Mr. D. Detlefsen has encountered hawks, rabbits, ducks, deer and coyote, among other creatures in the wetland, during contemplation and teaching time he has spent there with

children. Besides wildlife there is evidence of human activities. Car tires and tree trunks are positioned close together to bridge parts of the wetland separated by water during high raise.

Yard waste can be seen in piles, suggesting that neighbors use the wetland as dumping grounds.

On the site of the South Meadow Brook adjacent to private properties, piles of brush and debris may be observed from the school's side implying that property owners compost on the banks of the brook, thus contributing to the excess nutrient level in the brook's water.

Under Mr. Detlefsen and Dr. Olsen's supervision, the fifth graders began to clean trash out of the wetland last year. The trash didn't make it into a dumpster, and some of it has migrated back.

The wetland is overrun by invasive plants such as Garlic Mustard, Purple Loosestrife, Multiflora Rosa, Asian Bittersweet, and Norway Maple. Besides invasive plants it includes Virginia Creeper, Wild Grapes, Wild Raspberries, Honeysuckle, River Birch, small patches of Poison Ivy, Jewel Weed, Burdock, Dogtooth Lilies and Crabapples.

OUTDOOR CLASSROOM INITIATIVE

The Countryside School children presented their studies of wetland habitat in front of the Newton Conservation Commission asking for a permission to use the wetland as an outdoor classroom and make it accessible for studies during high water raise. Their inquiry was only partially approved. The

Conservation Commission permitted three lots behind the school building to conduct studies about invasive plants removal and further evaluation of emerging flora. However, due to insufficient documentation on wetland restoration, using it as an outdoor classroom with trails and boardwalks was declined. As a result, the Countryside School aimed to "develop a proposal for the Conservation Commission advanced by students seeking permission to extend restoration of the wetland area behind {the} school and to build an Outdoor Classroom."^{xii}



Countryside Wetland Clean-up, photo courtesy of Eric Olson

PROJECT SCOPE AND RESEARCH METHODOLOGY

Using Danks' book "Asphalt to Ecosystems" and Alice Waters' book "The Edible Schoolyard" as guiding tools, tapping from the combined experience of the green school yard movement from all over the world while tailoring it to the New England climate, and carefully considering Countryside Elementary School's unique ecology, culture, core values and educational spirit, we are proposing the following:

- ☛ To establish future goals and priorities for the school grounds via a participatory design process, while at the same time building stronger community collaborations that harness the talents of the school's principal, faculty, staff, as well as students and their families.
- ☛ To provide a flexible master plan to demonstrate innovative project ideas and useful design concepts, while allowing the specific elements in the plan to grow and transform reflecting ever-changing needs of the school community. As individual teachers, parents, and students change over time the flexibility in master plan must assure that school grounds remain an important part of the school's identity.

The most pronounced characteristic of the Countryside School grounds is its hydrology; therefore our overarching and unifying theme will be storm water management and the graceful movement of water throughout the landscape. While identifying the key elements in the site's hydrology we would like to harvest, merge and daylight storm water runoff to create a water feature that delivers water to edible gardens and ornamental landscapes while cleansing and percolating on its way until it finally reaches the wetland. This will allow children to study the water cycle and will emphasize the importance of wetland ecology.

- ☛ To "repair" the school yard ecology by restoring some of the natural diversity and ecological functions, we propose the following:
 - ☛ Wetland restoration including vegetative communities study, removal of invasive and the reintroduction of native plants
 - ☛ On-site storm water management
 - ☛ Promotion of native plants where appropriate to support wildlife
- ☛ To rekindle the connection between children and nature and to help them with a better understanding of their surroundings, we propose:
 - ☛ To provide outdoor spaces for hands-on learning that reflects importance of exploration and imaginative play
 - ☛ To create an outdoor classroom in the wetland, which minimizes the impact the children have on the wetland, and which enhances the students' educational opportunities
 - ☛ To provide "personal landscapes" for intimate experience that hasten a sense of belonging

- ☞ To reflect local history and culture, local materials shall be used and local artisans shall be involved in the school projects.
- ☞ To hasten the sense of ownership and reduce vandalism, neighbors shall be involved through participatory school yard design.

RESEARCH QUESTIONS

- ☞ How can we turn a degraded wetland, property with a high water table and storm water runoff issues into design assets while staying true to the sustainable and educational goals of the school?
- ☞ What are the design complications and legal restrictions which emerge from the one-acre backyard wetland and river front area/flood area?
- ☞ What are the origins of the wetland? Was it there before the development or caused by it?
- ☞ How do we deal with increased liabilities which may occur in an ecological schoolyard compared to a traditional one? How do we make the children's experience "safe" in the wetland, and possibly other areas of the property?
- ☞ How do we manage the existence of parasitic insects such as mosquitoes and ticks which carry the threat of Eastern Equine Encephalitis, West Nile Virus, Lyme and other insect borne illnesses?
- ☞ To minimize bee stings and pollen allergies, careful consideration and proper placement shall be paid to bee-plant-magnets and prolific pollen producers. Research those plants and avoid their use in close proximity to play areas.
- ☞ The school yard, as it is, serves the community in different ways: children play organized baseball, there are pick-up games of basketball, and people play with their dogs in the field. How can we make the school yard even more desirable to these people, or perhaps encourage other neighbors to use and enjoy the space, and through a heightened sense of ownership, discourage vandalism?

CASE AND PRECEDENT STUDIES

Mount Tabor Middle School, Portland, Oregon

The Bureau of Environmental Services presents a design report on storm water retrofit at Mt. Tabor Middle School Portland, Oregon.^{xiii} The project demonstrates a range of applications for vegetated infrastructure that create a greener, healthier environment for the students and staff at the school while at the same time addressing issue of combined sewer overflow during storms. The rain garden received a 2007 Design Award from the American Society of Landscape Architects.

The project includes a rain garden constructed as a large planter, a vegetated swale, six smaller infiltration planters, and three drywells. BES also constructed a storm water curb extension and sump adjacent to the school. The facilities together manage runoff from approximately two acres of roof, playground, parking lot, and street surface. The highest ground water table on the property is at 15 feet below the ground. The BES concluded that installed natural storm water amenities solved flooding caused by storms and it was twice cheaper to install and design than traditional underground system.

Crest View Elementary School, Boulder, Colorado

“Habitat” is a wetland restoration project initiated by Crest View Elementary School in Boulder, Colorado. It started in 1989 when Deborah Keammerer, a school parent and local ecologist, suggested transforming a problematic soggy area into an outdoor learning center. Similar to Countryside’s wetland, the marsh on Crest View property was filled during construction leaving 1.25 acres of land muddy for over thirty years. The restored wetland is a showcase for many local plant communities and includes more than 2000 native plants. The main features of the learning center are floating boardwalks, a bridge and an eighty seat amphitheater lay out with native red stone.^{xiv}

Edible, Sustainable Schoolyards are created in San Francisco, California

An ecological school yard was designed by Miller Company, Landscape Architects in Sherman Elementary School, San Francisco. “While major efforts are under way in cities like Boston, Chicago, Los Angeles, and Washington, D.C., the San Francisco Bay Area became an epicenter for the {ecological yard} movement... Sherman is one of 56 schools in the San Francisco United School District that have transformed areas that were once parking lots or asphalt playgrounds into dirt-filled recreation and educational areas.” The main features of the revitalized school yard include an edible garden, an outdoor classroom with a salvaged wooden bench, a maze, which is a focal point and a magnet to children, a waterfall cascading into a pool, and a garden shed to store tools and classroom projects.^{xv}

STAKEHOLDERS

- ☛ Countryside Elementary School:
 - ☛ Principal Emily Ostrower, Ph.D
 - ☛ Countryside Green Schools Initiative
 - ☛ Mr. “D” - Dirk Detlefsen, 5th grade teacher
 - ☛ Scientist-in-Residence Eric Olson
- ☛ Newton School Committee
- ☛ Newton Conservation Commission
- ☛ Newton Conservators
- ☛ Property owners in the immediate vicinity
- ☛ Park and Recreation Department of Newton

PROJECT SCHEDULE AND DELIVERABLES

The following presentations of the project development are open to the public and any interested parties. It will take place at the Boston Architectural College: address, rooms and times TBD:

Project Proposal	October 3, 2011
Site Inventory and analysis	October 28, 2011
Conceptual design alternatives	December 16, 2011
Schematic design	February 10, 2012
Design development	March 30, 2012
Final Presentation	April 27, 2012

To broaden opportunities for community involvement, we would like to coordinate our presentations to stakeholders as well as fundraising and projects involving the Countryside School students with significant environmental dates and invite the local press. The following schedule is to be revised as the project evolves:

Photograph the site	Week of September 26
Meeting with wetland ecologist Mary Rimmer to learn about constraints due to wetland and brook proximity	September 29
Project Proposal to be delivered to stakeholders	Week of October 3
Meetings with Principal Emily Ostrower, Faculty, PTO, and Eric Olsen to identify elements that outdoor classroom teachers want and need. Meetings will also establish the minimum play field area needed for organized sports	Week of October 3

Compose letters about the project and mail to neighbors	Week of October 8
Meetings with Newton Conservation Commission, others?	TBD
Charette design and coordination	January
Public meetings	TBD

Important Environmental Dates

Clean up the World Weekend	The 3d weekend in September
World Rivers Day	Last Sunday in September
UN World Habitat Day	First Monday in October
World Planting Day	October 22
International Day for Climate Action	October 24
World Soil Day	December 5
World Water Day	March 22
Earth Day	April 22
Arbor day	Last Friday in April
International Migratory Bird Day	May 3
International Day for Biological Diversity	May 22

ANNOTATED BIBLIOGRAPHY

- ☛ Danks, Sharon Gamson. *Asphalt to Ecosystems: Design Ideas for Schoolyard Transformation*. Oakland, CA: New Village, 2010. Print.

In this guidebook Danks established a “new bench mark of design” for creating innovative, ecologically rich environments in school yards. Over 500 color photos illuminate transformation of traditional asphalt playgrounds into wildlife habitats, edible gardens, exploration paths, and more, using examples from over 150 school projects from 11 countries. These examples convincingly demonstrate how ecological school yards positively affect children’s play, learning and education.

- ☛ Dunnett, Nigel, and Andy Clayden. *Rain Gardens: Managing Water Sustainably in the Garden and Designed Landscape*. Portland, Or.: Timber, 2007. Print.

This is a comprehensive guide for managing storm water in gardens and built landscapes. The book covers all possible elements and techniques to capture, channel, divert and make the most of the storm water. Based on research, it offers practical solutions and state-of-the-art case studies from a variety of countries.

- ☛ Thompson, J. William., and Kim Sorvig. *Sustainable Landscape Construction a Guide to Green Building Outdoors*. Washington: Island, 2008. Print.

“This book offers tools and ideas on adapting standard information from text books on grading, retaining walls, decks and etc. to new conditions, new materials, new regulations, and a new client demands, all driven by environmental concerns.” P. xxii

- ☛ Waters, Alice, Daniel Duane, and David Liittschwager. *Edible Schoolyard: a Universal Idea*. San Francisco: Chronicle, 2008. Print.

“*The Edible Schoolyard*” discusses the transformation of the grounds of Martin Luther King Jr. Middle School in Berkeley, California from a schoolyard completely covered in asphalt to a beautiful, productive garden. Waters chronicles the physical changes made, as well as the increased ownership the multicultural student population felt as they participated in the building, maintaining, harvesting, cooking, and finally eating the products of the edible schoolyard.

- ☛ Tallamy, Douglas W. *Bringing Nature Home: How Native Plants Sustain Wildlife in Our Gardens*. Portland, Or.: Timber, 2007. Print.

Chair of Entomology at the University of Delaware, Dr. Tallamy discusses how indigenous insects are struggling for survival as we remove native plants from our landscape and import foreign ornamentals. Most insects are selective herbivores, having evolved over thousands of years to eat just a few plants. We cannot expect them to survive if they do not have their species-specific plant available to eat. Dr. Tallamy suggests planting gardens with native species and watching the insects, namely butterflies, return.

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- ☛ "Evergreen - All Hands in the Dirt: A Guide to Designing and Creating Natural School Grounds." *Evergreen - Home*. Web. 01 Oct. 2011. <<http://www.evergreen.ca/en/resources/schools/all-hands/>>. A guidebook for schools interested in improving their school yards. It promotes a participatory design process that actively engages the whole school community and answers the following questions: "How do we meaningfully involve students?", "What are the most important things to consider?" and "How have other schools organized such an undertaking?"
- ☛ "National Gardening Association: Adopt a Rehabilitative Garden™." *National Gardening Association: Gardening Resources*. Web. 01 Oct. 2011. <<http://assoc.garden.org/ag/aprg/>>. The affiliated Adopt a Rehabilitation Garden Program offers at risk youth job training and other assistance. The "participants learn to work cooperatively, become stewards of the environment, and make a positive contribution to their community by growing food for others."
- ☛ "National Gardening Association: Adopt a School Garden®." *National Gardening Association: Gardening Resources*. Web. 01 Oct. 2011. <<http://assoc.garden.org/ag/>>. The Adopt a School Garden® Program bridges the gap between schools lacking resources and people who have the ability to help. This model can be used on local scale for fundraising.
- ☛ "Schoolyard Habitats - National Wildlife Federation." *Home - National Wildlife Federation*. Web. 01 Oct. 2011. <<http://www.nwf.org/Get-Outside/Outdoor-Activities/Garden-for-Wildlife/Schoolyard-Habitats.aspx>>. "The National Wildlife Federation assists schools in developing outdoor classrooms called Schoolyard Habitats®, where educators and students learn how to attract and support local wildlife." The site is comprehensive, including lesson plans for teachers, maintenance tips, etc.
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