



Plans and Proposal for Broad Creek Greenway and Waterfront Redevelopment in Laurel, Delaware

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Section 1. Introduction

Small towns are considered an icon of American society. Both as social constructs and physical realities, they have been part of U.S. national identity and heritage. Unfortunately, external forces have negatively impacted the social and economic viability of many small towns throughout the country. This is the case in Laurel, Delaware, a town founded in 1683 that over time developed a thriving economy around the waters of Broad Creek and eventually the railroad. However, as stated by its mayor, “Like most American towns, Laurel experienced the effects of a rapidly changing American economy in the latter part of the 20th century.” Once a thriving economy, Laurel lost its commercial centrality after the development of Route 13 in 1925.

At present, Laurel is home to approximately 3,835 residents and has approximately 800 historic buildings registered in the National Historic Record. According to the town’s Comprehensive Plan, the citizens of Laurel envision building on their proud heritage while creating new and exciting residential neighborhoods, commercial centers, recreational venues and job opportunities.

The purpose of this project was to work with the community of Laurel, DE to suggest ideas supporting the revitalization of the downtown area and providing specific landscape design recommendations for the waterfront. Three specific objectives for this project were:

- To improve the sense of connectedness through a user-friendly greenway extending between existing Creekside and Riverview⁴ parks.
- To design a highly visible residential project, consistent with the architectural style of the town and ecological restoration values.
- To propose a mixed-use design alternative for Thompson Block, to be included in the long-term vision of the Laurel Redevelopment Corporation.

The proposed recommendations were crafted after three distinct frameworks including ecological design, place branding, and collaboration, with the purpose of improving the quality of life of residents and attracting visitors and business owners. In order to give readers a target of emphasis and sense of flow of the document, the following three tables provide a synopsis of the recommendations provided in this study.

Table 1. Summary of recommendations to promote Ecological Design in Laurel.

<i>Ecological Design: Improve quality of life and community pride by protecting and restoring the natural environment.</i>	
Aspect	Recommendation
Water	<input type="checkbox"/> Adopt open drainage systems (i.e. swales, ditches, dry stone beds) to convey storm water and renovate closed systems (i.e. piping, drain inlets, catch basins) if necessary, to improve water quality of Broad Creek. <input type="checkbox"/> Restrict development (structures) within the 100-year floodplain. <input type="checkbox"/> Curtail the use of impervious surfaces and adopt green parking strategies. <input type="checkbox"/> Use rain-barrels on new development and encourage use on existing buildings within <i>The Ramble</i> . <input type="checkbox"/> Consult experts at DNREC and the Army Corps of Engineers for Best Practices.
Soils	<input type="checkbox"/> Protect soils by controlling for erosion during and after construction. <input type="checkbox"/> Amend soils based on analysis to promote favorable

⁴ Riverview Park is also known as Laurel River Park.

	conditions for trees.
Vegetation	<input type="checkbox"/> Plant native trees and eliminate exotic invasives. <input type="checkbox"/> Plant large deciduous trees to minimize heat island effect. <input type="checkbox"/> Plant in layers, including large, medium and small trees as well as masses of shrubs and perennials. <input type="checkbox"/> Use best management practices for landscape maintenance, including appropriately timed fertilizer applications and limited herbicide and pesticide usage based on Integrated Pest Management (IPM). <input type="checkbox"/> Plan for landscape maintenance that allows for natural succession. <input type="checkbox"/> Create Laurel Greening Programs (i.e. tree planting, town environmental amenities, street planters and flower baskets).
Wildlife	<input type="checkbox"/> Plan for integration of other organisms into the landscape (wildlife, birds, and insects).
Land Use	<input type="checkbox"/> Conserve public open spaces. <input type="checkbox"/> Reclaim and restore any brownfield lands.

Table 2. Summary of recommendations to brand Laurel as an attractive residential and touristic destination.

<i>Place Branding: Promote local economic development by building a favorable residential and visitor image for Laurel.</i>	
Aspect	Recommendation
Experience	<input type="checkbox"/> Create positive perceptions and emotions through impeccable landscaping and public art along <i>The Ramble</i> and within the <i>Art Loop at Village Green</i> . <input type="checkbox"/> Promote physical and social conditions that enhance the sense of safety and vibrancy (i.e. state of repair and occupancy of homes and buildings; illumination along <i>The Ramble</i> and downtown). <input type="checkbox"/> Promote direct interaction with the landscape and opportunities for social connections (i.e. pedestrian bridges, fishing docks, kayak launches, new cafés/bistros/eateries along Broad Creek). <input type="checkbox"/> Remove physical obstacles that prevent social and spatial connectivity (i.e. wild vegetation between <i>The Cottages at Laurel Mills</i> and <i>Riverview Park</i>). <input type="checkbox"/> Increase opportunities for spatial access and connectivity, by encouraging the use of existing and new infrastructure (i.e. allow public vehicular access in both entrances at <i>Riverview Park</i> ; add a pedestrian extension to the Rt. 28A bridge; develop pedestrian walkways; create additional water access points). <input type="checkbox"/> Install educational signs to highlight historic and cultural facts, and the benefits of green infrastructure. <input type="checkbox"/> Foster an Outing Club and/or Bird-watcher's Club. <input type="checkbox"/> Encourage landscape literacy through collaboration with

	public schools, universities, and community entities.
Identity	<input type="checkbox"/> Capture the essence of the town in a way that people can understand, embrace and share with others. <input type="checkbox"/> Build a place brand strategy around the skills, aspirations and culture of the local population. <input type="checkbox"/> Preserve architectural style and character of the town through restoration, repurposing and beautification programs. <input type="checkbox"/> Highlight a deeper connection with Broad Creek, open spaces, and rural traditions.
Image	<input type="checkbox"/> Address repair of streets, buildings and homes. <input type="checkbox"/> Address vacant buildings, especially on <i>Market Street</i> . <input type="checkbox"/> Develop a color scheme for the town’s infrastructure, signs and printed materials (i.e. bridges, wayfinding signs, brochures, flags, and official websites). <input type="checkbox"/> Install consistent landscape materials, including brick paver (i.e. herringbone pattern) or boardwalk walking surfaces. <input type="checkbox"/> Install brick paver crosswalks through the pavement at all intersections within <i>The Ramble</i> . <input type="checkbox"/> Install consistent landscape amenities, including park benches, trash receptacles, light fixtures, dog walk stations, and planters. <input type="checkbox"/> Install appealing, functional and consistent wayfinding elements throughout Laurel and <i>The Ramble</i> . <input type="checkbox"/> Maintain beautifully landscaped areas throughout <i>The Ramble</i> and downtown.
Marketing	<input type="checkbox"/> Create a marketing position statement for Laurel. <input type="checkbox"/> Partner with existing anchors to attract more visitors by development of recreational package discounts. <input type="checkbox"/> Provide mixed-use development in newly developed spaces such as the <i>Village Green</i> . <input type="checkbox"/> Develop a comprehensive Internet Marketing Plan.
Product offering	<input type="checkbox"/> Highlight Laurel’s competitive advantages (i.e. new schools and natural features, such as blue space and greenery). <input type="checkbox"/> Fight “slow economy perceptions” by attracting and retaining businesses that will appeal to people (summer concessions along <i>The Ramble</i>). <input type="checkbox"/> Extend Laurel’s product offering to include opportunities for social interaction and civic engagement. <input type="checkbox"/> Promote regional assets within Sussex County as part of Laurel’s offerings (i.e. hospitals and breweries). <input type="checkbox"/> Centralize existing information.
Projected Narrative	<input type="checkbox"/> Identify the events that have resonance for the community, and that can be supported through appropriate content and imagery. <input type="checkbox"/> Seek the perspectives of residents and stakeholders who can speak for Laurel’s past, present and future identity.
Tourism	<input type="checkbox"/> Capture and promote the “regional flavor”. <input type="checkbox"/> Orchestrate efforts to co-produce a memorable experience, rather than selling discrete goods and services. <input type="checkbox"/> Promote ecotourism initiatives such as recreational water

	<p>activities, bird watching and biking.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Maintain a position of leadership in historic preservation. <input type="checkbox"/> Increase the number, diversity and quality of hospitality businesses.
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Table 3. Summary of recommendations to promote collaboration in Laurel.

<i>Collaboration: Increase community capacity by utilizing a process to ensure participation from multiple stakeholders.</i>	
Aspect	Recommendation
Process	<ul style="list-style-type: none"> <input type="checkbox"/> Continue in the spirit of shared communication and collaboration between community stakeholders. <input type="checkbox"/> Consult the Government Accountability Office's 2012 Collaboration Models for best practices.
Community and economic development recommendations beyond the scope of this project	<ul style="list-style-type: none"> <input type="checkbox"/> Consider developing programs in the following areas: <ul style="list-style-type: none"> ▪ Healthy Living, including the creation of a Farmer's Market and Greening Projects throughout the town. ▪ Market Street Revitalization. ▪ Crime Prevention Through Environmental Design (CPTED). ▪ Back to Work Programs. ▪ Agri-tourism initiatives.

Section 2. Literature Review

The following literature review describes the historical background and contemporary considerations that are important for this community revitalization project.

2.1 Historical Background

As documented by H. Hancock (1983) in *The History of Nineteenth Century Laurel*, Laurel, DE has a long and note-worthy history. According to the author, when European settlers first came to the area that is modern day Laurel they found “...a dense forest that had stood undisturbed for hundreds of years except for wild animals and Indians. Berries and fruit flourished, as did wild life -- deer wolves, wildcats, foxes, raccoons and squirrels. The forests were filled with turkeys, pheasants, ducks and geese, and the streams abounded with shad, rock and trout. It was virtually an unexplored and unexploited paradise.”

Laurel is situated in the southwest section of modern-day Sussex County along the Broad Creek, a tributary of the Nanticoke River that flows to the Chesapeake Bay. Most of modern day Laurel has roots in history dating back to 1632 during the region's early years of settlement. Land disputes for territory in this area, initially with the Native American Indians, and later between the Penn's and the Calvert's are documented. The latter dispute was ultimately resolved with the formation of the Mason-Dixon Line in the 1760s. At the time of the Revolutionary War, the Little Creek Hundred

(geographically the land of modern-day Laurel) was established. For over one hundred years, the earliest settlers from that time period continued to play an important role in the development of Laurel (Hancock, 1983).

During the second half of the 1700's, timber was harvested to make way for farm fields. Consequently, timber was the primary building material for log cabin homes and the wooden structures predominant during this time. Logically, the first industry in this area was sawmills followed later by gristmills. The residents of this area grew primarily corn, fruits, and vegetables; crops that remain important today.

In 1789, Laureltown (as it was originally known) was established as surveyors at an area called the 'wading place' along the Broad Creek laid out 32 lots. In 1807, the village was described as "a small post town, situated on both sides of the Broad Creek, a branch of Nanticoke River" containing "about 40 houses, a Presbyterian and Methodist church (Hancock, 1983)."

By the mid-1800's, many of the citizens of Laurel were farmers, blacksmiths, carpenters, and cabinetmakers. Families in these early times were subsistence farmers who raised corn and some wheat, fruits and vegetables, cattle, hogs and poultry. Clothes were often made at home from wool grown on the homestead. To pay bills some farmers traded corn, lumber, shingles, meat or services such as furniture making or carpentry.

In 1859, the Delaware Railroad was extended to Laurel, and commerce grew in ways never possible before access was available for hardware, drugs, packaged foods, and fertilizers. Farmers extended their wealth through exportation of peaches, berries and other products.

In 1860, the town had a population of 1,200 and there were sixteen stores and four churches. Rail or steamer allowed for the export of more than five million feet of lumber annually. In 1883, Laurel was incorporated as a town and new houses, including many of the ones included in the historic registry today, were built. By the turn of the century, the population rose to 2,500, the number of stores doubled, and factories, sawmills and two hotels prospered with the help of novel modern conveniences like telephone, electric and public water. Even after a large fire destroyed many of the downtown buildings and residences in June 1899, the town was able to quickly rebuild, this time using brick. Many of the newly built turn-of-the-century structures are the buildings that comprise the current downtown.

The most recent modern era in Laurel has seen a rise and fall of wealth and manufacturing. As mentioned, several large factories operated in Laurel during the late-19th and early-20th centuries, including Marvil Basket Company (1870-1957), several mills, and a canning company. This important industry contributed to the health of the economy in the area. By 1925, U.S. Route 13 (US 13), the main north-south highway through Delaware, was completed, and later in 1939, Dupont opened a nylon factory in neighboring Seaford, contributing to many workers moving into the area. These changes resulted in increased demand for homes and rental properties in Laurel.

By the late 1980's, business development was moving out of the town center and Laurel Redevelopment Corporation (LRC) was established to begin a revitalization program. A new Comprehensive Plan was completed in 2011 highlighting many of the more recent accomplishments of the LRC and the town. The document guides development by articulating the following priority actions that are specific to this project:

- Develop New Residential Areas, which implement measures for Superior Community Design that promote a neo-traditional design on a variety of sites to support the appropriate neighborhood styles within the framework of Laurel's tradition of architectural scale.
- Continue to work with various partners to implement Land Conservation Programs for the Broad Creek Greenway.
- Continue to implement the Community Facility and Service Improvements for the Laurel Public Library, Laurel Town Hall, the Laurel Historical Society, and the Laurel Redevelopment Corporation.
- Expand the Economic Development Program to stimulate small business growth and attraction, technology development, Town Center commercial revitalization and creation of a progressive new Business and Technology Park (Town of Laurel Planning and Zoning Commission, 2011).

A strong emphasis on growth as well as on the protection of the natural environment throughout the planning document is notable. In addition, cultural considerations are highlighted, as in this statement: "Land use decisions will recognize the vision and goals expressed by the Laurel Comprehensive Plan, which are seen as inherent to Laurel's time, place and form as a historic village alongside Broad Creek" (Town of Laurel Planning and Zoning Commission, 2011, p. 33).

From the study of Laurel's history, we gained an understanding of the legacy of the people who lived in the town of Laurel. Many of the names in early registries are still recognizable in the town today and it is not uncommon for six generations of one family to have roots in Laurel. We also gained an understanding of the pre-farming

environment and strong farming culture. These impressions were used to guide our design and recommendations for the waterfront redevelopment.

2.2. Contemporary vibrant communities

We are living in fast-paced times of change that have resulted in complex, subdivided and standardized urban environments (Berger, 2009). Before the twentieth century, buildings were constructed with pride to last a lifetime. However, perceptions of functional obsolescence resulted in cycles of demolition, urban renewal and modernization (Isenberg, 2004).

Concerns about the destruction of the built environment resulted in the creation of the National Historic Preservation Act of 1966, which unified the efforts of independent local organizations (Tyler, 2000). Along this line, since the 1980's, the Main Street Program has been promoting an economic revitalization tool called the "Four Point Approach." The tool focuses communities on leveraging historic, cultural, and architectural assets, by directing attention to a commercial district's organization, promotion, design and economic restructuring (National Main Street Center, 2014).

Likewise, further attention to environmental quality has been expressed since the 1970's. Jackson and Sinclair described the mid-to late-twentieth century landscape as "depression-inducing environments" that lead to human health problems, anxiety and social isolation (2012, p. 11). Many urban environments are perceived as both unsustainable and unappealing for reasons not limited to the prevalence of concrete infrastructure, a general lack of greenery, and a seemingly unattractive, harsh, and unsafe environment (Jackson and Sinclair, 2012).

Furthermore, global warming, resource conservation and environmental degradation are pressing challenges at present. The literature on local economic development stresses the need to “respond to growing concerns about climate change and desires to create greater sustainability (Blakely and Leigh, 2013, p. 231). However, to many, our response as a society has been insufficient to reverse these negative trends.

Aligned with the new views of local economic development are visions to create more sustainable communities and commercial districts. According to Fosket and Mamo (2009), an increasing number of communities are embracing sustainability as a new paradigm, thus creating new identities. Healthy, sustainable, vibrant, livable communities are just some of the adjectives people use to describe what they seek when choosing where to live, work and play. Being legitimate in terms of sustainability, by expressing good social, economic and environmental management, along with effective governance, are signs of vibrant communities.

Throughout this project, we acknowledged the need for a holistic approach to promote local economic development in ways that successfully blend community identity, heritage, human capital and environmental restoration. We conclude that the conceptual framework related to ecological design provides a specific approach to plan for landscape elements that are at the heart of vibrant, progressive, and successful communities around the world. Further information about ecological design and green infrastructure is provided later on in this document.

Section 3. Materials and Methods

3.1 Existing conditions

The study of existing environmental conditions, natural features and physical characteristics of the site was completed through visits, interviews and analysis of documents, such as soil maps, FEMA flood maps, and topographical maps. In order to understand how the town is perceived, we consulted printed materials, interviewed a University of Delaware (UD) college student who grew up in Laurel, and extracted ideas from final design proposals presented during an undergraduate UD Plant and Soil Sciences (PLSC) course.

To identify desirable outcomes for the town and our project, we reviewed the 2011 Comprehensive Plan and meeting notes from 2013 focus groups hosted by UD's Sustainable Coastal Communities Initiative. As in the previous section, we also took into account the opinion of PLSC 301 students and the UD interviewee who will be referred to as *student resident*. To ensure the viability and alignment of our proposal with greater regional goals, we also consulted experts from the Delaware Department of Natural Resources and Environmental Control. Finally, we incorporated the expectations expressed by LRC and town officials.

3.2 Construction of a contextual framework

A framework was constructed with the intent to promote simultaneous advances in social, economic and environmental areas. "Ecological Design" was selected as the

core of the conceptual framework, as it focuses on the relationship between improved environmental quality and people who utilize the landscape. Additionally, “place branding” principles provided a foundation for local economic development and collaborative networks research provided for organizational aspects that are necessary to build community capacity.

Throughout the project, a standard landscape design process was employed including inventory, analysis, creation of functional diagramming and ultimately conceptual layout. Details related to construction are not within the scope of this project and suggestions for specific species of plants are listed only generally in section 4.1: Environmental conditions and natural features and in the Appendix: Design Process.

3.3 Elaboration of graphic proposals

The graphic proposals developed in this study followed a landscape planning exercise. Landscape planning is “the process of using natural and cultural knowledge to guide action over a relatively large area” (Hopper, 2007, p.30). Planning involves a process that is often broken into steps or phases that are roughly categorized as “understand”, “imagine”, and “implement” (Bruck and Middlebrooks, 2012).

During the “understand” phase, designers gather data related to the site and user, while establishing a thorough understanding of the client program. Work proceeds as fact gathering with the goal of exploring and understanding the problem. In landscape design, a graphic process is utilized to visualize data and trace paper overlays are created to find specific areas of the site that are considered opportunities or constraints.

As the designer moves into the “imagine” phase, many iterations of possible

solutions for the same space are explored quickly using pen and trace paper. While the technology exists to turn these drawings into precise construction documents, there is no substitute for a designer wrestling with ideas utilizing pen and paper. During this phase it is helpful to share ideas with a larger audience including the client for specific feedback. This allows the process to proceed in a collaborative way that leads to fewer surprises. As feedback is incorporated into the designer's drawings, the product is improving through iteration. This early stage of implementation allows the designer to test solutions and observe the results and reactions (Bruck and Middlebrooks, 2012).

The final result of this design process is a conceptual plan, which is a graphic illustration that allows diverse members of a community to see the end results of the proposed development. The conceptual plan should be used to help build community consensus, obtain support and funding for the various projects, and to sell the overall ideas.

The "implement" stage consists on the practical implementation of the conceptual design. Upon approval, the implementation of the proposed designs will be carried by LRC and the Town of Laurel in the near future.

Any further master planning or construction documentation are beyond the scope of this project.

Section 4. Existing conditions

4.1 Environmental conditions and natural features

Laurel is located in the Chesapeake Bay Watershed. Physiographically, it is part of the Coastal Plain province, which consists of an area with fairly flat topography and a southern climate.

Broad Creek is an important natural feature that has contributed to the development of the town over time. The tidal creek confers many recreational opportunities such as canoeing, kayaking and fishing. According to the town's official website (<http://www.townoflaurel.net/>), the waters are a good source of largemouth bass.

As noted on the site inventory map (App. Fig. 2), the following are other environmental and natural features characteristics:

- Laurel has great potential for both wind and solar generated energy.
- Songbirds and shorebirds, as well as wading birds, ducks and geese are common to this area.
- Small mammals include raccoon, opossum, and fox. Deer are prevalent. Many species of reptiles, amphibians and bats are present.
- Many native ferns, grasses, herbaceous perennials, herbaceous emergents, shrubs (notably *Kalmia angustifolia* and *Kalmia latifolia*, two native species of mountain laurel) will grow well in this area. Native trees include *Chamaecyparis*

thyoides and *Taxodium distichum*.⁶

- Soils are not rated as prime farmland nor are they rated high for growth of lawns and/or landscapes. *Amendments are necessary to support ornamental plant growth.* For that reason, native plants should be specified as part of the landscape and green infrastructure.
- The site is home to one of the largest cypress trees in Delaware.
- Soil mapping is seen on the graphic and indicates several soils that are prone to flooding and a majority of soils that are classified as urban infill.

Regarding water quality, it is apparent that the quality of the Nanticoke River is improving over time, but nitrogen concentrations remain a concern. The 2011 and 2013 Nanticoke River Report Cards indicate favorable scores for dissolved oxygen and water clarity, but reflect poor scores for total nitrogen. Poor nitrogen scores could reflect a problem with sources that provide steady outputs of nitrogen such as failing septic systems, lack of nutrient reduction systems, or over-application of fertilizers (Nanticoke Watershed Alliance, 2011). In addition, stormwater runoff can be a major cause of water pollution in urban areas.

As observed in the 2008-2012 Five Year Nanticoke River Report, Broad Creek has consistently maintained a general “B” score, reflecting that “most water quality indicators meet desired levels (60-79%)” and that the “quality of water in these locations tends to be good, often leading to good habitat conditions for fish and shellfish” (Nanticoke Watershed Alliance, 2012, p. 3). According to the U.S. Environmental

⁶ Check the US Fish and Wildlife publication, [Native Plants for Wildlife Habitat and Conservation Landscaping of the Chesapeake Bay Watershed](#) for more information about plants and wildlife.

Protection Agency (2010), the following are allowed annual discharges at the edge of the stream in Laurel, in order to comply with the Chesapeake Bay Total Maximum Daily Loads.

- Total Nitrogen: 8,528 lbs/year
- Total Phosphorous: 2,132 lbs/year
- Total soluble solids: 31,978 lbs/year

Finally, Laurel is prone to flooding due to urbanization and its close proximity to a major tributary of the Nanticoke River. Therefore, Laurel's Comprehensive Plan suggests that new development takes into account the limitations imposed by the 100-year floodplain map, which reflects the area adjoining the creek that will be covered by water in the event of a 100-year flood. Accordingly, "within the Broad Creek Special Environmental and Heritage Area, new development, and its design, should be carefully related to the environmental condition of being in the 100-year Floodplain, the heritage values of the area and relationship to the waterfront of Laurel" (Town of Laurel Planning and Zoning Commission, 2011, p. 36).

The Comprehensive Plan indicates that in 2003, Hurricane Isabel caused damages within the scope of the then current 100-year floodplain map. For the purpose of this project and in acknowledgement of the town's regulations, we have adopted the most recent 100-year floodplain map, proposed by FEMA in 2014 and expected to be approved in early-2015.

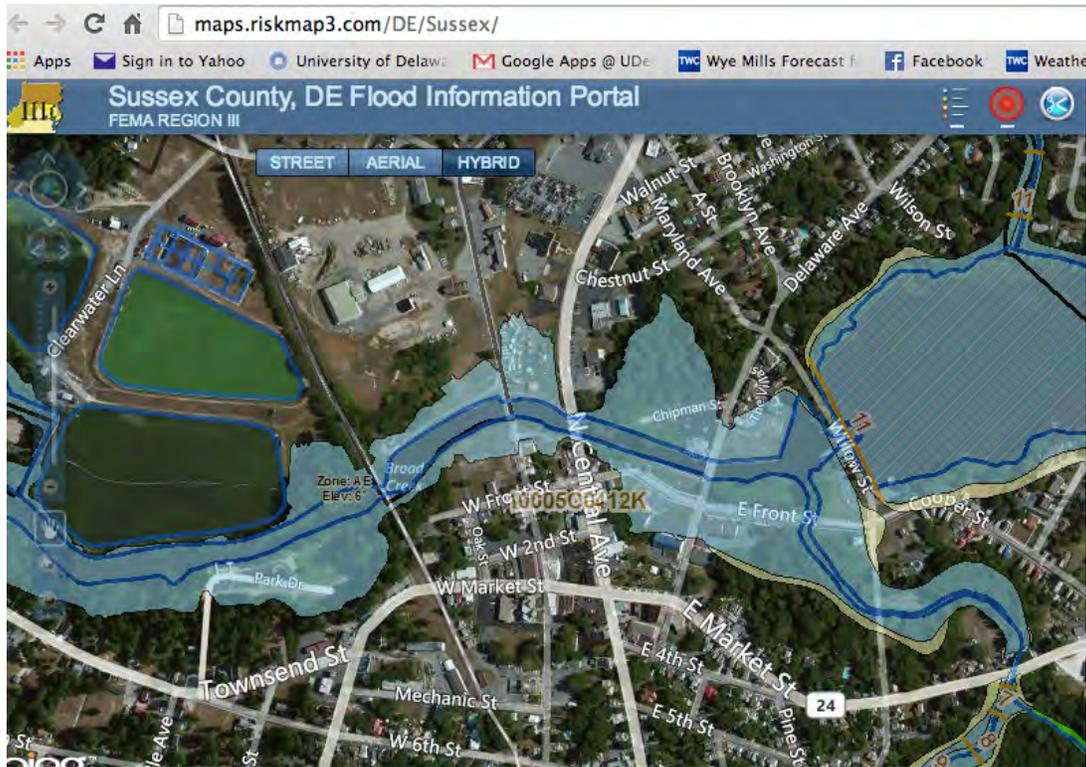


Fig. 1. Proposed 100-year floodplain map. Source: FEMA, 2014.

4.2 Physical description of the project area

The area comprised in this project is shown in Fig. 2.⁷ The collaboration between LRC and the Town of Laurel is evident by the initial map they presented us, which exhibits the boundaries of the parcels owned by both parties. The privately owned land is often referred to as “on LRC’s radar”, meaning they intend on purchasing it when it becomes available, so we considered that space open for design consideration.

⁷ Specific design recommendations for downtown areas outside the boundaries of the map shown in Fig. 2 are beyond the scope of this study.

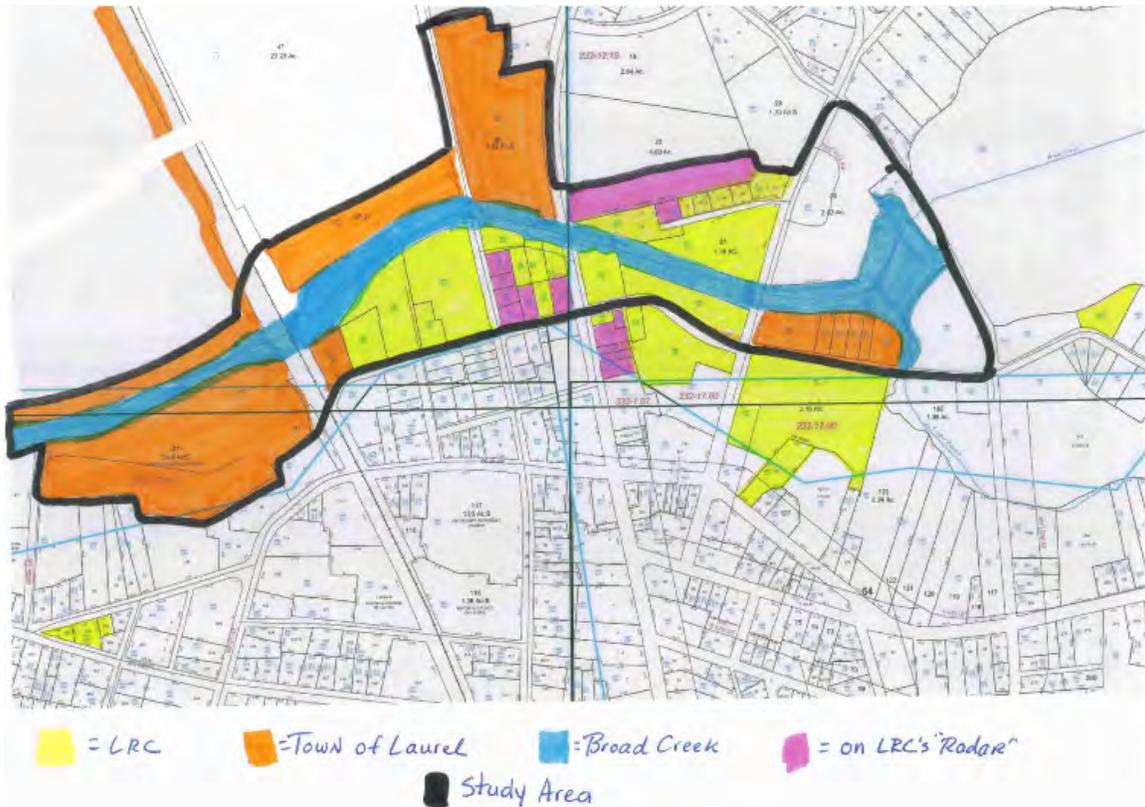


Fig. 2. Project Area. Source: Laurel Redevelopment Corporation.

Overall, the study focuses on providing a connected Broad Creek walking path called the “greenway,” green infrastructure, and distinct elements on eight key parcels including:

- A. Sharp Gas Property
- B. Kayak Launch
- C. Open Field
- D. Thompson Block
- E. Riverview Park
- F. Greenway and Pedestrian Bridge
- G. Future Wetland/Environmental Display and Educational Area

H. Creekside Park and Promenade

Parcels A, B, C, D and E, located on the west side of U.S. Alt. 13, are shown in Fig. 3. Parcels F and G, located on the east side of U.S. Alt.13, are shown in Fig. 4. Please refer to Appendix 7.1 for a more detailed description of the design process.



Fig. 3. Broad Creek West of US. Alt. 13, where A = Sharp Gas Property, B = Kayak Launch, C = Open Field, D = Thompson Block, and E = Riverview Park.

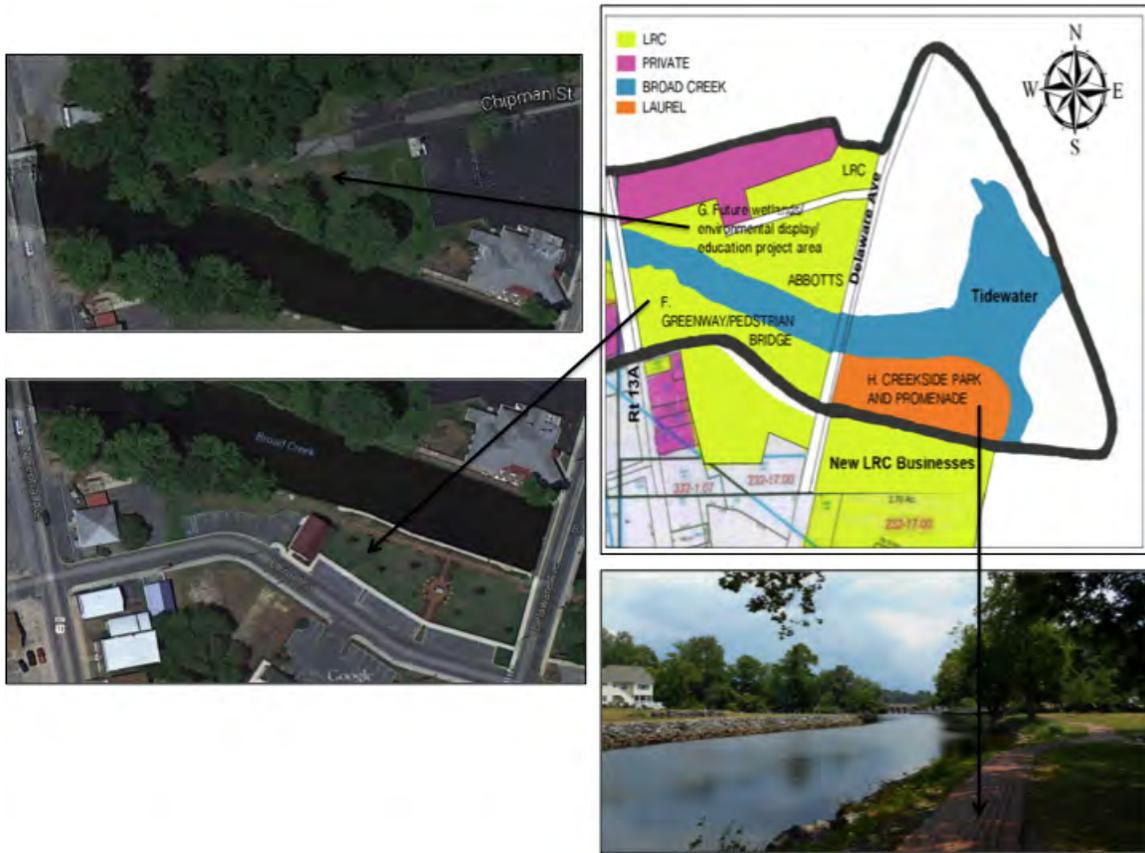


Fig. 4. Broad Creek West of US. Alt. 13, where F = Greenway and Pedestrian Bridge, G = Future wetland/environmental display and educational area, and H = Creekside Park and Promenade.

4.3 Perceptions findings

As designers residing outside Laurel, we took utmost care to understand how the town is perceived by those within the community. To that goal, we took detailed notes, recordings and photographs during project meetings and site visits, consulted printed materials, interviewed a UD college student from Laurel and extracted ideas from final projects of a UD undergraduate course. The following is a summary of our findings.

Participants and interviewees highlighted aspects of Laurel they found

exceptional and unique, including examples of entrepreneurship, good citizenship, history and scenic beauty. Brochures from Laurel's Chamber of Commerce visitor's package promote the town as the "Gem of Delmarva" and utilize phrases like: "*Experience the fun; Experience the history; A breath of fresh air; Exploring hidden treasures.*" These statements recognize and highlight Laurel's history and reference the outdoors as part of the charm and attraction. A letter of introduction highlights Laurel's historic architecture, tree-lined streets, special/seasonal events, and outdoors activities, such as fishing, boating, canoeing, biking and hiking. In terms of community, it presents Laurel as a low-crime and friendly town. A professionally designed Visitor's Guide & Membership Directory offers information about the town's history, education, development, health, recreation, public library, chamber of commerce, business directory and the Laurel Senior Center. Additional booklets and brochures provide details about local nearby attractions.

Laurel is also highlighted in regional and statewide tourism materials. In the 2014 Sussex County Profile (Sussex County Economic Development Office, 2014), Laurel is described as "a small town where community involvement is a genuine way of life" (p. 62). The 2013-2014 Southern Delaware Official Visitors Guide & Vacation Planner (Southern Delaware Tourism, 2014). describes Laurel and Bethel as towns with "natural wonders and historic charm" (p. 4).

Interviews determined that traditions, such as the summer Auction Block, contribute to a sense of uniqueness and rural pride and that summer rituals like Church Camp left an impression of fun and a family orientation in the minds of members from younger generations. There is an understanding that Laurel was prominent, wealthy

and vibrant in the past and the architecture in town still serves as a source of pride. Several traditions, establishments and activities contribute to a sense of community worth sharing with others. Examples include: Fourth of July celebrations, Strawberry Festival, Laurel Junction, Bowling Center, haunted cemetery house and skydiving.⁸

One of the students that participated in the coursework of PSLC 301 described perceptions of pride, nostalgia, dormancy and classic appearance: *“Upon visiting Laurel, I was met with an overwhelming sense of pride and nostalgia. Somewhat sleepy, yet rich in history and architectural interest, the town cherishes an atmosphere, which can only be described as classic small town America.”*

The town’s vision is *“to build on our proud heritage while creating new and exciting residential neighborhoods, commercial centers, recreational venues and job opportunities.”* However, based on the 2011 Comprehensive Plan, residents expressed dissatisfaction about “too many local streets in disrepair” and agreed “additional steps should be taken to preserve historic homes and areas in town” (Town of Laurel Planning & Zoning Commission, 2011, P. 22).

Interviews revealed a keen awareness of the state of deterioration of historic homes and buildings and the predominance of a slow economy reinforced by the limited options for recreation in the downtown. Specifically, young people feel there are few places in downtown Laurel to go out for a date. In addition, there is a perception of downtown being a low-income area because of “room for rent” signs, empty or

⁸ Available links for reference: Skydiving (<http://www.skydivedelmarva.com/>), Hunted Cemetery House (<https://www.facebook.com/cemeteryhouse>), bowling center (<https://www.facebook.com/bryansbowlingcenter>), and Laurel Junction (<http://laureljunction.com/>).

deteriorating buildings, and the presence of unemployed people loitering in town. The overall feeling that the downtown is unsafe, particularly at night, became a common theme; specifically poor nighttime illumination detracts from the overall sense of safety.

From a recreational standpoint, it was mentioned that Broad Creek is perceived as a good place to go fishing; however, Trap Pond State Park is perceived as a more competitive place for leisure.

Noteworthy, one of the students raised concerns about the perceived sense of community in Laurel, which may be interpreted in terms of social and/or spatial connectedness: *“Over the years, it seems that Laurel’s appearance has become disjointed (...) I hope to help re-instill the sense of community that makes Laurel special.”*

4.4 Expectations findings

According to the residents’ perspective, obtained through a questionnaire distributed by the Planning and Zoning Commission in 2009, (n = 59), Laurel could become “a modern Town while also preserving its architecture and heritage.” Besides, residents agreed “the area around Broad Creek should be protected as a natural public space.”

The 2011 Laurel Comprehensive Plan states the expectation to “accomplish a balance of growth and preservation, residential and business use, revitalization along US Route 13 and within the Historic Town Center (...) based on balanced environmental, historical and economic perspectives.” As indicated by the authorities, such transformation should occur with respect to Laurel’s values, “including its traditional neighborhoods and agricultural economy, its southern Delaware tradition; as

well as its potential for reinvestment into the Chesapeake Bay Watersheds.” Several goals indicated in the Comprehensive Plan are aligned with this purpose: to strengthen downtown revitalization, to continue the work of establishing a Broad Creek Greenway, to improve Laurel’s park system, and to strengthen planning for community facilities.

Focus groups conducted by UD in 2013 supported the idea of improving the waterfront experience through a coherent green design, featuring a river walk. Participants envisioned this area as a beautifully landscaped, well-marked, lit, and interesting trailhead, leading to a new visitor’s center, shops, outdoors sitting, and historic markers.

Several guidelines, extracted from the Comprehensive Plan, helped guide our sense of where elements of the landscape design should reside. Overall, the statement, *“The area around the Broad Creek should be protected as a natural public space.”* (p. 22) as well as *“Within the Broad Creek Special Environmental and Heritage Area, new development, and its design, should be carefully related to the environmental condition of being in the 100-year Floodplain, the heritage values of the area and relationship to the waterfront of Laurel.”* (p. 36) helped us remain mindful of protecting the creek edges along the north and south banks. Noteworthy, through consultation with experts from the Delaware Department of Natural Resources and Environmental Control, we were encouraged to anticipate drastic flood-patterns and increasing sea-rise levels in the next decades around Broad Creek. Specific green infrastructure recommendations were provided to maximize the resilience capacity of the project area. Those recommendations were acknowledged in the design in order to achieve long-term environmental outcomes.

For the Sharp Gas parcel, we found helpful specific directives for our design development: *“Advocacy for a “Laurel Crescent” residential project for the Oldtown area’s waterfront edge on the South Bank of the Creek at Oak Street, modeled after the famous Crescent of Bath in England”* (p. 29). In addition, and more generally, *“Develop New Residential Areas which implement measures for Superior Community Design that promote a neo-traditional design on a variety of sites to support the appropriate neighborhood styles within the framework of Laurel’s tradition of architectural scale* (p. 5). Last, the Comprehensive Plan mentions, *“The goal for community design in Laurel is to develop the community in a manner which continues Laurel’s historical character as a town of one- and two-story buildings in a village setting of small, richly landscaped lots.”* (p. 35)

For Thompson Block, we held fast to the Comprehensive Plan ideal in *“Support the idea of convenient small-scale neighborhood retail uses wherever possible, including as part of new Mixed-Use developments”* (p. 40) and, *“Encourage new uses which result in healthy new activity and increase Laurel’s tax base, taking into account the needs of surrounding land uses.”* (p. 34). We believe this block could help with the initiative by *“Bringing new business investment and people activity to Laurel’s Town Center through focus on new specialty retail, entertainment, dining, convenience goods and services, collectible and consignment shop and small business and office uses in rejuvenating downtown Laurel.”* (p. 40). In addition, this gives us an opportunity to develop this site in accordance to the goal of *“Encourag(ing) clean-up of deteriorated buildings and sites, including sites which may be “brown-field sites” in the sense of having some contamination as a result of past use.”* (p. 40).

In the design of the connected greenway from Creekside Park to Riverview Park, we held fast to the notion that the town wanted to *“Encourage greater pedestrian use of the neighborhood, Historic District, Town Center and Broad Creek streets and sidewalks by promoting walking tours of these areas, signage and walking route markers and maps.”* (p. 44), along with the town’s desire to *“Develop an attractive Farmer’s Market on the banks of Broad Creek.”* (p. 40).

The development of the Kayak Launch area was driven by the town’s objective that *“Broad Creek should be developed as a popular route for small-scale recreational water transportation connecting Laurel with the Nanticoke River and the Chesapeake Bay.”* (p. 44). Noteworthy, focus group participants, UD undergraduate students, and Laurel’s resident student also encouraged ecotourism initiatives such as recreational water activities, bird watching and biking trails.

To address the open field, we considered, *“Enhance forest cover in all parks and other publicly owned lands to increase forest canopy density throughout the community.”* (p. 60).

Of particular concern for the team was the type of housing to be developed on Sharp Gas, the only parcel we have dedicated to housing. According to the Comprehensive Plan, *“The Town’s future land uses will allow for **larger single family** and **modest mixed-use homes** to develop around the established Town Center along Broad Creek.”* (p. 31). When we initially conceived of development on the Sharp Gas property, we identified a concept of mixed-use commercial and residential with vibrant shops and dining along the creek. LRC has expressed a desire to limit the parcel’s development to small, low-to mid-income rental units in partnership with Homes for

America (<http://www.homesforamerica.org/>). In particular, we were asked to focus on: 1) Sharp Gas property limited to residential houses (rather than mixed-use or commercial development of any kind), 2) the “Church Camp” feel, trying to reproduce the concept of small-scale units, an inner plaza, and a promenade historically common in the area, 3) a semi-circle orientation of houses facing the creek, visible to those who access the town, 4) a focal green space within the semicircle, facing the creek. 5) Victorian architectural style, 6) green infrastructure, 7) some waterfront space for public use, and 8) parking along the “back” or south side of the property, with access through W. Front St.

Our design proposal acknowledges this concept by limiting development of the housing units and associated parking to the south of the lot so attention can be paid to establishing a public walkway through proposed rain gardens to keep the town’s connection to the creek open. The residential development is limited to twelve units, specifically six single story duplexes located outside the floodplain. This helps to reflect a need to *“protect the area against inappropriate or too-dense development...”* (p. 40), but at the same time focuses on attractive housing that is in line with the details of many of the town’s historic Victorian style homes.

While no specific guidelines are expressed in the Comprehensive Plan to improve the town’s safety and related perceptions (from a crime prevention perspective), we acknowledge the expectation to improve the sense of safety expressed by UD’s Laurel resident student and PLSC 301 students. From a design perspective, we controlled the elements that contribute to a sense of order, upkeep, and surveillance in the project area. We do recommend, however, consulting a Crime Prevention Through

Environmental Design (CPTED)⁹ specialist to develop more specific strategies for the Town of Laurel in the future.

Subtle recommendations expressed by young students evidenced the expectation for healthy lifestyles, as they encouraged walkability, outdoor sport areas, ecologically functional landscapes, and fresh produce markets or stores in town. In general, students also expressed the need for integration with the larger community, both in social as well as spatial terms.

Beyond the scope of this project is the needed attention to the Town's vacant and/or deteriorating downtown buildings. According to the Comprehensive Plan, the town must *"Evaluate the highest and best development potentials of the Town's vacant buildings and parcels, consistent with preserving the integrity of surrounding properties and uses, especially residential and parkland."* (p. 34). In the same line, it is recognized the town must *"Work to maintain existing businesses while attracting new investment opportunities"* (p. 2). For UD's student resident, it seemed important to increase the visibility of the town through improved advertising/marketing, and to highlight regional advantages, such as nearby facilities and attractions (i.e. hospitals and breweries).

The State of Delaware has also articulated essential principles and values for livable and prosperous communities, which reflect expectations at-large. These ideas are perfectly aligned with the conceptual framework proposed in this study and, for this reason, have been incorporated in our design proposal and recommendations.

⁹ CPTED focuses on many strategies that include mechanical, natural and organizational methods, but two of their main principles are preventing the "broken window concept" and utilizing good lighting that achieves a uniform, consistent level of light on pedestrian and vehicular paths. The broken window concept is related to signs of urban decay that ultimately lead to fear and distrust within a community.

In summary, the Delaware Office of State Planning Coordination (2014)

recommends the following principles:

- Conserve farmland, open space and scenic routes.
- Maintain a clear edge between town and countryside with the intent to preserve rural landscapes and enhance the vitality of existing communities.
- Build attractive, livable communities.
- Respect local character in new construction.
- Reduce the impact of the car.

For the purpose of our project, we have interpreted the Delaware's Office of State Planning Coordination values (2014) as follows:

- Recognize land features prior to the design stage with the intent to create land uses that respect to the natural environment.
- Focus on quality outcomes (i.e. functionality, appearance, increased quality of life for residents) rather than yield and profitability.
- Minimize sprawl while encouraging mixed-uses and land efficiency.
- Design human-scale projects that respect the character of the surrounding community.
- Create well-connected and accessible communities in which all residents have the opportunity to interact and enjoy the assets of the community.
- Create inclusive communities in which perceived or real isolation is minimized and opportunities for social interaction are maximized.
- Facilitate and promote pedestrian and biking habits rather than private transportation (use of vehicles).

- Promote the viability of local markets that support community identity, tradition and sense of place (i.e. human scale commercial streets rather than shopping centers).
- Preserve and extrapolate community character and architecture, rather than creating rigid and contrasting zone districts.
- Strive for flexibility and adaptability in order to honor architectural design when complying with technical requirements.
- Give priority to community character and quality before ordinances, by creating unique designs and avoiding standardized alternatives.

Given the perspectives presented in this document, our research group concludes the community expects to *augment the quality of life and sense of pride of current residents, to create new residential, commercial and recreational spaces, and to attract new residents and visitors.*

Section 5: Contextual framework

Throughout this project we acknowledged the need for a holistic approach to promote local economic development in ways that successfully blend community identity, heritage, human capital and environmental restoration.

“Ecological Design” was selected as the core of the conceptual framework, as it focuses on the relationship between improved environmental quality and people who utilize the landscape. Additionally, “Place Branding” principles provide a foundation for local economic development and “Collaborative Networks” research provide for organizational aspects that are necessary to build community capacity. Altogether, the recommended framework provides the elements that are at the heart of vibrant, progressive, and successful communities around the world.

This section is organized in three subsections. First, an introduction to ecological design is provided and complemented with a description of specific green infrastructure techniques (Appendix 7.2). Next, we describe the elements of a successful place-branding strategy. Finally, we present key aspects of collaboration, an appropriate mechanism to develop synergistic cross-sector relations.

5.1 Ecological Design

Greening communities is part of a transformational experience. A healthy and vibrant environment is necessary to provide good quality of life to residents and to remain competitive in a global economy (Daniels, 2008, p. 11). Neighborhoods and

communities undergoing economic distress have adopted ecological design to counteract the signs of urban deterioration, blight, and to address vacant land.

Ecological design is characterized by the use of infrastructure that helps to restore and maintain social and environmental equilibrium. Green infrastructure refers to the patchwork of natural areas that provide habitat, flood protection, cleaner air, and cleaner water (U.S. EPA, 2014). Examples include the use of green roofs, trees and tree boxes, rain gardens, vegetated swales, constructed wetlands, infiltration planters, pervious pavements, vegetated median strips, reforestation/revegetation, and the protection and enhancement of riparian buffers and floodplains. Planted landscape, private gardens, parks, open spaces and woodlands are all considered part of the natural patchwork that eventually leads to greater community greening. (Please refer to Appendix 7.2 for a detailed technical description about green infrastructure.)

Ecological design marries science with planning and theory with practice. In a broader sense, it helps communities by generating more sustainable landscapes that satisfy environmental, economic, equity, aesthetic, experiential and ethical expectations (Musacchio, 2009).

When appropriately implemented as part of a community development initiative that is also sensitive to appropriate collaborations, utilizing ecological design can achieve results that surpass expectations. For example, in North Philadelphia¹⁰, a community instilled pride through improvements in the landscape coupled with

¹⁰ In 2001, the City of Philadelphia launched a \$250-million initiative to “remove blight and renovate the city’s distressed neighborhood” through a broad-scale vacant-land management green (Bonham and Smith, 2008, p. 228). The Neighborhood Transformation initiative (NTI) was addressed as a collaborative partnership between the government and Philadelphia Green, a project created by Pennsylvania Horticultural Society.

community engagement. A program leader described the experience of reducing blight through urban greening as “fostering hope” and reported that, in addition to accomplishing physical improvements in the community, they were able to “tackle other issues like vandalism, crime and drugs” through collaboration with agencies (Iris Brown, cited by Bonham and Smith, 2008, p. 229). Restoring landscapes is an effective way to promote individual and community engagement, ecological awareness and place literacy (Musacchio, 2009).

In addition to achieving positive environmental outcomes that contribute to mitigating climate change, the use of green infrastructure generates social and economic advantages (see Fig. 5). For example, it has been positively correlated with health and well-being, recreation and leisure, and quality of place (Kaplan et al., 1988; Ulrich, 1988; Victoria Business Improvement District, UK, 2013). The simple presence of trees has proved to “positively affect judgments of visual quality” and “influence consumer responses and behaviors” (Wolf, 2007). From an economic perspective, green infrastructure has been associated with economic growth and investment, increased property values, improvements in labor productivity and tourism (Victoria Business Improvement District, UK, 2013).

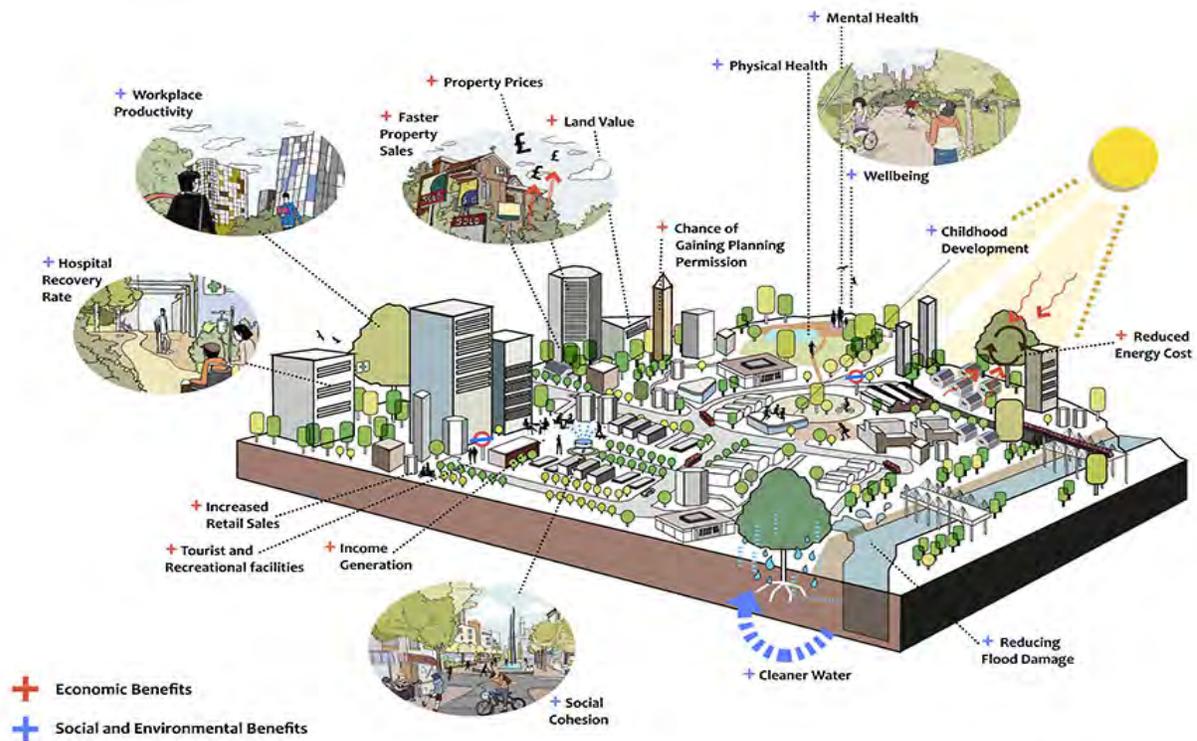


Fig. 5. Green infrastructure benefits. Source: Victoria Business Improvement District, UK, 2013.

By improving the image of the landscape, we can also improve perceptions and ultimately, the human experience. According to landscape ecology experts, “landscape sustainability can be considered in terms of order and disorder, where order implies causality, well-defined boundaries and predictable outcomes, while disorder implies uncertain causality, shifting boundaries and often-unpredictable outcomes” (Zurlini et al, 2012, p. 1161). In designed landscapes, decision-makers are perceived as facilitators of the relationship between people and nature. It is a way to express values, behaviors and actions that are relevant to the community (Musacchio, 2009). For example, a well-maintained landscape contributes to creating a sense of order and safety (Shaffer and Anderson, 1983, cited by Stamps, 2005).

Serving several divergent purposes, ecological design approaches environmental issues such as endangered biodiversity, the dwindling connection between people and nature, and eroding social interactions. Therefore, the greening of a community serves to restore ecological functions while creating social and spatial connections. A sustainable and stimulating landscape provides opportunities for exploration, discovery, learning and social interaction that are conducive to ecotourism initiatives.

Early in our planning it was suggested that ecotourism could play a role in redefining Laurel. Ecotourism is defined as "responsible travel to natural areas that conserves the environment and improves the well-being of local people" (TIES, 1990, cited by ecotourism.org). Revolving around several of the same principles as ecological design, ecotourism strives to minimize negative impacts, build awareness and respect towards culture and the environment, as well as create positive experiences and memories for visitors and hosts. In addition, it generates financial benefits for environmental conservation, empowers local people, and raises political, environmental, and social climate sensitivity (ecotourism.org).

In many ways, the cultural, historical and environmental assets of Laurel could lead to the design of a vibrant ecotourism destination. Connectivity to Broad Creek and Trap Pond are obvious opportunities. The many historical gems as well as a continued rural connection may be just the right reprieve for urban dwellers needing to reconnect with small town values and the outdoors.

5.2 Place branding

“A place brand is a representation of identity, building a favorable internal (with those who deliver the experience) and external (the visitors) image (leading to brand satisfaction and loyalty; name awareness; perceived quality; and other favorable brand associations)” (Govers and Go, 2009, p. 17). In branding a place, the following aspects require consideration: experience, identity, image, marketing, offering, narrative, and tourism.

5.2.a Place experience

Experience involves the senses, the mind, emotions, active participation or passive gazing, and social interaction (Govers and Go, 2009, p. 17). Positive experiences require that personal needs are fulfilled before expectations of place are met or, hopefully, exceeded.

According to Maslow’s hierarchy of human needs (often presented as a pyramid), personal needs are fulfilled at the lowest and most basic level of the structural pyramid. The different levels of the pyramid represent specific physical and psychological needs that must be satisfied before someone can move to higher levels of fulfillment.

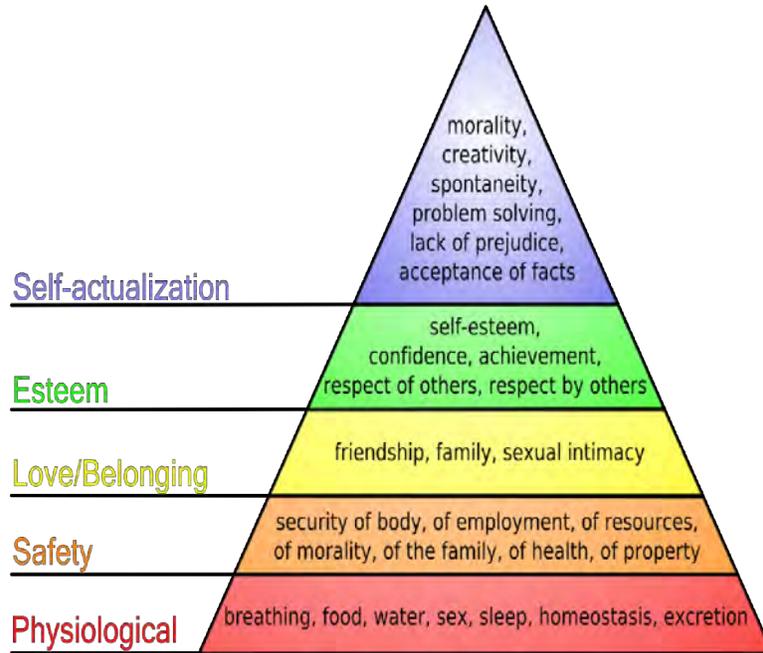


Fig. 6. Maslow's hierarchy of needs. Source: Wikipedia.org

The physical environment exercises a direct influence on the first three levels of Maslow's hierarchy. **A healthy, safe, prosperous, and locally engaged community can satisfy the basic needs of residents within a specific town, and provide the platform for constructive social interactions.** Extrapolating the principles of Maslow's hierarchy of needs, it is apparent the residents of a town need to fulfill basic personal needs such as adequate housing, health and safety prior to escalating towards the achievement of higher psychological needs, such as sense of belonging (social network), high-esteem (community pride) and self-actualization (community satisfaction).

Because the human experience is highly related to our relationship with the surrounding built and natural environment (Fosket and Mamo, 2009), we can expect that the built environment encodes a meaning, and therefore trigger's a reaction among

users. This conclusion is consistent with Amos Rapoport's (1990) perspective, which suggests *there is an implicit or subconscious dialog between the landscape and the users*. For example, in America, a rural image, low perceived density, historic and patriotic symbols, privacy, good maintenance, attractive appearance and high social status, convey positive meanings and create favorable environmental quality perceptions (Rapoport, 1990). Rapoport's previous description is very consistent with Laurel, thus suggesting that Laurel's imagery may trigger feelings of community pride and personal satisfaction. In a following section of this framework, more correlations will be described between imagery, perceptions and experiences.

A basic communication process includes a sender (encoder), a receiver (decoder), a channel, a message, a cultural code, a topic, and a context. In the case of the urban landscape, the built environment represents the channel. In branding a place, designers can manipulate or modify the attributes of the physical landscape to create positive images and emotions, and to include diverse opportunities for social/civic interaction, which is a fundamental aspect of the human experience, especially for residents. Therefore, in designed landscapes, decision-makers and designers are considered facilitators of the relationship between individuals and the elements of the community, such as nature, the built environment, fellow residents and social institutions.

In the United States, concerns about the vibrancy and engagement of civil society have been voiced. For example, research by Putnam observed that Americans' civic engagement and social connectedness has eroded after the decade of the 70's. The apparent reduction of public service values is distressing, as research has found a

positive correlation between successful community outcomes and civically engaged communities.

Sociologist Ray Oldenburg, cited by Moe and Wilkie (1997, p. 73), stated that “Americans have little choice but to retreat into the sanctuary of their family rooms because of the disappearance of local gathering places that used to be between walking distance from their homes and workplaces.” To counteract trends of individualism and lack of civic/community engagement, new movements such as citizen activism and new urbanism have developed to trigger new ways of interaction with the physical environment and fellow residents.

As mentioned previously, one of the students that studied the town of Laurel described the experience of visiting Laurel as an “*overwhelming sense of pride and nostalgia*” (PLSC 301 Student, 2014). Small town revitalization relies upon creating and delivering unique experiences. Indeed, many nostalgic towns have revitalized their economies by profiting from the sense of nostalgia, reactivating their assets, and making them consistent with a marketing strategy.

Based on research of the Urban Land Institute (cited by Scharoun, 2012, p. 113), “consumers are now seeking authenticity and a deeper sense of connection to their community, culture, climate, and daily lives.” Providing residents of Laurel with a safe, connected, well-maintained greenway with appropriate places for socialization and solitude may deepen the sense of connection to the local environment and the neighborhood overall. More specifically, Laurel’s experience could be enhanced by increased lighting in downtown and on the new greenway for better perception of safety at night; beautiful landscaping that reflects order and seasonality, for example an annual

flower program for the town with crops rotating seasonally in beds and on and around light posts; reduction of vacant stores and buildings; façade improvements; impeccably maintained walkways; and the creation of a central plaza for community gatherings and exchange¹¹ (i.e. farmer’s market, artisan fairs, small community festivals, cafés). In general, these recommendations aim to increase human presence in the town, which adds to the sense of perceived safety and vibrancy.

5.2.b Place identity

“A vivid and coherent brand message should present substance that people can understand, embrace and share with others. It should help people make emotional connections with the deeper underlying stories and ideas as well as the rich physical man-made and natural landscapes” (Berger, 2009, p. 134). In other words, a brand must capture the identity of the place and their people.

“Identity is the heart and soul of the brand experience and the design should grow out of the area’s rich history, while simultaneously serving as a beacon for opportunity and growth” (Berger, 2009, p. 134). “Place identities are constructed through historical, political, religious and cultural discourses; through local knowledge, and influenced by power struggles” (Govers and Go, 2009, p. 17).

In urban centers, architects, designers and city planners have the possibility to influence the creation or perception of a site’s identity. However, Jackson and Sinclair (2012, p. 43) stress that, when encouraging new economies through revitalization, decision makers “should never sacrifice character.” Instead, reflecting a true identity is

¹¹ Some of these activities could be proposed at present on Market Square Plaza. Note also this proposal includes the development of a future central plaza on Thompson Block.

more likely to yield favorable results. “Building a place brand strategy around the skills, aspirations and culture of the local population is far more likely to result in credible, sustainable and effective results than something cooked up by a team of ministers or PR consultants in closed meeting rooms” (Anholt, 2004, cited by Grovers and Go, 2009, p. 109).

For example, in Zeeland, The Netherlands, research was conducted to understand the affinity and level of connectedness of residents towards the place where they live. Researchers were able to decipher how meanings, experiences and feelings create a sense of place. As a result of the study, it was confirmed that the residents of Zeeland possessed a regional culture, reinforced by the existence of symbols, heroes, rituals and values. The research group decided to incorporate the findings in order to develop a brand identity that reflects the true identity of their residents (for more details, refer to Chapter 6, Grovers and Go, 2009).

Historic towns are considered places of shared memories where people can learn about the past, explore their culture and discover their identity. As suggested by the National Main Street Center, towns confer the opportunity to learn, discover and socialize in a genuine environment, at the difference of “bland suburbs” and “enclosed shopping malls.”

The historic preservation movement has effectively supported the revitalization of historic residential and commercial districts, resulting in “*living environments better than the ones sprawl has offered us*” (Moe and Wilkie, 1997, p. 35). According to a study conducted by Rutgers University, “in 2009 and 2010 historic rehabilitation created over 145,000 new jobs” (National Trust Community Investment Corporation, 2014).

However, preserving historic buildings is not sufficient to create healthy and vibrant communities. Historic preservation is only a part of a broader framework for sustainability. To be successful in current context, communities need to demonstrate their sense of uniqueness and superiority.

To create healthy places, Jackson and Sinclair (2009) recommend attention to the consistency of the design in regards to the larger cultural and physical context. “If the buildings and the cultural practices where we live are organic to that place, they fit. They are nurtured by the natural patterns, the weather, the seasons, and the life spans.” (Jackson and Sinclair, 2009, p. 37). A true sense of identity “should be rooted in reality and in fundamental truths about the place, and its needs to connect people” (Gilmore, 2002, cited by Grovers and Go, 2009, p. 109).

As a leader in historic preservation, Laurel needs to continue rehabilitating historic buildings and repurposing them for utilization, particularly in the downtown area. These buildings’ high visual exposure and public significance *are the backbone of the town’s collective sense of place.*

In addition, new buildings should reflect the predominant styles of historic architecture within the town; such as Federal-style architecture (i.e. Johnson Houses at 321 Poplar Street); Victorian style (i.e. Daneil Fooks House at 404 S. Central Avenue); Colonial Revival style (i.e. Nan Fooks Campbell House at 807 West Street); and Queen Anne style (i.e. Governor Joshua H. Marvil House at 606 West Street) (Laurel Public Library et al., unknown year; walkthetown.org, unknown year). More effort is needed to demonstrate commitment to creating spaces and opportunities for civic/social engagement. This could be achieved with more public festivals and/or frequent

community greening days.

To facilitate a positive experience between residents and visitors with the natural space, efforts must highlight a deeper connection with Broad Creek, along with other green spaces. As part of the goals, the designed landscape should inspire a sense of connectedness and continuity, as it was perceived that Laurel is a disjointed town.

An enriched identity must be perceived as truly reflective of the people's values and ideals. To be successful, changes in Laurel will need to be perceived as genuine rather than artificial. They must be perceived as legitimate efforts to increase the quality of life of their residents, and not as a "green wash" strategy to attract temporary visitors. To be perceived as legitimate, changes must try to incorporate and reflect as much as possible of the expectations expressed by members of the community. To that end, we recommend the establishment of collaborative networks to address community challenges and projects, and the adoption of the recommendations provided in section 5.3 of this document. Collaborative networks encourage the involvement of all relevant community stakeholders to drive positive changes.

5.2.c Place image

An image is the subjective interpretation of reality "based on attributes, functional consequences (or expected benefits), and the symbolic meanings or psychological characteristics consumers associate with a specific place" (Govers and Go, 2009, p. 18).

Place branding consists of the creation of a unique identity through the selection of the distinguishable elements of a destination, by means of "positive image building" (Acharya, 2010).

Images have been described as organic and induced. Organic images are the ones that are directly created by the individuals after past experiences and interactions with the place and the community. Induced images are created through information received indirectly from external sources, like advertising and promotion (Acharya, 2010). Induced images are very relevant in the context of place branding, as travelers give them consideration when making decisions about possible destinations. Websites such as Groupon, Trip Advisor, etc. display excellent examples of induced images, effectively alluring customers and visitors to businesses and destinations.

Positive imagery is an important variable for local economic development. According to Blakely and Leigh (2013, p. 262), “everyone wants to live in an orderly, well-maintained community that is proud of itself.” Therefore, positive perceptions are helpful to attract and retain new residents.

Laurel’s imagery at present has two prominent characteristics: Broad Creek and historic buildings. The presence of water (blue space) is a very powerful asset for a town. Research has found that “natural and built scenes containing water were associated with higher preferences, greater positive affect and higher perceived restorativeness than those without water” (White *et al.*, 2010, p. 482). In general, the literature indicates that people are prepared to pay more for houses and hotels facing blue spaces and that water is usually a preferred feature of people’s favorite destinations (White *et al.*, 2010). Also, as stressed by the historic preservation movement, the presence of historic buildings helps to create unique connections with the community, as they reflect their heritage and identity. In addition to a contribution to history and tradition, the attributes of Laurel historic homes may have positive social

repercussions.

Authors have empirically stated that urban places undergoing decay and disorder are more likely to experience safety threats. Signs of urban decay, such as broken or boarded windows and/or doors, broken street lights, weeds, litter, poor overall maintenance, and graffiti can lead to fear and distrust within a community (Hopper, 2007). Urban incivilities also “reflect a breakdown of social control and have been associated with higher crime, perceived crime and fear of crime” (Foster et al., 2010, p. 79-80). On the other hand, it has been found that well-maintained houses that display surveillance features (i.e. porch, veranda), and signs of territoriality (i.e garden, well-maintained lawn) promote walking in neighborhoods and trigger positive perceptions in residents (Foster et al., 2010).

As suggested by Jane Jacobs (cited by Hopper, L.J., 2007), any neglected space can fall victim to misuse. To avoid this, our goal should be to promote simultaneous perceptions of beauty and safety, and to recommend a specific use for each of the neglected spaces in Laurel, keeping in mind natural surveillance as part of the design.

As part of this project, enhanced greenery will be recommended to improve the visual appeal, perceptions, and experience of residents and visitors. Research has demonstrated that greenery is positively correlated with perceptions of beauty, wellbeing, health and economic success. For example, Lee and collaborators (2008, p. 60) found that neighborhood satisfaction in urbanized areas was higher “when tree patches in neighborhood environments were less fragmented, less isolated, and well connected.” White and Gatersleben (2011) also confirmed that people prefer houses that integrate vegetation (i.e ivy walls and green roofs), compared to traditional designs.

Their results indicated that greenery was perceived as beautiful, restorative, and produced affective connections (White and Gatersleben, 2011). Natural green and water environments have been correlated with states of relaxation and it is apparent that people intuitively seek for greenness when experiencing negative moods (Regan and Horn, 2005). Subjective vitality, which has been empirically associated with behavioral and health outcomes, also seems to improve when individuals are exposed to natural landscapes, compared to images of buildings (Ryan *et al.*, 2010). In England, access to good quality green space has been recognized as “an effective, population-wide strategy for the promotion of good health, wellbeing and quality of life” (Royal Commission on Environmental Pollution, 2007, p. 47). When pedestrian amenities are included in green design, healthy habits are encouraged (Scott, 2008). Finally, research is starting to support the synergistic combination of urban greening and commercial activities practices, as it may create business advantages while providing favorable environmental conditions for employees (Joye *et al.*, 2010).

Pedestrian amenities for Laurel included in the design include benches, emergency call boxes, dog waste stations, trash and recycling bins, public art, and planters.

5.2.d Place marketing

A “marketing plan should guide the organization and its partners in developing a consistent marketing approach. It should also provide the framework for integrated communication materials and media programs” (Berger, 2009. p. 135).

A good point of departure is the creation of a marketing position statement, which

is intended to capture the desirable essence of the visitor's experience. "A positioning statement is a concise description of your target market as well as a compelling picture of how you want that market to perceive your brand" (Stayman, 2013). This internal tool guides marketing efforts, strategy and tactics. According to Dr. Doug Stayman, a good positioning statement must be simple, memorable, and tailored for the target market; it should provide an unmistakable and easily understood picture of the brand that differentiates it from competitors; it should be credible and it should deliver its promise.

Cleverdon and Fabricius (2006) recommend the following elements and questions may be helpful to guide the construction of a position statement:

- *Primary attributes:* What are the tangible, verifiable, objective, measurable characteristics of this destination?
- *Rational/physical benefits:* What benefits to the tourist results from this destination feature?
- *Emotional benefits:* What psychological rewards or emotional benefits do tourists receive by visiting this destination? How does the tourist feel?
- *Brand personality:* What key traits and characteristics of the destination are communicated by the brand?
- *Brand values:* What does the value mean for the typical repeat visitor?
- *Brand essence:* What is the essential nature and character of the destination?

A general “template” for the construction of a position statement suggests the following structure:

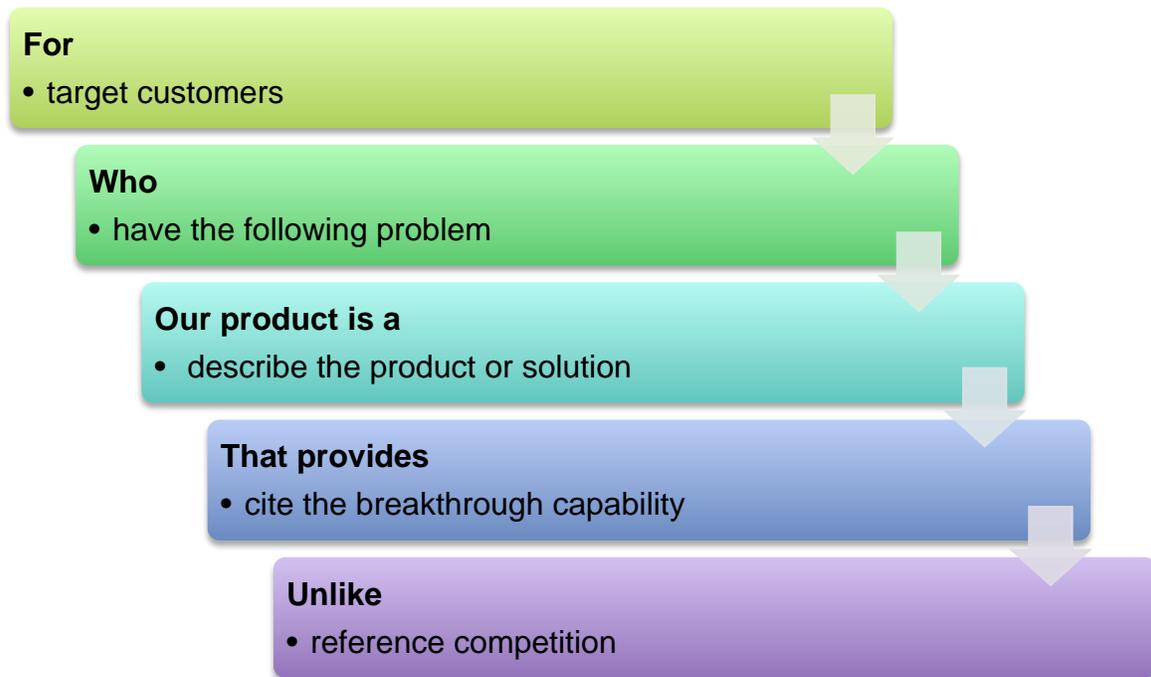


Fig. 7. General “template” for the construction of a position statement. Source: Moore, cited by Kent, 2014.

Following this template, a possible position statement could be: *“For people who appreciate the charm of historic towns but struggle to find sustainable lifestyles in the Eastern Shore, Laurel offers the perfect blend of heritage, natural beauty and sense of community, unlike other towns that have opted for standard ways of development. Laurel is the greenest and most beautiful historic town of Delaware.”*

When the essence of a place has been captured, it is simultaneously consumed at a symbolic and experiential level (Acharya, 2010). The name of the brand is considered one of the most important aspects and, to be effective, must reflect the

essence of the place. The brand name enjoys high visibility: it is “spoken and written, and used in all kinds of media, print, advertising, and promotional materials” such as signage, banners, souvenirs, and Internet portals (Berger, 2009, p. 134).

Marketing plans start with core communities and can be developed in consecutive increments, towards a national and even international audience.

5.3.e Product offering

Both as residential and tourism destinations, places compete against each other through the availability of convenient and desirable resources. For residents, *“downtown holds together the most varied mix of economic, civic and social functions. It is the place where everyone can meet and interact, where monuments are located, where speeches are made, where parades are held and crowds are entertained. More than anything else, downtown gives a community its collective identity and thus its pride”* (Moe and Wilkie, 1997, p. 180). To be successful, communities must satisfy the needs and expectations of their residents and must possess competitive advantages.

To brand a place, the following question needs to be answered: *What does this town have to offer that no other town has?* In general, places are marketed in terms of tourism, trade, talent (education, employment opportunities), treasury (investment opportunities), and other physical, human, social, financial, environmental, political, cultural and spiritual assets (Govers and Go, 2009, Green and Haines, 2011; Jabbar-Bey, personal communication).

For instance, Mayor John J. Shwed states that Laurel is a great place to call home because of its people, heritage, historic assets, natural beauty and environmental

qualities, state recreational activities, outstanding institutions and organizations, and even its state-of-the-art sewer infrastructure (www.townoflaurel.net).

In Laurel, the Chamber of Commerce serves as an entity to promote business growth and leadership, and to diffuse information to the community. At present, the chamber has four active committees: tourism, business development, economic, and membership. The membership section of their website includes a list of businesses and institutions by category (i.e. restaurants, schools, super markets). The chamber also provides information packages to individuals interested in visiting or relocating, which describe services such as real estate, education, development, health, recreation, historical society, public library, places of worship, and businesses such as banks, grocery markets, restaurants, schools, utilities.

Residents can also obtain informal information about businesses and organizations through social media. For example, Laurel's Facebook page compiles a list of businesses and related information (brief description, address, count of users or visitors, and ratings). Likewise, "www.meetup.com" provides information about social groups that get together to share activities of common interest. Some of the groups hosted in a 25 mile range from Laurel are: Moms Club of Coastal Delaware (117 members), Lower Shore Craft Beer Lovers (7 members), Eastern Shore Outdoor and Social Club (175 members), Sussex County Latin & Ballroom Dance Lovers (51 members), Delaware/MD Belly Dance and More (131 members), and Lower Delaware Small Dog Meet up Group (39 members).

It is apparent that multiple resources are available to describe the product offering of Laurel; however, the information seems to be scattered. It is also apparent

that little (official) information exists to disclose social and civic engagement opportunities.

As mentioned in other sections of the document, the slow economy of past decades has negatively affected Laurel's product offering perceptions. For example, an electronic tourism guide published by "walkthetown.com" (part of the series Look Up America!) describes Laurel as a "bedroom community" and states, "Today you have to work hard to spend a dollar in downtown Laurel" (p. 12). It is possible that the lack of vibrancy of Market Street and neglected areas of the neighborhood may be contributing to this negative perception.

Therefore, it seems imperative to centralize and disseminate Laurel's product offering information in formats that are appropriate to different audiences, taking in consideration technological and class divides. Laurel's product offering narrative and perceptions may be improved once an economic development entity and program are defined (as suggested in the Comprehensive Plan, p. 22), and collaboration is strengthened with the Chamber of Commerce and regional economic development partners, such as the Delaware Economic Development Office.

As part of the product offering, social and civic interaction opportunities need to be included. Laurel's product offering includes, but is not limited to retail stores, services, social and civic organizations, and environmental amenities.

5.2.f Projected narrative

A projected narrative is the discourse strategy utilized to describe the projected place image (Govers and Go, 2009, p. 19-20). According to Berger (2009), a core story

needs to be developed by building upon selected events that have resonance for the community, and that can be supported through appropriate content and imagery.

Secondary themes can be used to amplify and enrich the primary story.

To guide the process of creating a core story and developing interpretive signs, Berger (2009, p. 135) recommends:

- Creating a partnership panel to act as a steering committee.
- Having an experienced interpretive consultant guide the process.
- Defining the visitor/target audience and what they can expect from their visit.
- Forging connections between themes and the audience.
- Building a cohesive set of signage and presentation tools for use throughout the area.
- Defining the partner benefits of participation in the plan.
- Outlining implementation opportunities.

Based on the literature, it is advisable to seek the perspectives of residents and stakeholders who can speak for Laurel's past, present and future identity. For instance, Laurel's Historical Society can best provide an account of the events that have defined the history and character of the town; current leaders and officials can speak for Laurel's present aspirations; and children can contribute by proposing initiatives that they may continue to embrace in the future. According to Spirn (2005), the involvement of children in the ecological restoration of Mill Creek, PA (a socially and economically depressed community at the time of the study) was *crucial to create a new community identity and to obtain additional political support*. Spirn's progress was achieved by educating middle-school children in the field of Landscape Literacy. Before then, the

majority of proposals had failed to be supported or recognized. Students from the University of Pennsylvania led the initiative. Spirn's initiative suggests an opportunity for a collaborative partnership between Laurel's school system and the University of Delaware.

5.2.g Tourism

Tourism refers to the activities and perceptions experienced by persons traveling for leisure to places outside their usual environment, and may include short, same-day and extended periods of time (Govers and Go, 2009).

Joanne Steele (2009), a marketing consultant, highlights the importance of promoting the "regional flavor" of the town, which in this conceptual framework is referred as the town's identity and narrative. Different from of artificially created places such as theme parks and malls, towns have the power to deliver a genuine experience, which is considered to be in demand.

As indicated in other sections of this document, Laurel's most prominent physical assets at present are Broad Creek and its historic architecture.¹² When consulted about the most relevant sites, in terms of the town's identity and historic relevance, Laurel Historical Society highlighted the following sites: Old Christ Church, Trap Pond, Phillip's Landing, John Smith monument at Phillip's Landing, The Wading Place on Broad Creek, The Studley House, The Laurel Heritage Museum at the Train Station, Cook House, the headquarters of the Laurel Historical Society, The 1921 Laurel School Building, one of

¹² These physical assets, which are relevant to the community's identity, can be visually reflected through colors: historic architecture usually features bricks (earth red tones), while Broad Creek conveys the perception of blue.

the first DuPont Schools built in the 1920s, and The Laurel Auction Block. We recommend these sites should be featured through educational signs and appropriate wayfinding signs and tourism materials.

Appealing and functional wayfinding signs can enhance the aesthetic value of a community and improve visitors' experience. According to Berger (2009, p. 135) "people are natural pathfinders." With appropriate guidance and stimuli (such as wayfinding signs, confidence markers, social interaction and imagery), people undertake their journeys making sense of the site and reacting to the messages of the landscape. The use of graphic design is considered a competitive tool to meet the expectations of a demanding citizenry in a rapidly changing world. This includes educational signs that highlight the new green infrastructure built to bring resilience to the town in a time of changing climate. Please refer to Appendix 7.3 for an overview of wayfinding and educational signs.

Steele stresses that community stakeholders should agree upon a vision before engaging in public branding, and that participants must work collaboratively, as a network, seeking to co-create an experience, rather than selling discrete goods and services. In general, the network should aim to increase its partnership through time. Chambers of Commerce and Economic Development entities could lead the initiative. In the words of Pine and Gilmore (cited by Steele, 2009), "businesses must orchestrate memorable events for their customers", so "memory itself becomes the product."

Steele recommends that marketing strategies should take full advantage of the Internet, and that websites should be current and dynamic. As a concern, our research team perceived that Laurel's tourism presence on Internet is weak and unfavorable. For

example, very few destinations have been rated by actual visitors (i.e. Trip Advisor), no deals are available to encourage new visitors (i.e. Groupon), and no desirable accommodations are associated with Laurel. In contrast to other small Delaware towns, the absence of an official downtown or Main Street Redevelopment program is noticeable. These programs always have a strong Internet presence by advertising the town's charm, events and promotions. As seen on Trip Advisor (also accessible through "visitdelaware.com"), Relax Inn¹³ has been rated *very poorly* by visitors. Since the last negative entry (January, 2014), no other reviews have been submitted, suggesting that negative perceptions have discouraged the selection of this motel and potentially of Laurel as a tourism destination. Attention to this matter is urgent.

5.3 Key Aspects of Collaboration

The aspects mentioned previously are essential for a successful place branding strategy. However, bringing to fruition a reality that reflects a shared vision is a complex process that requires the effective participation of multiple stakeholders, often from diverse sectors (i.e several government levels, agencies, nonprofits, private sector, educational institutions, and citizens).

Words such as participation, engagement and collaboration imply positive attitudes and good intentions. They are often highlighted as essential values to bring to the table when working with others. However, good intentions sometimes are insufficient to achieve the desired outcomes. For this reason, we consider important to conclude this framework with a revision of the key aspects of effective collaboration.

¹³ If the available information is accurate, Relax Inn seems to be the only, or nearest motel for a stay in Laurel.

The rationale for network collaboration is that the scope and the complexity of most public challenges are “larger than one organization can address alone” (O’Leary and Gerard, 2012). Collaboration refers to “any joint activity by two or more organizations that is intended to produce more public value than could be produced when the organizations act alone” (Bardach, cited by U.S. GAO, 2005. p.6).

Collaborative networks “can operate horizontally, across a range of organizations, and integrate the strengths and talents of a variety of organizations in the public, nonprofit, and for-profit sectors to effectively address critical public problems” (Milward and Provan, 2006, p.7).

While collaboration is a powerful outcome-oriented approach, there are challenges to effective collaboration. Based on survey research, O’Leary and Gerard (2012, p. 22) reported the following issues (in order of importance): difficult relations, lack of resources, discordant organizations and mission, unskillful individuals, complex political environments, and unanticipated negative consequences. On the other hand, research has accumulated a wealth of knowledge to guide the effective practice of collaboration. For the purpose of this report, we will recommend the 2012 Government of Accountability Office Collaboration Model, which describes the key features that Federal Government uses to lead and implement interagency collaboration. GAO summarized these features as follows:

1. **Outcomes and Accountability:** Have short-term and long-term outcomes been clearly defined? Is there a way to track and monitor their progress?
2. **Bridging Organizational Cultures:** What are the missions and organizational cultures of the participating agencies? Have agencies agreed on

common terminology and definitions?

3. **Leadership:** How will leadership be sustained over the long-term? If leadership is shared, have roles and responsibilities been clearly identified and agreed upon?

4. **Clarity of Roles and Responsibilities:** Have participating agencies clarified roles and responsibilities?

5. **Participants:** Have all relevant participants been included? Do they have the ability to commit resources for their agency?

6. **Resources:** How will the collaborative mechanism be funded and staffed? Have online collaboration tools been developed?

7. **Written Guidance and Agreements:** If appropriate, have participating agencies documented their agreement regarding how they will be collaborating? Have they developed ways to continually update and monitor these agreements?

Adapting this model to a cross-sector local context is a good way to improve Laurel's community capacity and effectively address Laurel's revitalization initiatives. For example, our research team perceives the need to undertake the following general goals: 1) to improve the sense of spatial connectedness and quality of the landscape,¹⁴ 2) to improve social connectedness and civic engagement of residents, 3) to attract and retain new businesses, and 4) to position Laurel as a tourism destination. Each of these goals could be addressed as individual projects through "task-force" teams or other types of networks, by engaging all relevant stakeholders as network participants. For instance, when approaching community development and civic engagement projects, it

¹⁴ Addressed through this project.

would be important to engage a group of stakeholders that reflects Laurel's composition and current demographics (i.e. ethnic and cultural groups, civic organizations, public and nonprofit institutions and Town Council). For economic development projects, the network may require the participation of land and business owners, Chamber of Commerce, Laurel Redevelopment Corporation, Delaware Economic Development Office, Town Council, and alike.

Diverse stakeholders tend to bring contrasting and even conflicting perspectives to the table. While unanimous agreement and participation is almost impossible, it is important to engage as many groups as possible in order to move forward in a legitimate and effective manner. To solve potential barriers, common values, interests, goals and guidelines are needed. Participants need to be informed and express agreement about the procedures that will be followed to work together (i.e. how to maintain communication, how to make decisions, how to resolve conflicts) and they must accept the roles and responsibilities for which they are accountable. Written guidance and agreements have been positively correlated with networks that achieve their intended results, as they ensure clarity.

Clear leadership is also needed. Progressively, leadership and management paradigms are changing to become more inclusive and to help people to achieve their maximum potential. Under the concept of collaboration, a leader is the person who facilitates a participatory process and keeps actions rolling, while holding people accountable and motivated.

Last, but not least, a network requires diverse types of resources, including: capital, administrative capacity, and the talent, time and commitment of all participants.

A planner or designer could be employed to synthesize the diverse inputs and information, to seek clarity, and to lead and manage the collaborative process.

Much has been said about the skills set of a good collaborator. Experts in the field have highlighted individual attributes, such as openness of mind, patience and flexibility (O’Leary and Gerard, 2012). Good interpersonal skills include the ability to communicate well, listen to others, and working well with people. At the group level, it is important to demonstrate the ability to facilitate, negotiate, compromise, reach consensus and solve problems (O’Leary and Gerard, 2012).

As indicated previously, collaborative networks are very flexible. They allow people, communities and organizations to address one issue at a time, and to join and dissolve as needs arise and become fulfilled. Collaborative networks are excellent tools for today’s public management, which seeks for “greater productivity, increased reliance on private markets, stronger service orientation, decentralization, increased capacity to devise and track public policy, and tactics to enhance accountability for results (Kettl, 2005, cited by Milward and Provan, 2006, p. 8).

By taking into consideration the principles of ecological design, adopting the elements of place branding for strategic planning, and following the key aspects of collaboration for outcome definition and governance, we trust the town of Laurel will be able to design a solid vision for the future and accomplish all of the revitalization goals outlined in the Comprehensive Plan as well as those adopted from this report.

Section 6: Landscape Proposal

6.1 General Concept

The culmination of our design process, as described in Appendix 7.1, is the overall drawing titled *The Ramble, A Plan for Waterfront Redevelopment in Laurel, Delaware*. Based on the process, we developed a plan that takes advantages of the site opportunities while solving issues related to the site constraints.

To support the implementation of this proposal, we compiled a list of specific recommendations (prominently featured in the introduction of the document), arranged within the categories we described as our conceptual framework. The list of recommendations works in tandem with the landscape plan and together they form a comprehensive recommendation for the Laurel waterfront along Broad Creek.



Fig. 8. *The Ramble, A Plan for Waterfront Redevelopment in Laurel, Delaware.*

Sense of place has been important to the design team since the start of the project, as highlighted throughout our conceptual framework (Section 5). We are mindful that Laurel has a unique sense of place and we are emphatic that the aesthetic of the materials and the methods of construction are respectful of the “place”.

The use of green infrastructure throughout the project is paramount in our design thinking with the goal to increase infiltration, groundwater recharge, and biodiversity, as well as decreasing pollution loads and heat island effect.

Where pathways were proposed, we considered wood boardwalks, but for this design iteration settled on impervious brick pathways to relate to existing pathway materials throughout the town. Overlook structures along the greenway are piers of wood construction utilizing environmentally safe pressure treated wood. We encourage future development to be mindful of keeping all existing vegetation while newer plantings of more desirable species are introduced.

Through the use of 3D drawings and sketches, we hope to communicate the fundamental principles that we view as the defining characteristics of our plan. Through repetition or colors and textures as well as simplicity and rhythm, we hope to display unity to the community who will use the space. The landscape materials are all brick or wood, plant materials are massed together and are all considered to be native plantings, major use areas are defined, and the plan has descriptions for areas of special situation. The refinement of this design would not be possible without the entire team of collaborators and, in this way, we hope we exemplify how planners, developers, community members, academics, and designers can work together to create a valuable town vision.

6.2 Details of *The Ramble*



Fig. 9. The Cottages at Laurel Mills (formerly Sharp Gas).

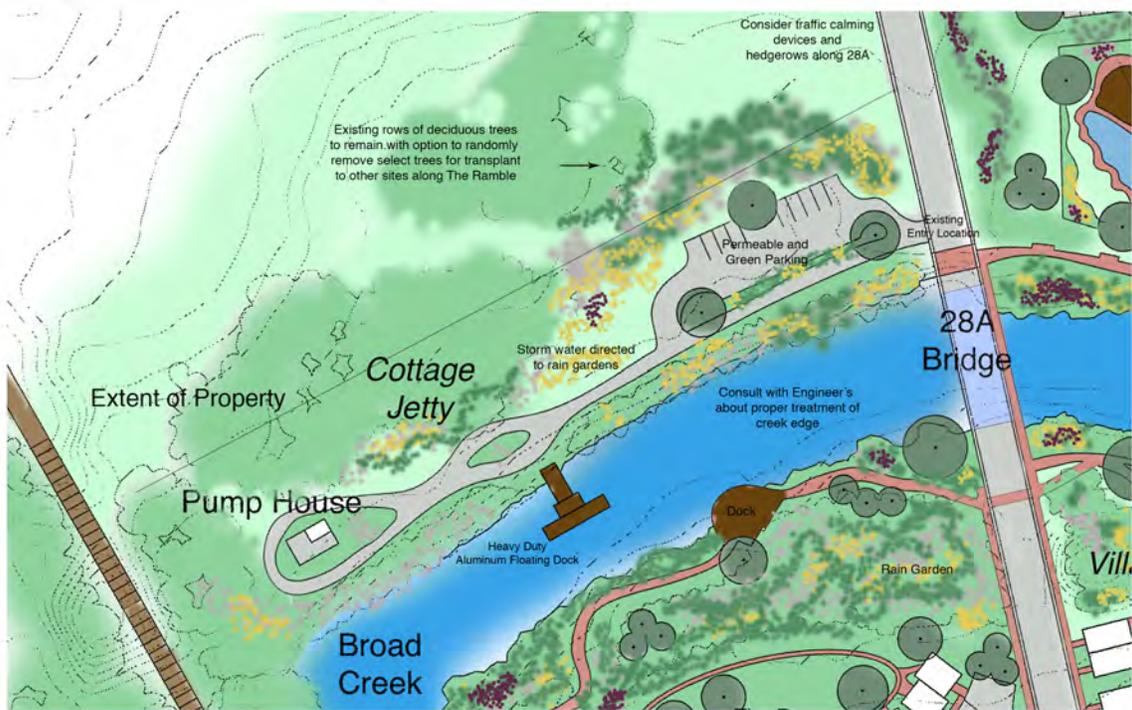


Fig. 10. Final Design for Cottage Jetty (formerly Kayak Launch).



Fig. 11. The Village Green (formerly Thompson Block).



Fig. 12. The Governor's Park and Independence Playground (formerly Open Field).

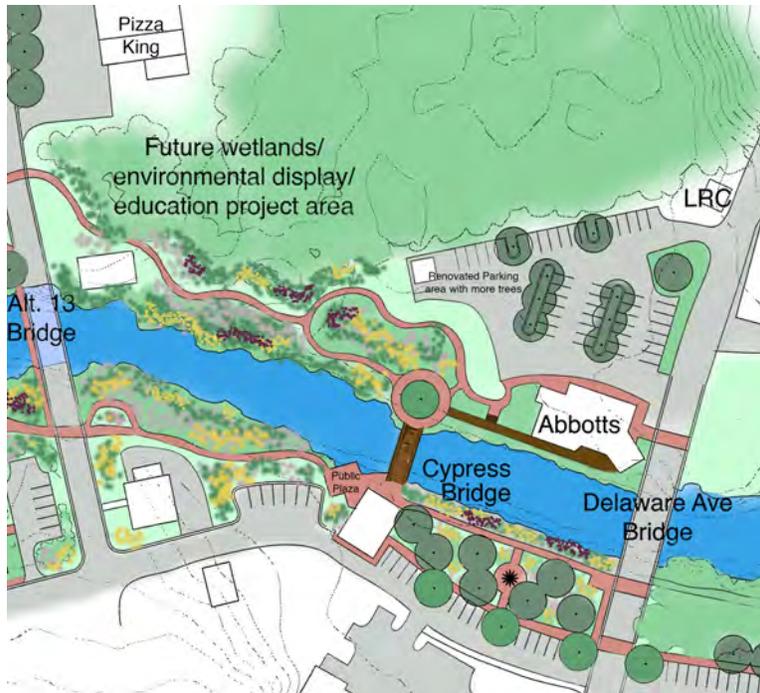


Fig 13. Cypress Bridge and The Boardwalk.

Section 7: Appendices

7.1: Design Process

7.2: Green Infrastructure

7.3: Wayfinding

7.4: Landscape Design Proposals Elaborated by PLSC 301 Students

7.5: Broad Creek Greenway Development in Laurel (Memo).

7.6: A Conceptual Site Design and Plans for Waterfront Redevelopment Along the Broad Creek, Laurel, DE.

Appendix 7.1 Design Process

Introduction

In December 2013, Jules Bruck (designer) met with Ed Lewandowski to visit the town of Laurel and review the project parameters. A detailed tour of the major portions of the future design as well as the downtown and surrounding parks helped the designer understand the scope of the project. Mr. Lewandowski provided focus group notes highlighting elements the convened community members considered important for the space.

A preliminary proposal with quick sketches was sent to Mr. Lewandowski following the meeting to determine if the designer had a favorable style and a fitting design sensibility. The sketch, delivered in early January, highlighted a portion development intended for Sharp Gas property, but given the quick turnaround time, it was based on impressions of what the focus groups desired rather than a detailed analysis.



App. Fig. 1. Preliminary proposal for style demonstration.

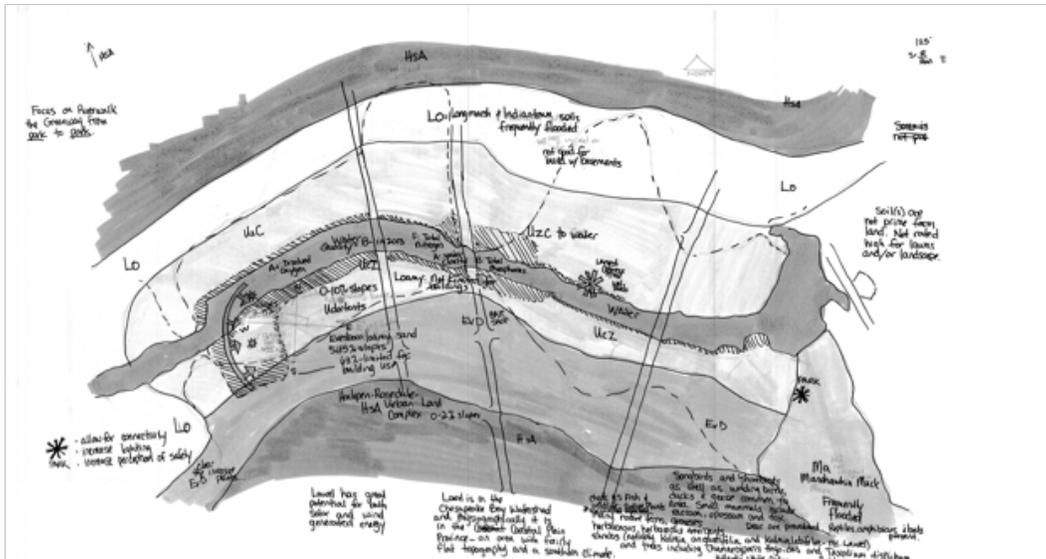
The Laurel Redevelopment Center and the designer entered into a contract in February to develop a master plan with the following deliverables:

- a. Graphic Presentation Showing Overall Layout
- b. Hand-Drawn Renderings of 3D Spaces
- c. Recommendation for Phasing
- d. Public Sharing of Information Process

In mid-April the design team, consisting of two UD undergraduates and one doctoral student, Lorelly Solano, met with town members at LRC and we toured the entire site. We received detailed comments from LRC and town members including the mayor. At this time, the designer introduced the project to students enrolled in an undergraduate course called Technology for Landscape Designers. The students were asked to utilize the information they learned about “revitalizing small towns” to envision a new mixed-use district for the Sharp Gas property. They were to incorporate houses, some retail, and a walking path.

Throughout May and June the design team met weekly to discuss items related to the site inventory. A base map was created along with a project area map so we could communicate about the various parcels within the larger project. During this time, we explored ideas related to community while considering the physical, biological and cultural attributes of the site and the surroundings. The student projects were graded in late May and highlights from the project were sent to LRC in a document called *Landscape Design Proposals for Sharps Gas Property, Laurel Delaware* (See Appendix 7.4). Ideas from those projects spurred on additional conversations about land use.

The designer and Ms. Solano independently visited the site several more times to record ideas and consider the space in new ways as the design ideas started to unfold. By mid-June, the Site Inventory phase was complete and the information was consolidated and finalized into the following graphic.



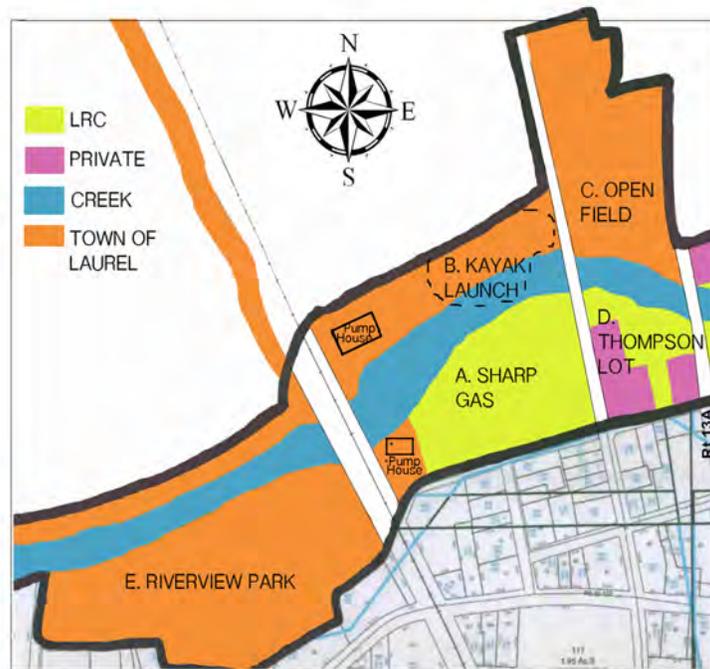
App. Fig. 2. Graphic site inventory of the project area.

The next two subsections of this appendix describe relevant characteristics of the project area, which has been split in two sections for convenience (west and east from U.S. Alt. 13). A site analysis follows the descriptions.

7.1.a Broad Creek West of US Alt. 13

The project area west of US Alt. 13 includes all highlighted sections on App. Fig.

3. Please refer to the lettered system for a detailed description following the map.



App. Fig. 3. Project area west of Route 13A, comprising a) Sharp Gas, b) Kayak Launch, c) Open Field, d) Thompson Block, and e) Riverview Park. Note the position of pump houses to the right side of railroad tracks.

A. Sharp Gas. This property is owned by LRC. The adjacent land uses include a residential block to the south, Thompson Block to the east across Alt. 13A, Broad Creek to the north, and a woodlot to the west. Also along the west are Norfolk-Sussex owned railroad tracks that separate the Sharp Gas parcel from Riverview Park. The woodlot, consisting of a mix of native and exotic species, is the only element that provides screening or privacy to the block. In addition, there are scrappy exotic plants along the creek bank. A small building is on the southeast side and an asphalt lane, referred to

as Oak Lane, extends into the site from the south.

The high point is located in the southwest corner at elevation 18', while the low point is across the entire north side at the site of Broad Creek, elevation 0'. The steepest slope is approximately 14% with the average slope across the site approximately 5.3%. The existing drainage pattern is primarily sheet flow with all water directed toward the Broad Creek. An open drainage pipe is located approximately half the site distance from the Road 28A bridge that drains stormwater directly into Broad Creek. The most significant biological features on site include the woodlot that protects the western boundary from the railroad tracks and the plants along the stream bank.

The heaviest vehicular traffic is on the east side along Route 28A, while most pedestrians will approach the site from the downtown area south of the site. Current vegetation is a mix of poor quality turf grass and compacted soil. Two soils exist on this site demarcated by the boundaries of the floodplain. Udortents, represented by loamy infill on typically 0-10% slopes, is the soil on the property closest to the creek. On the upper bank of the creek, the soil type is Evesboro, a sandy loam characterized by 5-15% slopes. Trees that perform well in this soil are Oak (black, white, red, chestnut, yellow), poplar, hickories, pine (pitch, Virginia and loblolly). It is also suitable for peaches and grapes.

The client would like to see residential houses facing the creek on this site in a 'crescent' configuration reminiscent of Cape May, NJ. There are specific instructions about the design criteria of the space (See Appendix 7.6) and a vision exists for a promenade. These design ideas recall a Church Camp setting which is a familiar concept to people growing up in Sussex County, DE. From the analysis we determined

the floodplain extends throughout a major portion of the site and we have suggested development only outside of the 100-year floodplain. This site presents lovely views and the area preserved within the floodplain should be appropriately planted and enjoyed by the community at large.

At the conclusion of our design process, we renamed this space *The Cottages at Laurel Mills*. We feel *The Cottages* is appropriate because of the scale of the houses and their final layout, which aligned the houses in a slight oval looking onto a promenade we called *The Runner*.



App. Fig. 4. Sharp Gas Property. Source: Google Maps.

B. Kayak Launch Area. This property belongs to the town of Laurel and it is intended for a future kayak and canoe launch area. The adjacent land uses include an open field on the east side across Alt. 13A, a fertilizer company to the north, Broad Creek to the south, and a sewer treatment facility to the east preceded by a woodlot that protects the western boundary from the railroad tracks. This property contains a service drive that leads to a pump house located at the west end. The gravel access road cuts through the property in an E-W orientation along the contour.

This property contains small and non-contiguous patches of trees. The vegetation includes a mix of native and exotic species and provides screening and privacy on the east and north sides. Of particular note is a grove of trees planted along the north border of the parcel forming a straight-line border.

The high point of this lot is located off site to the north, while the low point is across the entire south side at the site of Broad Creek, elevation 0'. The steepest slope is approximately 10% with the average slope across the site approximately 3.6%. There is a bulkhead along the floodplain, which shows deterioration in several segments. The existing drainage pattern is primarily sheet flow with all water directed toward the Broad Creek. In addition, a drainage pipe is located approximately half the site distance from the Road 28A bridge that drains stormwater directly into Broad Creek. Within the floodplain, the soil on this site is also Udortents.

The heaviest vehicular traffic is on the east side along alternate route 28A. Currently, there is no pedestrian traffic, but once developed as a kayak/canoe launch there will be pedestrian traffic from the east and south.

The client expressed interest in a kayak/canoe launch early in the process and this was confirmed as a strong value for the community during 2013 focus groups. There is an existing boat launch located .2 miles to the west within Riverview Park, however, the suggestion for a kayak launch in this location is based on high visibility and potential for a business to be placed on the site in the form of a small shed on existing impervious surface or by truck and trailer. The designers would like to see the open pipe that drains into the creek redirected through green infrastructure to aid in improving water quality. Moreover, the removal of the bulkhead and inclusion of a

bioengineered bank should be further explored.

In addition to the kayak launch, and a proposed alternative if the launch is not built, is to convert the entire area into a beautiful riparian border which would downplay the linear aspect of the tree line to the north, help protect water quality, and to enhance the view from the neighboring parcels.

At the end of our design process, we renamed this area the *Cottage Jetty* based on the proximity to the new housing development and the fact that it will hold a launch for small boats.



App. Fig. 5. Kayak Launch Area. Source: Google Maps.



App. Fig. 6. Bulkhead deterioration at the Kayak Launch Area.

C. Open Field. The large field owned by the town of Laurel is envisioned by LRC as a potential site for new fully accessible children’s playground. The adjacent land uses include a *Shore Stop* convenience store to the east across Rt.13A, the kayak launch area across Rt. 28A to the west, the Broad Creek to the south, and a building with a parking lot on the far north edge. The heaviest vehicular traffic is on both the east and west sides along the two highways, while most pedestrians would approach the site from the east at the start of the walkway (from Creekside Park).



App. Fig. 7. Open field.

This area is the site of large community celebrations such as the Fourth of July festivities. On the south side, there is a well-maintained, illuminated, paver walkway with benches that overlook Broad Creek. The walkway, which follows an east to west orientation, is the most significant feature on site. Along the west side of the parcel there is a large existing deciduous tree and along the creek there are several trees planted along the walkway.

The high point is located in the northwest corner at elevation 8', while the low point is across the entire south side, adjacent to Broad Creek at elevation 0'. The entire site is relatively flat. The steepest slope is approximately 3% with the average slope across the site approximately 2%. The drainage pattern is primarily sheet flow with all directed toward the Broad Creek, however, this open field has poor drainage characteristics and is prone to flooding.

The soils of the site are not appropriate for development. On the north, the types of soils are LO, Longmarsh and Indiantown, which are very poorly drained and frequently flooded. Runoff is slow and the erodibility factors are also low. Native tree species that will do well in these soils include maple (red), oak (nigra), elm (*Ulmus rubra*), riverbirch, black gum, American holly, *Lindera benzoin* and *Sambucus canadensis*. The soils from the mid-site towards the creek are UzC, Udortents.

The client expressed a desire to put an accessible children's playground in this location. The team initially felt this was redundant since there is a community playground ¼ mile to the west and the traffic on both sides of the lot raised safety concerns. However, the visibility of the site and the accessible nature of the playground, along with designed safety solutions, made for a compelling location. In addition, because of the location within the 100-year floodplain, and the expense and environmental concern for adding fill to the site, we wanted to site something in this area for the community to enjoy without adding any formal structures. Other outdoor community amenities that would benefit youth were considered, such as basketball courts, but they were seen as low priority within the comprehensive plan and the focus groups.

To the north of the playground, we see an opportunity to increase urban tree cover. Soils in this area are poorly drained, however, native trees would be an excellent addition to the site. While decisions are being made, a short-term alternative for the area is to site a meadow and include mowed pathway walking trails and some informational and educational signs. The meadow would add valuable urban greening, is cost effective and temporary in nature.

We renamed this entire area *Governor's Park* to commemorate the fact that five Governors of Delaware come from Laurel. *Independence Playground* is a reference to the Fourth of July festivities that have traditionally been held in this field.

D. Thompson Block. This block contains a mix of privately owned buildings (highlighted in pink on Fig. 2, Section 4.2) and LRC properties. There is moderate visual screening with several medium sized trees separating the waterfront from the existing buildings. Currently, the heaviest vehicular traffic is along both the east and west sides of the property and care will be taken to ensure safe pedestrian egress through the lot when connecting this property to the greenway/river walk.

The grade along the Broad Creek is fairly regular in terms of slope and the edge of the creek is protected by rip-rap. Future use of the block may include mixed-use commercial and residential options. Existing soil is Udotents near the creek and Evesboro along the south side of the property. Several existing houses on this site exist in varying states of repair. Their mixed styles lend to a sense of discord. The designers recommend removal of one structure that is within the floodplain and of very different style, relative to the town's overall identity.

E. Riverview Park. Also known as Laurel River Park, this park is considered “an outstanding Olmsted-styled creek side park with *much additional potential for future design and use*” (The Town of Laurel Planning and Zoning Commission, 2011, p. 50). This park belongs to the Town of Laurel and includes parking facilities, accessible boat ramp and fishing dock, a playground, picnic areas, fitness equipment¹⁵, and benches along Broad Creek. It is located on the extreme west of downtown and is separated from Sharp Gas Property by the railroad and a dense woodlot. The steep terrain and vegetation underneath the railroad prevent connectivity of these properties at present. *Ideally, the greenway and pedestrian walkway will eventually extend from this as the starting point at the westernmost destination.* Through site visits, we determined this park was frequently utilized by families. Increased actual supervision through regular policing as well as decreased privacy through selective thinning of surrounding vegetation, and illumination may be needed in the future, as safety concerns have been expressed.

Evidence from the Norfolk-Southern railroad documents indicates a pedestrian passageway under the existing railroad bridge is a possibility. Further research must be conducted to determine requirements for proposing a new pedestrian passageway, but an overhead structure to protect pedestrians would be necessary. Extending the greenway through the Sharp Gas property and under the railroad bridge to Riverview Park is a long-term goal of this project.

The designers would like to see this park play a more extensive role within the

¹⁵ The Broad Creek Community Fitness Trail was a 4-H Engaging Youth, Serving Community Project, lead by The Laurel Public Library and the University of Delaware Cooperative Extension. The project was inaugurated in 2014, when this proposal was under development.

overall community. Increased surveillance will occur with higher usage, and therefore, we recommend extending the greenway into the park under the railroad bridge. In addition, we recommend thinning the surrounding woodlots by removing invasives allowing better views into the park from the surroundings. Increased public participation on water activities and frequent supervision by DNREC Natural Resources Police would “ensure the safety of all citizens and visitors who access our State waterways and lands”, as promoted by the Division of Fish & Wildlife Enforcement Section (DNREC, 2014). Typically, Natural Resources Police officers supervise the appropriate utilization of facilities and compliance with regulations, thus contributing to a higher perception of order and safety in the community. Examples include verification of fishing licenses, registration numbers, and boat safety equipment; restricting access to parks and facilities after dark; and monitoring suspicious activities (i.e unusual driving, drugs consumption).



App. Fig. 9. Pavilion at Riverview Park.

Pump Houses (indicated with symbols). Two “state of the art” pump houses are located along the east side of the railroad bridge, adjacent to Sharp Gas Property and the intended Kayak Launch Area, respectively. The pump houses were recently upgraded to comply with the Enhanced Nutrient Removal (ENR) limits established for wastewater plants discharging into the Chesapeake Bay tributaries¹⁶. George, Miles and Buhr Engineering (GMB) from Salisbury, MD was responsible for a design featuring Parkson Corporation’s Biolac® treatment system and DynaSand® filter technologies. “The project was partially funded by the Delaware Water Pollution Control Revolving Fund, which is supported by the Delaware Department of Natural Resources and Delaware Division of Water Resources” (Parkson.com).



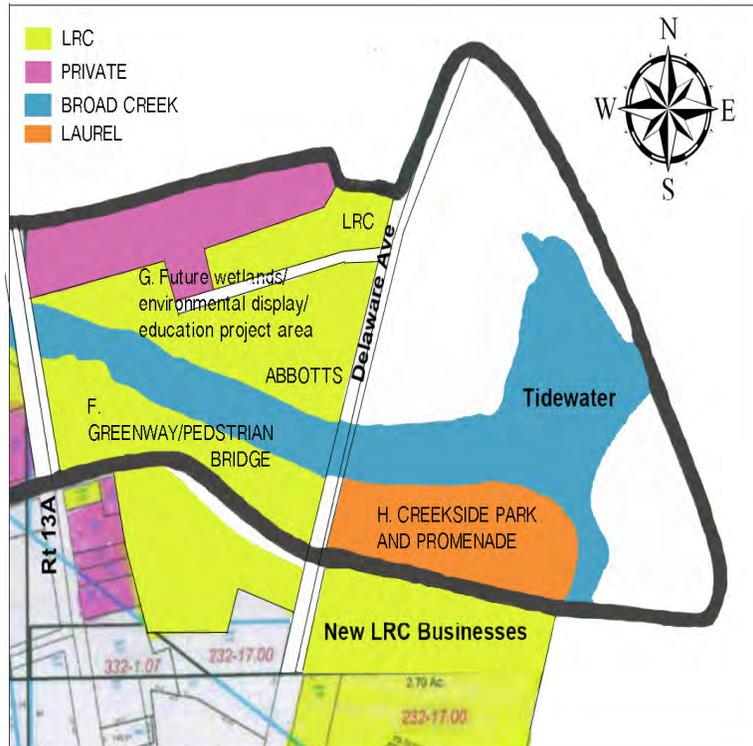
App. Fig. 10. Pump House, North Side.

¹⁶ ENR limits: 5 mg/L of Total Suspended Solids (TSS), 3 mg/L Total Nitrogen (TN) and 0.3 mg/L Total Phosphorus (TP).

7.1.b Broad Creek East of US Alt. 13

The project area east of US Alt. 13 includes all highlighted sections on App. Fig.

11. Please refer to the lettered system for a detailed description following the map.



App. Fig. 11. Project area east of route 13A, comprising f) Greenway/Pedestrian Bridge, g) Future wetlands/environmental display/education project area, h) Creekside Park and Promenade. Note other relevant properties outside the scope of this project: LRC, Abbotts, New LRC Businesses.

F: Greenway/Pedestrian Bridge. The area labeled Greenway/Pedestrian Bridge, owned by LRC, refers to the strip of land on the south bank of Broad Creek that extends from Delaware Avenue to Route 13A.

This area comprises Venables' Park, located in the east of the parcel (below and

opposite the creek from Abbotts) and the Bait Shop on the west side, at the intersection of E. Front St. and Rt.13A. A former pumping station, which currently houses a graphic t-shirt business, is located in an intermediate position within this strip. Street side parking is available along E. Front St.

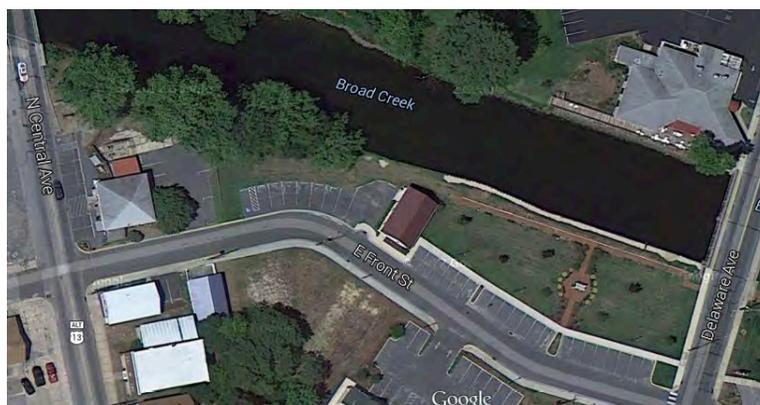
The parcel is relatively flat, but there is an upward inclination towards Delaware Avenue, on the east side. The existing drainage pattern is primarily sheet flow with all water directed toward the Broad Creek and the parking lot.

The creek is protected by rip-rap or a narrow vegetative buffer of poor to mixed quality, but offering a spatial connection to The Wading Place and Creekside Park, which together are labeled on the map as “Existing Park”. There is a brick pedestrian walking path that ends abruptly near the location of the former pumping station. The path has adequate lighting and seating in the form of park benches facing the creek.

The most significant features on site include a low spot near the creek directly across from the landmark Cypress tree located on the opposite bank, the small building, and Venables’ Park. A 2012 marble stone shows the gratitude of the community towards Senator Robert L. Venables, for his more than two decades of support. Care will be taken to integrate the site to the rest of the landscape.

A stone revetment creates the edge of the creek from Delaware Avenue to the low spot mentioned above. This break in the rip-rap provides an area of direct connection to the creek. It is in this location the team is proposing a key aspect of the design be constructed in the form of a new pedestrian bridge, called *Cypress Bridge*, which crosses the creek toward the existing large cypress. The bridge will allow diners from Abbotts to cross into the greenway without walking along Delaware Avenue. We

recommend adding additional interest to the area by housing an ice-cream shop/bakery in the existing building and providing better connection to Venables Park and adding a small dock landing. Some landscape recommendations for Venables Park are noted on the plan and include removing plants that restrict free movement through the linear landscape and adding groups of flowering shrubs as well as a central element under the existing arbor to create a park-like setting.



App. Fig. 12. Satellite view of the Greenway/Pedestrian Bridge. Source: Google Maps.

G. Future wetlands / environmental display / education project area. The land between Abbott's Grill and a private property at the intersection of Broad Creek and Alt. 13 belongs to LRC and is intended to become a Nature Area in the future. At present, it contains a mix of scattered trees and invasive species. Noteworthy, one of the largest Cypress trees in the State of Delaware is located in this area within the 100-year floodplain.

The team felt it important to make this area substantial and connected to the new playground by running the greenway toward the highway. We hope this is feasible even

though a portion of the property close to the bridge is within private land. We envision school and community groups using this area for study and contemplation. Interpretive signs will highlight the environmental benefits.



App. Fig. 13. Satellite view of future Nature Area. Note landmark Cypress tree at the left side of Abbott's Grill. Source: Google Maps.

H. Creekside Park and Promenade. This park is located in a central location between Trap Pond and the Nanticoke River, on the south bank of Broad Creek. The focus of the park is related to the scenic views of Record's Pond Milldam. This parcel is the location of the historically important "Wading Place", a landmark that served as a ford for Native Americans and colonial settlers. The park features a brick promenade¹⁷ that has become a little unstable as a result of time, a double allée of healthy ornamental trees, appropriate lighting, park benches, mature trees providing ample shade and adequate parking along Front Street. Overall, the vegetation consists of healthy ornamental plants and well-maintained lawn. Portions of the park lie within the 100-year floodplain and the soils are Evesboro. Parking is available on Front Street.

¹⁷ Maintenance is needed on the walkways in Creekside Park. We suggest removing the bricks, digging down additional width and depth for a more stable base, and creating an uphill slope not to exceed 3:1. Bricks should be reused and laid in a herringbone pattern if feasible. Sweep the joints with polymeric sand.

Regarding wayfinding and educational signs, this park displays a metallic historic sign describing the history of The Wading Place, and two signs from the Delaware Division of Fish and Wildlife identifying Broad Creek and Records Pond. The latter has an accessible fishing area.

While there is little design work needed in this area, any suggested improvements are consequential because this park will be the eastern departure point of the greenway along Broad Creek. These improvements could include an ornamental buffer strip at the Villas on Broad Creek, which are located on the opposite bank of the creek. Both banks have mown turf grass that extends into a stone revetment and additional vegetation would be beneficial. Regular maintenance of the pathway and the park amenities and vegetation will ensure a proper community identity is preserved.



App. Fig. 14. Creekside Park and Promenade.

7.1.c Site Analysis and Conceptual Design

A landscape design site analysis assesses the site's opportunities and constraints for a specific land use program. Based on considerations from the Site Inventory, throughout June the team worked to map relevant information regarding the way people will circulate and experience the space. Views were considered along major view corridors and emphasis was placed on the creation of nodes (places for social interaction), oasis' (places for quiet respite) and niches (a place to view a scene from within a shelter or in one direction). In addition, consideration of site resources revealed opportunity areas to highlight in the design. These included natural, historic and culturally significant resources, such as the large Cypress tree near Abbott's; the view of the railroad bridge from the Sharp Gas property; the fishing spots along the Broad Creek; Abbott's Restaurant; Venables' Park, and the milldam at Record's Pond.

The analysis considered a much larger area than the determined design space. Place branding was utilized as a framework for us to focus on the larger community to base our recommendations.

The current Comprehensive Plan was utilized to assess how the planning commission envisioned the future of Laurel, and green infrastructure was explored on each site to determine how best to deal with one-site stormwater (See Appendix 7.2).

In July, an overall conceptual plan was shared with LRC for purposes of a design critique. The team was interested in particular with feedback for the Sharp Gas property because we had specific instructions about how best to deal with the arrangement of housing on that site. In addition we wanted to share our plans for other additional proposed design elements.



App. Fig. 16. Revised plan with emphasis on green parking.



App. Fig. 17. Revised plan with emphasis on visual exposure.

By early August, we had a second conceptual draft and Mr. Lewandowski suggested we present our preliminary plan to the Planners Technical Advisory Committee (PTAC) group, the Sustainable Planning section of Delaware Division of Energy and Climate. On August 20th, we met and presented to representatives from several DNREC Departments (See Appendix 7.6). The experts provided detailed feedback regarding environmental constraints for use in finalizing our landscape designs and recommendations.



Fig. App. 18. Revised design for general project area.

Following the PTAC meeting, and after further inquiry and research into the green infrastructure elements we had proposed, a final master plan was developed. The revisions to the final plan include efforts to limit pervious surfaces and structure development in order to reduce future environmental threats on residents and permanent structures and to protect the ecological stability of Broad Creek. To that end, it was decided that we would accept the recommendations of experts and avoid

the construction of new structures and infrastructure such as roads, sewer and water extensions in the floodplain area. Please refer to section 6 for a detailed description of the final proposal.

Appendix 7.2 Green Infrastructure

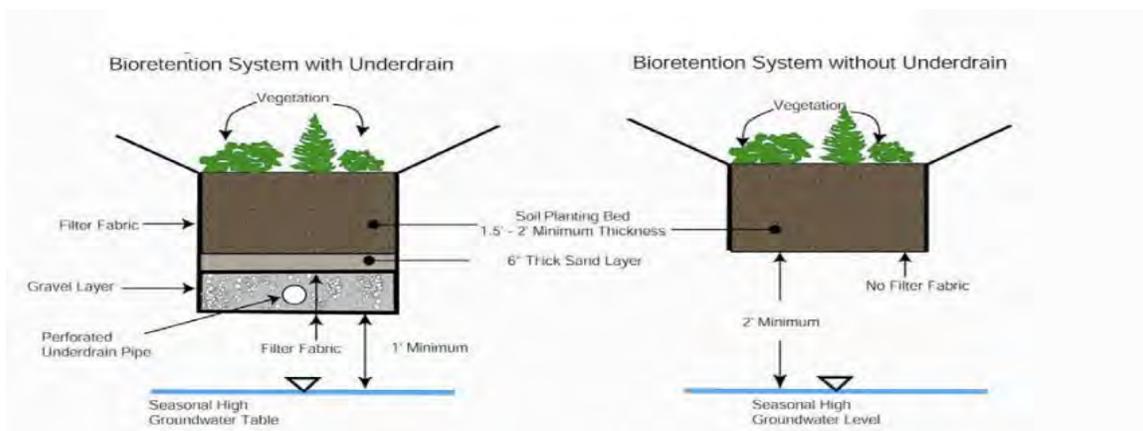
Introduction

“Green infrastructure is an approach to wet weather management that uses natural systems - or engineered systems that mimic natural processes - to enhance overall environmental quality and provide utility services. As a general principal, green infrastructure techniques use soils and vegetation to infiltrate, evapotranspire, and/or recycle stormwater runoff” (American Rivers, 2014).

This section provides technical information about green infrastructure techniques, in an effort to illustrate practical applications of ecological design.

7.2.a Rain gardens

Rain gardens, also known as bioretention areas or bioinfiltration cells, are landscaping features characterized by the presence of a soil bed planted with suitable non-invasive vegetation, designed to capture and filter stormwater runoff before being either conveyed downstream by an underdrain system or infiltrated into the existing subsoil below the bed (Obropta, 2011).



App. Fig. 19. Cross-section of a rain garden. Source: Obropta, 2011.

Rain gardens are placed in strategic locations to intersect flows of runoff water and to improve infiltration. The length of the garden should be perpendicular to the flow for the water to spread evenly. Typically, residential rain gardens range from 4-12 inches deep, and 100-300 square feet in area, depending on the amount of water expected to capture (Ghertner, 2009). According to EPA, the depth of the garden should not overlap with the water table, to avoid groundwater contamination. If the natural soil lacks good infiltration characteristics, it can be replaced with a mixture of 40-60% sharp sand, 20-30% topsoil, and 20-30% organic compost (Ghertner, 2009).

Rain gardens can be planted with perennials, grasses, shrubs and trees. Annuals can be used in the first year (for aesthetics), while the permanent vegetation becomes established. In addition to climatic considerations, the plant selection should focus on tolerance to dry and wet conditions, seasonal interest, and diversity (i.e. native plants). It is encouraged to have plants of different root depth, in order to improve evapotranspiration¹⁸. During establishment, plants need to be irrigated frequently and weeds should be removed and suppressed with mulch (Ghertner, 2009).

¹⁸ Evapotranspiration refers to the process by which water is transferred from the land to the atmosphere by evaporation from the soil and other surfaces and by transpiration from plants.



App. Fig. 20. Rain garden in residential area. Source: Beatt, unknown year.

7.2.b Riparian buffers

Riparian buffers are vegetated areas next to water bodies that protect water quality by filtering pollution, providing bank stabilization and aquatic and wildlife habitat.

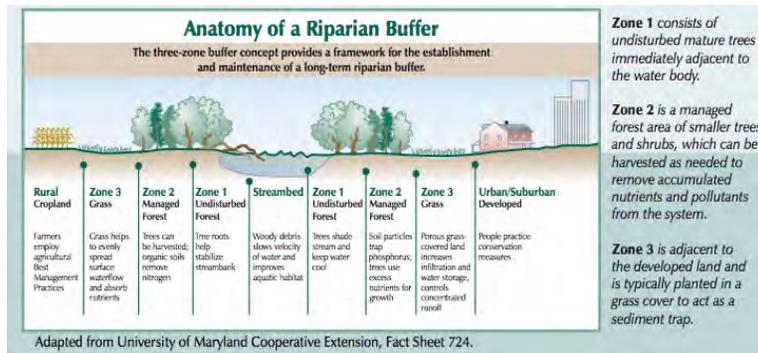
Riparian vegetation in urban places enhances the appearance of waterfront areas and can create recreational opportunities: “The most obvious area of potential impact would be in urban areas where forested riparian buffers can be established to provide a park-like atmosphere for local residents to utilize” (Cunningham *et al.*, unknown year). For the purposes of education and demonstration, appropriate vegetation could be labeled.



App. Fig. 21. Riparian buffer with aesthetic characteristics. Source Mattas-Curry, 2012.

The design and dimensions of a riparian buffer depend on the characteristics of the stream and the land area than drains into the water body. The larger the drainage area, the wider the buffer width should be (North Carolina State University (NCSU), unknown year).

Conceptually, a riparian buffer can be constituted by three zones: 1) suitable undisturbed woody vegetation extending a minimum of 15 feet from the normal water level; 2) additional 60 feet of trees and shrubs, which can be managed (removed and replaced); 3) additional 20 feet of grazed or ungrazed grass, or other type of vegetation that facilitates sediment filtering, nutrient uptake, and flow speed reduction (USDA Forest Service, 1991, cited by NCSU, unknown year).



App. Fig. 22. Riparian buffer diagram. Source: Department of Natural Resources & Environmental Control, Delaware, unknown year.

In North Carolina, they adapted the system into two tiers: 30 feet of forest and 20 feet of grass (NCSU). Another source suggests that, depending on the surrounding land use, riparian zones could range from 25 to 100 feet in each side of the stream (Department of Biological and Agricultural Engineering, NCSU, unknown year).

In the case of Broad Creek, it was strongly suggested to leave a minimum of 100 feet of buffer vegetation around the perimeter of the Sharp Gas housing development to protect water quality and rare wildlife species (Fleming, 2014, personal communication).

A well-established riparian buffer helps to reduce costs for mowing, fertilizer, pesticides and bank stabilization (Connecticut River Bank Commission).

7.2.c Rain barrels

Rain barrels are simple systems that collect and store rainwater from roofs. Typically, they consist of a 55-gallon drum, a vinyl hose, PVC couplings and a screen grate to keep debris and insects out. Rain barrels can supply a considerable volume of fresh water for outdoor use during the summer. As illustrated in App. Fig. 23, rain barrels are often utilized to feature art and are often used to create environmental

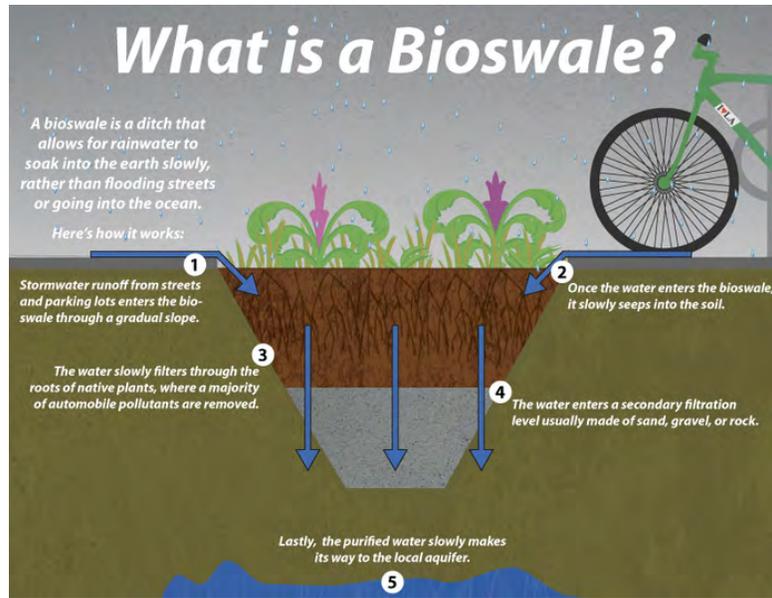
awareness and community engagement.



App. Fig. 23. Rain barrel auction. Source: Elkhart River Restoration Association Inc., 2014.

7.2.d Bioswales

Bioswales are vegetated or mulched channels that provide treatment and retention as they move stormwater from one place to another. Vegetated swales slow, infiltrate, and filter stormwater flows. As linear features, vegetated swales are particularly suitable along streets and parking lots (U.S. EPA, 1999). The effectiveness of a bioswales increases when they are combined with other stormwater management practices (U.S. EPA, 1999).



App. Fig. 24. Cross-section of a bioswale. Source: Pinterest.

Ideally, bioswales should be sized to convey at least a 10-year storm, or 2.4 inches in 24 hours. The U.S. EPA (1999) indicates that the width of the bioswale should be estimated as 1% of the area that drains to the swale, and the depth should not exceed the height of the grass. The following table can be consulted for reference.

App. Table 1. Optimal design measurements. Source: City of Salem, 2005, cited by Yocum (unknown year).

Optimal Design Measurements	Minimum	Maximum	Optimum
Depth (m)	1	4	2.5
Bottom Width (m)	1	4	-
Channel Width (m)	7	12	
Length (m)	30		-
Slope (%)	1%	6%	3%
Sideslope (%)	20%	25%	20%
Drainage Area (hectares)	1	4	-
Vegetation Height (mm)	100	150	150
Height above Groundwater (m)	3		3

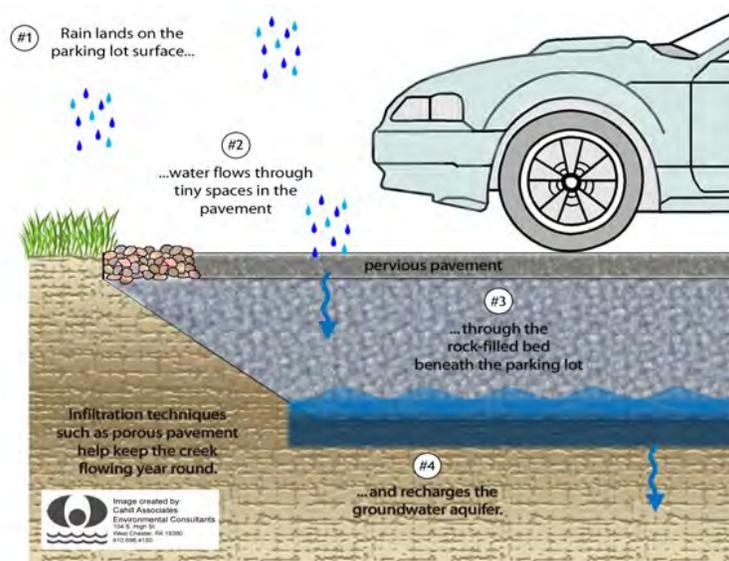
Bioswales are not effective in flat terrains or in poorly drained soils. If water fails to infiltrate, it can become a mosquito hazard, with the additional inconvenience of bad odors. Water accumulation can also prevent seeds from germinating during establishment. If needed, the flow should be diverted until vegetation thrives. In the event of poorly drained soils, an underdrain system should be installed (University of Florida, 2008).

Before constructing bioswales, riparian areas should be established to avoid erosion. The use of deep-rooted native plants can enhance the performance of bioswales, by promoting water infiltration and controlling erosion (USDA, 2007).

Bioswale maintenance includes removing dead plants, invasive species and sediment. Plants may need irrigation during establishment (Yocum, unknown year). Maintenance is considered less expensive than traditional curb and gutter treatments, and underground stormwater systems (University of Florida, 2008).

7.2.e Permeable pavement

“Permeable pavements are paved surfaces that infiltrate, treat, and/or store rainwater where it falls. Permeable pavements may be constructed from pervious concrete, porous asphalt, permeable interlocking pavers, and several other materials. These pavements are particularly cost effective where land values are high and where flooding or icing is a problem” (U.S. EPA, 2014).



App. Fig. 25. Permeable pavement. Source: taschifsky.com (unknown year).

It has been estimated that, “depending on design, paving material, soil type and rainfall, permeable paving can infiltrate as much as 70% to 80% of annual rainfall” (UMD, unknown year). When this technology is selected for driveways or parking lots, attention must be paid to structural load considerations. The thickness of the permeable pavement and reservoir must be determined according to the anticipated traffic load and specifications of the materials (UMD, unknown year).

Pervious pavements are only adequate to manage rainfall. No additional water

should be conveyed through pervious materials. Pervious pavements are not recommended for heavy loads, slopes above 5%, or where excessive sanding or snow removal is needed, as it may saturate the system or catch the edge of stones, respectively (UMD, unknown year).

Sediment accumulation can occur during construction, therefore, the area needs to be stabilized before installing permeable pavement (U.S. EPA, 2013).

For paved areas containing trees, pervious pavement is a wise alternative, as it increases the amount of oxygenated water directly entering the root zone.

Periodic maintenance involves vacuuming at least 3 times a year to prevent clogging. The high cost of maintenance may limit developers to restrict the use of pervious pavers to only overflowing areas (U.S. EPA, 2013).

7.2.f Green parking

Parking space is considered a necessity, however, little attention has been placed to the quality of this space in the past. According to the Green Parking Council, “a successful parking lot is one that integrates its site conditions and context, takes measures to mitigate its impacts on the environment, and gives consideration to aesthetics as well as the driver-parker experience. Designed with conscientious intent, parking lots could actually become significant public spaces, contributing as much to their communities as great boulevards, parks, or plazas”.

Green parking is defined as parking lots that integrate green infrastructure elements in their design (i.e. permeable pavement, rain gardens, bioswales and increased tree canopy). The utilization of green infrastructure in parking lots helps to

mitigate vehicle pollution before it reaches basins, storm sewers and water bodies.



App. Fig. 26. Green parking example. Source: Chesapeake Bay Program, 2012.

7.2.g Increased urban tree canopy

Trees are important aesthetic features of the landscape and also provide ecological services. For example, substantial rainfall water is captured by the canopy and then released into the atmosphere; root systems helps to improve the infiltration characteristics of the soil; trees improve air quality by filtering pollutants and help to reduce urban heat islands. “Installing trees in locations that are engineered to retain stormwater is a great way to augment existing stormwater management systems, increasing their capacity and improving water quality while greatly improving urban forest canopy” (U.S. EPA, 2013).

Planting and establishing trees requires appropriate planning. Urban trees require space (both for the canopy and the roots), proper soil, drainage and irrigation. The larger the tree, the greatest is its stormwater management potential. However, a

larger volume of soil is needed to accommodate larger trees. Conventionally, it is estimated that a large-sized tree (16 inches diameter at breast height) needs at least 1,000 cubic feet of uncompacted soil (U.S. EPA, 2013). If necessary, amendments need to be done to the soil in order to improve its porosity, permeability and infiltration characteristics, which are essential for effective stormwater management. For example, structural soil is a “designed medium, which can meet or exceed pavement design and installation requirements while remaining root penetrable and supportive of tree growth” (Bassuk *et al.*, unknown year). Failure to provide adequate soil volume and site conditions can result in stress for the tree (i.e. water deficit, compaction).

The use of structural cells is a good way to increase the space for roots and prevent compaction over time. Structural cells are systems in which a network of pillars, piles, or structural cells supports the ground surface (which can be pervious pavement, hence the system is also known as suspended pavement). Some design recommendations for structural cells include installing of a drainage system, as well as inlet and outlet locations along with elevations, protecting underground utilities against water and root penetrations, and interconnecting the system with adjacent suspended pavement units or other forms of stormwater management infrastructure (U.S. EPA, 2013).



App. Fig. 27. Structural cells and tree. Source: Greenleaf.co.uk (unknown year).

Considering that the cost of removing and replacing trees is high, it is worthwhile to ensure appropriate growing conditions.

7.2.h Green roofs

A green roof is defined as a contained green space on top of a man-made structure above, at or below grade (Green Roofs for Healthy Cities, 2008).

Contemporary green roofs integrate the plants and supportive structures in the construction or retrofit of buildings.

There are two main categories, based principally on the types of vegetation, purpose, and amount of maintenance required: intensive and extensive green roofs.

Intensive green roofs are designed to reproduce conventional gardens and are usually accessible (Dunnet and Kingsbury, 2008). They display a whole range of vegetation types, from herbaceous plants to trees and shrubs (Getter and Rowe, 2006).

In contrast, extensive green roof systems are usually designed to fulfill ecological

functions. Hardy succulents are the most extensively used plant species (Snodgrass and Snodgrass, 2006) but herbs, grasses and mosses have also been used in installations (Getter and Rowe, 2006). Extensive green roofs are often adopted in flat commercial buildings, given the high cost of installation and structural requirements. However, green roofs are often featured in urban settings, because of their aesthetic and environmental value.



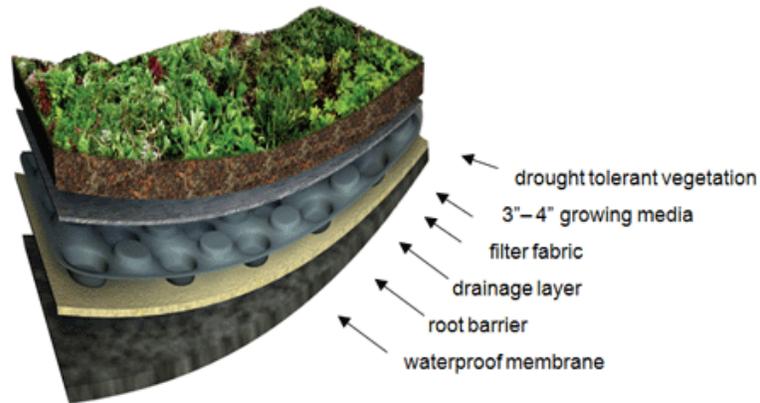
App. Fig. 28. Extensive green roof on a shed. Source: InspirationGreen.com (unknown year).

Some authors refer to a third group of green roof called “semi-intensive,” where the elements from intensive and extensive systems are combined. Dunnet and Kingsbury (2008) consider semi-intensive green roofs to provide an alternative to enhance aesthetics and biodiversity. App. Table 2 summarizes the general characteristics of intensive, semi-intensive and extensive green roofs.

App. Table. 2. Green roof systems' comparison. Source: Green Roofs for Healthy Cities 2008; cited by Solano, 2010.

Characteristic	Extensive	Semi-Intensive	Intensive
Substrate depth	6 inches (15 cm) or less	25% above or below 6 inches (15 cm)	More than 6 inches (15 cm)
Accessibility	Often inaccessible	May be partially accessible	Usually accessible
Fully saturated weight	Low 10 - 35 lb/ft ² (48.8 - 170.9 kg/m ²)	Varies 35 - 50 lb/ft ² (170.9 - 244.1 kg/m ²)	Varies 35 - 300 lb/ft ² (170.9 - 1,464.7 kg/m ²)
Plant diversity	Low	Greater	Greatest
Cost	Low	Varies	High
Maintenance	Minimal	Varies	Varies, but is generally high

Extensive green roofs are typically composed of the following layers (from bottom to top): deck, waterproofing, insulation, root barrier, drainage, root permeable filter, substrate and vegetation (Snodgrass and Snodgrass, 2006). Roofs with slopes above 40 degrees are not suitable for green roof systems.



App. Fig. 29. Extensive green roof components. Source: Center for Landscape Design & Stewardship (unknown year).

The substrate, or growing media, is one of the most important components of an extensive green roof. An ideal substrate should be lightweight, well-drained, have adequate water and nutrient-holding capacity, be able to filter pollutants, and be sustainable, durable and stable (Solano, 2010). Typically, the mineral portion of substrates consists of expanded shales, slates and clays. A minimal amount of organic matter can be used.

As other forms of green infrastructure, green roofs require to be irrigated and weeded until the vegetation has fully established.

Throughout our design we concentrated on incorporating appropriate forms of green infrastructure to produce the best results with respect to environmental sustainability.

Appendix 7.3 Wayfinding

Introduction

Graphic design can support community objectives by reinforcing identity and explaining the surrounding landscape (Berger, 2009). For example, maps and signs can inform visitors and newcomers about pedestrian trails, cultural destinations, landmarks, and relevant public information (Berger, 2009).

According to Berger (2009, p. 135) “people are natural pathfinders”. With appropriate guidance and stimuli (such as wayfinding signs, confidence markers, social interaction and imagery), people undertake their journeys making sense of the site and reacting to the messages of the landscape.

Appealing and functional wayfinding signs can enhance the aesthetic value of a community and improve visitors’ experience. The use of graphic design is considered a competitive tool to meet the expectations of a demanding citizenry in a rapidly changing world. The rest of this section describes relevant design characteristics of wayfinding and educational signs.

7.3.a Highway signs

The most important characteristic of signs located in highways is legibility. Considerations include: type, style, width and height. The use of upper and lower case is considered effective to prioritize information and fit more content (Berger, 2009).

Highway/road signs are also used to inform about destinations such as: city hall, downtown, art & culture center, and performing arts center. The size of the sign and the font is dependent upon speed limits.

American highway departments recommend a maximum of three destinations per sign and allow the use of symbols. See example below.



App. Fig. 30. Highway signs at U.S. Route 13 in Delaware. Source: Wikipedia (unknown year).

7.3.b Urban Signs

“Urban wayfinding signs form part of the process of city image-building and should be defined in those terms” (Berger, 2009, p. 123). Berger recommends utilizing the language contained in the mission statement of a place to reflect consistency with the official goals and narrative. Key words can be utilized in maps, banners, gateways, and interstate trailblazers.

The urban environment can be “convoluted”. Therefore, urban signs should strive for clarity, simplicity and economy of design. The recommended level of contrast between the letters and the background is 60%. Colors, arrows and logos can be utilized for additional clarity (Berger, 2009).

When using arrows, it is recommended to follow this convention: indicate first the destinations that are straight ahead (in the top of the sign). Then, include

destinations on the left, followed by destinations on the right (Berger, 2009).

No more than three or four destinations should be included per sign. Town codes should be considered for additional regulations.

According to Berger (2009), key considerations for urban wayfinding signs in touristic destinations include:

- attractiveness
- orientation to both resident and visitors
- clear vocabulary
- consistent with identity
- ability to provide direction to smaller destinations
- ability to provide direction to drivers, pedestrian and transit users
- ability to attract attention in a visually busy context

Additional recommendations (Berger, 2009, p. 131) include:

- Carry out an analysis of the specific urban condition (project goals, vehicular, pedestrian and transit routes, destination criteria, and urban stakeholders).
- Obtain regulatory approval before developing design.
- Use multiple design elements to complement each other.
- Limit the amount of information per sign to improve visibility and comprehensibility.
- Use colors and type that enhance legibility.
- Make sure signs are attractive to pedestrians.
- Develop route planning on models based on the history and development of the

city.

- Build signs to withstand the test of time physically, stylistically, and technologically.
- Establish a maintenance and management system before any signs are put in place.

See urban signs examples below.



App. Fig. 31. Urban sign with identity elements. Source: Citiylab.com (2012).



App. Fig. 32. Use of colors and symbols in urban signs. Source: Kim, 2012.

7.3.c Heritage Area and Park Signs

“Both intellectual and physical assets are drivers of value in the heritage environment” (Berger, 2009, p. 134). Aligned with the U.S. Congress goal to preserve historic areas, signs are intended to educate, inspire and facilitate the interpretation of unique and significant sites that have contributed to our national heritage (Berger, 2009).

Wayfinding and interpretive (educational) signs in heritage areas and parks are intended to create a welcoming experience and connect people to important stories and events; establish a visual identity that describes the place; integrate signs, getaways, landmarks, views, and pathways; support all users; serve different transportation modalities; and enhance safety and perceptions of safety (Berger, 2009).

Signage raises people’s awareness about places while establishing a sense of

visual continuity. Identity and a core story are the pillars of interpretive (educational) signs, which, through design, also serve the purpose to promote opportunities for growth (Berger, 2009). Banner and flags are relatively inexpensive resources, commonly used to promote identity in heritage areas.

The selection of appropriate style is important for interpretive signs, markers and plates. For example, size and type can be adjusted according to the context and the message (Berger, 2009).

The messages displayed in educational signs should be selected in a participatory manner, by engaging community members and experts from local civic, cultural and educational institutions. See example below.



App. Fig. 33. Interpretive signs at a park. Source: Groundplay (unknown year).

The designers recognize a variety of signs exist in Laurel and we recommend a comprehensive “placemaking plan” to help Laurel articulate its identity (See Section

5.2). The signage strategy will be an important aspect of forming connectivity and promoting the Broad Creek and the town as a destination.

7.3.d Directional maps

Directional maps provide information about the surrounding pedestrian district. Experts recommend to keep maps as simple as possible, to orient maps according to the user's interaction with the landscape, to comprehend small geographic areas (600 foot square), and to use them in combination with other wayfinding devices such as directional signs (Berger, 2009).

Directional maps can be displayed in highly visible places of the destination of interest, or made available online. The following example illustrates a directional map displayed at the Salisbury Zoo, Maryland.



App. Fig. 34. Salisbury Zoo, MD.

**Appendix 7.4: Landscape Design Proposals Elaborated by PLSC 301
Students**

Landscape Design Proposals for Sharp Gas Property Laurel, Delaware



Elaborated by PLSC 301 Students,
under the direction of Dr. Jules Bruck

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Introduction



- Junior Landscape Design students were given the assignment to envision possibilities for the use of Sharp Gas property.
- Their recommendations blended young professional perspectives and personal beliefs for a vibrant community.

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A vibrant community is...

- 'An open naturalistic community, supportive of its members' needs'.
- 'A celebration of small-town charm and natural beauty'.
- "The most green community possible".
- 'One that enriches the lives of the community with education and freedom of expression'.
- 'Green and sustainable'.
- 'One whose local coffee shop and brewery attract people to town'.
- 'Eye-catching'.
- 'One that promotes eco-tourism, arts and music'.
- 'One with an exciting brewery and shopping district'.

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Design "A": "An open naturalistic community, supportive of its members' needs"

- Victorian houses arranged in a reverse cul-de-sac around a plaza featuring a fountain, wildflowers and a gazebo.
- "The plaza functions as a walking space to bring members of the community together".
- Walking path parallel to the river. Native trees to control erosion.
- Shops facing the road with residential space in the second floor and solar panels in the roofs.
- Docks available for kayaks.

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Design “A”

Highlights:

- Victorian houses around a focal point (brown).
- Mix-used commercial space in front of the main road (blue).
- Sustainable practices: solar panels and vegetation to control erosion.
- Healthy habits: walk trail and kayak launch.



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Design “B”: “A celebration of small-town charm and natural beauty”

- Residential and commercial buildings oriented inwards, to promote people to commune on the central green and stroll around the shops and restaurants.
- Central gazebo with free information about the town serves also as bandstand.
- Five waterfront mixed/commercial use buildings (C-shaped) with patio areas for outdoor dining.
- Walking path with potential to attract people to the shops (loop).
- Vegetative buffer along the creek to mitigate erosion and runoff.

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Design “B”



Highlights:

- Buildings arrangement facing inward to recreate church camp feel.
- Waterfront mix-used commercial space (C-shape with space for outdoor dining).
- Gazebo / bandstand as central point.
- Sustainable practices: vegetative buffer.

College of Agriculture and Natural Resources

Design “C”: “The most green community possible”

- Most to the space allocated to commercial and recreational areas.
- Community center and outdoor recreation with sport facilities are focal point.
- Commercial mix: Victorian restaurant, clothing, books & café, grocery, restaurant, ice cream, gym, and shoes.
- Compact and secluded residential space.
- Solar roadways, green roofs and solar panels on buildings.

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Design “C”: “The most green community possible”



LAUREL, DE
Greener is Better

In this design we strive to create the most green community possible. There are green roofs and solar panels featured on the business apartment complex, and also on the community center. In addition, the roads will be using the new Solar Roadways in attempts to reducing the town's carbon footprint.

Aside from the many shopping opportunities, there is also a community center and outdoor recreation spot for the sports enthusiast. Behind there is a scenic walkway featuring shade trees and a walkway.



location solar roadways green roof

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Design “C” (continues)

BUSINESS SECTOR		L 1.02	
TYPE	NOTES	Sarah Morales PLSC 301	
	<p>Clothing Small, locally owned boutique that specializes in vintage-inspired clothing.</p> <p>Books & Cafe Small, locally owned business that caters to the coffee enthusiasts and book-lovers.</p> <p>Music This locally owned music shop has vinyl, cds, and cassette tapes! It's a blast to the past.</p> <p>Grocery An independent grocery store influenced from the general stores of the past.</p> <p>Restaurant The Victorian Modern Tavern boasts of a victorian influence with a modern twist. It's charming, affordable, and has an excellent outdoor deck. They are unique drinks, vintage inspired menus and their fine influence from the 1920s ready to enjoy.</p> <p>Ice Cream Have a rough day at work? No worries, this gym is just a mere flat on the opposite walk. Convenient and provides state of the art equipment.</p> <p>Gym Friendly hours ahead! This business serves men, women, and children. Your old fashioned gym and everything included.</p> <p>Shoes</p>		
			

College of Agriculture and Natural Resources

Design "C" (continues)

HOUSING




L 1.03

Sarah Morales
PLSC 301

FEATURES

Green roofs and solar panels are present on the business and apartment buildings.

One fantastic feature is the use of Solar Roadways. They provide much of the town's power, reduce the negative impacts of snow accumulation, and are easily removed. For more information you can visit solarroadways.com

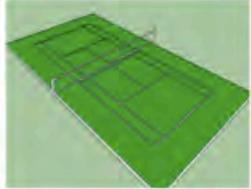
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Design "C" (continues)

RECREATION



Laurel Community Center
fostering creativity and providing activities since 2014


L 1.04

Sarah Morales
PLSC 301

Notes

The Laurel Community Center provides many after school activities and also offers free use of the tennis, beach volleyball, and basketball courts in the back. There are art and music studios, a graffiti room, and a classroom featured inside the center. Everything inside is free and maintained with the help of volunteers and community workers. We believe in enriching the lives of those in the community with education and freedom of expression.

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Design “D”: “A green, sustainable and eye-catching community”

- Attractive houses and waterfront cafe and brewery are the eye-catching elements of the design.
- Parking lot enclosed.
- Small, sustainable homes with solar energy.
- Victorian style, full of color, eye-catching.
- Local coffee shop and brewery.
- Planted areas, including rain gardens and native species.

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Design “D”: “A green, sustainable and eye-catching community”



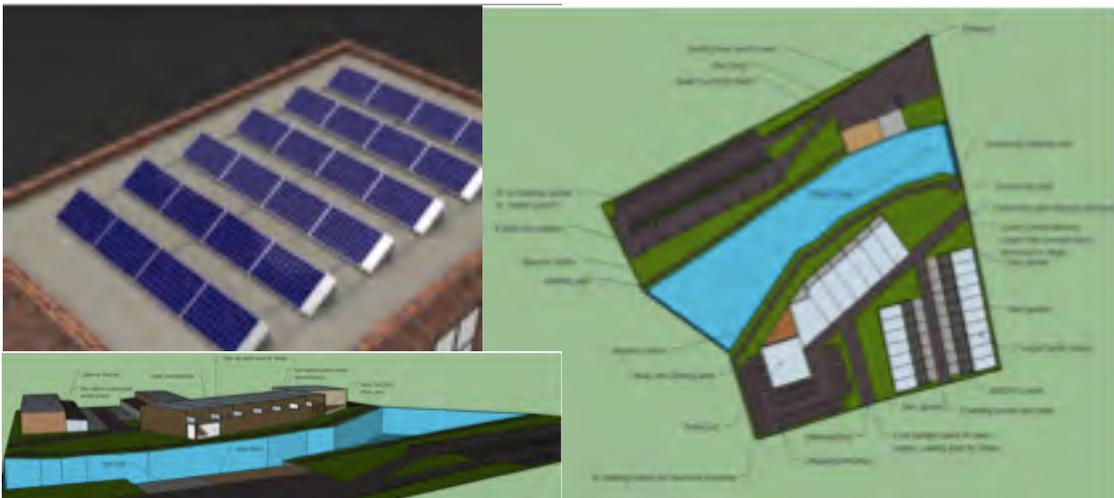
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Design “E”: “A fun place for residents and visitors to spend time enjoying Broad Creek”

- Kayak and boat launch on the north side of Broad Creek with parking space for 55 vehicles and 14 boat trailers.
- Low-cost housing development (17 two-story single family homes with porches).
- Local brewery with second floor dining area with views of Broad Creek. Deck for concerts.
- Seven shops in prime waterfront area with residential condominiums above.
- Parking space for patrons in the opposite side of Broad Creek.
- Flat roofs with solar panels.

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Design “E”: “A fun place for residents and visitors to spend time enjoying Broad Creek”



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Closing remarks: general trends

- Mix use: commercial, residential and recreational.
- Adoption of green infrastructure: solar panels, green roofs, solar roadways.
- Ecologically functional landscape: rain gardens, buffer vegetation (erosion and nutrient mitigation).
- Historical identity: consistency with the architectural style of the town.
- Focal points: water fountains, gazebos, emphasis on the creek.
- Emphasis on walkability and healthy lifestyles.
- Social integration with the larger community.

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Discussion points

- Residential : commercial ratio.
- Built vs. open space ratio.
- Ownership and use of prime waterfront space.
- Buildings: architectural pride vs. cost-efficiency.
- Audience: younger vs. older.
- Relationship of this project with the large picture.

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Appendix 7.5: Broad Creek Greenway Development in Laurel (Memo)

MEMO

MAY 28, 2014

TO: Jules B.

FROM: DON PHILLIPS

LRC Board Member, Town of Laurel Councilman

443.359.1009

I wanted to follow up our discussions re: the Broad Creek Greenway development project in Laurel.

You will remember I had suggested a themed residential project on the parcel along the south side of Broad Creek between Poplar St. and the railroad, to include these features (Please note: This is a personal idea, not that of either the Town or the LRC.):

- A 'Crescent' shaped array of modest Victorian cottages and duplex-cottages (a la Cape May, NJ), all with gingerbread multicolored porches and eaves facing onto a crescent-shaped 'promenade' in front of the porches, would be constructed.
- The cottages would invoke the vintage image of the many religious retreat/camps in Sussex County. A more grandiose model would be Chautauqua in New York State.
- Main individual-cottage entrance/access and all parking would be to the back (south side) of the arc of cottages.
- The Promenade would be lined with attractive benches, shrubs, trees, and statuary.
- The creekside park along the south side of Broad Creek, including riprap and natural plantings, would be continued from Poplar Street to the railroad, and would be 'tied' to the Laurel River Park under the railroad bridge, as funding and access became available.
- Sites such as military memorials and politic memorials (to the 5 governors of Delaware from Laurel) might be incorporated along the greenway.
- The semicircular open area between the promenade and the greenway walk could be used for a 'community' pavilion, gazebo, or socializing area, but care should be taken in planning to ensure the 'vista' northward from the porches and promenade would be mostly open, all the way to the creekside walk.
- Design consideration must be given to camouflaging and soundproofing the Town 'pumping station' on the west end of the site.
- Public parking might be limited to the east edge of the property, as well as in the parcel to the east between Poplar Street and Central Ave. (This area might be properly used to house supportive commercial development).
- We already have a very successful Homes for America project for seniors here in Laurel (900 sf duplex apartments), and we feel that this organization might be interested in another partnership, with the LRC ownership of the site being a strong incentive.

Sites you might share with students:

Royal Crescent Bath (England) description and images

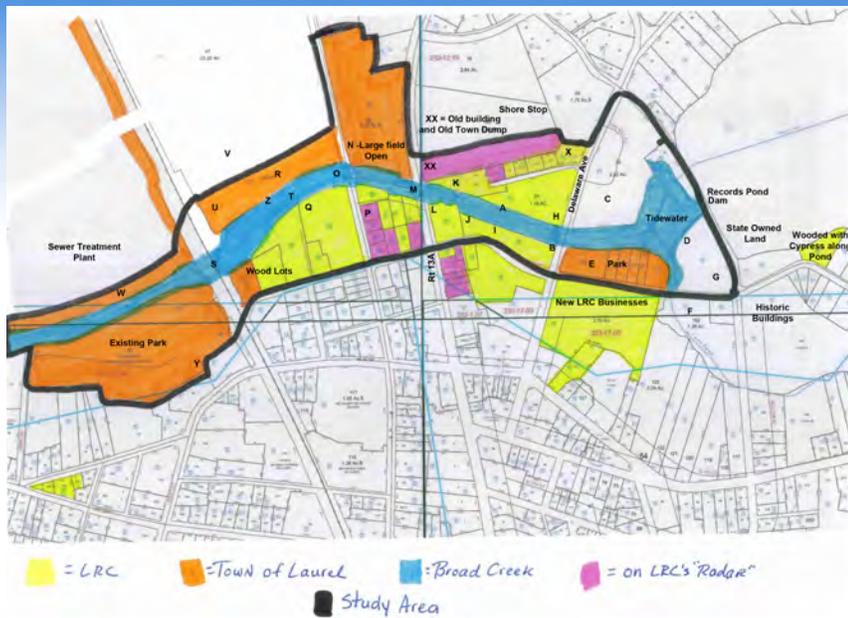
Cape May NJ images for cottages, porches, gingerbread deco
www.Chautauqua (NY) Asso. The epitome of religious camps & cottages
Careyscamp.org (Millsboro DE) local religious campground still in use
Discussions of 'promnades' in early- and mid-20th Century religious camps

**Appendix 7.6: A Conceptual Site Design and Plans for Waterfront
Redevelopment Along the Broad Creek, Laurel, DE.**



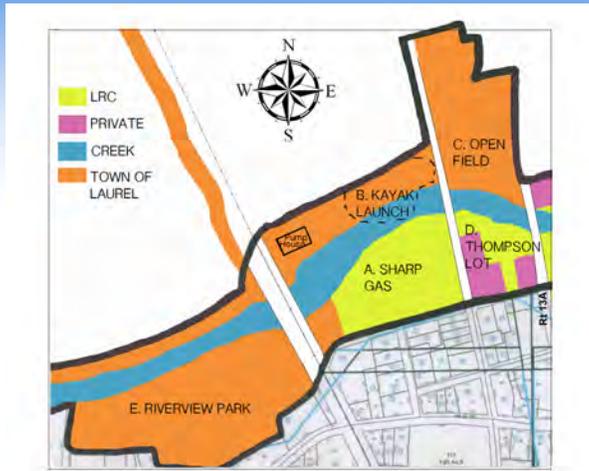
Google Earth imagery helped to verify existing land use and vegetation patterns

JB, LS & EL



JB, LS & EL

Study Area West



Study focus locations:

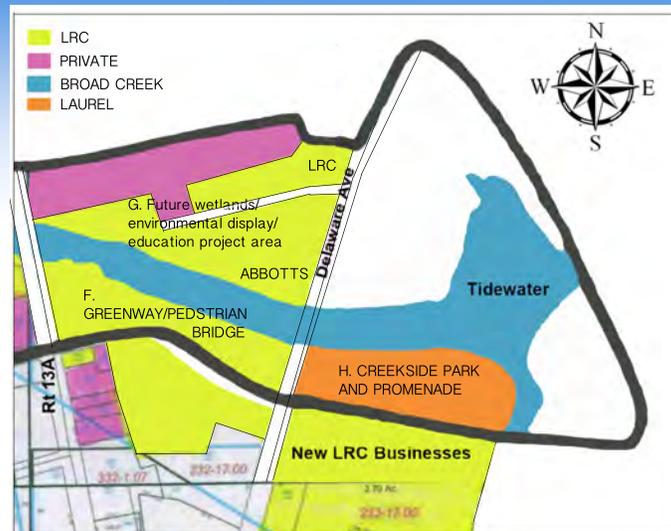
- A. Sharp Gas – in conjunction with Homes for America, future small footprint duplexes.
- B. Kayak Launch with parking
- C. Open Field – future accessible playground facility with parking
- D. Thompson Lot – future mixed-use
- E. Riverview Park – not part of study but ultimately want pedestrian connection to this park to complete greenway.

JB, LS & EL

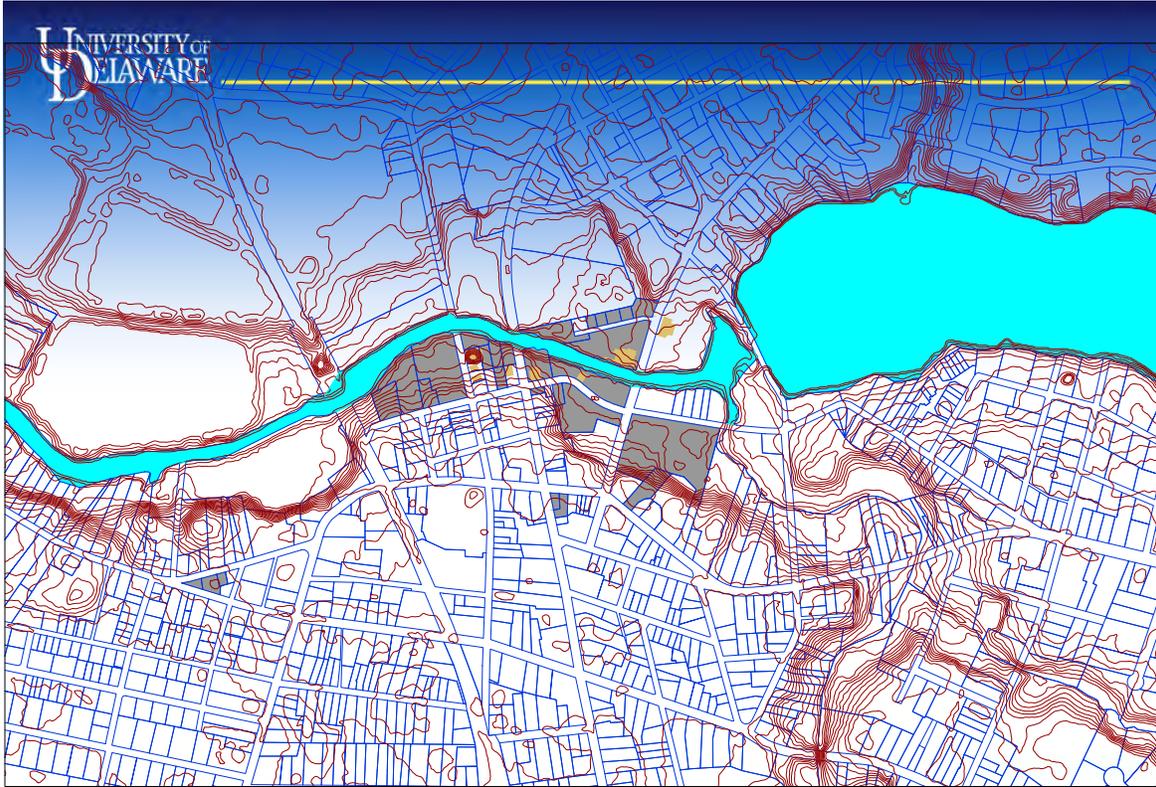
Study Area East

Study focus locations:

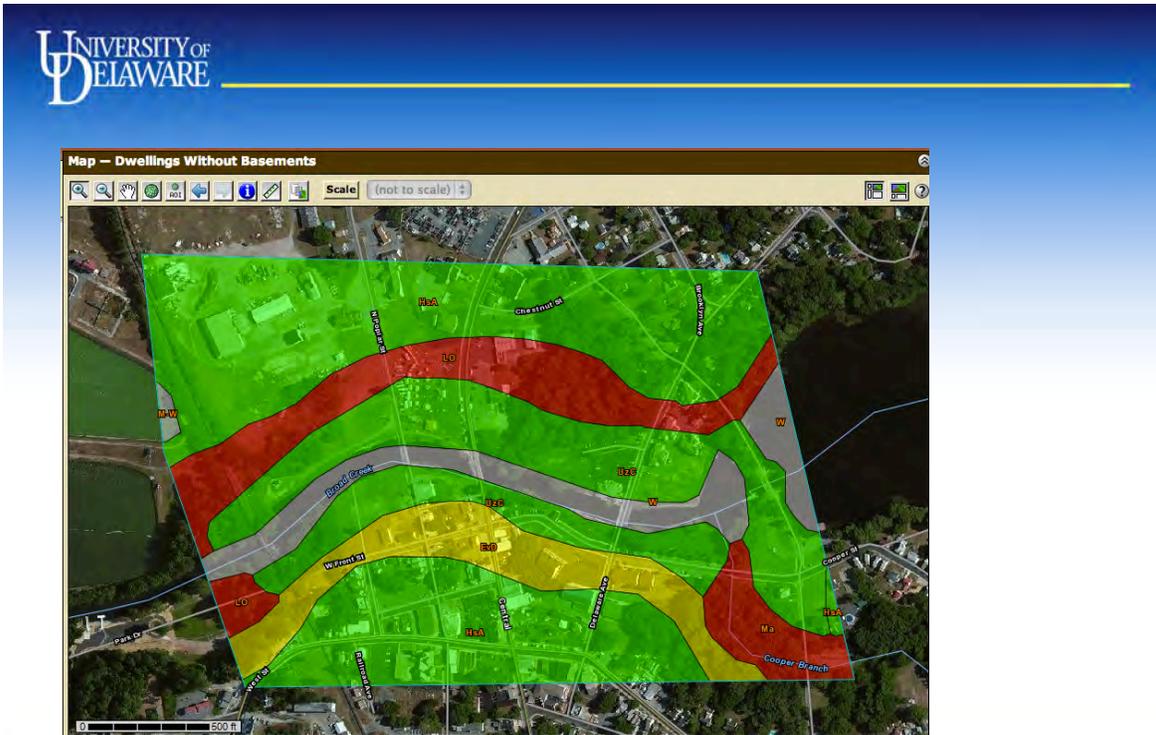
- F. Greenway (walking trail from Creekside Park to Riverview Park) and **Pedestrian Bridge** to connect to Abbott's.
- G. Future wetlands/ environmental display, education project area
- H. Creekside Park – no work being considered in this location



JB, LS & EL

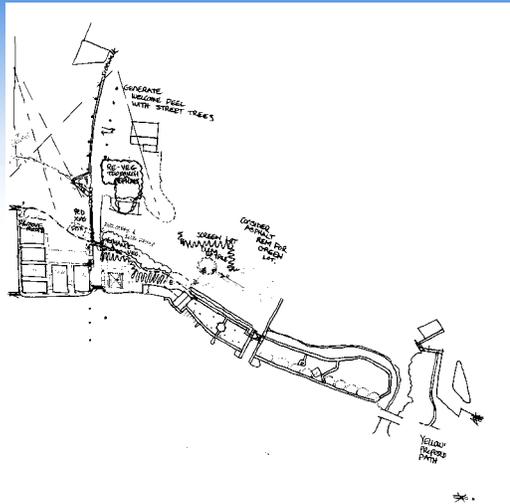


JB, LS & EL



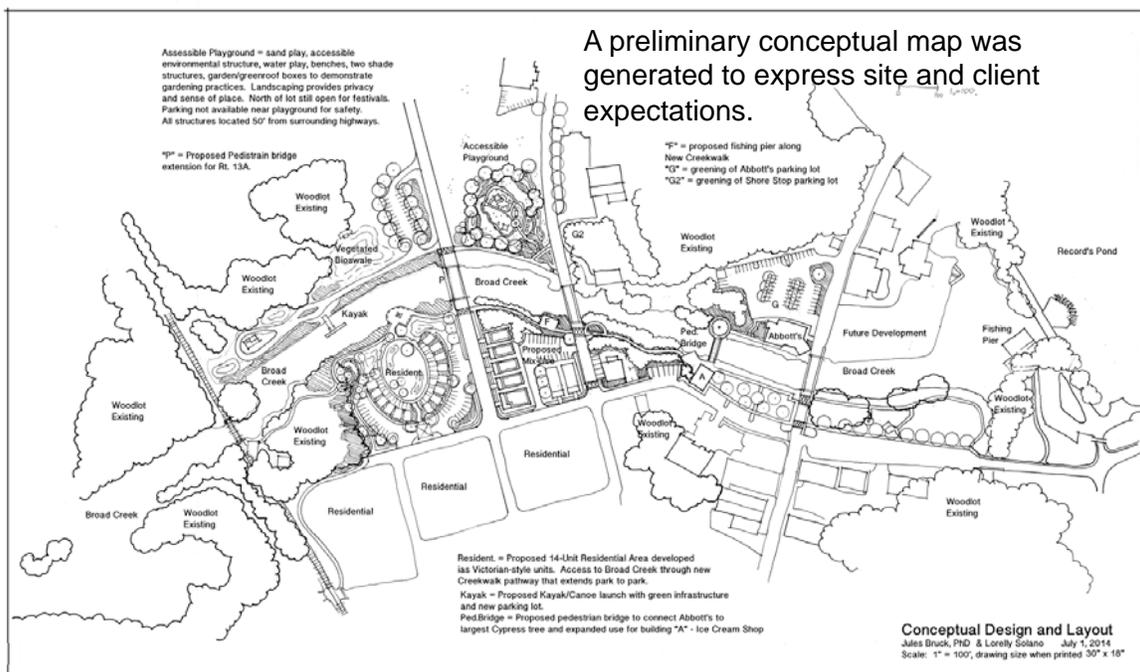
Soil maps

JB, LS & EL



During **Site Analysis** consideration was given to views onto and off site, circulation patterns and possibilities, pedestrian safety, important nodes and both historic as well as culturally important elements.

JB, LS & EL



JB, LS & EL



Additional design possibilities were explored to take better advantage of views and to explore circulation options as well as to lessen footprint within the floodplain



JB, LS & EL



JB, LS & EL

Sharp Gas

1. Development condensed to south side of property outside of floodplain.



Green Infrastructure options may include:

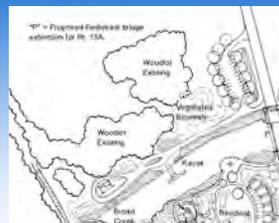
- a) Vegetated swales
- b) Pervious paving
- c) Restoration of riparian buffer
- d) Rain gardens
- e) Bank revetment if necessary
- f) Rainwater harvesting



JB, LS & EL

Kayak Launch

1. Development includes kayak/canoe launch, parking lot



Green Infrastructure options may include:

- a) Vegetated swales
- b) Pervious paving
- c) Restoration of riparian buffer
- d) Rain gardens
- e) Bank revetment if necessary



JB, LS & EL

Open Field

1. Development of playground and parking lot condensed to south side of parcel within floodplain.

Green Infrastructure options may include:

- a) Vegetated swales
- b) Pervious parking
- c) Restoration of riparian buffer
- d) Rain gardens
- e) Greenroof educational area
- f) Creekbank revetment if necessary



JB, LS & EL

Thompson Lot

1. Development includes removal of several structures, renovation of others, and development of parking and plaza to generate a café culture as well as host a Farmer's Market

Green Infrastructure options may include:

- a) Vegetated swales
- b) Pervious paving
- c) Restoration of riparian buffer
- d) Rain gardens
- e) Bank revetment if necessary
- f) Rainwater harvesting



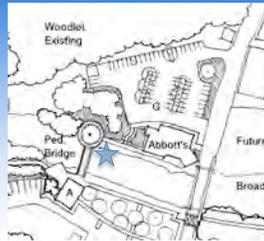
JB, LS & EL

Pedestrian Bridge

1. Development includes 85' manufactured prefabricated bridge with wooden decking and hand railings.

Green Infrastructure options may include:

- a) Restoration of riparian buffer
- b) Rain gardens
- c) Bank revetment if necessary



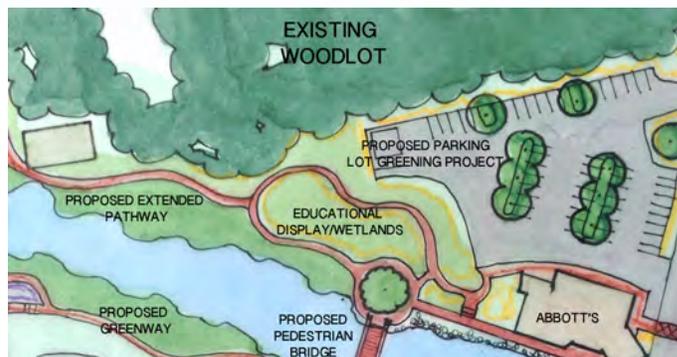
JB, LS & EL

Wetland Area

1. Development of constructed wetland for educational display. Requires wooden boardwalk.

Green Infrastructure options may include:

- a) Constructed wetland
- b) Pervious parking and greening of adjacent lot.
- c) Restoration of riparian buffer
- d) Bank revetment if necessary



JB, LS & EL

References

- Acharya, P. (2010). Destination Branding.
<http://www.slideshare.net/peshwaacharya/destination-branding>
<http://www.slideshare.net/peshwaacharya/destination-branding>
American Rivers (2014). Green infrastructure definition.
<http://www.americanrivers.org/green-infrastructure-training/resources/glossary/>
(accessed 08/27/14).
- Bassuk, N., Grabosky, J., Trowbridge, P., Urban, J. (unknown year). Structural Soil: An Innovative Medium Under Pavement that Improves Street Tree Vigor.
<http://www.hort.cornell.edu/uhi/outreach/csc/article.html> (accessed 08/11/14).
- Beatt, G. (unknown year). Rain Gardens Stop Runoff, Remove Pollutants And Return Water To The Aquifer. http://www.grantsgardens.com/blog/post/645/Rain-Gardens-Stop-Runoff--Remove-Pollutants-And-Return-Water-To-The-Aquifer#.VBB_iC5dUSQ
(accessed 09/10/14).
- Berger, C. M. (2009). *Wayfinding: Designing and implementing graphic navigational systems*. Mies, Switzerland: Roto Vision Book.
- Blakely, E. J., & Leigh, N. G. (2013). *Planning local economic development: Theory and practice*.
- Bonham, B; Smith, P. (2008). Transformation through greening. In Birch, E. L., & Wachter, S. M. (Eds). *Growing greener cities: Urban sustainability in the twenty-first century* (p. 227-243). . Philadelphia: University of Pennsylvania Press.
- Bruck, J., & Middlebrooks, A. (2012). iDea Fan Deck. Bruck & Middlebrooks.
- Center for Landscape Design & Stewardship (unknown year). Extensive Green Roof.
<http://www.digclids.org/photos/greenroofcomponents.gif> (accessed 08/11/14).
- Chesapeake Bay Program (2012). EPA to provide \$4 million in grants to local governments for pollution-reducing “green infrastructure” projects.
http://www.chesapeakebay.net/blog/post/epa_to_provide_4_million_in_grants_to_local_governments_for_green_infrastru (accessed 08/11/14).
- Citylab.com (2012). The Surprisingly Complex Art of Urban Wayfinding.
<http://www.citylab.com/design/2012/01/surprisingly-complex-art-wayfinding/1088/>

(accessed 08/12/14).

Cleverdon, R; Fabricious, M. (2006). Destination Positioning, Branding and Image Management. <http://www.slideshare.net/Annie05/destination-positioning-branding-and-image-management-presentation> (accessed 08/07/14).

Connecticut River Bank Commission. Urban Buffers. <http://www.crjc.org/buffers/Urban%20Buffers.pdf>

Cunningham, K., Lietchy, H., Stuglinger, C. (unknown year). Riparian Buffers: Functions and values. University of Arkansas. <http://www.uaex.edu/publications/pdf/FSA-5026.pdf> (accessed 08/11/14).

Daniels, T. (2008). Taking the initiative: why cities are greening now. In Birch, E. L., & Wachter, S. M. (Eds). *Growing greener cities: Urban sustainability in the twenty-first century* (p. 11-27). . Philadelphia: University of Pennsylvania Press.

Delaware Department of Natural Resources and Environmental Control (2014). Enforcement Section. <http://www.dnrec.delaware.gov/fw/Pages/enforcement.aspx> (accessed 09/01/14).

Delaware Office of State Planning and Coordination. (2014). Better Models for Development in Delaware. http://stateplanning.delaware.gov/info/better_values.shtml (accessed 09/01/14).

Elkhart River Restoration Association Inc. (2014). Rain Barrel Auction June 2012. <http://www.elkhartriverrestorationassociation.org/rain-barrel-auction-june-2011/> (accessed 08/11/14).

Department of Biological and Agricultural Engineering, NCSU (unknown year). Riparian Buffers. <http://www.bae.ncsu.edu/programs/extension/wqg/sri/riparian5.pdf>

Department of Natural Resources & Environmental Control, Delaware. Delaware's Riparian Buffers (unknown year). Delaware's Riparian Buffers. Building a line of defense to protect our state's waters. <http://www.dnrec.state.de.us/dnrec2000/Library/RIPARIANBUFFERS1.PDF> (accessed 08/11/14).

Dunnet, N. and N. Kingsbury. 2008. Planting green roofs and living walls. Timber Press, Inc. Portland, Oregon. 328 pp.

Ecotourism.org (2014). What is ecotourism? <https://www.ecotourism.org/what-is-ecotourism> (Accessed, 08/06/14).

Federal Emergency Management Agency (2014). Sussex County, DE Flood Information Portal. FEMA Region III. <http://maps.riskmap3.com/DE/Sussex/> (Accessed 09/05/14).

Federal Interagency Stream Restoration Working Group (FISRWG). 1998. Stream Corridor Restoration: Principles, Processes, and Practices. Chapter 3: Disturbance Affecting Stream Corridors. p. 3-23.
http://www.nrcs.usda.gov/technical/stream_restoration/PDFFILES/CHAPTER3.pdf (Accessed, 05/01/2010).

Fleming, K. (2014). Laurel waterfront redevelopment. Personal communication (08/25/14).

Fosket, Jennifer, and Laura Mamo. 2009. *Living green: communities that sustain*. Gabriola Island, BC: New Society Publishers.

Foster, S., B. Giles-Corti, and M. Knuiiman. 2011. "Creating safe walkable streetscapes: Does house design and upkeep discourage incivilities in suburban neighbourhoods?" *Journal of Environmental Psychology*. 31 (1): 79-88.

Getter, K. and B. Rowe. 2006. The role of Extensive Green Roofs in Sustainable Development. *HortScience* 41:1276-1285.

Ghertner, P. (2009). Rain Gardens. http://manatee.ifas.ufl.edu/FFL/Dazzling-Designs-pdfs/Fact_sheet_Bioretention_Basins_Rain_Gardens.pdf
http://manatee.ifas.ufl.edu/FFL/Dazzling-Designs-pdfs/Fact_sheet_Bioretention_Basins_Rain_Gardens.pdf

Govers, Robert, and Frank M. Go. 2009. *Place branding: glocal, virtual and physical identities, constructed, imagined and experienced*. Basingstoke: Palgrave Macmillan.

Green, Gary P., and Anna Haines. 2012. *Asset building & community development*. Los Angeles, Calif. [u.a.]: SAGE. ok
http://manatee.ifas.ufl.edu/FFL/Dazzling-Designs-pdfs/Fact_sheet_Bioretention_Basins_Rain_Gardens.pdf

Green Parking Council. Parking Lots. <http://www.greenparkingcouncil.org/structures-and-places/parking-lots/>
<http://www.greenparkingcouncil.org/structures-and-places/parking-lots/>

Green Roofs for Healthy Cities. 2008. *Green Roof Plants and Growing Medium 401. Participants Manual*. 101 pp.

Greenleaf.co.uk. (unknown year). A tale of two trees. <http://greenleaf.co.uk/news-and-events/a-tale-of-two-trees> (accessed 08/11/14).

Groundplay (unknown year). Thorndon Park Reservoir, Campbelltown.
<http://groundplay.lightbulbdigital.com.au/> (accessed 08/12/14).

Hancock, H., 1983. *The History of Nineteenth Century Laurel*. Otterbein College Print Shop, Westerville, OH.

Homes for America (2014). *Creating Communities. Enriching Life*.
<http://www.homesforamerica.org/> (Accessed 09/05/14).

Hopper, Leonard J. 2007. *Landscape architectural graphic standards*. Hoboken, N.J.: John Wiley & Sons.

InspirationGreen.com (unknown year). *Green Roofs on Homes and Sheds*.
<http://www.inspirationgreen.com/green-roofs-in-the-country.html> (accessed 08/11/14).

Isenberg, A. (2004). *Downtown America: A history of the place and the people who made it*. Chicago: University of Chicago Press.

Jabbar-Bey, R. (2012). *Community Development Theory, Concepts and Practice*. University of Delaware. Notes from lectures.

Jackson, Richard, and Stacy Sinclair. 2012. *Designing healthy communities*. San Francisco: Jossey-Bass.

Joye, Yannick, Kim Willems, Malaika Brengman, and Kathleen Wolf. 2010. "The effects of urban retail greenery on consumer experience: Reviewing the evidence from a restorative perspective". *Urban Forestry & Urban Greening*. 9 (1): 57-64.

Kaplan, S., J.F. Talbot, and R. Kaplan. 1988. *Coping with daily hassles: The impact of the nearby natural environment*. Project Report. USDA Forest Service, North Central Forest Experiment Station, Urban Forestry Unit Cooperative. Agreement 23-85-08.

Kent, G. (2014). *How to write a kick-butt brand positioning statement*.

Kim, S. 2012. *Why are some cities easier to navigate than others?*
<http://www.smartplanet.com/blog/decoding-design/the-value-of-urban-wayfinding/>
(accessed 08/12/14).

Laurel Historical Society (2014). *Laurel's historical sites*. Personal communication (email; 07/21/14).

Laurel Public Library, Laurel Chamber of Commerce and Visitor Center, Laurel Historical Society (unknown year). Walk Laurel. Brochure.

Lee, Sang-Woo, Christopher D. Ellis, Byoung-Suk Kweon, and Sung-Kwon Hong. 2008. "Relationship between landscape structure and neighborhood satisfaction in urbanized areas." *Landscape and Urban Planning*. 85 (1): 60-70.

Maslow Hierarchy of Needs.

http://images.wikia.com/psychology/images/c/c3/Maslow%27s_hierarchy_of_needs.png
(Accessed, 05/10/2011).

Mattas-Curry, L. (2012). Around the Water Cooler: Riparian Buffers. EPA Blog.

http://blog.epa.gov/science/2012/09/around-the-water-cooler-riparian-buffers/?utm_source=rss&utm_medium=rss&utm_campaign=around-the-water-cooler-riparian-buffers (accessed 08/11/14).

Milward, H. B., Provan, K. (2006). A Manager's Guide to Choosing and Using Collaborative Networks.

<http://www.businessofgovernment.org/sites/default/files/CollaborativeNetworks.pdf>
(Accessed 08/09/14).

Moe, R., & Wilkie, C. (1997). *Changing places: Rebuilding community in the age of sprawl*. New York: Henry Holt & Co.

Musacchio, L. R. (January 01, 2009). The scientific basis for the design of landscape sustainability: A conceptual framework for translational landscape research and practice of designed landscapes and the six Es of landscape sustainability. *Landscape Ecology*, 24, 8, 993-1013.

Nanticoke Watershed Alliance (2011). 2011 Nanticoke River Report Card.

http://ian.umces.edu/pdfs/ian_report_card_376.pdf (Accessed 08/06.14).

Nanticoke Watershed Alliance (2012). 2008-1012 Five Year Nanticoke River Report Card.

<http://nanticokeriver.org/wp-content/uploads/2010/06/FY-RC-HR-FINAL.pdf>
(Accessed 08/06.14).

National Main Street Center (2014). What is Main Street.

<http://www.preservationnation.org/main-street/about-main-street/> (accessed 08/07/14).

National Trust Community Investment Corporation. (2014). What do high-paying jobs, billions in private investment, and historic buildings have in common?

<http://www.preservationnation.org/information-center/economics-of->

[revitalization/rehabilitation-tax-credits/jobs/Second-Annual-Rutgers-Report_summary.pdf](#)

North Carolina State University (unknown year). Riparian Buffers: what are they and how they work? <http://www.soil.ncsu.edu/publications/BMPs/buffers.html> (accessed 08/11/14).

Obropta, C. (2011). Bioretention systems. <http://www.water.rutgers.edu/Conference2011/ObroptaPresentation.pdf><http://www.water.rutgers.edu/Conference2011/ObroptaPresentation.pdf>
<http://www.water.rutgers.edu/Conference2011/ObroptaPresentation.pdf>

O'Leary, R., Gerard, C. (2012). *Collaboration Across Boundaries. Insights and Tips from Federal Senior Executives*. IBM Center for the Business of Government.

Parkson.com (2014). DynaSand® EcoWash™ Enhanced Nutrient Removal Filtration System at Laurel, DE. <http://www.parkson.com/sites/default/files/documents/document-case-study-laurel-de-595.pdf><http://www.parkson.com/sites/default/files/documents/document-case-study-laurel-de-595.pdf>
<http://www.parkson.com/sites/default/files/documents/document-case-study-laurel-de-595.pdf>

Pinterest (unknown year). What is a bioswale? <http://media-cache-cd0.pinimg.com/originals/6a/82/8b/6a828b97616a4e2ff1564cebc8a3173d.jpg> (Accessed 08/11/14).

Putnam, Robert D. 2000. *Bowling alone: the collapse and revival of American community*. New York: Simon & Schuster.

Rapoport, Amos. 1990. *The Meaning of the Built Environment. A Nonverbal Communication Approach*. The University of Arizona Press. 253 pp.

Regan, Clair L., and Sandra A. Horn. 2005. "To nature or not to nature: Associations between environmental preferences, mood states and demographic factors." *Journal of Environmental Psychology*. 25 (1): 57-66.

Royal Commission on Environmental Pollution, 2007. *The Urban Environment*, Royal Commission on Environmental Pollution Twenty-Sixth Report, presented to Parliament March 2007. The Stationery Office, London.

Ryan, R.M., N. Weinstein, J. Bernstein, K.W. Brown, L. Mistretta, and M. Gagne. 2010. "Vitalizing effects of being outdoors and in nature." *Journal of Environmental Psychology*. 30 (2): 159-168.

Scott, Marcia S. 2008. *Healthy communities: a resource guide for Delaware municipalities*. [Newark, Del.]: Institute for Public Administration.

Scharoun, Lisa. 2012. *America at the mall: the cultural role of a retail utopia*. Jefferson, N.C.: McFarland & Co.

Snodgrass, E. and L. Snodgrass. 2006. *Green Roof Plants. A Resource and Planting Guide*. Timber Press. Portland, Oregon. 203 pp.

Solano Torres, Sonia Lorelly. 2010. *Investigating crumb rubber amendments for extensive green roof substrates*. College Park, Md: University of Maryland.
<http://hdl.handle.net/1903/10813>.

Southern Delaware Tourism (2014). *Official Visitors Guide & Vacation Planner 2013-2014*. The Convention and Visitors Bureau for Sussex County, Delaware.

Whiston Spirn, Anne. 2005. "Restoring Mill Creek: Landscape Literacy, Environmental Justice and City Planning and Design". *Landscape Research*. 30 (3): 395-413.

Stamps, Arthur. 2005. "Enclosure and Safety in Urbanscapes." *Environment and Behavior*. 37 (1): 102-133.

Stayman, D. (2013). How to write market position statements. eCornell.
<http://blog.ecornell.com/how-to-write-market-positioning-statements/>

Steele, J. (2009). *Creating Small Town Tourism Success*.
<http://ruraltourismmarketing.com/2009/08/creating-small-town-tourism-success-part-1-branding/> (Accessed 08/09/14).

Sussex County Economic Development Office (2014), *Sussex County 2014 Profile*. Delaware State News & Sussex County Post.

Taschifsky.com (unknown year). *Ecopaving*.
http://www.taschifsky.com/taschifsky.com/Eco_Paving.html (accessed 08/11/14).

Town of Laurel. (2014). *Town of Laurel, Delaware*. <http://www.townoflaurel.net/> (accessed 08/18/14).

Town of Laurel Planning & Zoning Commission (2011). *2011 Greater Laurel Comprehensive Plan*.
http://www.townoflaurel.net/pdfs/2011_Laurel_Comp_Plan_ADOPTED.pdf (accessed 07/09/14).

Tyler, Norman, and Norman Tyler. 2000. *Historic preservation: an introduction to its history, principles, and practice*. New York: W.W. Norton.

Ulrich, R. S. and R.F. Simons. 1986. Recovery from stress during exposure to everyday outdoor environments. In J. Wineman, R. Barnes & C. Zimring, Eds., *In Proceedings of the Seventeenth Annual Conference of the Environmental Design Research Association*. Washington, D.C.:EDRA, pp 115-122.

University of Florida (2008). Bioswales/Vegetated swales.
http://buildgreen.ufl.edu/Fact_sheet_Bioswales_Vegetated_Swales.pdf

University of Maryland (unknown year). Permeable pavement fact sheet.
https://extension.umd.edu/sites/default/files/docs/programs/master-gardeners/Howardcounty/Baywise/PermeablePavingHowardCountyMasterGardeners105_11%20Final.pdf (accessed 08/11/14).

U.S. Department of Agriculture (2007). Bioswales. <ftp://ftp-fc.sc.egov.usda.gov/MT/www/technical/water/Bioswale.pdf>
<http://ftp-fc.sc.egov.usda.gov/MT/www/technical/water/Bioswale.pdf>

U.S. Environmental Protection Agency (USEPA). 1999. Storm Water Technology Fact Sheet. Vegetated Swales.
http://water.epa.gov/scitech/wastetech/upload/2002_06_28_mtb_vegswale.pdf
http://water.epa.gov/scitech/wastetech/upload/2002_06_28_mtb_vegswale.pdf

U.S. Environmental Protection Agency (USEPA). 2010. Managing wet weather with green infrastructure. How does green infrastructure benefit the environment?
http://cfpub.epa.gov/npdes/home.cfm?program_id=298 (Accessed; 03/03/2010)

U.S. Environmental Protection Agency (USEPA). 2010. Section 9. Chesapeake Bay TDMLS.
http://www.epa.gov/req3wapd/pdf/pdf_chesbay/FinalBayTMDL/CBayFinalTMDLSection9_final.pdf (Accessed 08/06/14).

U.S. Environmental Protection Agency (USEPA). 2013. Stormwater to street trees: engineering urban forests for stormwater management.
<http://water.epa.gov/polwaste/green/upload/stormwater2streettrees.pdf>

U.S. Environmental Protection Agency (USEPA). 2014. What is green infrastructure?
http://water.epa.gov/infrastructure/greeninfrastructure/gi_what.cfm (Accessed 08/18/14).

U.S. Fish and Wildlife Service. n.d. *Native plants for wildlife habitat and conservation landscaping Chesapeake Bay Watershed*. Annapolis, MD: U.S. Fish and Wildlife Service, Chesapeake Bay Field Office.
<http://nps.gov/plants/pubs/chesapeake/pdf/chesapeakenatives.pdf>.

U.S. Government Accountability Office (2005). *Results-Oriented Government. Practices that can Help Enhance and Sustain Collaboration among Federal Agencies*. GAO-06-15.

United States Government Accountability Office (2012). *Managing for Results. Key Considerations for Implementing Interagency Collaborative Mechanisms*. GAO-12-22.

Victoria Business Improvement District, UK (2013). Green Infrastructure Audit. http://www.victoriabid.co.uk/wp-content/uploads/2013/10/BestPracticeGuide_A4-10.pdfhttp://www.victoriabid.co.uk/wp-content/uploads/2013/10/BestPracticeGuide_A4-10.pdfhttp://www.victoriabid.co.uk/wp-content/uploads/2013/10/BestPracticeGuide_A4-10.pdf
Walkthetown.com (unknown year). Look Up, Laurel! A Walking Tour of Laurel, Delaware (via Amazon Kindle).

White, M., A. Smith, K. Humphries, S. Pahl, D. Snelling, and M. Depledge. 2010. "Blue space: The importance of water for preference, affect, and restorativeness ratings of natural and built scenes." *Journal of Environmental Psychology*. 30 (4): 482-493.

White, E.V., and B. Gatersleben. 2011. "Greenery on residential buildings: Does it affect preferences and perceptions of beauty?" *Journal of Environmental Psychology*. 31 (1): 89-98.

Wikipedia. Org (2014). Maslow's hierarchy of needs. http://en.wikipedia.org/wiki/Maslow's_hierarchy_of_needs (accessed 08/07/14).

Wikipedia (unknown year). Highway signs at U.S. Route 13 in Delaware. http://en.wikipedia.org/wiki/U.S._Route_13_in_Delaware (accessed 08/12/14).

Wolf, K. (2007). The environmental psychology of shopping. http://www.fs.fed.us/pnw/pubs/journals/pnw_2007_wolf001.pdf?

Yocum, D. (unknown year). University of California. Design Manual: Biological Filtration Canal. http://fiesta.bren.ucsb.edu/~chiapas2/Water%20Management_files/Bioswales-1.pdf

Zurlini, G., Petrosillo, I., Jones, K. B., & Zaccarelli, N. (January 01, 2013). Highlighting order and disorder in socialecological landscapes to foster adaptive capacity and sustainability. *Landscape Ecology*, 28, 6, 1161-1173.