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INSIGHT

DESIGNING SUSTAINABILITY

Creating viable environments, communities, and economies

IN THIS ISSUE:

BUCHART HORN

ENGINEERS · ARCHITECTS · PLANNERS

FLIP TO NEXT ▶

A MESSAGE FROM OUR PRESIDENT

Welcome to BH's new publication – *Insight*. We are committed to bringing exciting and thought-provoking insight from the point of view of our professionals, our clients, and fellow consultants on current and cutting-edge industry topics and trends. Each issue will be theme based, and, for our inaugural issue, we're putting a spin on sustainability.

BH is committed to being part of the solution by placing environmental, economical, and societal sustainability at the core of our practices and professional responsibilities. It is as simple as incorporating integrity into our daily tasks. To quote C.S. Lewis, "Integrity is doing the right thing, even when no one is watching." The first of our firm's four core values is: Integrity in everything we do – matching our behaviors to our words and taking responsibility for our actions, which includes practicing what we preach and doing the right thing for our clients, our communities, and all of our futures.

Sustainability should be thought about in broad terms, not only in terms of reducing energy consumption and constructing with recycled materials, but also encompassing social responsibility and economic viability. Building and connecting can become an act of rejuvenating communities if planning and design consider that humans and nature are all part of the same system.

In 1991, when BH began to look for a new corporate headquarters, our mission to strengthen our community began at home. York is known as a historically industrial town, but the departure of industry from town in the late 20th Century left large—but architecturally interesting—buildings abandoned. The old York International factory complex was named as the city's most difficult challenge in terms of blight. BH worked with the then York County Industrial Development Corporation in developing the brownfield site into The Industrial Plaza of York. Today, the Plaza is home to a mix of industrial, commercial, and professional businesses. The influx of people into the area has had supportive influence on the community, as the plaza's employees take advantage of being within walking distance of local restaurants and other specialty shops. We are proud to incorporate true sustainability in our own needs by eliminating blight and brownfields, using existing infrastructure, and protecting agricultural land from development.

Please enjoy your first issue of *Insight*. We'd love to hear your insight regarding the topics contained in this issue at www.bucharthorn.com/contact.

BRIAN S. FUNKHOUSER, PE, PRESIDENT/CEO

In this Issue

BUCHART HORN
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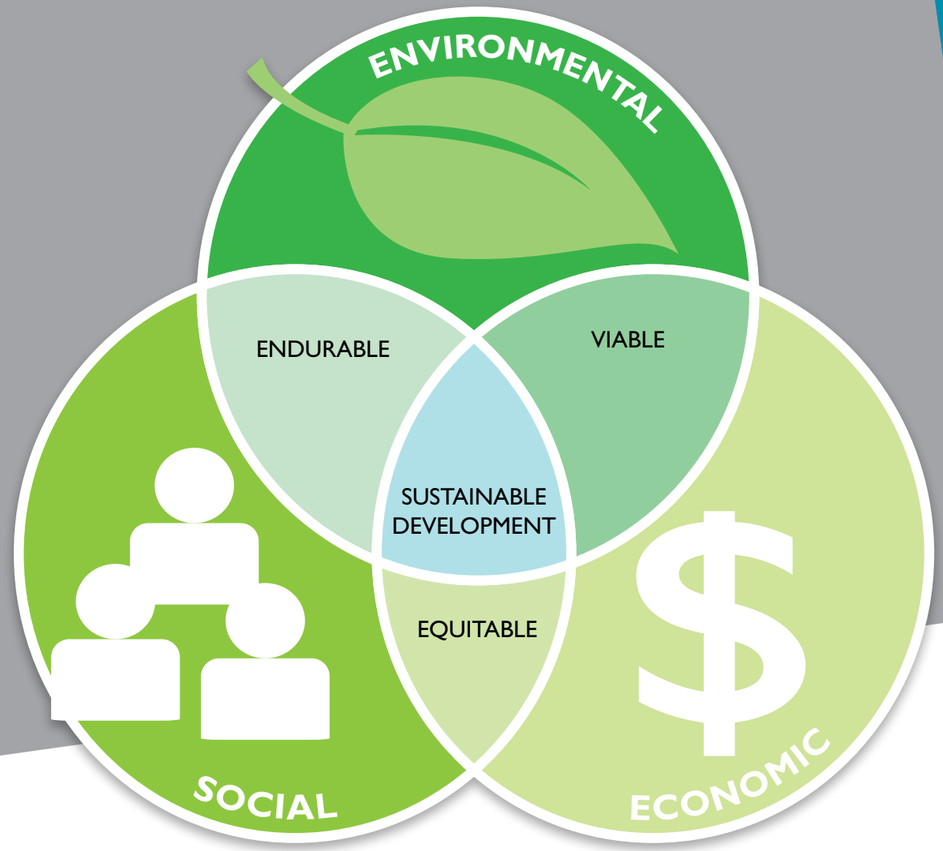


EQUITABLE, ENDURABLE, AND VIABLE... NOT JUST GREEN

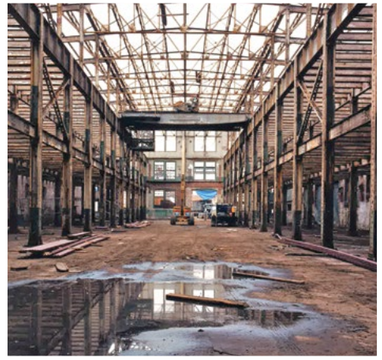
The terms "sustainable" and "green" are often used interchangeably in the architecture and engineering industry. The dilution of the importance of true sustainability can be attributed to the global emphasis on green design being equivalent to sustainable design. As industry professionals, it is our responsibility to ensure the economic and societal sustainability of our design choices.

A lot of typical "green design" elements reduce energy consumption and necessary maintenance. It is imperative that sustainability is considered beyond the benefits to the building owners. The economic and societal benefits of true sustainable design will far exceed the immediate or life-cycle advantages the owner sees. The design can promote better health, comfort, and productivity of the building users. The economic advantages can also be seen by the reduction of the burden on community infrastructure – less water is used; more is being recycled; less pollution is being emitted.

As you will see throughout this issue, there are countless examples of a seemingly simple undertakings to capture stormwater runoff, plant trees, or reuse an existing building that can have a very positive ripple effect through an entire community. You'll see evidence of preserved infrastructure, lowered crime rates, and reinvigorated communities.

AS INDUSTRY PROFESSIONALS, IT IS OUR RESPONSIBILITY TO ENSURE THE ECONOMIC AND SOsocietal SUSTAINABILITY OF OUR DESIGN CHOICES.

The former York Manufacturing Company atrium building after more than 30 years of idleness and vandalism.



Left: Before and After – Adaptive reuse gives the old factory a new lease on life.

BH'S CORPORATE HEADQUARTERS:
ADAPTIVE REUSE IN YORK CITY

York is known as an industrial town and still has some of the largest manufacturing facilities in the country. As with typical cities at that time, industry facilities were built in or near the cities to be close to employee populations. One such facility was the York Manufacturing Company, an ice making machine manufacturer that supplied 50% of the United States' ice making machinery business in 1899. In the 1930s, it converted to an air conditioning manufacturing complex.

Built in 1905 and vacated in the mid-1970s, the complex occupied 6.2 acres. Its 40-odd, interconnected buildings ranged in size from 5,000 to 60,000 SF. A landmark of the wrong kind, the dilapidated complex was a crowded collection of century-old brick buildings filling a long city block between West Philadelphia Street and the Pennsylvania Railroad in York, PA. Many of the buildings had suffered badly from neglect, structural deterioration, and vandalism. The area had become a regular call for the City's police and fire departments, and its large-scale deterioration lowered the value of the surrounding neighborhood.

ADAPTIVE REUSE IS THE CORNERSTONE OF INNER-CITY REVITALIZATION PROGRAMS.

In the early 1990s, the troublesome complex was purchased by the York County Industrial Development Authority (YCIDA). The YCIDA saw the complex's possibilities, named it "The Industrial Plaza of York" and asked BH to assist them in transforming the complex into something new and useful. In concert with the YCIDA, BH performed the following services:

- Structural review of all the buildings on the site
- Preliminary Environmental Site Assessment: studies of this type were performed several times as general site conditions became clearer
- Feasibility study for the Industrial Plaza
- Master site development plan including structural evaluation and recommendations for 200,000 SF of renovation/restoration and new construction
- Plans for environmental remediation/removal of underground storage tanks, hazardous and/or waste materials, and lead paint and asbestos-containing materials in pipe insulation and roofing
- Negotiation with Commonwealth of Pennsylvania environmental authorities to accept encapsulation of certain hazardous materials on-site
- Demolition plans for more than 120,000 SF of structures, including boiler houses and smokestacks

Waste reduction and material reuse were incorporated into the renovations. Conventional sand blasting to remove lead paint would have generated hazardous airborne particles and damage to the 100-year-old brick. The weight of the paint waste and cost for removal and disposal was reduced by using crushed walnut shells instead of sand in the paint removal process. The antique brick was salvaged from demolished buildings and used to renovate buildings to remain.

BH signed a lease for the 56,000 SF former machine shop and erecting hall and converted it into our firm's corporate headquarters.

By choosing to renovate this space (as opposed to constructing a new building outside of the City), we made a positive impact on the environment and the community. New buildings require stormwater management detentions areas; additional impervious surfaces for parking lots; and many times the extension of roads and utilities. BH's headquarters office underscores the company's commitment to the City of York and to the environment. Adaptive reuse of empty buildings helps cities change blighted sites into useful spaces, generating badly needed revenue and inner-city economic activity. BH was able to put an empty factory back to work for the City of York.

Cost-effective benefits:

- Utility infrastructure was already in place – the existing stormwater collection system within the City was adequately managing the 100% impervious area; therefore, the introduction of vegetated islands and shade trees only reduced the amount of runoff from the site.
- There is no need to manage stormwater runoff and, therefore, no mowing or other maintenance of large grass stormwater basins.
- Neither traffic studies nor road widenings were needed.
- Water and sewer hook-ups were within 20 feet of the building.

The adaptive reuse of this space has been positive for the City and the surrounding community:

- Tax revenue for the city increased.
- Adjacent property values improved.
- Additional parking for neighborhood afterhours and weekends for City events.
- Employees walk downtown, which helps supports local businesses and keeps us from contributing to carbon emissions.
- Available large indoor venue with adequate parking for community events such as fundraisers for the local art district and public information meetings.

It has been more than 20 years since BH moved its headquarters into this sustainable building, and it continues to function very well. The interior is an ever-changing landscape to suit the needs of the company and our employees.

BH kept the 30-ton Niles crane as homage to its former industrial use.

Sidewalk in Etna showing decorative stormwater collection grates

BOROUGH OF ETNA:
Designing green stormwater infrastructure

The Borough of Etna is the most downstream community in a 67.3-square-mile Pine Creek watershed in Allegheny County near Pittsburgh, PA. The Borough is highly urbanized and densely populated. Etna's Butler Street Central Business District contributes stormwater to adjacent sections of Pine Creek via the Borough's combined sewer system, dedicated stormwater facilities, and direct runoff. This also led to flooding and the discharge of sewage into Pine Creek.

The Borough tasked BH with refining and implementing its green streetscape vision to reconstruct Butler Street in the Borough's business district. The objective was to renew and revitalize its business district while simultaneously reducing the impact of impervious surface and managing stormwater through the retrofitting of Green Stormwater Infrastructure (GSI). The Borough had laid the groundwork for the project under the Act 167 Pine Creek Watershed Implementation Plan. Ultimately, with the assistance of BH, the Borough was able to secure support for the initial project phase through the Pennsylvania Department of Environmental Protection (PADEP) Growing Greener and the US Environmental Protection Agency (US EPA) Section 319 grants, with a match by the Borough of Etna.

Installation of trench drain, tree grates, and downspout disconnect

BH was authorized to provide design services for Phase I of the project: the reconstruction of the east side of Butler Street between Bridge and Freeport Streets as well as the reconstruction of the north side of Freeport Street between Butler Street and Union Alley.

As part of the streetscape project, a new aggregate sidewalk was installed with attractive, curving, metal grates with a natural leaf pattern to direct sidewalk runoff to modular plastic stormwater storage boxes under the sidewalk. Here, the stormwater is temporarily stored and gradually infiltrated into the underlying soil. The sidewalk runoff combines with the runoff now channeled from disconnected downspouts of the buildings. Stormwater from Butler Street is also conveyed to the storage and infiltration system under the sidewalk via one curb inlet fitted with an innovative pretreatment filter to remove trash and sediment from the street runoff. Storage is provided for the 1.25-inch design storm for the impervious area.

This phase involved installing 12 street trees, 2,300 CF of underground storage to promote infiltration, 3,900 SF of pervious pavers, downspout disconnection, and restatement to new conveyances and related work.

To the rear of the same block, four private parking areas were retrofitted with permeable paving systems with subsurface storage. Surface runoff from the parking areas along the roof runoff from the adjacent buildings is now piped to this stormwater system for infiltration.

The Borough has just finalized the funding arrangements for constructing Phase 2 of the green streetscape project, also designed by BH through PADEP and US EPA funding. Phase 2 will involve the reconstruction of the south side of Butler Street between Winschel and Freeport Streets as well as the reconstruction of the south side of Freeport Street between Butler Street and Cherry Alley. This phase will continue the basic visual design elements of the Phase 1: a new exposed aggregate sidewalk with attractive, curving, metal grates with a natural leaf pattern along with urban tree plantings under matching decorative gratings. This phase will involve installing planting areas with nine trees, 2,400 CF of underground storage in two locations to promote infiltration, 1,800 SF of pervious pavers, a unique "rain park" to repurpose an existing vacant lot , an innovative "green" inlet, downspout disconnection, and restatement to new conveyances and related work. Phase 2 will also include planting areas adjacent to the municipal parking lot on Winschel Street.

Both phases also include other improvements and traffic calming/safety features, including realigned curbing to create bump-outs, new concrete sidewalks, new curb ramps, and inlets to accommodate drainage.

The full implementation of the green streetscape project will create storage sufficient to retain the runoff generated from between two- and five-year, one-hour storms from the contributing business district roofs and pavements. This translates into an estimated 4.8 million gallons in annual runoff reduction.

The Borough government strongly supports the project. However, because this streetscape is home to the Borough's commercial district, the final design takes into consideration the needs of the business community. The Borough has successfully addressed concerns during the project though meetings, outreach, and maintenance of high levels of personal communication with the affected businesses and property owners. Another indicator of the success of the Borough's outreach efforts has been the Borough's ability to execute agreements with property owners under Phase 1 for the installation of Best Management Practices in four private parking areas.

The successful completion of the Green Streetscape Phase 1 was only achieved through the partnership of the Borough and BH working cooperatively with the PADEP and US EPA. The Borough has been engaged in all phases of the project and continues to be strongly committed to realizing its streetscape vision.

Q&A WITH ETNA'S BOROUGH MANAGER, MARY ELLEN RAMAGE

What primary benefits has the Borough received as a result of the Phase I green streetscape project?

The primary benefits are two fold - some relief on the combined sewer system/localized taxing of those systems and the aesthetics of the business district.

What do you see as the driving force to tackle these green infrastructure changes?

The driving force is addressing stormwater management within our community and our combined sewer overflows. If we don't do our part to address stormwater issues, everything else we do moving forward cannot be fully realized. This has to be a big part of our comprehensive approach to moving our community forward in long- and short-term goals.

Have you been satisfied with the results? What has been the overall feedback/reaction from the community and business owners?

We have been very satisfied with the results, as have our business owners. This investment in our business district shows our commitment to stormwater management and economic development. We have been asked numerous times to provide tours of the project to many outside organizations, including community development organizations and environmental groups.

What advice do you have for municipalities interested in making these changes in their communities?

The best advice I can give is to engage with partners in your watersheds, as stormwater is a regional problem and can only be addressed on a regional level. Keeping the public involved, primarily the affected business owners, was critical to the project's success. Our business owners were fantastic, and we utilized their input every step of the way.

What else is the Borough doing to incorporate green infrastructure throughout the community?

We adopted a Green Master Plan identifying numerous green infrastructure projects in areas where they can have a substantial effect on removing stormwater from our combined sewer system, including other phases of green streetscapes, larger infiltration beds, and rain barrel and rain park installations.

ETNA STREETSCAPE

STREET TREES
Studies show street trees reduce traffic speeds, create safer walking environments, improve business income streams, absorb 30% of precipitation from normal storm events, provide heat protection, add value to real estate, and screen overhead utilities.

PERVIOUS PAVERS
Parking pads on the Union Alley side of the block use permeable pavers with subsurface gravel storage/infiltration beds.

GREEN INLETS
Treatment inserts in catch basins remove pollutants associated with sediment-laden road runoff.

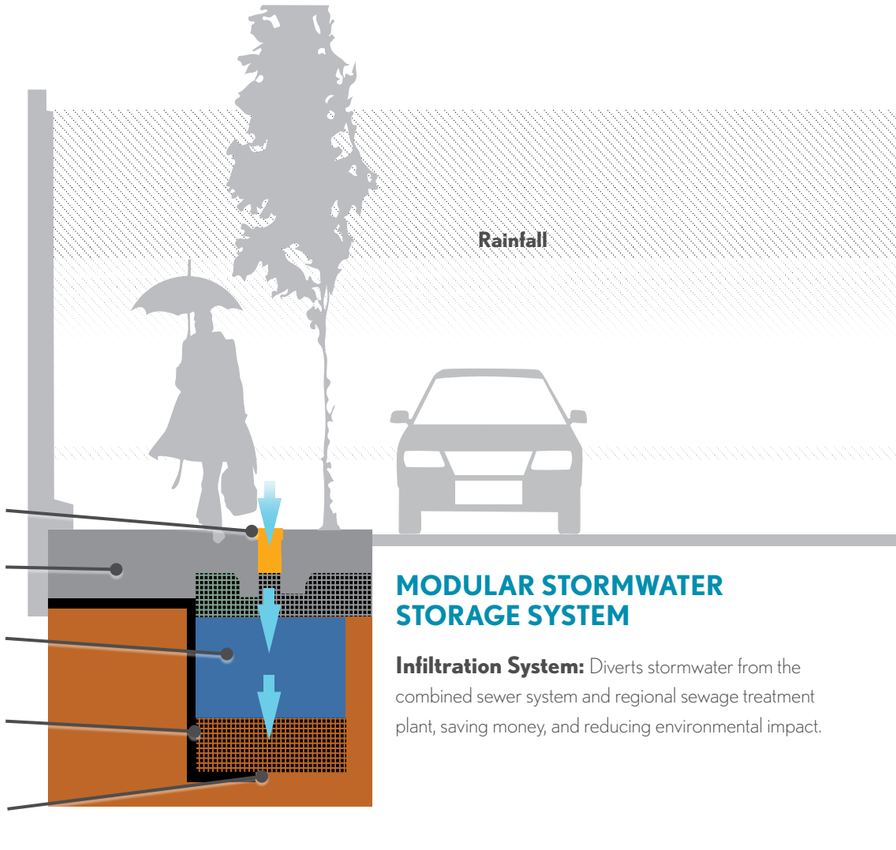
ROOF DRAIN COLLECTION
The Butler Street, Freeport Street, and Union Alley facilities collect roof runoff via channels and pipes and direct it to below-ground facilities.

IMPERVIOUS PAVEMENT
Runoff from the sidewalk within 5 feet of the existing building structures flows to the trench drain, protecting the buildings from water damage.

CURVILINEAR TRENCH DRAIN
Emulates water flow in a natural pattern, a nod to Etna's ties to the nearby Allegheny River and to its ironworks history. It also allowed the system to be built around the myriad of existing utility valves in the sidewalk.

BUMP-OUTS
Bump-outs improve pedestrian safety by reducing the distance and time that pedestrians are exposed to vehicular traffic. Bump-outs also calm traffic as drivers perceive a need to slow down to negotiate the narrow lanes.

TREE GRATE
ADA-compliant tree grates maximize pedestrian space in the commercial district and allow oxygen and water to reach the tree roots.



MODULAR STORMWATER STORAGE SYSTEM

Infiltration System: Diverts stormwater from the combined sewer system and regional sewage treatment plant, saving money, and reducing environmental impact.

FACE-TO-FACE

Discussing Sustainability and Green Design with Landscape Architect and Planner, Karla Farrell

As a LEED Accredited Professional, Landscape Architect, and Planner, Karla S. Farrell, PLA, AICP, LEED AP BD+C, continuously looks for ways to incorporate sustainability. Ms. Farrell's more than 20 years of site planning and development projects have integrated sustainable design long before it was vogue to do so. At BH, she is responsible for managing projects and coordinating design teams. Her abilities encompass all phases of landscape architecture from conceptual design and master planning through production of construction documents.

What is your personal philosophy on sustainable design and how do you apply it to your work?

As a landscape architect, you are taught to balance the needs of the environment with the needs of the community and that every design needs to incorporate social, environmental, and economic goals in order to be successful, so sustainability has always been part of my design philosophy. The components that make up my career (that have seemed haphazard at times) work together to support my need for balance. I have supported growth but campaigned for low-impact development. I have influenced decision makers to retain schools within the existing built community rather than develop a remote farm by finding innovative ways to expand within limitations. I have found ways to allow businesses to grow while minimizing the impact on the planet. I have been fortunate to have had many clients with similar goals.

Bike trails have been my passion since 1999 because of the numerous ways a slender pavement course can improve life quality for both the environment and humans. Trails provide alternative transportation avenues thereby reducing pollution, providing recreation and exercise venues, promoting healthy lifestyles and walking to school, and in the case of rail trails, reviving small communities that historically had busy downtowns and villages built around rail stops. Many trails provide access to natural areas, offering opportunities for people to enjoy nature and become aware of the need to preserve it. Rail trails help preserve the original rail rights-of-way that might someday make it easier to revive mass transportation. For the past few years, I have been researching how our built environment can affect healthy living and how the lack of basic community infrastructure has contributed to the rise in healthcare costs. Whether someone has a sidewalk that provides a safe and convenient route to school or the grocery store impacts their opportunities to get the recommended physical activity.

There is an increasing recognition that the environments in which people live, work, learn, and play have a tremendous impact on their physical and mental health. As a landscape architect and planner, I have a responsibility to ensure our designs for community infrastructure support health and healthy behaviors.

What is the biggest obstacle getting a sustainable project off the ground? How do you overcome it?

Legislators, other decision makers, and even colleagues assume sustainability is going to be more expensive than conventional design. Sometimes the initial capital investment is more, but, many times, you can find a way to incorporate sustainable features into a design for the same price or less. The key to sustainability is creating something low maintenance, has a longer life cycle, and meets more than one need. In cases where the initial investment is more, identifying all the indirect savings can help, but it still takes a lot of effort.

What's your insight on the future of sustainability?

Various health research centers understand how our community infrastructure affects the health of our nation. Planners, landscape architects, architects, and engineers will be tasked to address population health goals and promote the inclusion of heath into design, setting a new paradigm for healthy planning. The indirect benefits to caring about the health of our citizens, such as robust walkable communities and reductions in suburban sprawl, will have positive effects on the environment and the economy. These indirect benefits need to be identified by healthy planning teams in order to compel decision makers to make appropriate choices. We have to ask ourselves what are the costs of NOT building this multi-modal trail?

What kind of policies, regulations, and/or standards should or could be changed so sustainable design can become a fully supported practice?

Local governments need to include goals and objectives that promote public health into their comprehensive plans. These long-term plans impact how people make choices of where to live and how to get around, their ability to access healthy foods and opportunity for physical activity, and affect broader issues of social equality, clean air and water, and more. Municipalities need to integrate public health goals, objectives, and policies into their planning and zoning ordinances in order to create communities in which people want to live.

THE CODORUS CORRIDOR GREENWAY

The Codorus Creek Corridor is part of the City of York's North Bend Opportunity Area, a 2.4-acre, former brownfield site cleared of all hazardous material to a level safe for residential development. The City received a generous grant from the Pennsylvania Department of Conservation and Natural Resources (DCNR) to complete a Master Site Plan for the Codorus Corridor Greenway, situated between the Codorus Creek and the former brownfield area. BH is currently working on the Master Site Plan to ensure future infrastructure investments protect and enhance the project area's resources; improve accessibility; and increase the flexibility of the area to expand opportunities for education, historic interpretation, recreation, and wellness. Decisions concerning new amenities, how they're connected, and how they might be mutually supportive will be made holistically, so all ideas, concerns, and goals are incorporated into the plan.

An extension of the York Heritage Rail Trail, named 2015 Trail of the Year by DCNR, will be located within the greenway to make the final connection between the north and south trail sections, providing a continuous 27-mile regional trail with connections into Maryland. BH's landscape architects, planners, and electrical engineers recently worked on a trail improvement project that will provide LED lighting along the existing trail and make formal connections to York College, whose campus is located immediately adjacent to the southern portion of the trail. The Heritage Rail Trail is the key element in the greenway outside the city and will be a primary component of this project, but there is a great opportunity to explore the wants and needs of the community to determine what can make the corridor special in the city.

Existing conditions of the Codorus Corridor Greenway.

BH hosted the first of three public meetings where more than 70 members of the community came out to learn about the plan and provide their input.

WITHIN THE URBAN LANDSCAPE, GREENWAYS BRING TOGETHER TWO FUNCTIONS - TO FORM PUBLIC OPEN SPACE AND TO PROTECT AND ENHANCE NATURAL RESOURCES.

Not only will the North Bend Opportunity Area benefit from this adjacent green space, its vicinity to the waterway and York Heritage Trust's historic resources, and the City's need to meet US EPA's requirements for cleaner stormwater runoff make the site a prime location to incorporate low-maintenance, aesthetically pleasing, stormwater Best Management Practices that can tell a story about York's past. To fill this tall order, York Heritage Trust suggested a local artist be included on the design team from the beginning. BH provided a $5,000 grant to Downtown, Inc. to engage Ophelia Chambliss, an artist, graphic designer, and Penn State adjunct professor, to lead the creative process and work with the trail planners and engineers to accomplish these challenging but exciting goals.

On January 28, 2016, BH hosted the first of three public meetings that are part of the Master Site Plan development process. More than 70 members of the community came out to learn more about the plan and provide their input.

ENGINEERING A BRIGHTER FUTURE

Eschborn, Germany's Kindergarten and Day Care Center

BH's winning entry in a design competition resulted in its first architecture and engineering project for the City of Eschborn, Germany – a new 16,000 SF kindergarten and day care center. Built on the site of the original kindergarten, the new facility serves 150 children in its four functional areas.

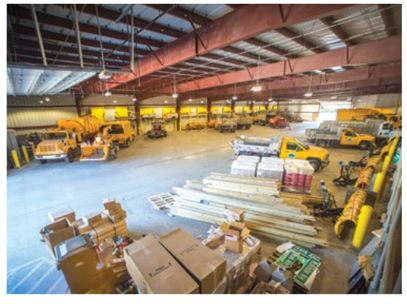
Temporary modular facilities were provided during demolition and construction to allow the facility's students to continue to attend classes during demolition of the old facility and construction of the new. The move and demolition were completed in one month, and construction of the new facility was completed 20 months later.

BH led the work from pre-concept development through bid reviews. Value engineering indicated prefabricated steel, wood, and concrete slabs and panels for quick and economical construction. Interior design considered modern educational concepts as well as colors, finishes, and furniture.

The facility meets or exceeds all current health and safety standards and European Union and German sustainable design, acoustic, and insulation standards.

WITH SOLAR WATER HEATING AND PHOTOVOLTAIC GENERATION, THE NEW FACILITY REDUCES ENERGY CONSUMPTION BY 25%.

The complex is eligible for LEED Gold certification; however, certification was not pursued due to the additional cost.



DESIGNING A SUSTAINABLE MAINTENANCE COMPLEX

BH provided architectural and engineering services to the Borough of State College, PA for the design and construction of a municipal public works maintenance complex. The project included the construction of several structures and improvements to existing site features. New structures included warm and cold vehicle storage buildings, salt storage shed, an administration building, future compressed natural gas fueling, and an automated vehicle wash facility. The completed site accommodates new parking, rainwater harvesting collection system, public works storage, stormwater management, and a community soccer field.

One issue the Borough faced was frequent flooding of the original maintenance facility. A key sustainable design feature of the maintenance facility was designing equipment storage buildings with large roof surfaces with the purpose of harvesting rainwater. Two 20,000 SF buildings were constructed on the highest point of the property with their roof lines sloping toward each other. A 20,000-gallon rainwater collection tank was buried between the buildings. The harvested water is used fill a sewer jetter truck, street sweepers, and large pressure washer tanks.

THE BOROUGH'S GOAL IS FOR THE PROJECT TO BE A MODEL PROJECT FOR SOCIAL, ENVIRONMENTAL, AND ECONOMIC SUSTAINABILITY AS WELL AS ENERGY REDUCTION, FLOODING REMEDIATION, AND REDUCED EMISSIONS.

The Borough's goal is for the project to be a model project for social, environmental, and economic sustainability as well as energy reduction, flooding remediation, and reduced emissions. All occupied buildings were designed to stress energy efficiency, low operating expenses, and highlight regional and recyclable materials. Several features were incorporated into the design in order to enhance interior daylighting, reduce water usage, and minimize mechanical system expenses.

Sustainable design strategies included:

- Public transportation access
- Bicycle storage and changing rooms
- Reducing parking capacity
- Stormwater quality/quantity control
- Maximizing open space
- Reducing light pollution
- Reducing water use
- Harvesting rainwater
- Recycling truck wash water
- Water-efficient landscaping
- Refrigerant management
- Optimizing energy performance
- Using recycled content and regional materials
- Reducing heat island effect (roof)
- Increasing ventilation
- Using low VOC-emitting materials
- Indoor pollutant source control
- Lighting system controllability
- Thermal comfort controllability
- Daylighting/views

TREATMENT PLANT EFFICIENCY

Improving Sustainability by Recycling Biosolids

The Lancaster Area Sewer Authority (LASA) proactively began an upgrade and improvement project anticipating tighter regulations on biosolids, the nutrient-rich organic material generated from treating wastewater and residential septage. The upgrades and improvements to LASA's Susquehanna Water Pollution Control Facility in Lancaster, PA will yield Class A biosolids, the US Environmental Protection Agency's (US EPA's) highest standard for biosolids. The use of biosolids as fertilizer is useful since the nutrients, nitrogen, and phosphorous within the product release slowly throughout the growing season, improving a farmer's crop growth and yield.

Rendering of LASA's pump room

According to the Pennsylvania Department of Environmental Protection, 2.2 million tons of wastewater solids are produced in Pennsylvania each year. Local governments are required to treat wastewater and have three options for disposal: recycle into fertilizer, incinerate, or bury in a landfill.

LASA previously recycled their biosolids and sold them to local agricultural communities for use as a spray fertilizer. Numerous complaints of the odor from the fertilizer forced LASA to instead bury 15,000 tons of biosolids annually at a county landfill. By depositing at the landfill, the facility's biosolids contributed to increased polluted waters, including the Susquehanna River which feeds into the Chesapeake Bay. Under the Clean Water Act, the states surrounding the Chesapeake Bay and the US EPA have all agreed on pollution limits to restore the water quality of local rivers, streams, and the bay.

The facility currently meets the standards set by the US EPA for production of Class B biosolids. LASA chose to have BH perform a study of their facility to determine a cost-effective process to provide an environmentally safe biosolid product for use by the agricultural community, thus reducing the volume of their biosolid disposal at landfills and completing a natural cycle in the environment.

The process chosen by BH and LASA included constructing two new anaerobic digesters to stabilize and reduce the volume of biosolids. Since methane gas is produced as a byproduct, the facility can use the gas to fuel the boilers responsible for heating and drying the sludge.

A second new dewatering centrifuge was installed while the facility's existing dewatering system maintained operational. New centrifuge sludge feed pumps, primary clarifier sludge feed pumps, and chemical feed systems were also installed. Using the existing and new centrifuge dewatering equipment, the digested biosolids are dewatered to 22% solids and 88% water concentrations. A new thermal dryer heats the sludge, evaporating the water even more to produce a solid waste product with a 5% to 8% water content, which greatly reduces the volume of biosolids being transported and disposed of at a landfill.

"THIS PROJECT IS POSITIVE FOR THE ENVIRONMENT, FOR LOCAL JOBS, AND FOR THIS COMMUNITY. WE'RE PROUD TO BE A PART OF A PROJECT THAT PROMOTES SUSTAINABILITY AND INNOVATIVE THINKING FOR THE BETTERMENT OF THE ENTIRE REGION."

– BRIAN FUNKHOUSER, BH PRESIDENT/CEO

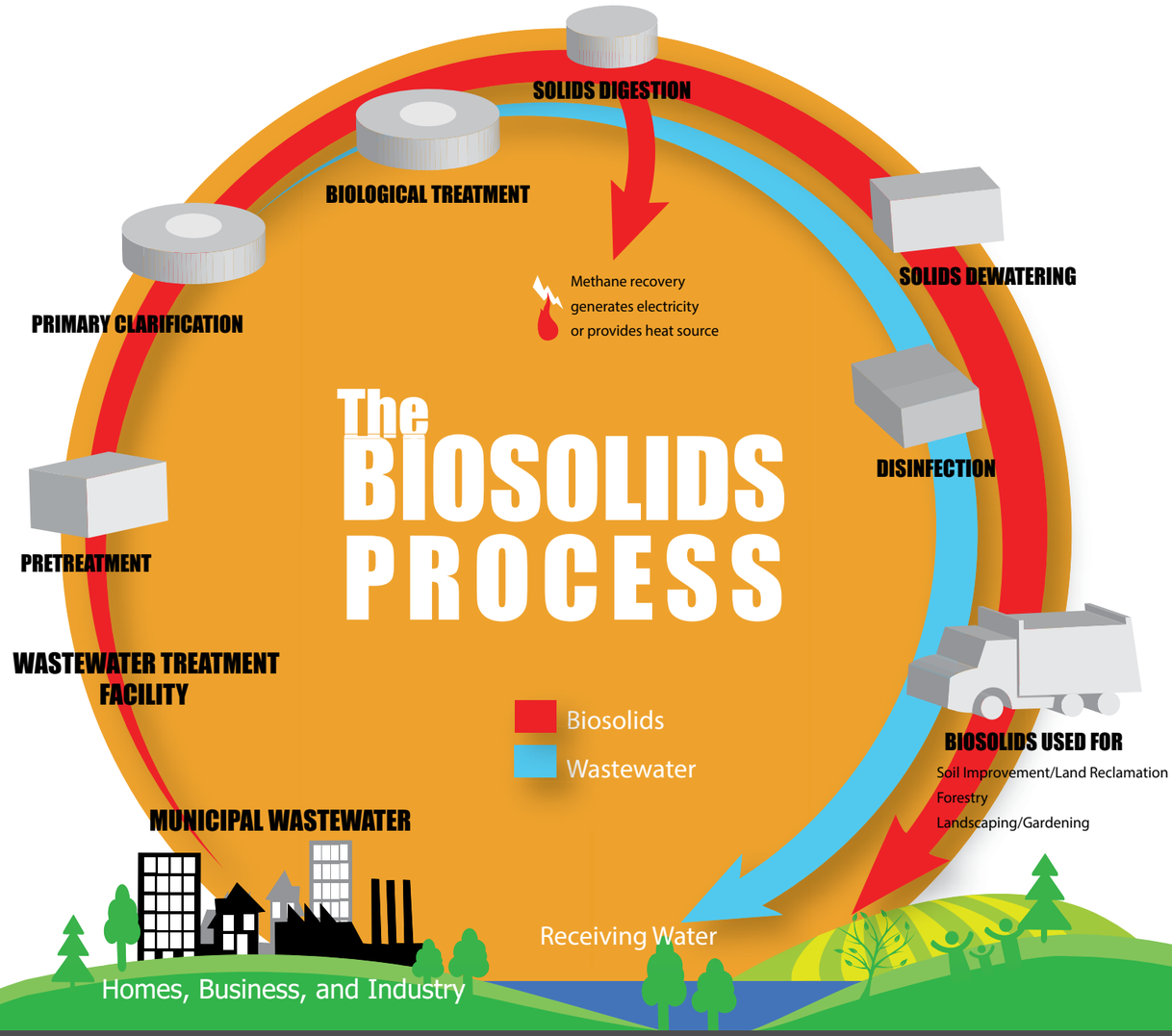
The heated drying process also destroys any remaining pathogens, or disease causing organisms, helping to produce Class A biosolids, leaving the final product eligible to be used as a fertilizer. The heat produced from the sludge-drying process is captured and used to heat the anaerobic digesters, allowing the methane gas to be used as an additional fuel for the boiler heating the dryer.

Similarly, the main goal of the North Wastewater Treatment Plant (WWTP) sustainability project in Baton Rouge, LA is to harvest methane, instead of purchasing natural gas, from their sludge treatment process to beneficially use the byproduct on-site as fuel for the boilers to produce the heat for anaerobic digestion operations.

This project is one of the final projects of the Baton Rouge Sanitary Sewer Overflow Program implemented under a Consent Decree with the US EPA, Department of Justice, and the State of Louisiana. BH performed a feasibility analysis for the beneficial reuse of biogas for co-generation and a feasibility analysis to compare the use of lime stabilization for the production of Class A biosolids to the current anaerobic digestion sludge stabilization process.

BH designed the improvements to the anaerobic digestion system to convert the solids present in the primary and secondary sludge to Class B biosolids while producing methane.

These projects are improving sustainability by recycling and reducing costs of their treatment systems.



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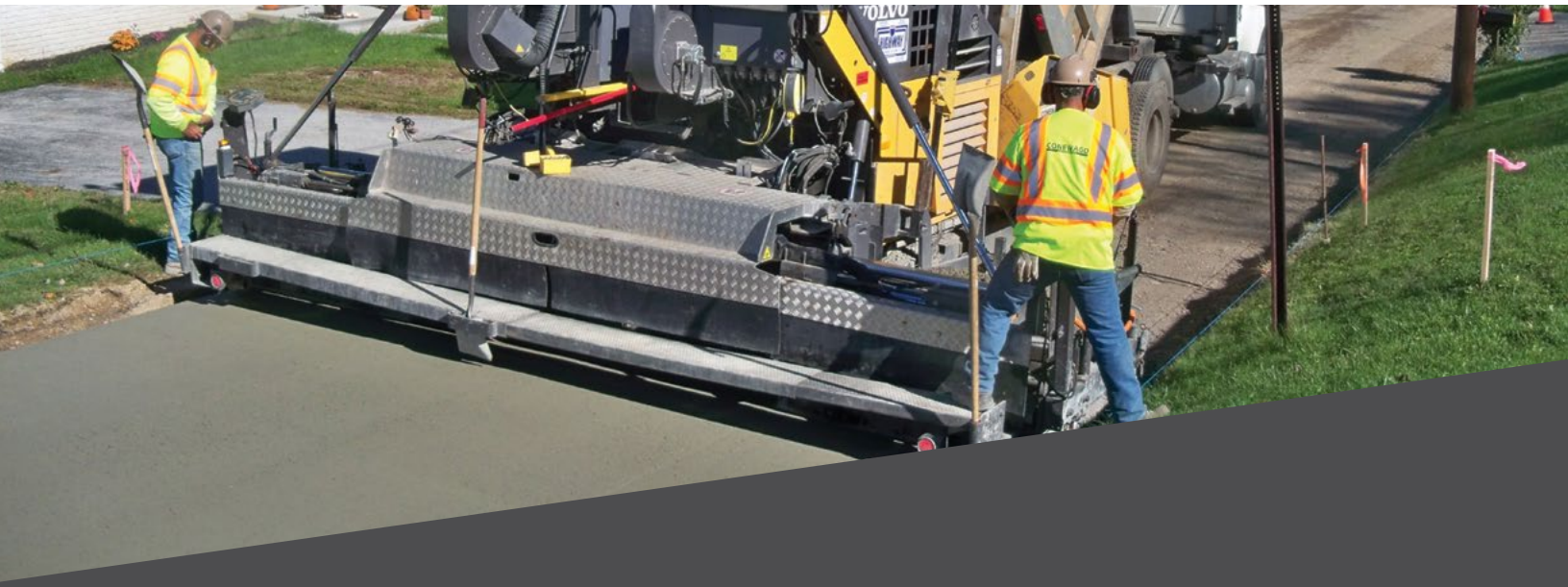

ROLLER-COMPACTED CONCRETE: GOING THE DISTANCE

Conewago Township was the first municipality in Pennsylvania to establish a PennDOT-approved Pilot Project to use Roller-Compacted Concrete (RCC), a special, drier blend of concrete, on a local roadway. RCC, used as a base course on 1,500 LF of Peanut Drive, is durable, low maintenance, cost effective, and sustainable. BH Project Manager and Township Engineer, Eric Mains, PE noted "when we began to look at the numbers... using RCC meant the investment they put into this road would last a whole lot longer," since the RCC product provides a much longer service life than traditional hot mix asphalt (HMA). BH is assisting the Township in a multi-year field comparison of RCC compared to a traditional HMA-based product. If the results prove successful, RCC is likely to become a candidate for use on a larger Township roadway.

Marcy Krum, former Conewago Township Manager, stated "BH helped us see that our investment in RCC would result in long-term savings, with its design life almost double that of traditional pavement base materials."

◀ FLIP TO PREVIOUS