



The BETA Project

at the Center for Sustainable Landscapes

Phipps Conservatory and Botanical Gardens

PROJECT OVERVIEW

The multi-award winning Center for Sustainable Landscapes (CSL) is one of the greenest buildings in the world. Located at Phipps Conservatory and Botanical Gardens in Pittsburgh, Pa., it is home to The BETA Project (Biophilia Enhanced through Art).

A multi-sensory biophilic art program, The Beta Project utilizes artwork to remind visitors of the incredible beauty of nature, to celebrate the interconnectedness of human and natural processes, and to foster both human and ecological health and well-being. To awaken the true spirit of the CSL, the installations include the work of over 20 artists, a sound exhibit, a natural pigment display and an interactive exhibit created with a multitude of diverse mediums. The majority of the artwork was created by local artists, with a small selection of national and international artists featured.



BIOPHILIA

The term biophilia – which means “love of life” – was coined by social psychologist Erich Fromm and popularized by biologist E.O. Wilson, who defined it as “the innately emotional affiliation of human beings to other living organisms.”

The BETA Project at the Center for Sustainable Landscapes



Biophilic Design Case Study

 **PHIPPS** 1

Biophilic design patterns that have been proven to increase human and ecological well-being were the basis for the project and were an essential part of each piece of artwork selected.

Biophilic design workshops were instrumental in determining the most important patterns to include in The BETA Project. During the experiential workshops, a selection committee was led through mindfulness, play-based and nature-inspired experiences. This interactive format fostered a unique and effective approach for determining the specific artwork selection and placement.

The BETA Project is repeatedly evaluated to help determine its value to staff and visitors. Findings to date have noted an increase in occupant perception of beauty, cognizance of their senses, and a higher awareness of their connection with and a greater appreciation for nature.

The BETA Project

Location

Center for Sustainable Landscapes
Pittsburgh, Pa., USA

Project Type

Administration, Education and Research

Size

Building: 24,350 sq. ft.

Design Team

Phipps Staff, MoxBox and Sonja Bochart

Date of Completion

April 2014

Biophilic Design Elements

Environmental features, natural shapes and forms, natural patterns and processes, place-based relationships, and evolved human-nature relationships

Prepared by Sonja Bochart and Emily Kalnicky for Phipps Conservatory and Botanical Gardens

Photos: Sonja Bochart, Paul g. Wiegman and Denmarsh Photography Inc.

Image 1: Rings, a site-specific, carbon steel, suspended sculpture by Dee Briggs based on chirality, a property of asymmetry important in several branches of science

Primary Element: Natural patterns and processes



BETA Defined

As the second letter of the Greek alphabet and a representation of the numeral two, beta signifies a second phase. For Phipps, The BETA Project represents a second phase of interconnection between the CSL and its visitors and staff. It also invokes a new level of sensory engagement, strengthening the innate bonds between people and nature.

In computer programming, some software is kept in perpetual beta, a state of continuous evolution in which functionalities and features are added without an established endpoint. This development mode is a critical feature of the CSL's role as a "living laboratory," a space growing in value and depth as it yields new research and discoveries in fields such as sustainable landscaping, green building strategy, human and ecological health, environmental education and ecopsychology.

The BETA Project is designed to highlight the work of local artists. More than half of the project's artists hail from the region, with many still living here today. Because the principles of biophilic design are universal, The BETA Project's message is complemented and reinforced by the inclusion of work from national and international artists.



The biophilic design patterns expressed in The BETA Project were developed from Stephen R. Kellert's six biophilic design elements.

The project supports and encourages biophilia through art. It was designed to feature the 10 biophilic design patterns: beauty, cycles and seasons, interactive, intrinsic connection, mindfulness, rethinking possible, scale, sensory rich, subtlety and symbolic geometry.

Many of the installations feature more than one biophilic design pattern, but all have a dominant pattern for which they were specifically selected.

BEAUTY: Nature has incredible beauty, and the value of this pattern has been proven to influence human health, emotions and happiness. This pattern also has been shown to increase human concern and care for the environment. In the biophilic design pattern of beauty,

Image 1: Feathered Fellows, cast glass life-size birds created with the lost wax technique by Luke Jacomb and Katherine Rutecki

Primary element: Natural shapes and forms

Image 2: Flute Dance, stainless steel sculpture by Kevin Robb

Primary element: Evolved human-nature relationships

viewers are asked to engage their senses, hearts and minds in an expression of delight and attraction. Beauty is an invitation to connect; and in connecting, one learns to care more fully.

Feature Installation: "Magnolia, Clematis Montana," watercolors by Ellen Little. This San Francisco artist captures and shares the beautiful and simple essence of the flowering magnolia and the budding *Clematis montana* as they grew in her backyard.

CYCLES AND SEASONS: Like the yearly movement through the seasons – from spring to summer and from fall to winter – all things in nature experience life in cycles. To bring expression and importance to this nature principle, cycles and seasons reconnects viewers with and fosters an appreciation for our place within and our relationship with these cycles.



Feature Installation: "Seasonal Local Photography," Donald M. Robinson. This collection reveals a story of place and serves as a reminder of the beauty and power of nature in different expressions of the seasons, discovered throughout Pennsylvania.

INTERACTIVE: To encourage enjoyment, engagement and lively learning, The BETA Project includes a piece designed specifically to invite people into the biophilic design experience. This immersive activity presents opportunity for the primary action of doing; and in doing, the viewer can participate more fully and connect with the experience of art and nature.

Feature Installation: "Skywatcher Loom," Jason Boone. The process of slowing down and taking notice of the natural world is essential to biophilic design. The Skywatcher Loom was inspired by the Waldorf School of Pittsburgh. Each morning, a different staff member in the CSL is invited to take careful notice of the sky, select a color of yarn that represents his or

her experience, and weave the yarn on the loom. At the season's end, the finished piece represents the collective experience, and the cycle begins again.

INTRINSIC CONNECTION:

The biophilic design pattern intrinsic connection reinforces the interconnectedness of humans, nature and the built environment. It reminds us to recognize and bring attention to the interdependence of these relationships.

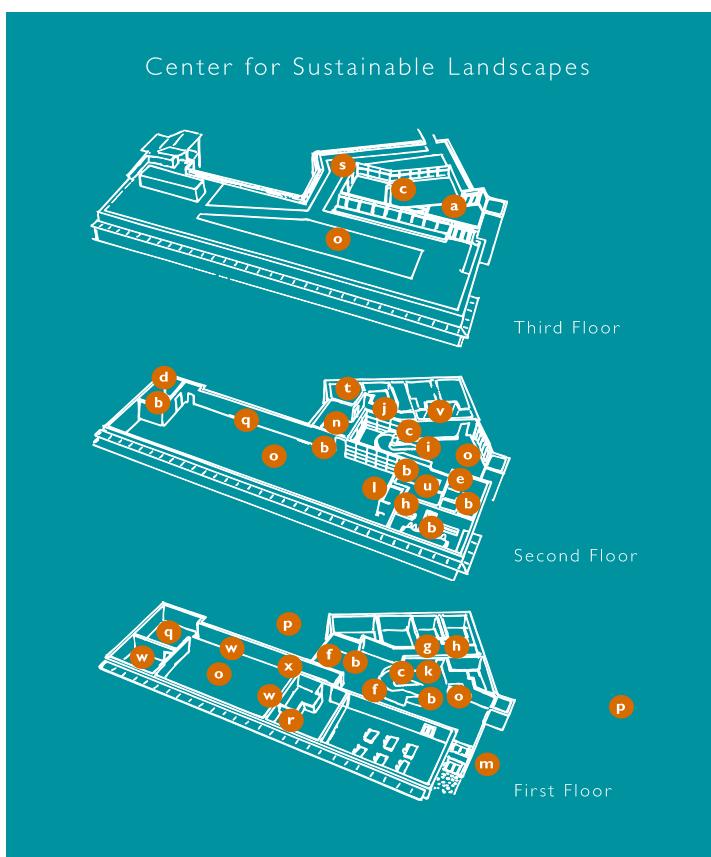
Feature Installation: Untitled Corten steel structure by Peter Lambert, Red Star Ironworks. Located along the stone wall leading to the ground floor entrance of the CSL, this site-specific, free-flowing exterior sculpture physically joins the building to the earth, signifying the connection of one to the other as a part of the same structure. The Corten is also a nod to the industrial heritage of the City of Pittsburgh.

MINDFULNESS: The experience of mindfulness – becoming aware within the present moment – has been found to alleviate stress, increase focus, create



Image I: Skywatcher Loom by Jason Boone. An interactive piece encouraging staff to view the color of the sky and weave that color onto the loom

Primary element: Place-based relationships



β BETA

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a sense of calm and increase care for the planet. The pattern of mindfulness can be expressed in biophilic design by integrating works of art to create tranquility and connection. These works can also encourage viewers to breathe more deeply.

Feature Installation: "Seijaku 30," by Judith Kruger. "Seijaku" translates as the attainment of stillness, quiet and tranquility while being in the midst of activity. Using the ancient technique of Nihonga, the artist works with pulverized organic and inorganic matter; embodying raw and inherent beauty.

RETHINKING POSSIBLE: Spending time in nature can often evoke feelings of deep connection and have a powerful effect on the human spirit. The pattern of rethinking possible within The BETA Project challenges habitual and limited thinking by harnessing the energy of nature with thought-provoking forms and expressions of wonder; shedding moments of inspiration, encouragement and delight.

Feature Installation: "6/3/3 Rings," by Dee Briggs. This suspended steel sculpture creates a somewhat unexpected rhythmic experience for the viewer: three-dimensional patterns are at once familiar and foreign. They are heavy forms, and yet they imply weightlessness and sense of play and delight.

SCALE: The biophilic design pattern of scale is created through use of proportion; at times larger than life, at times smaller, to bring attention to the human relationship to natural forms. The intended outcome is a form that creates awareness to special and sacred relations between humans and the environment. This pattern has the potential to accentuate interconnection.

Feature Installation: "Held in Waves of Suspension," by Drew Hine, Vessel Studio. Feelings of energy, growth and beauty are represented in a wall of the mounted glass sculptures representing blooming flowers. The oversized blossoms layer the wall from between

the floors of the atrium. They are arranged in the order of the rainbow; beginning in red and ending in violet.

SENSORY RICH: The human body is designed to experience life and receive information with all of its remarkable senses. Often this is overlooked in our human-constructed environments, and the most dominant sense designed for is sight. The intent of this pattern is to offer visitors and staff the opportunity to re-engage their bodies more fully to connect with nature and living systems through the wisdom of their fully sensing bodies. These types of sensory rich patterns have been shown to calm the mind, regulate heart rate and create a sense of overall well-being.

Feature Installation: "Of Earth and Sun," a sound installation by Abby Aresty. This was created specifically for the CSL. It is a dynamic piece composed from sounds of nature recorded locally. The sounds change with the seasons, the weather and the time of day.

SUBTLETY: Many of the installations have been distinguished to not be per-

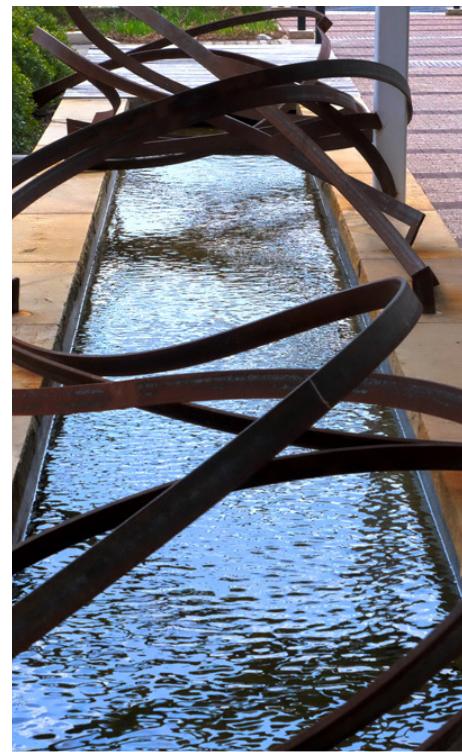


Image 1: Cor-ten steel sculpture, Red Star Ironworks

Primary element: Place-based relationships

Image 2: Recycled glass botanical forms by Drew Hine, Vessel Studio

Primary pattern: Natural shapes and forms





ceived on the first visit to the CSL, but on the second or third. They are intended to be so gently featured that they speak quietly, almost whispering to their viewer.

The effectiveness of this type of pattern is that it requests the viewer's utmost attention and brings great depth to the experience. This sensory-based pattern is intended to balance with the more prominent works of art.

Feature Installation: "Feathered Fellows," by Luke Jacomb and Katherine Rutecki. The cast glass birds use the lost wax technique, which dates back to 3500 BC. This intricate craft allows each unique bird to have beautifully detailed feathers and wings.

SYMBOLIC GEOMETRY: Geometry in much of the music, art and architecture throughout history is based on an underlying geometry of nature. Ancient and indigenous cultures were aware of the potential of these repeating patterns and harmoniously proportioned shapes to support and increase their sense of well-being and connection. New research reinforces the importance of symbolic geometry in supporting health, happiness and well-being.

Feature Installations: (3) "Infinite Creativity, Infinite Health, Infinite Surrender." Museum-quality digital prints with small gestures of silver leaf, by P.C.Turkzyn. The circular mandala format represents wholeness, interconnection and perfection. In addition to healing intent being part of the pieces, the artist accentuates the sacred geometry in the botanical form.



Image 1: One of the reclaimed wood conference tables at the CSL, by Jason Boone, local artist and woodworker

Primary element: Environmental elements

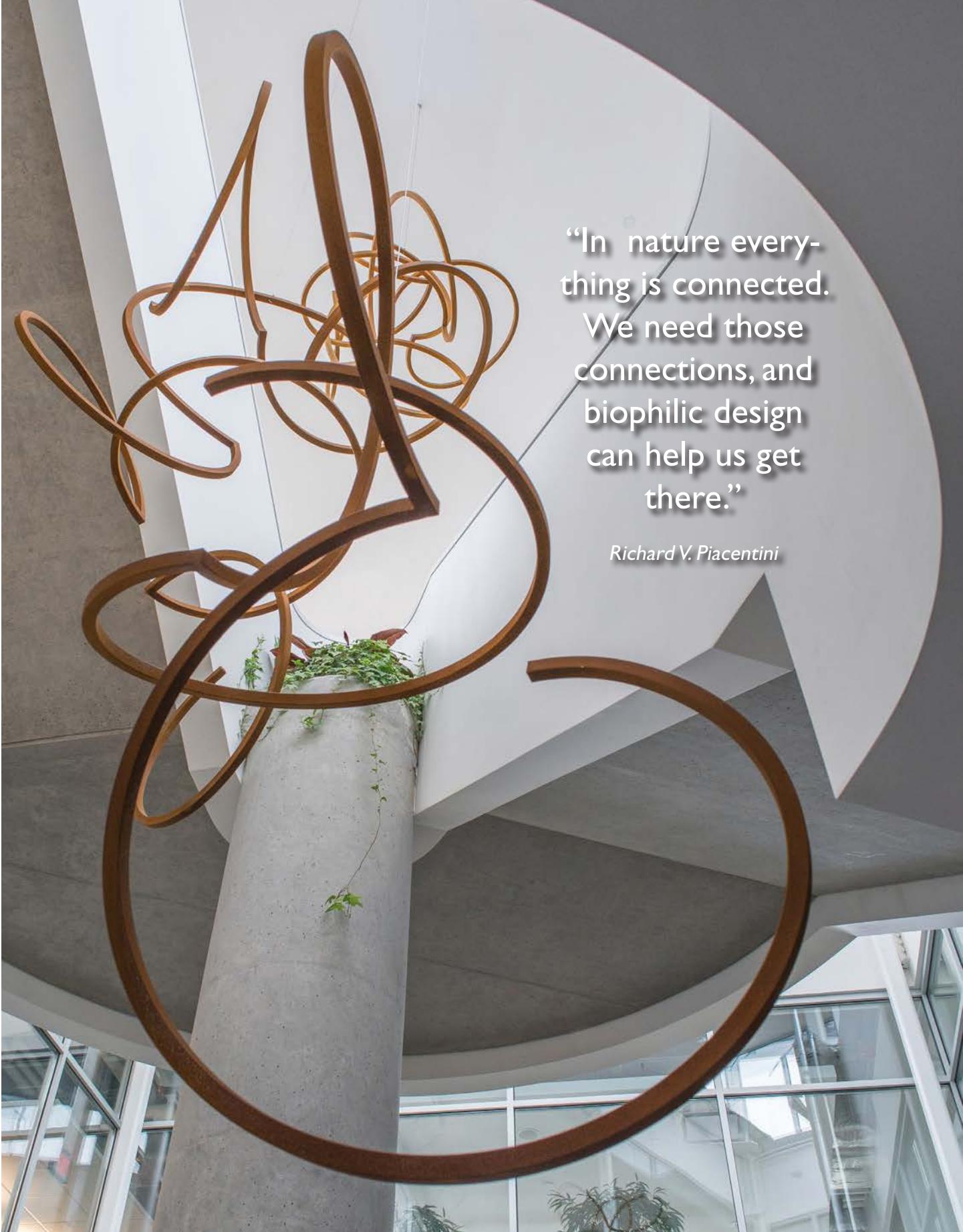
Also in Image 1: Large-scale works on paper and glass sculpture by Dale Chihuly

Primary element: Natural shapes and form

Image 2: "Infinite Health," sacred geometry with botanical form, digital print, New York-based artist and tree communicator P.C. Turkzyn

Primary element: Natural shapes and forms





“In nature everything is connected. We need those connections, and biophilic design can help us get there.”

Richard V. Piacentini





PROCESS

The BETA Project's design approach was integrative and featured guided experiential visioning activities as well as interactive learning and application processes. This systems-thinking approach commenced with the identification of a small and diverse selection committee, which provided guidance and an overview for the project.

The biophilic design workshop was divided into four main parts: education and overview, mindfulness, play, and visioning.

The education and overview portion included an initial project approach discussion and description of objectives for the project, including biophilia and biophilic design education. The second part, mindfulness, included a guided meditation directed at increasing the focus and collective energy of the group.

Following the mindfulness portion, participants engaged in activity directed at personal, creative flow through the experience of play, including mandala (circular elements) renderings. The intent of play considers that through immersive and play-based activity, humans more freely and comfortably approach and complete creative work and collaboration.

The final portion of the workshop included visioning through image review and information gathering. Visioning and outcome from the workshop allowed

"Through learning, we re-create ourselves. Through learning, we become able to do something we never were able to do. Through learning, we reperceive the world and our relationship to it. Through learning, we extend our capacity to create, to be part of the generative process of life."

Peter M. Senge

the design team and artwork consultant to prepare options for the project reflecting a unique, place-based approach to both the biophilic design artwork selection and placement.

Proposals for the type and location of pieces were submitted periodically for both the selection committee and overall staff review.

The final selections and their placement for The BETA Project were intended to engage visitors in a multi-sensory biophilic experience and to bring out the true spirit of the CSL.

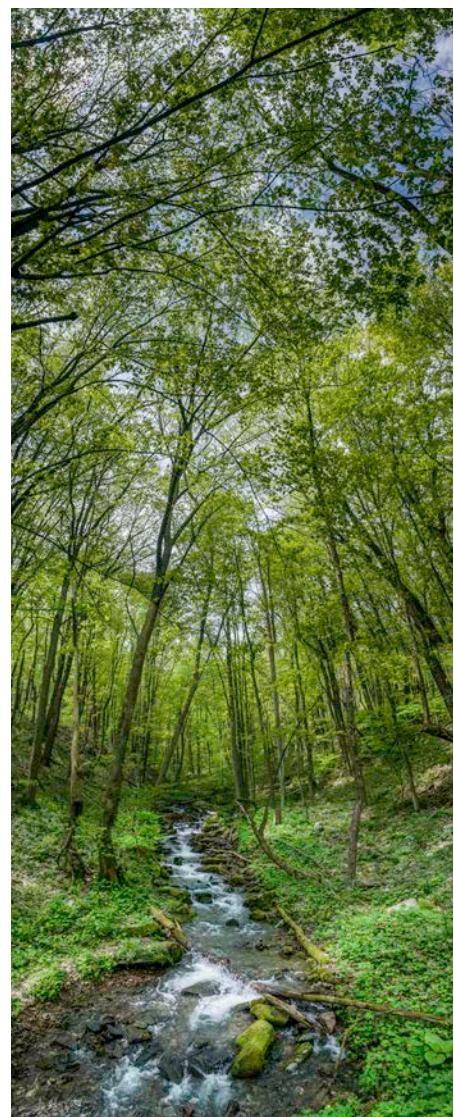


Image 1: Biophilic design workshop with the selection committee

Image 2: Regional photography by Paul g. Wiegman

Image 3: Mandala rendered in the biophilic design workshop



BETA Research Project

Evaluation of The BETA Project's effectiveness is ongoing. To date, evaluation has included stakeholder engagement in the biophilic design workshop as well as a one-hour BETA tour for members. More generally, there was also a post-occupancy evaluation by staff working in the CSL.

Biophilic Design Workshop Evaluations

Stakeholders involved in a biophilic design workshop in November 2014 were asked closed- and open-ended questions to help us evaluate their experience participating in the workshop. 14 stakeholders completed the survey (approximately 50% response rate).

One of the open-ended questions asked stakeholders, "Please describe your experience of the CSL after participating in the silent walk-through at the biophilic design workshop."

Participants said this workshop helped them to really appreciate the depth of the building more than they had before, even for individuals that are in the building daily.

"I felt one with the building, breathing it in and becoming part of it...grounding to it, taking in all aspects of life."

"It's a serene space with ample views of Panther Hollow and the surrounding landscape. The art is subtle so as not to take away from the beauty of nature just outside, and allows for the visitor to appreciate the experience with all senses."

"Every time I enter the CSL I go directly where I need to go. The silent walk-through made me stop and actually look at the building itself. It made me aware of my surroundings and how carefully constructed it was. I felt peace when usually all I focus on is moving quickly to the next project or task."

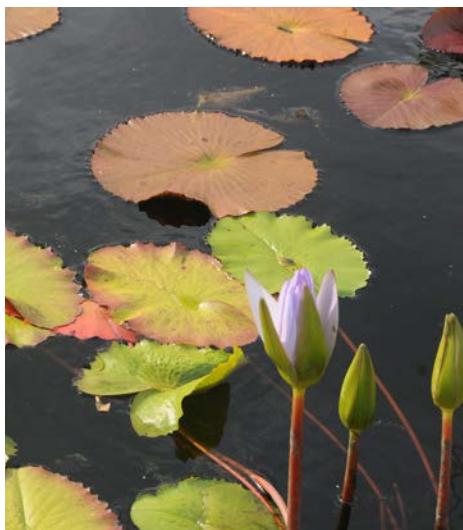


Image 1: Art as nature surrounds the CSL with beauty, inspiration and diverse animal species; designed by Phipps staff

Primary pattern: Natural elements

Image 2: Watercolor on paper by Ellen Little, drawing from the ever changing beauty of nature

Primary pattern: Natural shapes and forms



BETA Tour Evaluations

Membership evaluation consisted of 25 individuals completing the survey after participating in a one-hour BETA tour. Participants were emailed a link to a survey on surveymonkey.com after participating in the docent-led tour on a Saturday morning in April 2015. Participants were asked a mixture of closed- and open-ended questions to help us evaluate their experience with The BETA Project.

One of the open-ended questions asked, "Please describe how your favorite piece of artwork on the BETA tour made you feel." From this question, we saw that participants in the tour felt peaceful, felt engaged through one or more of their senses (not including taste), and felt a stronger explicit connection with nature.

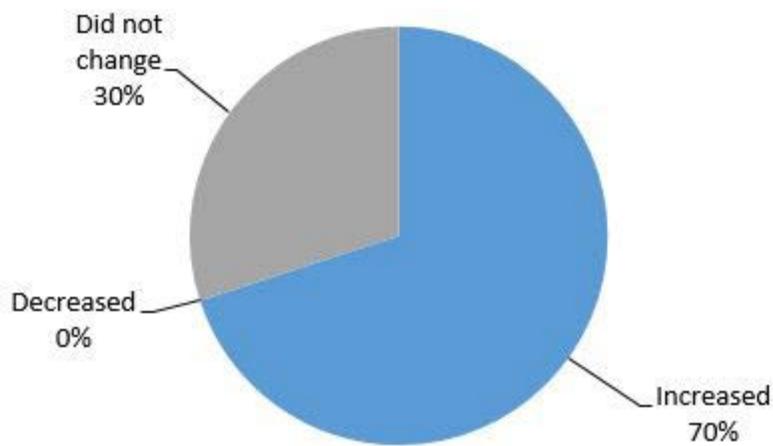
"Peaceful; in touch with nature."

"I think the best single word I would use to describe my feeling for them would be 'awe.'"

"Appreciative of nature."

Participants also were asked a general question about how the tour affected their awareness of the connection between people and nature. Results are shown in Figure Y. Overall, it was observed that a large percentage (70%) of our members indicated they noticed an increase in their awareness of the connection between people and nature.

Figure Y



All of the evaluation results are impressive, given that the members participating in the survey are a highly selective group of individuals who self-select as members of Phipps, which focuses on providing people a place to connect with nature.

Post Occupancy Staff Evaluation

To evaluate the impact of the use of biophilic design more generally – in addition to The BETA Project – on staff behavior and attitude, three post-occupancy evaluations have been conducted. The surveys included questions about participants' attitudes and behaviors toward the environment and health. It was found over the three years that the CSL has had a consistently positive impact on people's attitudes and behaviors toward the environment, with behavior being slightly less positive than attitude. Results can be seen in Figure Z.

The fact that there has been a larger increase in positive attitudes toward the environment compared to behaviors is not surprising, as changing behavior is hard to measure and also hard to achieve. Interestingly, there was also a steady increase in the impact of the CSL on employee health-related behavior, as well as the same positive relationship for attitude. While specifics were not asked for the health-related behavior change, people were asked to share,

in an open-ended question, why they chose their answer (yes, no, or not sure) to the closed-ended questions.

"I am more aware of my natural surroundings and the impact they have. I have noticed a change in the level of stress I have since moving to such a natural environment. I have always appreciated my relationship with the environment, but working in the CSL has brought new light and meaning to that relationship." April 2015

"I was always very careful to recycle and turn off the lights but I did so out of habit. Now I am aware of what I am doing and that, even as one person, I can make a difference in the environment." April 2015

"I've started to be more conscious of my energy usage as well as my eating habits (to eat more healthy foods)." April 2016

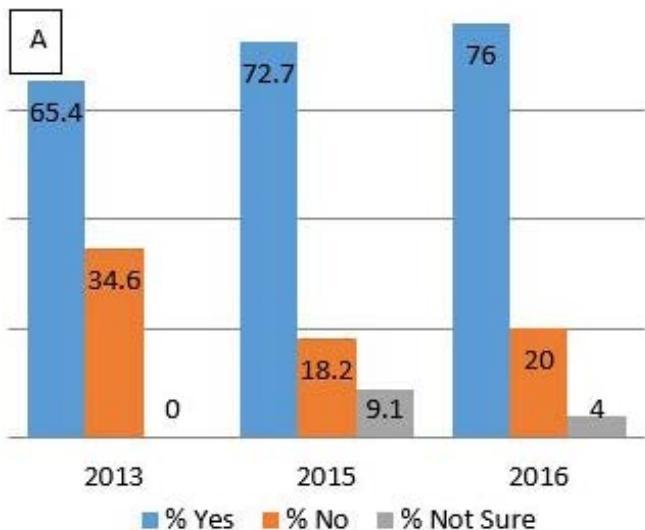


Image Above: Dancing Triangles, a stainless steel sculpture by Kevin Robb

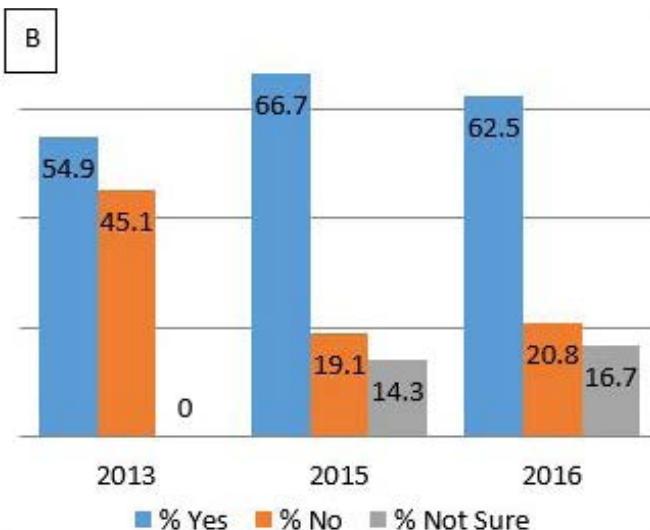
Figure Y: N=25, Did not change (N=6), Increased (N=14), Decreased (N=0), skipped (N=5)



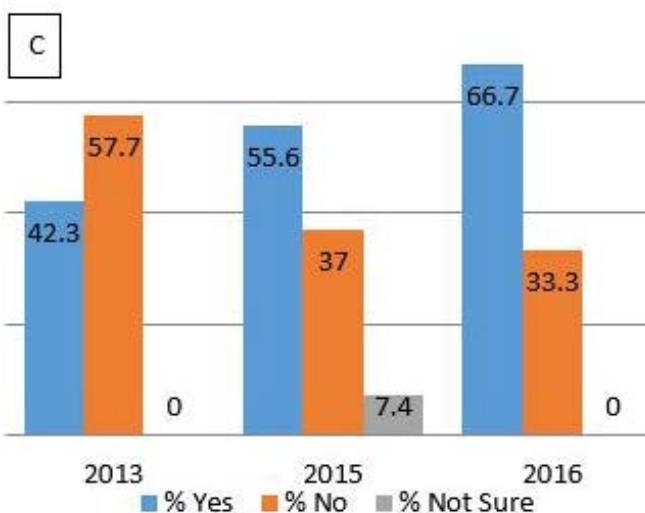
Figure Z



A="Has the CSL project changed the way you think about your relationship with the environment?"



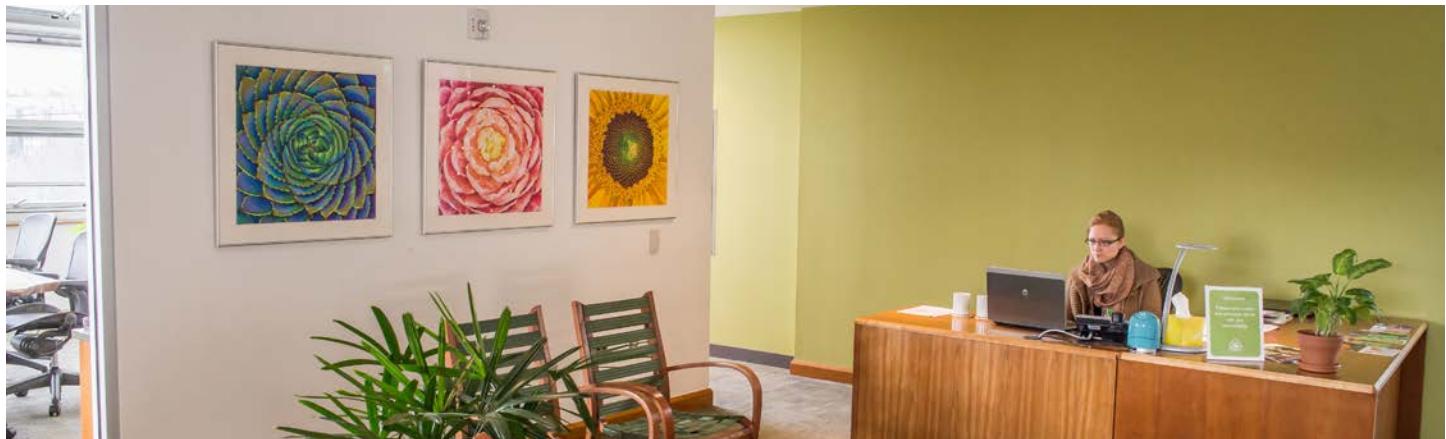
B="Has the CSL project changed the way you think about your health?"

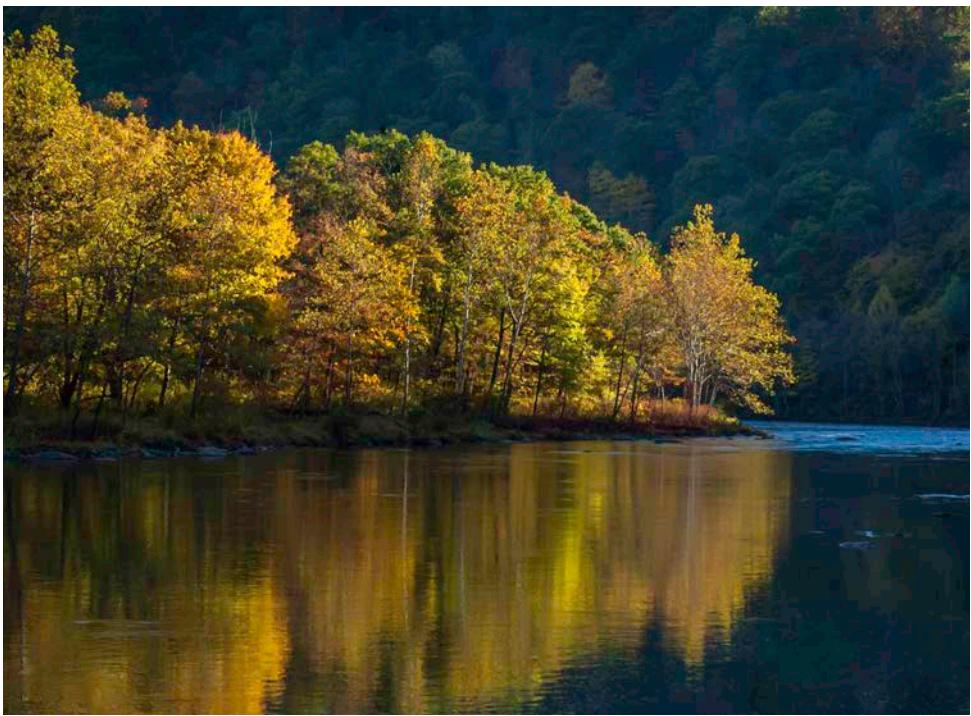


C="Has the CSL project changed the way you live in relationship with the environment?"



D="Has the CSL project changed the way you live regarding your health?"





CONCLUSION

These evaluations by stakeholders, members and staff reveal that The BETA Project and its use of biophilic design elements at Phipps have positively impacted attitudes and behaviors related to human and environmental health.

This supports the plethora of research supporting the impact of biophilic design and connection with nature to health and environmental outcomes (see for example: Ulrich, 1984; Kuo and Taylor, 2004; Mayer and Frantz, 2004; Sternberg, 2009; Mehta, Zhu and Cheema, 2012; Brown, Barton and Gladwell, 2013; Frantz and Mayer, 2014; Zelenski and Nisbet, 2014; Gillis and Gatersleben, 2015).

It also suggests that using these methods will benefit not only human inhabitants, but also the environment.

Image 1: From a series of seasonal, regional photography focusing on the diverse natural history of Western Pennsylvania by Paul g. Wiegman

Primary element: Natural patterns and processes

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