(DIS) DESIGN ISSUES SERIES

THE DIGITAL IN DESIGN + MAKING

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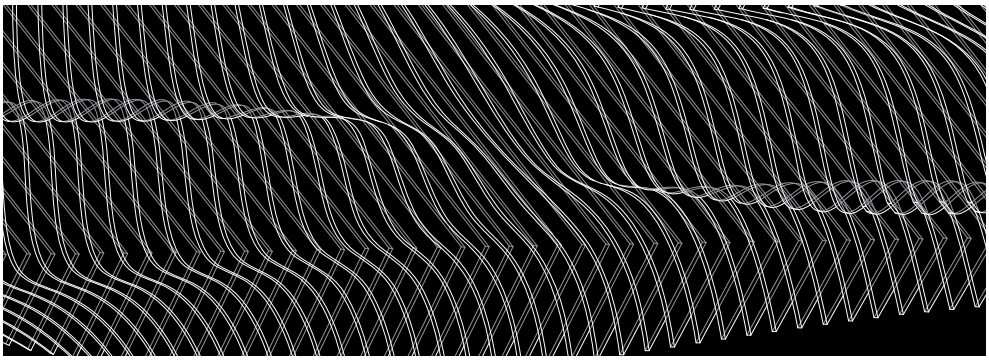
The Digital in Design and Making explores the work of GBBN Architects and their use of digital tools to create inspiring spaces and architectural artifacts. The images and artifacts in this exhibition only begin to scratch the surface of representing the monumental effort it takes to deliver architecture. From client to architect to consultant to contractor to fabricator, each phase of the project requires passionate people to recognize the importance of the experiential quality of space and the performance of the built environment. Digital tools allow the team to visualize the potential of each project by testing various options and conditions on the journey towards thoughtful design solutions. GBBN leverages technology in its design solutions

This Design Issues Series (DIS) exhibition will feature projects by GBBN Architects that have used digital design processes and fabrication to create architectural objects. The architectural design process is unfolded with a collection of sketches, video, imagery, digital, and physical models demonstrating how buildings take shape. The exhibit will travel to each office gallery throughout the fall of 2015.

PROJECTS

AHC: Atlanta History Center
B: Beechview Branch Carnegie – Library of Pittsburgh
BP: Belle Pavilion Competition – Louisville Waterfront Park
CH: Callahan Dining Renovations – Northern Kentucky University
CUT: Cincinnati Union Terminal – Cincinnati Museum Center
DT: Downtown Tower Project
EAM: Erie Art Museum
G: Gateway Light Rail Station
GP: Golf Pavilion – The Ohio State University
HC: Heinz College – Carnegie Mellon University
HG: Healing Garden Pavilion – UPMC Mercy
LS: Louisville Storefront
TC: Tomorrow City Clubhouse – Shenyang, China
TZ: Teen Zone Hive, Carnegie Library Pittsburgh – East Liberty
UDP: UPMC Presbyterian Deconstruction Project
W: Reception Lobby Desk – The Andy Warhol Museum



AHC

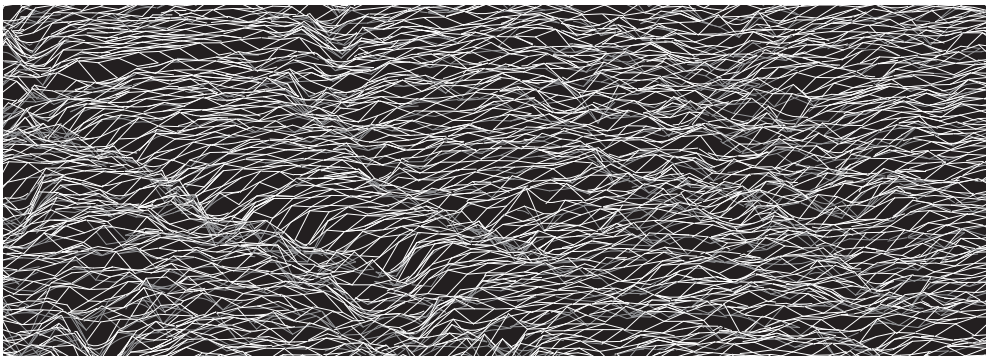
ATLANTA HISTORY CENTER

COMPETITION ENTRY | Atlanta, GA 2011

The architecture of the addition and renovation of the history center is informed by the phenomenon of parallax, the apparent displacement of an observed object due to a change in the position of the observer. A series of fins creates a threshold, a soft space that is fluid and permeable. As the visitor moves along it, changing one's position relative to this enclosure, the space and activity beyond it, as well as elements within it are revealed. From a distance, parallel to the fins, the interior activity is fully exposed, the fins disappear. At an angle to the fins, a patterning that recalls light filtered through the tree canopy is revealed. The multiple images of the building are at times transparent, and always inviting. From other views, carved spaces that accommodate display or contain seating elements are exposed.

At another level, the construction is a filter through which the visitor moves to access history. It frames a reorganization of the spaces at the interior, giving shape to the temporary exhibit spaces as a preface to the permanent exhibits. It defines an intuitively navigable experience within and through the Museum Building to the campus beyond. The construction filters natural daylight, both inside the museum and on the front porch, redirecting sunlight and providing shade. The interior programs are reconfigured and arranged to take advantage of programmatic adjacencies that support the Center's educational and program goals. The filter, porous but transitional, provides an environment that encourages visitors to see history, and their community through alternative perspectives.

TOOLS:	Rhinoceros 3D AutoCAD
ARTIFACT:	Fin Wall Mock-Up – ½" Birch Plywood Scale: 3" = 1'-0" 8'-0" H x 6'-0" W x 1'-0" D
IMAGES:	AHC.1 Axonometric Diagram AHC.2 Gallery Rendering AHC.3 Courtyard Rendering AHC.4 Fin Series



UDP

UPMC DECONSTRUCTION

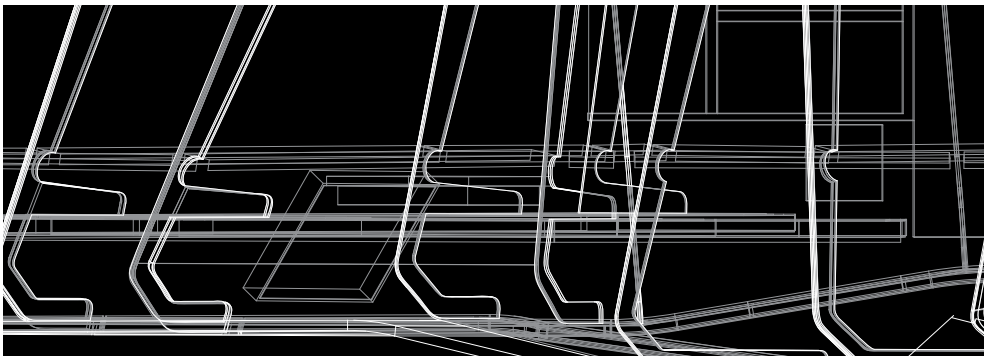
UPMC PRESBYTERIAN | Pittsburgh, PA 2016

Strategic demolition is a growing need on aging hospital campuses. Approached with vision, it enhances existing facilities while making smart provisions for efficient future construction. This "deconstruction project" quickly became an opportunity to provide a gateway to the campus, clearer public access and introduce important green space within a dense urban community.

While this project respects the architectural style and scale of the existing hospital campus, the design team chose to address the context of the urban environment through the building façade and outdoor space. This move turns the campus focus from inward to outward, making it a community gathering space as well as a destination point for wellness. Providing a transition in scale, massing, character, and functional relationship to the surrounding community will establish a hierarchy of public space with established entry requirements for each major program component.

Limited by the structural capacity of the existing structure, the design team chose a thin ultra-high performance concrete panel to clad the building. In order to respond to the classical "heavy base" context, a custom pattern was developed for the large 4 foot by 8 foot panels on the base. Likened to "barnstone" the texture was developed utilizing cut stone as well as topographical expanses of the western Pennsylvania region. The result is the appearance of a rusticated base accomplished with a ½" thick concrete panel.

TOOLS:	Rhinoceros 3D Grasshopper Revit
ARTIFACT:	Taktl Wall Panel Mock-Up Full Scale 24" x 12" x 1" Deep
IMAGES:	UDP.1 Material Studies UDP.2 Façade Development



W

RECEPTION LOBBY DESK

THE ANDY WARHOL MUSEUM | Pittsburgh, PA 2009

The lobby of the Warhol Museum was a multi-functional space serving as entrance, gallery, admissions, an event room, and gathering space, however doing so inefficiently. The architect was engaged to solve this problem, and the result is a sensual, sculptural piece that not only directs patrons and elegantly facilitates a variety of functions, but also represents a precision in fabrication made possible only through innovative vision and utilization of technology.

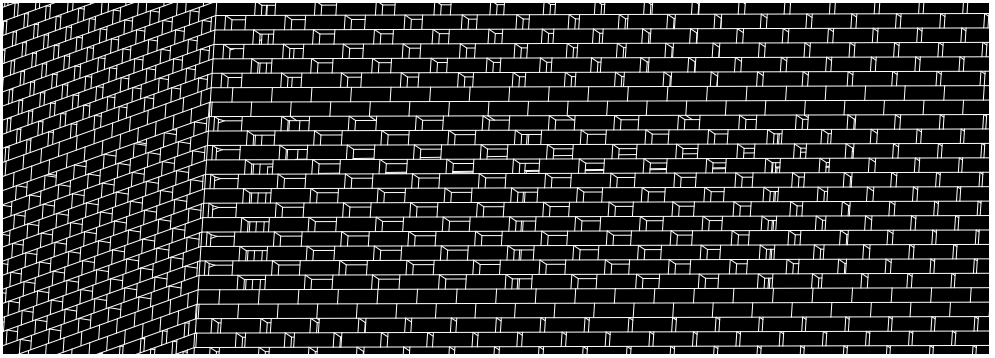
The form of the desk arose from a flow diagram of patron traffic through the lobby of the museum. Spanning 45 feet, the diagram produced an irregular shape, which the architect visualized as an integrated 3-dimensional form and singular curvaceous piece. This vision required careful and precise fabrication, demanding a close relationship between architect and fabricator. Sensing an opportunity to fully utilize the power of BIM, the design was modeled in 3D specifically clarifying the connection between the thermoformed acrylic countertop to the plasma-cut 3/16" aluminum plate structural form. The fabricator input this precise 3D model into his fabrication equipment and was able to completely circumvent the production of 2D shop drawings.

The innovation and experimentation embodied by Andy Warhol are fully realized by this desk in a museum dedicated to the artist. It is a design not restricted by conventional forms or construction methods because of the seamless utilization of a 3D model by both the architect and fabricator.

TOOLS: Rhinoceros 3D
AutoCAD
Water Jet Cutter

ARTIFACT: Desk Mock-Up – 3/16" Aluminum
Full Scale
26" W x 22" H x 12" D

IMAGES:
W.1 Fabricator Cut Sheet
W.2 Wireframe Axonometric
W.3 Fabrication Photos
W.4 Installation Photograph – complete



B

BEECHVIEW BRANCH

CARNEGIE LIBRARY OF PITTSBURGH | Pittsburgh, PA 2015

The two story Beechview branch was constructed in 1967 as a library and has not been significantly altered in its 47 years of operation. The project modifications, completed this year, include a building addition to provide enlarged floor areas and renovations to the existing space of the library. The project also completely transformed the exterior of the building to give it a more distinct and welcoming presence within the residential streetscape and to provide bright, daylit spaces for the community occupants inside.

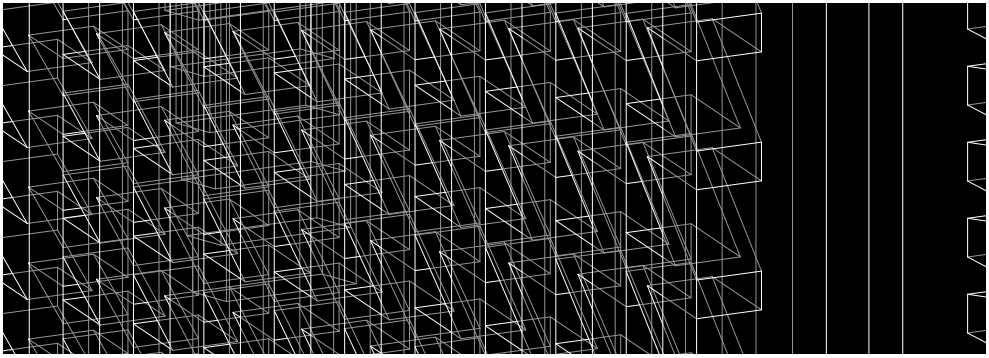
The design team worked with the library to facilitate a complete reorganization of the existing services and spaces, resulting in a sustainable design that is also universally accessible. The Adult Service Area provides generous lounge and study seating, a comfortable computer space, and shelving arranged to facilitate serendipitous browsing. An open stair connects the entry floor to the lower level containing the Children's Area, providing new visual and physical connections. The introduction of lower level windows overlooking the green wooded area behind the library is a welcome addition to what was once a dark, internal space.

Back at the front door, parametric modeling tools were used to develop a unique brick screen on the main façade, announcing a progressive new direction for the library and shielding an enlarged, dedicated Teen Area at the front corner of the building. The new brick screen marks a special space in the building, a room filled with constantly changing light and shadows by day and a glowing lantern for the neighborhood by night.

TOOLS:	Rhinoceros 3D Revit
ARTIFACT:	CNC Milled Model, Foam Scale: 1 to 3 6'-0" W x 8'-0" H x 12" D
IMAGES:	B.1 Exterior Rendering B.2 Exterior Material B.3 Construction Photos

"It's going to be a landmark in the community, the jewel in the crown. Everyone who has come in already has been enormously pleased and just delighted with their new library."

Audrey Iacone
Branch Manager



BP

BELLE PAVILION COMPETITION

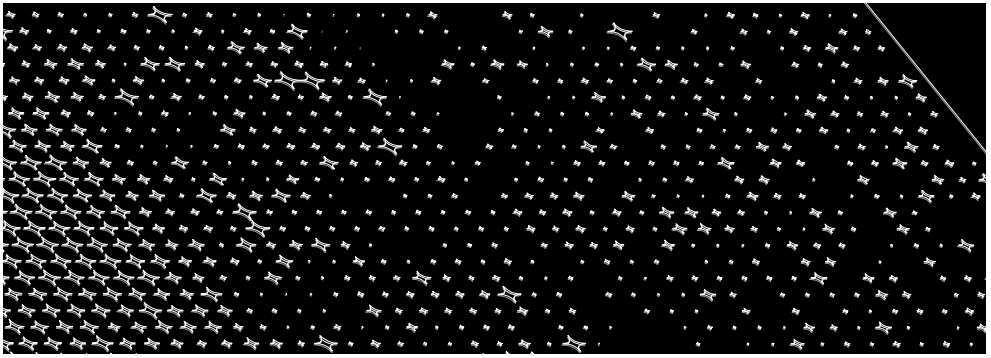
LOUISVILLE WATERFRONT PARK & DEVELOPMENT CORPORATION
Louisville, KY 2014

GBBN responded to an open competition in Louisville to design a series of festival pavilions for the centennial celebration of the Belle of Louisville, the oldest operating steamboat in the United States. The festival pavilions were intended to be built in multiple locations and become the iconic landmarks for the festival programs and events that would be hosted in Louisville Waterfront Park.

GBBN's design entry concentrated on a repeatable and deployable design structure adaptable to various site conditions and flexible enough to support a variety of programs and events such as a bourbon tasting, concerts, or private parties. Each pavilion also captured rainwater for a central rain garden at each pavilion.

The design was developed with Rhinoceros 3D and the parametric design plugin Grasshopper so the pavilion structure could be modified dynamically and quickly adjusted to different site conditions or structural conditions. The stick built structural frame doubled as the filigree and ornament of the pavilion to create "screenwalls" that could be modified to have more density or more openness, depending on site conditions. The 3D model was dynamically editable to study light and shadow depending on view corridors, built context, environment, resulting in a unique and functional structure whether adjacent to the river or placed within a sculpture garden.

TOOLS:	Rhinoceros 3D Grasshopper 3D Printer
ARTIFACT:	(4) 3D printed scale models Scale: 1/8" = 1'-0" 4" W x 2.5" H x 0.25" D
IMAGES:	LS.1 Diagrams LS.2 Elevation + Perspective LS.3 Assembly



CH

CALLAHAN DINING RENOVATION

NORTHERN KENTUCKY UNIVERSITY | Highland Heights, KY 2015

One of the existing spaces within Callahan Dining Hall was particularly dismal and secluded. The renovation sought to re-brand the space as an escape by transforming it into a unique place of retreat for the students. Light becomes sculpture, as the extent of the room is defined by a sweeping wall punctured with warm light that emulates stars. A large, leather bench undulates against the wall creating a variety of niches and surfaces for the students to lounge, eat, and share in quiet conversation.

To study light and its relationship to the wall, numerous photos of nature scenes were collected and abstracted using Photoshop. Development occurred through an iterative study process using Grasshopper to generate abstracted patterns derived from the original photo and then laser cut at full scale 18" x 30" chip board sections of the pattern for the wall. The laser cutter was also used to construct a ¾" to 1'-0" model of the room with multiple iterations of the wall pattern.

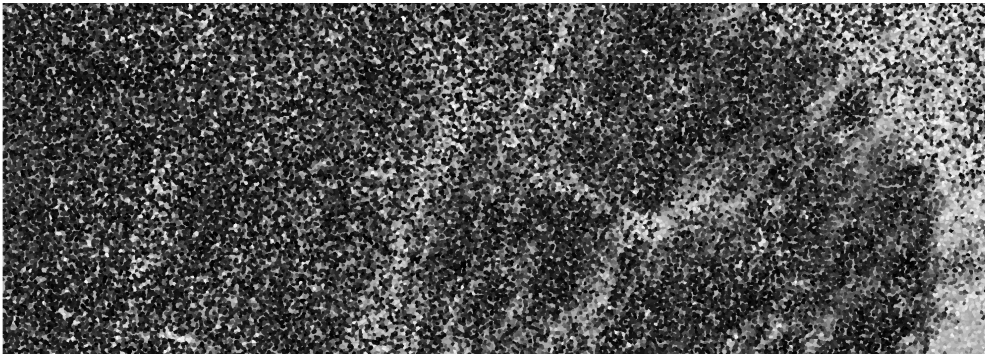
Using both the full scale sections and the ¾" model a final pattern was selected. The millworker used the digital files for the pattern. Using a CNC router the millworker constructed a full scale mock-up of one 4' length of the wall for review of joint, corner and light details.

Working with the millworker to tweak the design and allow for ease of construction, the mock up review permitted the millworker to be released to construct the remainder of the wall and associated bench. Running for 54 hours the router produced 18 perforated panels, the top and bottom plates for the curving wall and the framing for the associated bench.

TOOLS:
Sketch Up
Grasshopper
Laser Cutting
CNC Router
Revit

ARTIFACT:
Wall Panel Mock-Up
Scale: ¾" = 1'-0"
30" W x 24" H x 7" D

IMAGES:
CH.1 Image Patterns
CH.2 Grasshopper Definition
CH.3 Full Scale Mock Up
CH.4 Test Patterns in Office



CUT

CINCINNATI UNION TERMINAL

CINCINNATI MUSEUM CENTER | Cincinnati, OH 2015 (awarded)

Cincinnati Union Terminal, designed by renowned architect Paul Phillippe Cret, was constructed in 1933 to unify all of Cincinnati's passenger rail traffic under a single roof. In 2015, GBBN was hired to lead a national team of consultants and builders to undertake a complete and thorough renovation and restoration of the building.

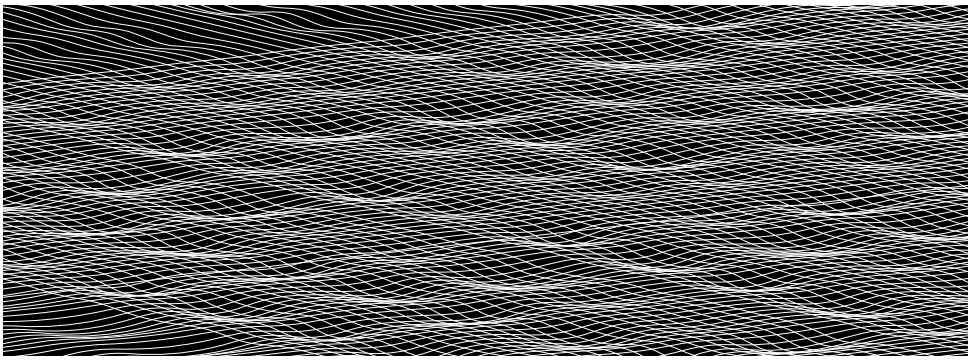
In order to fully document and coordinate a project of this scale, a complete 3D scan of the building was undertaken. By allowing GBBN and its team of consultants to fully catalogue the complete range of historic conditions present at the Union Terminal, the full exterior restoration and scheduling of the entire façade stone by stone was enabled through the precision of the building scan information. By re-creating conditions for the precise replication of historic detailing and decoration digitally, the total building scan has brought a new level of sophistication and precision to the design and documentation process for large preservation projects such as Cincinnati Union Terminal.

In addition to providing the team with the ability to thoroughly catalogue building components, the scan has allowed the team to peek inside sensitive walls to gain an understanding of the original building methodologies and wall construction.

TOOLS: 3D Scanning
Revit

ARTIFACT: Drone Video

IMAGES: CUT.1 3D Point Cloud overlay with Revit model
CUT.2 Interior Rendering
CUT.3 Skylight Rendering
CUT.4 Stone Schedule



HC

HEINZ COLLEGE

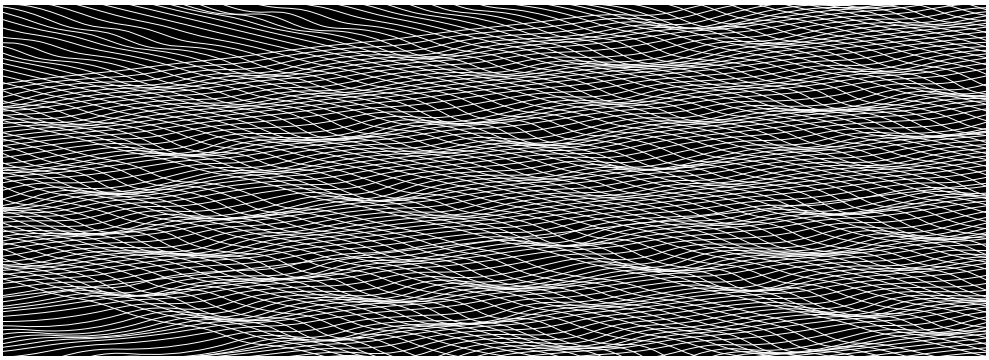
SCHOOL OF PUBLIC POLICY, CARNEGIE MELLON UNIVERSITY
Pittsburgh, PA 2015 (Ongoing)

Heinz College at Carnegie Mellon University is an extensive renovation and addition at the historic Hamburg Hall along Forbes Avenue. An original Henry Hornbostel building, master planner of the university, was conceived as an office building and testing facility for the Bureau of Mines. The GBBN design team was challenged to transform the school into a modern day collaborative education environment. Three components were developed with digital tools: Taktl panels to enclose new state of the art classroom, Acoustic panels to provide sound mitigation with the classroom, and Steel Structure Glass Roof to enclose an existing exterior courtyard as the final phase of the project.

Taktl Panels
The Taktl panels installed at the new Heinz College Classroom were developed through rigorous collaboration between the design team (GBBN), mold fabricator (Laser Lab Studio), and panel fabricator (Taktl). The intent of the design team was to use digital technology to explore the embedment of textural information within the panels. Initial dimple pattern designs where developed in-house utilizing Rhinoceros 3D and Grasshopper. These digital files were sent to Taktl during the design process to develop physical samples used to obtain client approval. Following authorization to proceed, the design team intensively worked with the mold fabricator to hone the CNC tool settings and achieve a highly refined mdf mold. Taktl utilized the mdf model to produce urethane molds in which concrete is poured and left to cure.

The subtle pattern of the finished panel in conjunction with a media blast finish softens the appearance of the classroom façade against the historic yellow brick of Hamburg Hall. The surface treatment produces dramatic shadowing that creates a dynamic experience which evolves daily and throughout the year.

Acoustic Panel
In much the same manner the Taktl panel pattern was developed, the interior panels of the classroom were designed to meet specific technical criteria set forth by our acoustic engineer. By utilizing Grasshopper we were able to efficiently modify and vary perforation sizes and spacing to achieve a pattern that achieves acoustic performance and aesthetic quality. Following our digital study, the fabricator produced a number of physical samples to observe the panel strength with a 30% reduction of material. The panels were confirmed to have maintained their stability and a finished sample was provided for client approval.



HEINZ COLLEGE (cont'd)

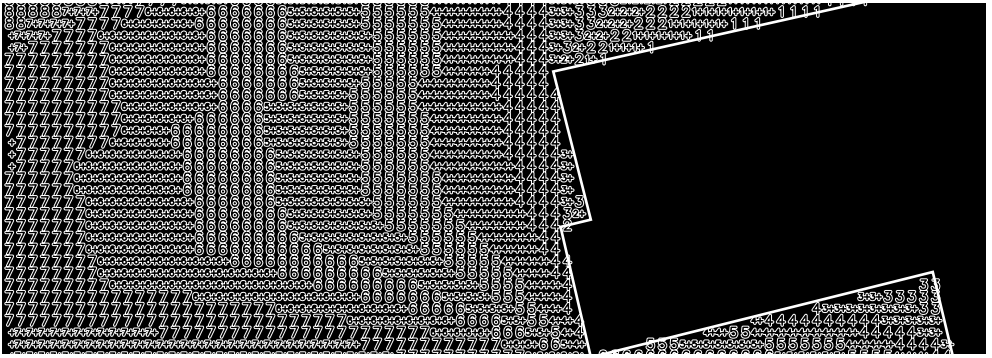
Glass + Steel Roof
The design and structural team have worked closely to develop a steel and glass structure which spans the 60' between Hamburg and Smith Hall while minimizing steel member sizes and maximizing glazing to produce a light-weight structure. The design team modeled the roof first in Rhino for early study and then in Revit for schematic design. At this time, the Revit model was shared with the structural engineer to run a range of structural simulations via Autodesk Robot. Following digital simulation, a physical model was created to allow the client to better visualize the atrium.

In addition to the steel structure of the roof, the team has also thoroughly researched and tested different glazing options via Autodesk Robot and the effect various glazing options will have on mechanical system requirements.

TOOLS: Rhinoceros 3D, Autodesk Revit, Autodesk Robot

ARTIFACT: (2) CNC Milled MDF Building Panel Mock Ups
Full Scale:11 ½" x 24" x ¾" | 16" x 52" x ¾"
(2) High Performance Concrete (Taktl) Panels
Full Scale: 11 ½" x 21 ½" x ¾" | 16" x 51" x ¾"
Acoustic Panel Mock Up: Full Scale: 24" x 24" x ½"
Scale Model – Wood (existing) and 3D Print (new)
Scale: 1/16" = 1'-0" | 23" x 15 ½" x 5 ½"

IMAGES: HC.1 Building Panels: 3D Model Views
HC.2 Building Panels: CNC Milled MDF Board
HC.3 Building Panels: Milling Process
HC.4 Building Panels: Taktl Panel Fabrication
HC.5 Building Panels: Installation Views
HC.6 Acoustic Panels: Pattern Studies
HC.7 Glass + Steel Roof: Axonometric Drawing
HC.8 Glass + Steel Roof: Structural Diagrams



DT

DOWNTOWN TOWER PROJECT

Client + Location Withheld, 2014 (ongoing)

Data driven analysis helps to understand the impact of our designs and allows us to make smart decisions throughout the design process. By introducing it early on in projects, it provides valuable information that helps anticipate conditions and create scenarios that are more beneficial for the project and its surroundings. Applied to a downtown site, it was used to study how a new high-rise project would affect daylighting and sun exposure at the urban, building, and interior scale.

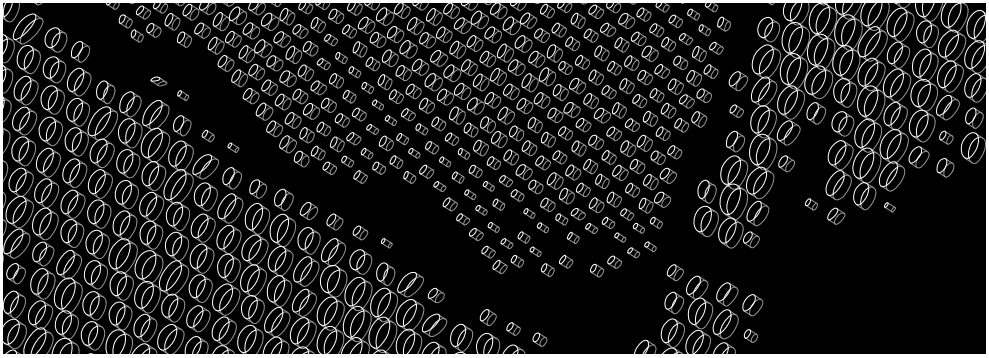
In the Beijing office, a CAD plug-in is used to study how to meet specific orientation requirements set by the Chinese building and zoning codes. It projects numbers on a chosen plane that represent the sun exposure on a location per day in hourly segments. Applying this tool to different tower massing options allows us to study the impact on the nearby public space.

Using this tool, we can study how the sun exposure will react with the façade; under influence of shading dropped from the nearby tall buildings; and apply additional shading strategies if and where needed. When introducing a pool to the residential project we looked at z-shaped plan options to provide better sun exposure for the amenity deck. With Sefaira daylighting analysis tools, we studied how daylight hits the interior space and whether or not additional screening or shading strategies are needed.

TOOLS: Revit Architecture
Tangent (Tianz Heng: Chinese Version of AutoCAD)
Sefaira

ARTIFACT: Scale Model – multiple materials
Scale: 1/16″ = 1′-0″
12″ W x 25″ L x 45″ H

IMAGES: DT.1 Sun Exposure Diagram + Axon
DT.2 Sun Exposure Diagram Elevation + Axon
DT.3 Precast Concrete Building Panel Pattern



EAM

ERIE ART MUSEUM

Erie, PA 2010

The renovation and expansion of the Erie Art Museum redefines the museum as a recurring destination for the community. The LEED Gold designed project, located in downtown Erie, provides new spaces for permanent and traveling exhibitions, a multipurpose performance and program space, a café, and an outdoor "living room/ sculpture garden," fostering diverse programs.

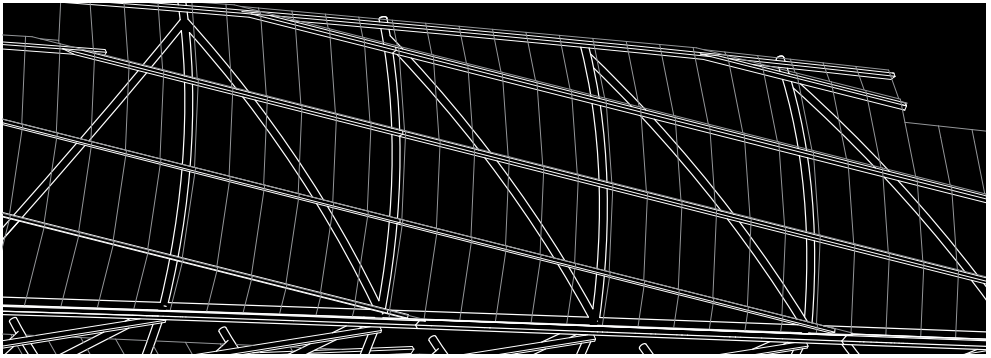
Previously housed in two existing but noncontiguous buildings, the Museum committed to a project that would link the facilities and provide a new, common entrance along with gallery spaces and a multipurpose room. The project incorporates a 10,000 sf addition along with reorganization and renovation of 15,500 sf of existing space to improve the functionality and environment of the museum. During the design phase, a third building was acquired that the new construction was revised to additionally connect. A continuous visitor experience was designed by creating opportunities for experiential transition synchronized with the inevitable thresholds between different building structures.

Within the lobby, CNC milled panels were developed with a graphic abstracted from a map of Presque Isle, an iconic peninsula along the shore of Lake Erie. The result is a dynamic space created by an abstraction of the immediate context.

TOOLS: Rhinoceros 3D
Auto CAD
CNC Routing

ARTIFACT: n/a

IMAGES: EAM.1 Image Series – deriving pattern
EAM.2 Interior Photographs – stair + lobby
photo by David Joseph



G

GATEWAY LIGHT RAIL STATION

PORT AUTHORITY TRANSIT | Pittsburgh, PA 2012

Our team, partnered with Pfaffmann + Associates, proposed an innovative alternative to a solid-wall headhouse and a station sunken below the street. The new headhouse is built of transparent materials allowing uninterrupted views from, into, and through the site, providing a "gateway" experience for arriving transit passengers without causing visibility issues for adjacent properties. In addition, the site was excavated to slope from street-level toward the rail platform, providing daylighting, natural ventilation and creating a unique urban plaza in the adjacent, unused plot.

Initially envisioned as a glass box intended to allow light and views to the city from the heart of the "underground" station, as the design developed, the form of the volume evolved with the use of Rhinoceros 3D. Intent was to extract a form intrinsically linked to the metal structure that could be constructed as a consistent whole. The form was derived from the intersection of three cylinders, allowing for simple geometric shapes to intersect and create the structural frame.

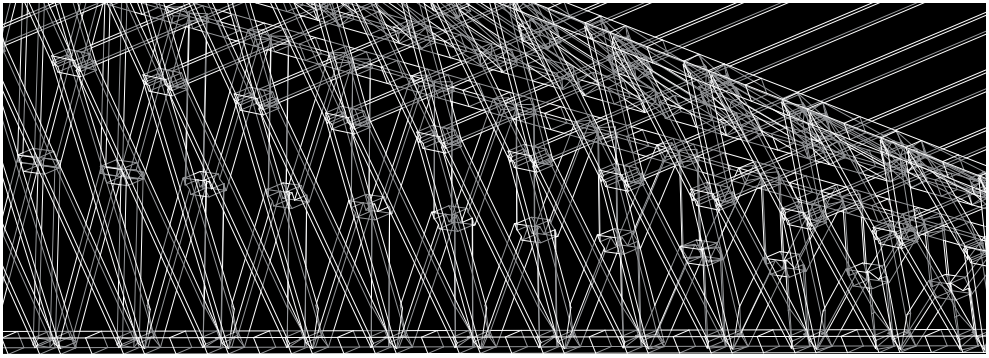
Rather than a static volume, the headhouse became a dynamic volume that appeared to be in motion. This carried downward to the platform where columns, benches, light fixtures, and railings sloped to signify movement in the transit architecture. The digital tools of design were shared with the construction team so that concrete formwork and steel framing were fabricated with the use of the design team's 3D models.

TOOLS: Rhinoceros 3D
AutoCAD

ARTIFACT: Animation [04:17 length]

IMAGES: G.1 Geometry Diagram
G.2 Systems Diagram
G.3 Elevation Rendering
G.4 Street Level View – Inside Headhouse *
G.5 Platform View *

* *photos by Ed Massery*



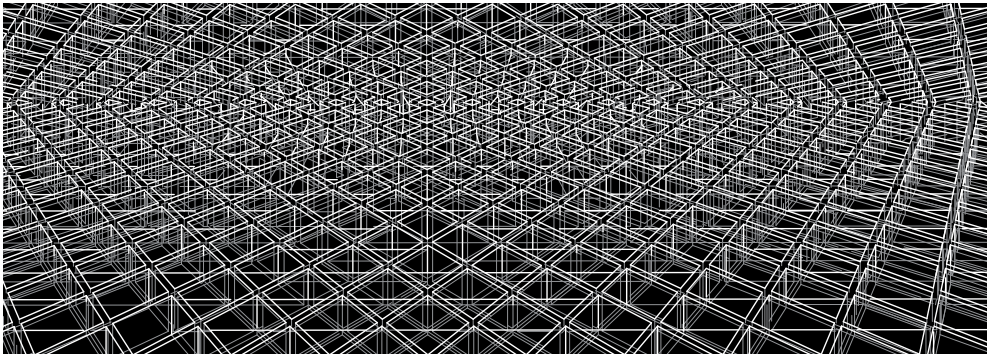
GP

GOLF PAVILION

THE OHIO STATE UNIVERSITY | Columbus, Ohio 2014

GBBN completed an indoor golf practice facility at The Ohio State University in 2014. Particular attention was given to the relationship between the new facility and the existing clubhouse as well as the adjacent golf course. In order to link the pedestrian experience, a canopy study was undertaken to provide a continuously shaded walking route between the different site locations. Focusing on the OSU brand, the design team utilized the geometric form of the university logo as a starting point to explore the structural logic of the canopy. The canopy form was generated parametrically in Rhinoceros 3D utilizing the Grasshopper plug-in to execute multiple versions and optimize workflow. With the 3D model in place, the design team was able to complete quantity takeoffs, shading studies, and basic structural analysis quickly and efficiently.

TOOLS:	Rhinoceros 3D Grasshopper 3D Printer
ARTIFACT:	3D printed scale model Scale: 1/8″ = 1′-0″ 9″ L x 1.5″ W x 1.5″ H
IMAGES:	GP.1 Plan + Elevation Drawings GP.2 Perspective View



HG

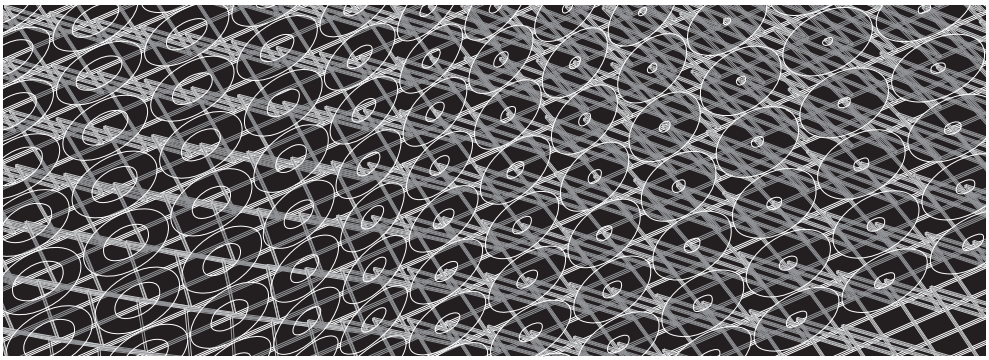
HEALING GARDEN PAVILION

UPMC MERCY | Pittsburgh, PA 2013

GBBN was asked to develop concepts for a landscape and healing garden as part of the entrance sequence to one of its major hospitals, UPMC Mercy. In order to shelter the healing garden, UPMC requested a canopy that would simulate the effects of a large shade tree by providing a place for repose and a focal point for the garden year round.

GBBN's design concept studied the effects of light and shadow in the qualities of tree canopies and vegetation. GBBN modeled several design concepts in Rhinoceros 3D and utilized the parametric plugin Grasshopper to analyze varying densities, patterns and depths of the canopy. The use of digital tools enabled the design team to explore multiple options at once and generate shade studies to analyze the effects of the design. Variations in depth, density and opening size allowed for a dappled lighting effect.

TOOLS:	Rhinoceros 3D Grasshopper 3D Printer
ARTIFACT:	(2) 3D printed scale model Scale: 1/8″ = 1′-0″ 2.75″ x 2.25″
IMAGES:	HG.1 Canopy Roof Plan HG.2 Studies



LS

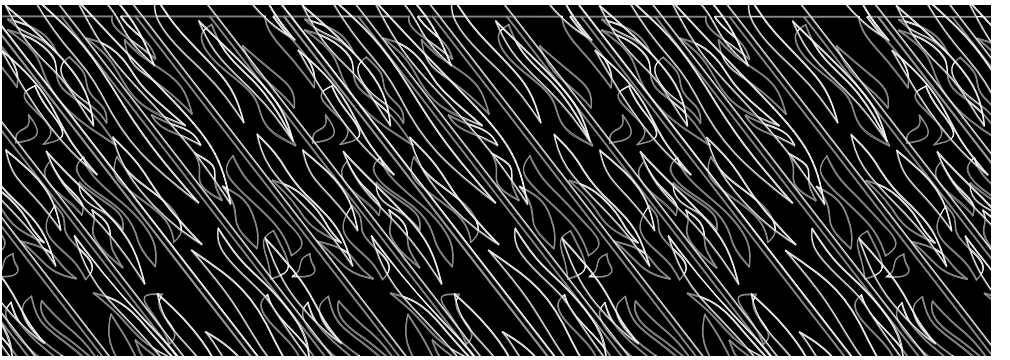
LOUISVILLE STOREFRONT

GBBN ARCHITECTS | Louisville, KY 2013

The Louisville office of GBBN is located in the historic West Main Street district in the heart of downtown Louisville, Kentucky. It has grown to be a cultural center – referred to as museum and gallery row – a destination within the city where people come to "look."

In an effort to participate with the artists and passers-by in our community, the GBBN team challenged ourselves to improve the curb appeal and visibility of our office space. The design team developed multiple iterations of a digitally fabricated "showcase" in our existing storefront. The design concept originated from the desire to develop an interactive piece that demonstrated our proficiency with digital tools that GBBN employs in our design process. The intent was to engage in a dialogue with the historic landmark geometric context along West Main Street with a digitally generated parametric form.

TOOLS:	Rhinoceros 3D Grasshopper 3D Printer Lasercutter
ARTIFACT:	(2) 3D printed scale models Scale: 1/8″ = 1′-0″ 5″ x 2.5″ (2) laser cut models Full Scale 12″ W x 6″ H x 8″ D
IMAGES:	LS.1 Concept: Density + Opacity Studies LS.2 Storefront Renderings LS.3 Grasshopper Studies



TC

TOMORROW CITY CLUBHOUSE

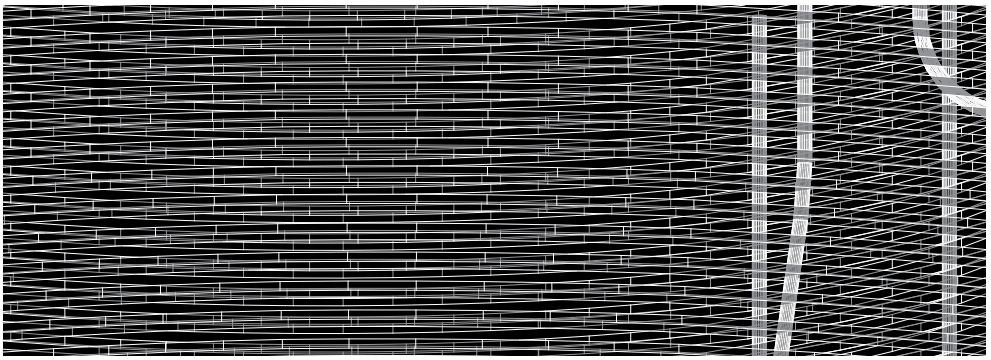
SHENYANG VANKE | Shenyang, China 2012

For large scale developments in China, the clubhouse is a feature and an icon. It serves initially as the sales hall, then – once the development is complete and occupied – as model units, management offices, and event space. The clubhouse for Tomorrow City, a mixed-use development for Shenyang Vanke (SHUNN yahng VAIN key) in northeast China, is a simple glazed volume shaded by a strikingly patterned, layered façade.

The screen's outer layer is 15mm Trespa, a high pressure compact laminate chosen for its flatness and dimensional stability; panels were precisely cut by computer-controlled milling machine and installed with tight tolerances and concealed fasteners to emphasize volume over material.

An inner layer of 30mm fiber cement board panels, just visible through the incisions in the Trespa shell, is surface fastened to the curtainwall. Similar cut forms were offset to exploit the capabilities of each material and the reflectivity of the glass.

TOOLS:	Rhinoceros 3D AutoCAD
ARTIFACT:	Wood Laser Cut Model Scale: 1 to 3 24″ x 36″ x 4″
IMAGES:	TC.1 Close Up – Interior TC.2 Exterior Photo TC.3 Close Up – Exterior Soffit



TZ

TEEN ZONE HIVE

CARNEGIE LIBRARY OF PITTSBURGH, EAST LIBERTY BRANCH
Pittsburgh, PA 2015

The design of the Teen Zone takes advantage of the large window wall along Whitfield Street and Baum Boulevard. A 'room within a room,' known as the Studio Hive, creates an intriguing image that identifies the Teen space and defines the threshold into the Teen Zone. The hive provides an intimate space for teens to work intensely on multi-media and digital productions.

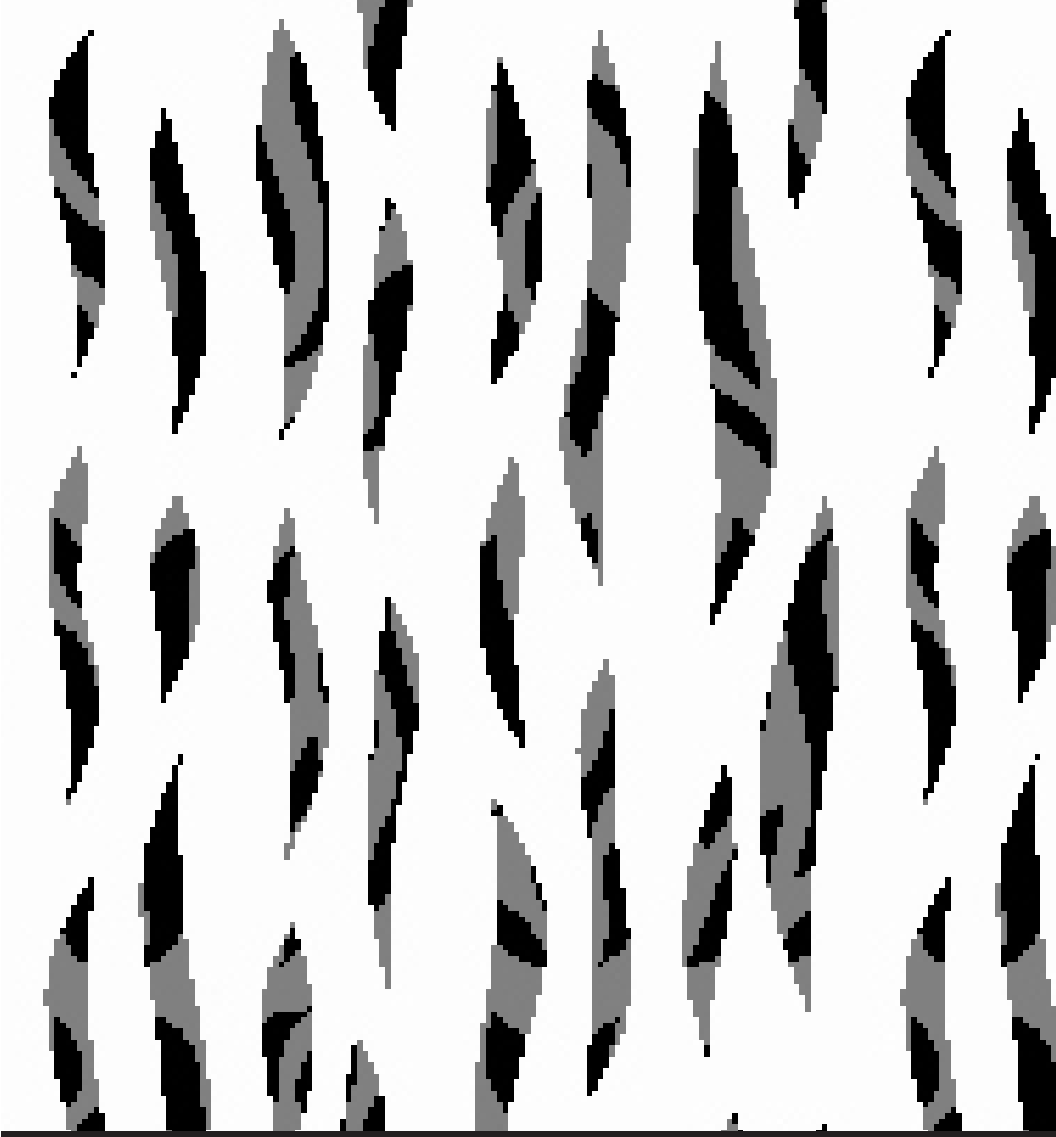
The design team developed a 3-dimensional model of the hive, which was shared with fabricators to collaborate on the development of details. The final product was fabricated directly from the model, eliminating the need for conventional construction documents. The fabricators fully installed the Hive in their studio as a mock-up then disassembled it and permanently reinstalled the Hive at the East Liberty branch while the library remained in full operation. Made of wood and sound absorbent industrial felt, the Hive evokes curiosity and encourages teens to think beyond the box.

The Teen Zone is intentionally divided into spaces that promote different levels of activity. The 'living room' is a very informal space facilitating hanging out, playing video games and watching movies. The collaboration space, made up of small group seating, offers an environment for more structured and experimental group activities. The development of these distinct areas recognizes that the creative process is one that requires varying levels of engagement and activity.

TOOLS: Revit
CNC Milling

ARTIFACT: Mock Up
Full Scale
24" x 48" base, 30" height

IMAGES: TZ.1 Axonometric & Detail Drawings
TZ.2 Fabrication + Installation Photos
TZ.3 Interior Photo *photo by Ed Massery*
TZ.4 Exterior Photo



(DIS) DESIGN ISSUES SERIES

A sincere thanks to our project collaborators including our clients, fabricators, engineers, and specialty consultants. We are grateful that we have the opportunity to work with such talented and creative people who are dedicated to making great spaces and inspiring innovation.

We would also like to thank all the GBBN employees for their commitment and enthusiasm to the procurement and installation of this inaugural (DIS) exhibit.

Thank you for your support of good design.

GBBN