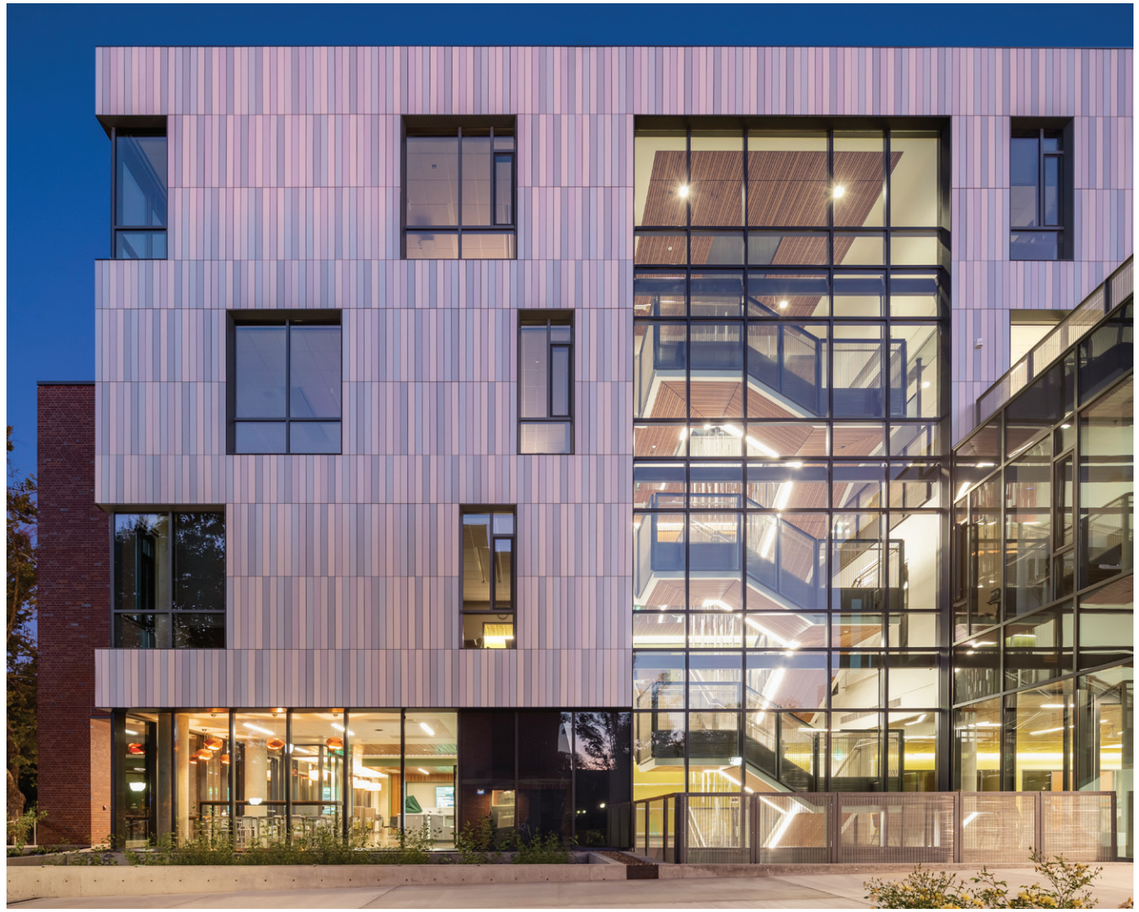
Aesthetic Nuance: Tykeson Hall

OFFICE 52 Architecture

TYPE Institutional **CLIENT** University of Oregon **LOCATION** Eugene, Oregon



PHOTOGRAPHY SINZIANA VELICESCU

The design solution is based on science, technology and the art of geometry with an economy of means. By transforming a kit-of-parts engineered façade system for a structure to be unique yet contextually harmonious, affordable yet highly sustainable, and more easily constructed with a unit that is a measure of the hand, we combined innovation with simplicity.

The building is a combination of hand and mechanical production that explores the art and craft of architecture, echoing the tradition of nearby buildings with clay-based materials. The result is a high-performance, artistically inspirational facade.

FAST COMPANY'S INNOVATION BY DESIGN AWARDS 2020 HONOREE

Designed with sensitivity for its historical surroundings (right), the new building (top) complements nearby structures while retaining a distinct character of its own by using terra cotta in a new way that highlights advances in façade engineering with innovations like open-joint fabrication and rich custom glazes.

PHOTOGRAPHY TOP SINZIANA VELICESCU; BOTTOM IMAGES MICHELLE LAFOE

We focused on the design of the façade system with a pragmatism in terms of materials and assembly methods, which addresses flexibility in how the system can be applied. This is the first campus building to include terra cotta in eighty years, melding innovative prefabrication cladding technology with a glazed color field of regional landscape tones.

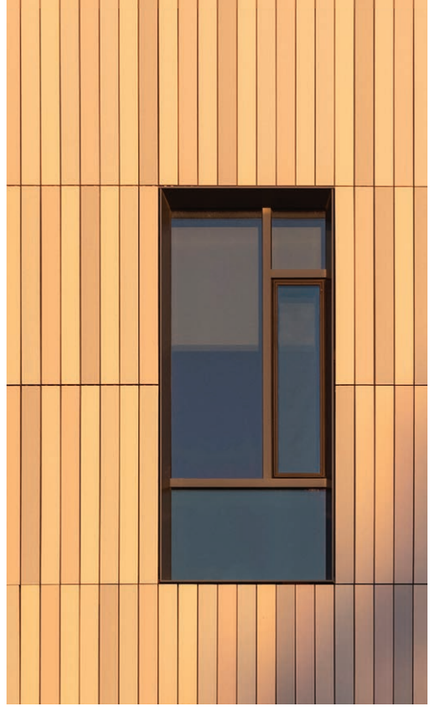
by Michelle LaFoe, AIA

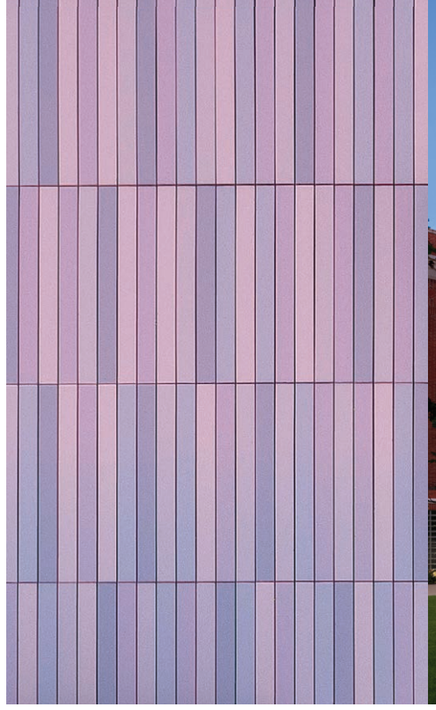
An idea that seems obvious and too simple can be the most relevant with subtle effect and demonstrable impact. How we create and use our built environment reflects an inherent value system for a better world. As such, three factors characterize high-performance building façades: the materials, the system (fabrication and installation), and the design. As with many communities in America, the University of Oregon features a rich environment of clay-based materials, namely brick and decorative terra cotta, dating to the late 19th and early 20th centuries. With this material we combined innovation and common sense to create a high-performance façade system for Tykeson Hall, the new home and academic center for the College of Arts and Sciences. The goal was to combine art, science and technology in a way that was relevant to the college's progressive interdisciplinary educational philosophy and create a unique yet contextualized outward expression that embodied their culture of ingenuity while evoking beautiful aspects of the region that reinforce a sense of community with an environmentally conscious mission.

To embody an architectural vision with these materials, we integrated them into a cohesive whole with a combination of innovative technology and traditional craftsmanship. This is the first campus building to include terra cotta in eighty years, melding modern cladding technology with a glazed color field of neutral regional landscape tones. The engineered terra cotta system by Shildan Group that we transformed is a relatively lightweight façade rain screen composed of extruded clay panels and clips designed for the tolerances of today's high-performance buildings. With consultation from construction and manufacturing partners, we customized this off-the-shelf system with modifications to the clay panel and attachment components for a simplified geometry to be more easily installed by local contractors. With a focus on durability and craftsmanship, we designed six-inch wide, vertically-oriented panels with two primary lengths for ease of construction, affordability, aesthetics and regional seismic requirements.

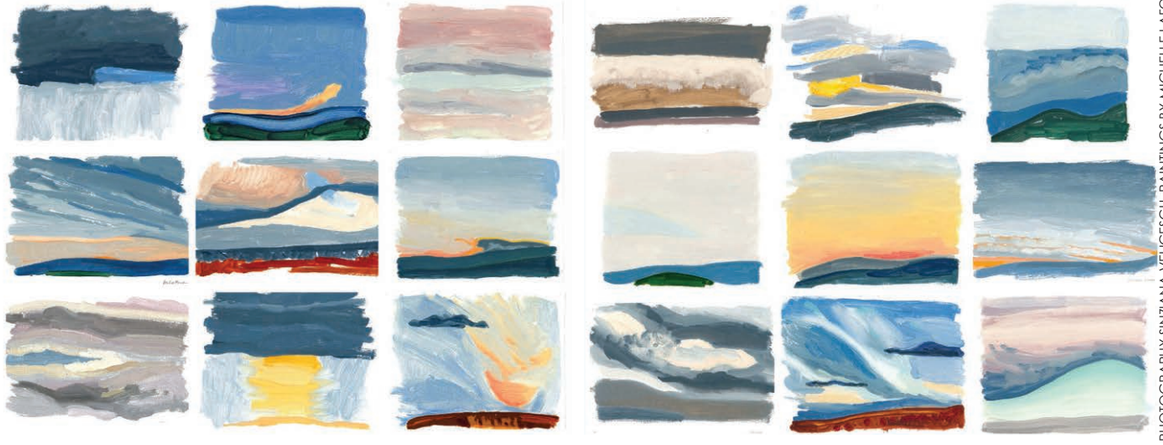
The creative process for clay panel finishing began by looking at the perception of light and color in numerous large installations like Claude Monet's Water Lilies at the Musee de l'Orangerie as well as similar ethereal landscapes found in the Pacific Northwest, noticing there was only a four-degree latitude difference between these places with similar light qualities. We completed a series of Oregon landscape and sky oil paintings and translated this perceptual experience by using these as a basis for terra cotta glaze options and the creation of an abstract color field accentuated by the simplified façade geometry.

Hands-on material research ensued with exploration of fabrication techniques, sourcing, and aesthetic capabilities for an economically sensible solution that made a flat panel exciting in its context. Our studio built full scale mockups and did glaze research, pushing the envelope of possibility. We looked at the surface qualities, color, luminosity and opacity of glaze that influence light as an outdoor visual experience in the Pacific Northwest. We knew that materials read differently in overcast versus sunny conditions, with variations of light in between, and as such skins of buildings have an opportunity to stimulate the senses and bring this into the design.





We completed Oregon sky and landscape oil paintings and translated this perceptual experience by using them as a basis for glaze options and creation of an abstract color field accentuated by panel geometry. The modulation of light becomes part of the design and contributes to the liveliness of the façade.



PHOTOGRAPHY SINZIANA VELICESCU, PAINTINGS BY MICHELLE LAFOE

With a graphic and algorithmic system, we ensured no one color repeated next to itself within the customized 3,100 terra cotta tile panel system and provided an easy-to-use road-map for installers. By choosing a single neutral-beige clay and using five custom color glazes, instead of more costly individual through-body molds, and a matte finish to accentuate natural light variations, we achieved desired aesthetics within a tight project budget. All components arrived on site with ascribed numbers ready to install. The panels gleam with a full depth of tone thanks to thoughtfully developed ceramic glazes on five of six sides. The appearance of the façade alters depending on season and solar position, with the modulation of light lending the architecture a corresponding dynamic with transformative effect.

To embrace commitment to environmental conservation, sustainability is integral to Tykeson Hall's design with both high- and low-tech solutions. Built upon a former surface parking lot, the building achieved LEED Gold certification and met the Architecture 2030 Challenge energy goals. An economically compact building footprint with efficient systems resulted in an energy performance modeled at 77% better than a building of similar size and program, an EUI of 25, and an estimated energy use 34% less than the current Oregon Energy Code. Our design solution is based on science and the art of geometry with an economy of means. By transforming a kit-of-parts engineered façade system for an everyday structure to be unique yet contextually harmonious, affordable yet highly sustainable, and easily constructed with a unit that is a measure of the hand, we combined innovation with simplicity.

The spatial organization of the building in plan and section is based on Golden Section proportions, and the façade cladding systems are laid out on a one, four- and eight-foot modules. We designed the high-performance façade so that two terra cotta tile panels together form a repetitive unit measuring one foot from center to center of the vertical joint line. We knew that the brick construction should occur first so dominant horizontal joint lines of the terra cotta would align with brick coursing. This enhanced a harmonious composition of building proportions and datum lines

PHOTOGRAPHY SINZIANA VELICESCU

The matte glaze imbues the color field with a slight sheen that captures the atmospheric light with subtle luminosity. With consultation from the terra cotta fabricator Shildan Group, we mocked-up glaze options to achieve this effect. It's a compelling union of form and surface treatment.

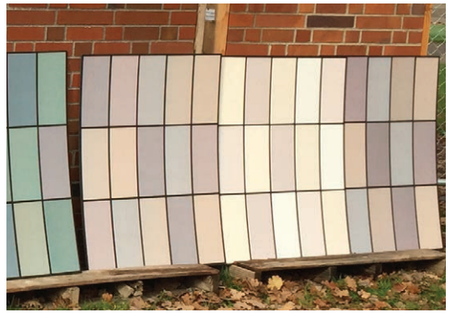
Our studio looked at the texture, color, luminosity and opacity of glaze that can influence light as an outdoor visual experience in the Pacific Northwest. Materials read differently in various lighting conditions. Buildings thus have an opportunity to stimulate the senses and bring this into the design.

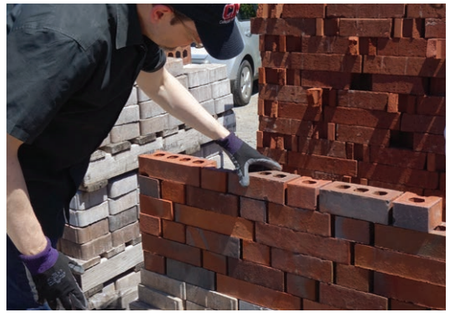
PHOTOGRAPHY CHRISTIAN COLUMBRES

PHOTOGRAPHY MICHELLE LAFOE

The design was the result of a creative process that sensibly prioritizes form and materials with a focus on realizability by weaving high-tech (prefabrication) methods with more traditional hand-based techniques. OFFICE 52 Architecture researched the materiality of architectural ceramics including performance contributions, forming processes, and glazing to devise an innovative solution. We did this by customizing a readily-available Moeding Alphaton terra cotta rainscreen system by Shildan Group to work alongside the custom brick pattern. We played up the visual and material qualities of the project, explored through mock-ups, knowing that the building will produce intrigue as a transformative part of the adjacent outdoor public space. It was important to look at material mock-ups vertically outdoors to garner a true sense of surface qualities. The façade is ever-changing, depending on time of day, a visitor's location and sight line. The goal was to combine art, science and technology in a way that was relevant to the college's progressive interdisciplinary educational philosophy and create a unique yet contextual expression that embodied their culture of ingenuity while evoking beautiful aspects of the region that reinforce a sense of community with an environmentally conscious mission.





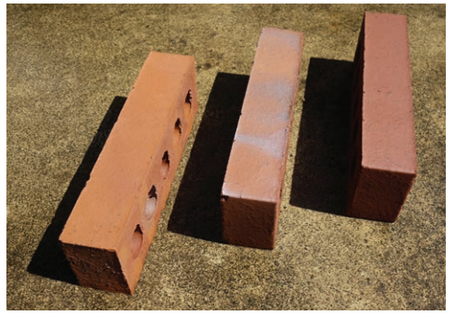


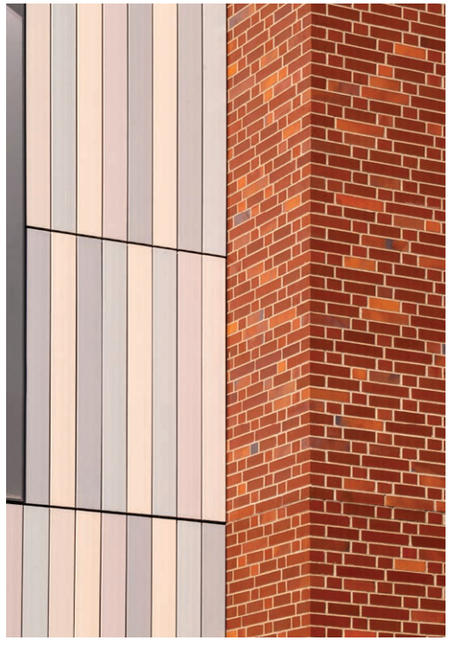

PHOTOGRAPHY OFFICE 52 ARCHITECTURE; TOP RIGHT SINZIANA VELICESCU

With a graphic and algorithmic system, we ensured no one color repeated next to itself within the customized 3,100 terra cotta tile panel system. By choosing a single neutral-beige clay and using five custom color glazes, instead of more costly individual through-body molds, and a matte finish to accentuate natural light variations, we achieved desired aesthetics within a tight project budget. All components arrived on site with ascribed numbers ready to install. The panels gleam with a full depth of tone thanks to thoughtfully developed ceramic glazes on five of six sides.

PHOTOGRAPHY SINZIANA VELICESCU

The building's spatial organization in plan and section is based on Golden Section proportions, and the façade cladding systems are laid out on a one-, four- and eight-foot modules. We knew the brick construction should occur first so dominant terra cotta horizontal joint lines aligned with brick coursing. This enhanced a harmonious composition. Clay brick is a timeless and sustainable material that adds texture and exhibits a nuance of color in light and shade while enhancing the contextual and regional connections. Looking at the brick in wet and dry conditions informed our light grey mortar selection to highlight the pattern's diagonal.





PHOTOGRAPHY FAR LEFT BOTTOM MICHELLE LAFOE; TOP AND NEAR LEFT SINZIANA VELICESCU

The role of tempering the use of energy for environmental performance was crucial in the design. Terra cotta and brick are some of the best materials in embodied energy. Sustainably sourced clay and ceramics are the least energy intensive and have the lowest environmental impact, generating the least CO2 in production compared to a variety of other commonly-used building materials.

while also creating a crisp line where the two systems meet. For brick we used a blend of locally sourced Oregon and Washington clay, installed using a custom Norman Cross Bond pattern we designed specifically for this project.

Our brick research on and off campus led to the English Cross Bond, which emphasizes the diagonal by staggering the vertical mortar joints from course to course. To this we added longer Norman bricks, creating a new pattern we dubbed the Norman Cross Bond. We worked closely with the brick supplier on dry-stack and on-site mockups to develop a custom mix of local Autumn Blend and Columbia Red bricks that would accentuate the terra cotta as well as the Norman Cross Bond's geometric texture and regional connections. Since it rains half the year in the region, we looked at the brick in wet and dry conditions and specified a light grey mortar to highlight the diagonal in all climactic situations. Craft of the corner details and elegant transitions with the prefabricated terra cotta featured prominently in our digital modelling and mockups prior to construction.

A disciplined approach towards curtain wall and window fenestration details weaves the two respective clay facade systems together to reinforce the overall expression of form and concept. This adds richness to the contemporary design aesthetic and uniformity of glazing detail for all punched openings, curtain walls, and where the two clay systems meet. Locally fabricated glazing accentuates a sense of openness within the five-story building, which features views with floor-to-ceiling windows at the end of all circulation corridors and abundant daylight illuminating work and circulation spaces - with strategically placed fenestration for an integrally designed interior and exterior.

Due to economics most facades are made with "off-the-shelf" systems provided by manufacturers, and this provides opportunity to interpret these in new ways with customization of system components for facades that are special to the place, uniqueness of function, and artistic rendering of the building. A multitude of materials can be employed in rainscreen systems, including wood, metal and masonry. Terra cotta however offered a relatively affordable way to achieve a durable finish with superior insulation values for Tykeson Hall. The terra cotta units were fabricated using the highly-efficient extrusion forming method, which pushes the material through a die with a uniform cross-section for a large number of pieces. The pre-fabricated modular nature of its construction lends it a certain modernity, with an open-jointed system that requires less maintenance over time.

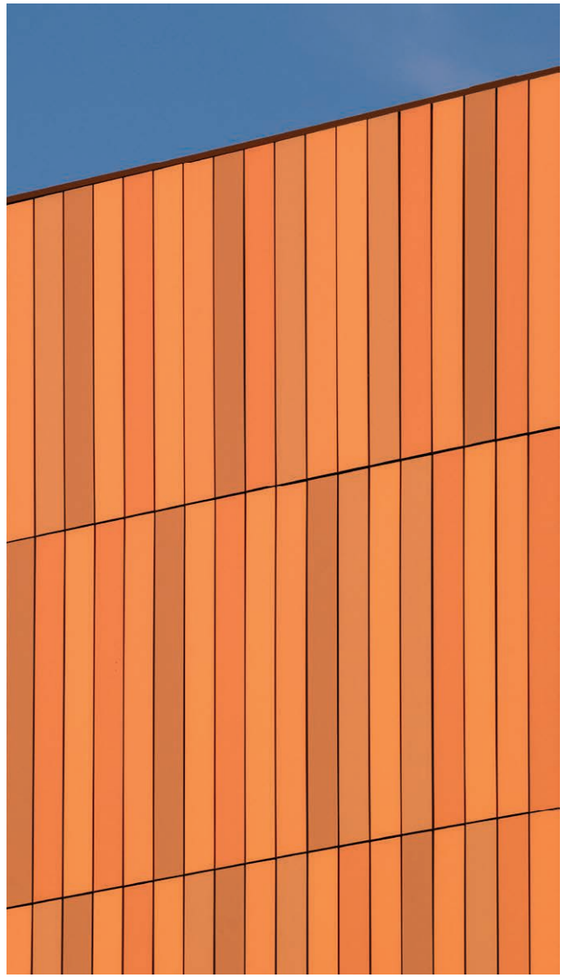
Sourcing of the materials in a sustainable way upholds the value system of the project. Climate change places great importance on the need for significant energy conservation and sustainability in the design of a high-performance façade system that contributes to the building's overall energy efficiency. This is where we can combine innovation and beauty through fabrication collaboration. Clay (terra cotta and brick) as a material is good from an energy and CO2 cost standpoint. No CO2 is generated from the raw material itself, and the material requires the least amount of energy and generates the least CO2 in production compared to a variety of other commonly-used building materials. The project team utilized extensive energy modelling to optimize façade enclosure and building performance.

Sustainability is integral to Tykeson Hall's design with both high- and low-tech solutions. Built upon a former surface parking lot, the building achieved LEED Gold certification and met the Architecture 2030 Challenge energy goals.

Reduced energy production and energy-use impacts on the environment and human health achieved an energy cost 47% lower than ASHRAE 90.1 standards.

Energy conservation measures include high-efficiency wall, roof and window assemblies for one of the first buildings in the Pacific Northwest to integrate post-tensioned concrete slab construction with a high-efficiency hydronic heating and cooling system, exposed thermal mass, and active chilled beams with heat recovery on HVAC systems. Practical design strategies include operable windows, ceiling fans, abundant (natural) daylighting, LED fixtures, daylight sensors, use of local materials to enhance comfort and regional connection, as well as low VOC materials. Highly efficient fixtures reduce potable water demand by 38%. The warm character of Pin Oak wood salvaged from construction site trees for ceilings and wall panels enhances select public spaces, and 89% of the construction waste was diverted to recycling plants. New adaptive landscaping, roof terrace native vegetation, and drip irrigation systems decrease potable water use by 58%, and storm water from the roof collects in rain gardens to return it to the aquifer.

The Tykeson Hall design takes advantage of clay-based materials' warm character, technical innovation, and geometric scale for ease of installation for an iconic building with an ecologically intelligent design representative of a new programmatic idea. The façade serves a functional and technologically sophisticated purpose yet exhibits artistic expression. The terra cotta color field converts light into an active element with an aesthetic nuance amplified by the radiance of natural light variations.



PHOTOGRAPHY SINZIANA VELICESCU

Radiant terra cotta during a Pacific Northwest sunset - where art, science, technology and architecture meet.

PROJECT CREDITS

Client University of Oregon
Design architect OFFICE 52 Architecture
Architect of record Rowell Brokaw
General contractor Fortis Construction Inc.
Interior design and programming RMA Studio
Sustainability consultant Brightworks Sustainability
Environmental | energy consultant Glumac
MEP Systems West Engineers
Civil KPFF Consulting Engineers
Structural Hohback Lewin, Inc.
Landscape PLACE Studio

SELECTED SOURCES

Terra cotta rain screen Shildan Group
Terra cotta installer Streimer
Brick Mutual Materials
Brick installer Davidson's Masonry Inc.
Fenestration glass Vitro
Insulated glass units Hartung
Glass installer Culver Glass Company

COPYRIGHT 2020 OFFICE 52 ARCHITECTURE