

ARCH 384: Live Make Competition Research Essay

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Live Make Industrial Arts Center Cincinnati competition calls for a design proposal that engages the site's rich historic fabric and restores the native living and making characteristic of the community. It aims to revitalize the district's economy by promoting localized industrial production and increasing public interest in CNC/robotic manufacturing.¹ Programmatically, the art center consists of private residences, maker-in-residence studios, light industrial studios, and open workshop. The site includes an existing one story brick building (previously a factory) and a north-facing backyard that extends to a wooded hill. Precedent/context research involved three main topics: city's history/master planning, refurbishment precedents, and green technology. Firstly, an in-depth research of the brewery district's history and current master planning was carried out. The result was an informed, sensible design scheme of the arts center – reflecting citizens' need through the placement of central work yard that invites public to the 'Make' programs of the arts center; continuing existing street fabric through careful street front design; and decision to employ a feature green wall. Secondly, refurbishment projects were closely studied, since retrofitting the existing brick building was a major component of the design proposal. This included looking at technical details of insulating existing brick wall, studying metal and copper as the main material palettes, and exploring open concept design for studio and workshop spaces. Lastly, research on green technology was conducted to address the integration of industrial nature of the building with sustainable features. It involved studying public buildings that incorporated green walls and various passive sustainable design methods.

The proposed site, Over-the-Rhine, a neighborhood in Cincinnati, is valued as the largest, most intact urban historic district in the United States. Over-the-Rhine's Brewery District was the heart of Cincinnati's beer brewing industry until the Prohibition, and is home to annual festivals such as Bockfest. The district was recently designated as an Urban Mix zoning area in order to encourage a return of manufacturing and living. It is the first citizen-created zoning district in the city's history, reflecting the need for quality public spaces, pedestrian-oriented streets, and easily accessible cultural amenities.² This desire to create hybridized spaces was addressed by BDAC's prominent "ribbon" that wraps the exterior and flows into the interior of the building, combining industrial and natural materials while connecting the 'Live' and 'Make' programs of the building (Figure 1). Further study of the master planning and documents from community meetings revealed concerns on the visibility and safety of existing playgrounds, which lack trees, doesn't have enough windows overlooking them, and are noted for crime/drug dealing. Responding to the district's need for a safe

¹ AIA Cincinnati, "Live Make Industrial Arts Center Cincinnati." Accessed April 27, 2013. <http://iaccincinnati.com/>

² Over The Rhine Brewery District Community Urban Redevelopment Corp., "Urban Mix Zoning District." Accessed April 22, 2013. http://www.otrbrewerydistrict.org/projects_zoning.php.

public green space that could serve as a cultural hub, one of the major concepts of the design proposal emerged – to create a courtyard that serves workshops on ground floor, and is visible from the street and can open up for social events (Figure 3). This courtyard extends to the backyard and wraps around the light industrial studios, visible to McMicken Avenue. It would add to the existing public spaces on McMicken Avenue (playgrounds, indoor recreation center) to effectively activate the district’s primary street. Another observation made was that the existing city’s fabric consists of brick buildings of 2-5 stories, placed very close to the street, forming intimate urban street corridors. This informed the front façade of BDAC which faces McMicken Avenue. The crucial task was to continue the existing fabric (by retaining existing brick building on site on grade) while introducing radically different, yet inviting features (tilted South-facing glass wall of digital fabrication lab, bronze metal screens on Southwest face). Infilled windows were opened up to create an inviting street frontage that would also make the street itself safer.

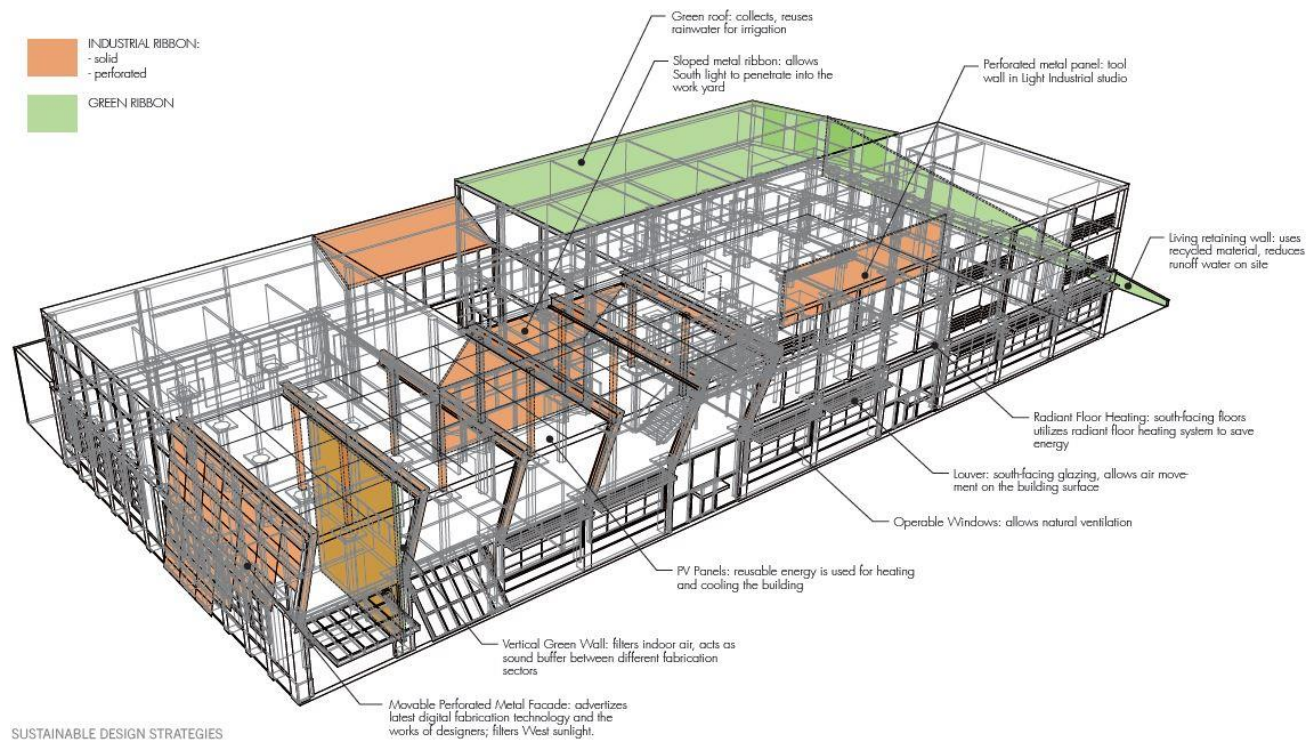


Figure 1: “Ribbon” concept, BDAC



Figure 2: Existing Playground, Brewery District

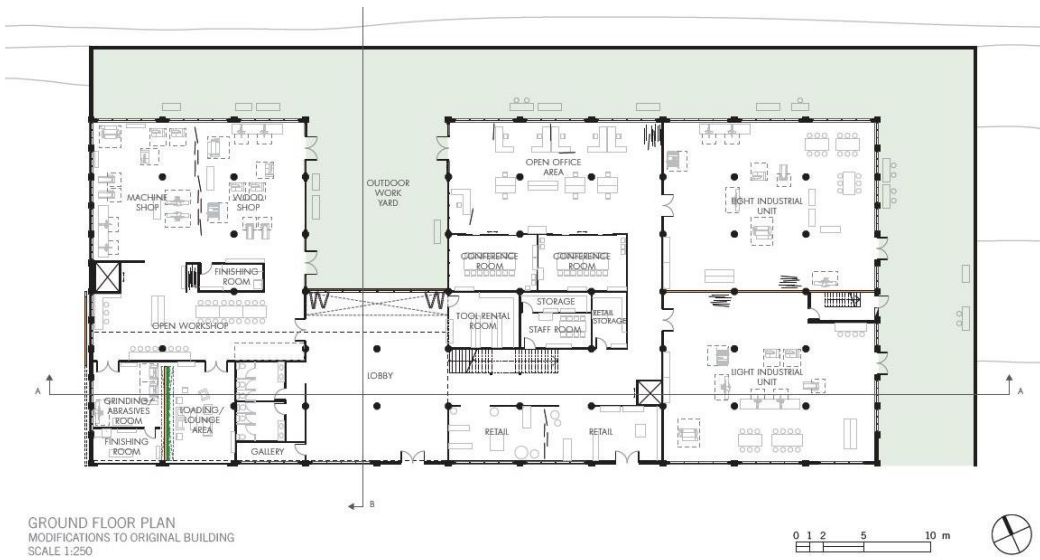


Figure 3: Ground Floor Plan with Work yard, BDAC

Study of refurbishment projects included looking at open layout/flexible spaces (movable wall panels, loft space), materials for the newly added portion of the building, and methods of insulating/managing existing brick walls. Abbotsford Warehouse Apartments is a primary building precedent that was studied for this purpose (Figure 4). The former Catholic Technical College was converted into three story warehouse apartments by removing the roof, retaining the lower floors and adding a new upper floor which has been set back on all sides to create upper balconies.³ The resulting look is a set of free standing brick walls offset from the inner core. The old brick walls of the previous college function as the main feature of the building, thus acknowledging its history to the public. The materiality of newly added portion of the building was also studied closely. Dark metal was used for columns, bracings, window frames, and guardrails to create a gentle contrast with the faded brick walls. The idea of putting the existing walls on display was employed for the design of the BDAC. It befitted the goal of promoting and celebrating the rich, industrial history of the Brewery District rather than merely leaving a vestige of once illustrious factory. To acknowledge existing historic building, original structural bays were kept and translated onto the upper floor where steel columns continue the rhythm of existing brick/concrete columns. Most of the existing concrete columns on the ground floor were also kept to retain the industrial spirit of the old building. Similar to the precedent building's materiality, dark metal finish was used for upper stories that embody digital fabrication lab, computer lab, and residential units (Figure 5). Since the building did not have additional insulation added to the existing brick wall, separate research was required to solve the technical issue of retrofitting load-bearing brick walls with interior insulation. Spraying airtight insulating foam directly to the back of the existing masonry is a suitable and popular approach. All air leakage condensation is strictly controlled, and is the most practical approach to achieving high levels of airtightness in existing buildings. Spray foam also acts as a moisture barrier, and any small amount of rain penetration will be localized and controlled.⁴ This method of using airtight spray foam was applied to the existing brick walls of BDAC to create a comfortable indoor environment.

³ Arch Daily, "The Abbotsford Warehouse Apartments." Accessed April 14, 2013. <http://www.archdaily.com/269623/the-abbotsford-warehouse-apartments-itn-architects/>.

⁴ Building Science Digests, "Interior Insulation Retrofits of Load-Bearing Masonry Walls In Cold Climates." Accessed April 25, 2013. <http://www.buildingscience.com/documents/digests/bsd-114-interior-insulation-retrofits-of-load-bearing-masonry-walls-in-cold-climates>.



Figure 4: Abbotsford Warehouse Apartments



Figure 5: Street View, BDAC

Botin Foundation Office by MVN Arquitectos was another main refurbishment project that was studied for its open concept workspace, featured existing brick wall, and material palette. The office building embodies a 1920s industrial building, successfully retaining the spirit of the original industrial character while allowing natural light into the building (Figure 6). The refurbishing process involved reopening of infilled windows and skylights, and mending internal structure to create a double-height atrium that would function as the main lobby.⁵ The ground floor is laid out for public activities with a flexible but modular open space, achieved by movable partitions. The material palette for new construction consists of oak, steel, and glass, adding warmth to the existing assembly. The idea of creating highly flexible open space – serving both public (lobby, exhibition) and private programs – was applied to BDAC in order to accommodate the changing goals and technologies of the art center itself and the district. Office space east to the central courtyard and workshop on both floors employ movable partition walls. This enables multiple configuration of spaces to accommodate different activities. For instance, the office on ground floor could be rearranged into one large meeting room that can be used for public education purposes. In turn, the meeting room space could spill out to courtyard where demonstrations of tools or

⁵ Arch Daily, "New offices of the Botín Foundation." Accessed April 10, 2013. <http://www.archdaily.com/284283/new-offices-of-the-botin-foundation-mvn-arquitectos/>.

exhibition of crafts could be held (Figure 7). The concept of modular, movable panels was also applied to Southwest side of the arts center. The perforated, laser-cut panels feature the works of BDAC users, and are replaced monthly with new works to act as a symbol for dynamic and constantly evolving nature of the district. Similar perforated bronze panels are used throughout the building (office, residential units, workshops) to create flexible spaces and serve as a board for hanging tools/works (Figure 8).



Figure 6: Atrium, Botin Foundation Office



Figure 7: Work yard, BDAC



Figure 8: Live unit, BDAC

Last portion of research addressed the idea of integrating sustainable features with the industrial nature of the BDAC. It involved looking at various passive sustainable strategies and green wall application. The goal was to create a continuous ‘ribbon’ combining industrial and natural materials, while wrapping together the ‘Live’ and ‘Make’ components. For site strategies and passive sustainable methods, Evergreen Brick Works was studied as a chief precedent. The project revitalizes an abandoned brick factory into a vibrant public space, healing contaminated landscapes, reusing buildings, and regenerating ecosystems. Its walls combine 150mm of locally manufactured rigid mineral wool placed exterior to the building sheathing, additional 50mm closed-cell foam placed in steel cavity, achieving R-value of 35 (Figure 9). It also uses additional insulation to the exterior of the roof along with 150mm of growing medium that further reduces heating and cooling load (overall R-value of 50).⁶ Similarly, BDAC applies closed-cell foam insulation (exterior to steel stud cavity) and green roof for Northeast portion of the building to achieve effective R-values. In addition, the green roof provides storm water retention, wildlife habitat, buffer against heat and cold. The cladding of upper floor was also inspired by that of Brick Works which uses corrugated steel cladding covered in zinc to extend its life. It is 80% post-consumer and 16% pre-consumer recycled content and regionally manufactured. Window construction was also inspired by that of the Brick Works, and consists of durable fiberglass frames, which insulate better than metal and resist thermal expansion/contraction that can compromise seals. Fiberglass frame also requires the lowest amount of energy during its production compared to other window-frame materials. All windows are double, with a layer of Heat Mirror, a transparent film that reflects radiated heat, in between the panes. Resulting insulation value of windows is R-8 (norm for office building windows is R-3). As horizontal louvers applied on Brick Works did not suit the goal of making the digital fabrication lab a transparent/iconic volume, ceramic frits were chosen to control the amount of solar gain. Rest of the south facing windows applies overhangs, while west and east facing windows apply external louvers to effectively reduce summer heat gain. In addition, deciduous trees planted act as vertical shading device to minimize summer heat gain while allowing winter light. The idea of integrating a wall with artwork (Figure 10) was applied to the wall separating maker-in-residence studio and digital fabrication lab. The side that faces digital fabrication lab is a green wall, acting as indoor air filter and sound buffer, while the back of it, facing maker-in-residence studio, is made of perforated metal screen for hanging tools/works (Figure 11). Living retaining wall – composed of recycled materials and reducing runoff water on site – was used on north and east of the backyard (Figure 12).

⁶ Evergreen Brick Works, "Green Design at EBW." Accessed April 15, 2013. <http://ebw.evergreen.ca/about/green-design>.



Figure 9: Insulation, Brick Work



Figure 10: Concept for Wall with Integrated Artwork, Brick Works



Figure 11: Green Wall + Digital Fabrication Lab, BDAC



Figure 12: Living Retaining Wall, Lima

Overall, the design of BDAC was informed by thorough research on three topics: city's history/master planning, refurbishment of existing brick buildings, and green technology. The result was a sensible design that responds to the community's need for a safe public space, while engaging the site's rich historic fabric and restoring the district's unique living and making characteristic. It clearly demonstrates that "the works of the past always influence us" and that "the past is not just that which we know, it is that which we use, in a variety of ways, in the making of new work."⁷

⁷ The Harvard Architectural Review. Volume 5. Precedent and Invention. Between History and Tradition: Notes Toward a Theory of Precedent. John E. Hancock.

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Pictures

[Figure 2]

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[Figure 4]

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[Figure 6]

Arch Daily, "New offices of the Botín Foundation." Accessed April 10, 2013. <http://www.archdaily.com/284283/new-offices-of-the-botin-foundation-mvn-arquitectos/>.

[Figure 9]

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[Figure 12]

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All other pictures are produced by Jiyeon Kim and Michelle Piotrowski as a part of the LIVE-MAKE Competition 2012/2013 entry.