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Clock Shadow Building

Project Overview

Exterior Image - Photo Credit: Daniel Andera Photography

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The Clock Shadow Building is not your ordinary sustainable building. The developer came to the project team with a vision “to transform a vacant brownfield site into an environmentally sustainable building that provides a home for occupants that share a commitment to community and environmental values.” The developer wanted a building that was a commercially viable project, repeatable in different communities, a radically sustainable building that followed the Living Building Challenge, and met the quadruple bottom line mission of economic improvement, social justice, environmental restoration, and cultural celebration. With these ambitious and unapologetic goals, the project team set off to design a one-of-a-kind building for a one-of-a-kind developer.

The project sits in Milwaukee’s Walker’s Point neighborhood and is inserted into a small, 4,000-square-foot site in this dense area. The four-story, 28,000-square-foot building houses a mix of non-profit organizations providing healthcare services for the neighborhood’s under-served population, as well as an artisan cheese factory and a premium ice cream store.

Location:
138 West Bruce Street
Milwaukee Wisconsin 53204
United States
Project Owner:
Fix Development
Submitting Architect:
Continuum Architects + Planners
Project Completion Date:
March, 2012
Project Site:
Brownfield Site
Project Type:
Mixed – Use
Project Site Context/Setting:

Urban
Other Building Description:
New
Building or Project Gross Floor Area:
30,370 square feet
BOMA Floor area method used?:
No
Hours of Operation:
Monday - Friday 7:00am - 6:00pm
Total project cost at time of completion, land excluded:
$6,000,000.00

Design & Innovation

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The design of the building started with an idea to create a radically sustainable building that is affordable and repeatable. The project's goals dictated that all sustainable measures be explored, while the project's budget ensured that all features implemented would face great scrutiny in their bid for acceptance in the project's final budget.

Many forms of sustainability were tackled. The project cleans up a brownfield site that was difficult to develop; it provides a beautiful building that has been embraced by the community; it provides needed services to the community that were previously difficult to obtain; it conserves energy and water; it manages a majority of the stormwater on site; it promotes local urban gardens with its community garden on the roof; it promotes healthy living with a central stairway that encourages walking; and it provides pleasant interior spaces with plenty of sunlight and fresh air.

Of special focus for the project team was maximizing the amount of salvaged materials for the project. Nearly 30% of the project's materials are salvaged. In order to achieve this, the project team developed a different model for material procurement that maximized the salvaged material while maintaining the construction schedule.

Regional/Community Design

Community Demographics - Photo Credit: Continuum Architects + Planners

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The project is committed to creating positive change in its neighborhood. The non-profit organizations that inhabit the upper floors work together to provide integrated and holistic mental, physical and spiritual health services: 1) Walker's Point Clinic provides free primary care for uninsured patients, 2) The Healing Center provides counseling services to domestic abuse survivors, and 3) CORE/El Centro is a natural healing center that offers a combination of health promotion and wellness counseling.

The first floor is occupied by a local cheese maker who specializes in producing artisan cheeses and an ice cream shop that makes and sells some of the city's best ice cream.

With these uses on all the floors, the building begins to foster a true sense of community, embracing all of humanity through equal access and dignity. The building's program creates the opportunity for people with financial means to enjoy a triple scoop premium ice cream cone alongside a homeless person seeking basic primary health care. The project doesn't segregate these two human extremes, rather, combines them with the hope that their integration will build a greater sense of shared purpose and shared commitment to mutual health and prosperity.

Metrics

Estimated percent of occupants using public transit, cycling or walking:
35%

Land Use & Site Ecology

Overhang at South Facade -

Photo Credit: Tricia Shay Photography

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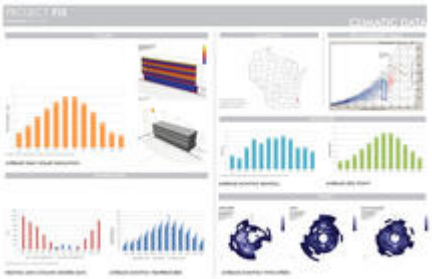
This project is built on a challenging site that had three significant obstacles to development. The property was formally marsh land that was in-filled in the early part of the 19th century and therefore had structurally unstable soil; it had previously held a foundry operation which contaminated its soil; and at 4,000 sf, was considered too small to support a profitable development. The project responded to these challenges in cost-effective and innovative ways. The design called for a deep foundation system that contained 55 piers driven 100’ into the earth. The contaminated soil from the foundry was segregated, remediated and in some cases removed. And in an effort to expand the small site footprint and maximize the floor plate above, the upper three floors of the building are cantilevered over the right of way of the south side of the property increasing the leasable area by over 15%.

With these solutions, the project develops previously undevelopable land, and simultaneously transforms a blighted spot in the neighborhood into a beautiful building that provides essential goods and services to the community.

Bioclimatic Design



Climate Information - Photo Credit: Continuum Architects + Planners

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Milwaukee has a continental climate with large temperature and humidity swings throughout the year. These swings necessitate the use of heating and cooling systems that will condition the spaces during the extreme winter and summer months. However, the team wanted to minimize the use of these systems during the swing months of April, May, September and October. Passive strategies, such as the south-facing windows with sun screens that maximize solar heat gain during cooler months, and operable windows that let cool fresh air into the building, allow the users to greatly decrease and even effectively “turn off” the heating and cooling systems during these swing months.

To gain the most efficiency from the HVAC systems, the project utilizes a ground-source heat pump system, drilled directly below the building, that stabilizes the temperature of the conditioned water used to heat and cool the spaces. Additionally, the building has a very tight exterior envelope with high thermal resistance to prevent conditioned air from escaping. Exterior walls of the building have an R-value of 16 while the roof has an average R value of 42—nearly 70% more than the standard amount.

Light & Air

Rooftop garden - Photo Credit: Tricia Shay Photography

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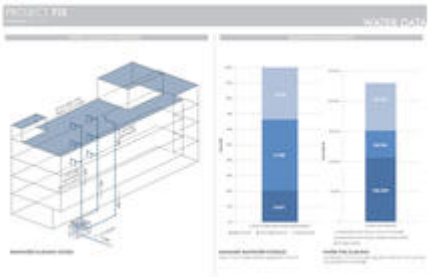
The project uses a number of strategies to maximize the connection to the exterior and promote daylighting of the interior spaces. The building takes advantage of its southern orientation and uses large 10 foot by 10 foot windows on the south facade to bring daylight deep into the interior spaces. The building also specifically locates open office spaces along this southern wall as a way to maximize the daylighting and views in these spaces. The windows have sun shades to prevent excessive heat gain in the summer months, and still allow generous daylight penetration, and also have operable windows that allow fresh, cool air into the spaces during more temperate months. Additionally, all spaces with access to daylighting have electric lighting with dimmable controls and sensors that activate the lights only when needed or the space is occupied.

Lastly, the building provides an exterior roof space for all the tenants to enjoy during the temperate months. This roof space is used for yoga classes, meetings, and other community gatherings and provides all occupants with fresh air and brilliant views of the Milwaukee Harbor. It also provides additional habitat space for some of the urban wildlife in the area.

Metrics

Daylighting at levels that allow lights to be off during daylight hours:
41%
Views to the Outdoors:
63%
Within 15 feet of an operable window:
44%

Water Cycle



Water Conservation - Photo Credit: Continuum Architects + Planners

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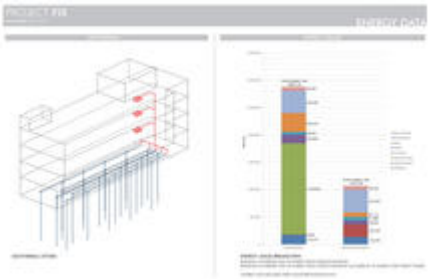
In this area of Milwaukee, the municipal sewer system combines storm and sanitary sewers into one system that leads to a lakefront plant where it is cleaned, purified, and ultimately released into Lake Michigan. At times of significant rain, the Sewerage District is forced to discharge large amounts of semi-treated water into the lake in order to prevent sewer back-ups in residences. With this in mind, the project placed a high priority on minimizing the amount of water that is discharged into the city sewer system.

The project implements two strategies to minimize this discharge. First, it has a green roof covering about 50% of the roof area that retains the rainwater before it is allowed to get into the sewer system. Second, it uses a 5,000-gallon cistern that stores all rainwater that is discharged off the roof. The building uses this water to flush toilets in the building, making this the first commercially permitted building in Milwaukee to have a grey-water flushing system. With these two components, the project holds over 66% of the two-year storm runoff and reduces the amount of potable water used of the building by 54%.

Metrics

Percent reduction of regulated potable water:
54%
Is potable water used for irrigation:
No
Percent of rainwater from maximum anticipated 24 hour, 2-year storm event that can be managed onsite:
66%

Energy Flows & Energy Future



Energy Conservation - Photo Credit: Continuum Architects + Planners

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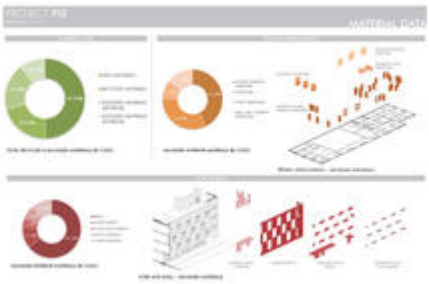
One of the critical goals of the project was to be carbon neutral. However, it was clear early on that this dense urban site would not be able to generate enough energy to have any impact on the building's energy consumption. The roof was only big enough to hold 6,000 s.f. of photovoltic cells—not nearly enough to justify the infrastructure required to efficiently use this energy, and the project team quickly concluded that building-mounted wind was an experimental proposition at best. The project researched erecting a dedicated wind turbine off-site to offset the energy use of the building, however, ultimately this proved not to be financially feasible.

The team instead concentrated on significantly reducing the energy consumption of the building to allow it to purchase green energy from the local utility's Renewable Energy program. The building reduces its energy consumption by over 37% when compared to the median building in Energy Star. Purchasing renewable energy allowed the project to be carbon neutral, took advantage of the economies of scale of the utility company for renewable power, and through the creation of more demand for this energy, lobbied the utility to increase the amount of renewable power it generates.

Metrics

Total pEUI:
44 kBtu/sf/yr
Net pEUI:
44 kBtu/sf/yr
Percent Reduction from National Median EUI for Building Type (predicted):
37%
Lighting Power Density:
0.78 watts/sf
Upload Energy Data Attachment:
Energy Cost Budget.pdf

Materials & Construction



Salvaged Material Use - Photo Credit: Continuum Architects + Planners

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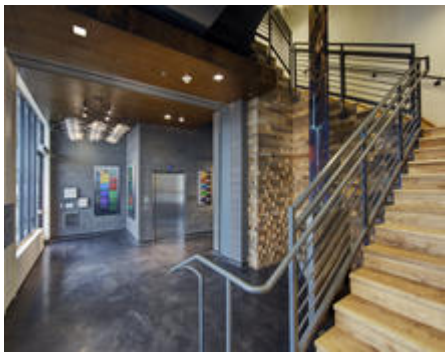
The project team was intensely focused on using salvaged materials because using these materials is an economical way to integrate multiple sustainable features into a project. This tactic extends the life of useful materials, prevents these materials from being sent to a

landfill, saves significant energy / carbon footprint by eliminating the manufacturing process, and promotes the local economy. On this project, over 30% of the building's materials are salvaged.

Moreover, the design of the building attempts to capture the character and soul of a building made of these salvaged materials. The building's exterior, comprised of a palate of materials that includes "cream city" brick, weathered wood siding and rusted steel panels, is infused with the warmth and familiarity that comes from the age of these materials. Woven together, the full effect is to give the overall design a weathered patina that fits seamlessly into this urban neighborhood.
While the design uses these materials to contribute to the building's character, they do not prescribe the style of the project. Instead, the design juxtaposes these materials with a contemporary, elegant facade that expresses both the solidity of the building and the staccato rhythm and texture of the surrounding environment.

Long Life, Loose Fit



Main Stair - Photo Credit: Tricia Shay Photography

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The project places an imperative on making this development financially sustainable for the tenants. In order to justify their move into a new facility, the non-profits organizations had to ensure that this move was one that would enhance and grow the long-term viability of their programs. Additionally, because of their intermingled services they needed a place that promoted their synergistic relationship.

The developer and the tenants entered into agreements for long-term leases structured to give them affordable and cost-certain rents. This assures that they will be part of this building and this community for the long term, and will be able to concentrate on growing their services. To promote the synergy of these tenants, different floors have spaces that are intended to be shared between the organizations. Instead of building a large conference room on all three floors, we have built one on the second floor which all three organizations can use.

Lastly, to encourage this synergy, the design provides a light filled, open wood staircase that connects these organizations, inviting people to walk between the floors in lieu of taking the elevator.

Collective Wisdom & Feedback Loops

The project undertook many challenges and pushed many boundaries that required coordination between many stakeholders. Below are three examples:

This project is the first project in Milwaukee to obtain a city permit to use rainwater to flush toilets. The design team worked with the Urban Ecology Center of Milwaukee, which had previously participated in an experimental program to use this flushing system, and allowed the City to monitor water quality levels of the system. The team gained valuable insights from this program and used this experience to design a system that the City would approve.

The high priority on using salvaged materials dictated that the project team develop a process that facilitated the use of these materials. This process created schedule benchmarks that, without compromising the timeline, allowed the team to find useful and durable salvaged materials of sufficient quantities, and once found, determine if they would be available at the appropriate time, or if they needed to be procured and stored until the construction was at a point where they could be used.

Lastly, the tenants hold a monthly meeting to track performance of things such as energy used, biking to work, composting of lunch materials, and recycling compliance.

Other Information

Cost and Payback Analysis:

Being a commercial development, the project had to use its sustainable dollars wisely. Every decision on the project was analyzed from a life-cycle cost perspective, and to see if it met the quadruple bottom line mission of the project. Simply put, sustainable strategies had to contribute in more than one way.

For example, the grey-water flushing, the intensive green roof and the geothermal wells all had significant costs associated with them, but were included because they contributed to the both the micro-environment of the site, as well as the macro-environment of the region.

The operable windows, the inviting central stairwell, and pleasant day-lit spaces were included because they conserved energy, and also contributed to the quality of life of the occupants.

The salvaged materials not only reduced the waste stream, and reduced the energy associated with creating new materials, but also connected the inhabitants to the history of the neighborhood, and created a beautiful building that they could embrace.

Lastly, the tenants of the building have not only provided the neighborhood with valuable goods and services, but also reaffirmed the quality of this a great neighborhood, and restored the pride of place with the inhabitants of the community.

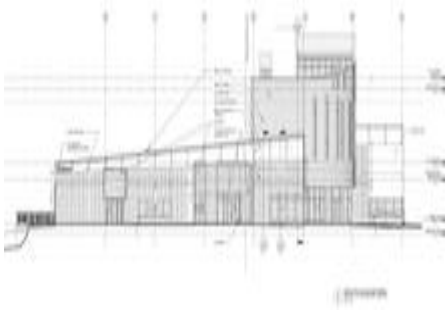
Process and Results:

The project put great emphasis on using salvaged materials. This led to challenges in creating a design using materials that had not yet been sourced. The design had to be flexible and allow the ability for different salvaged materials to be replaced if they could not be located during the construction phase of the project.

Additionally, the project team took great pains to create a design that contributed to the elimination of construction waste. For example, knowing that the reclaimed wood siding came in random lengths, the team standardized the length of the siding on the exterior, and used scrap wood that was cut off these random lengths to clad the stair at the first floor lobby. The design team worked with the contractors to set up a pattern that could be used with small lengths of scrap wood to create a beautiful composition from these scraps.

Lastly, the team also concentrated on recycling construction waste from the project. Working with Waste Cap—a local organization that specializes in recycling construction waste—the project was able to recycle 99% of its construction waste.

Additional Images



South Elevation - Photo Credit: Continuum Architects + Planners

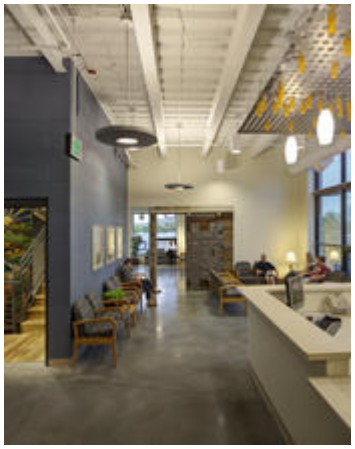
Second Floor Plan - Photo Credit: Continuum Architects + Planners

Site Plan - Photo Credit: Continuum Architects + Planners

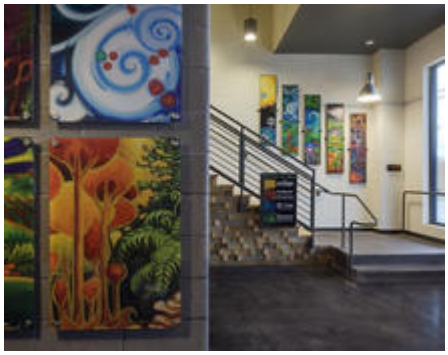
Exterior Materials - Photo Credit: Tricia Shay Photography

Exterior view at dusk - Photo Credit: Tricia Shay Photography

West Facade - Photo Credit: Tricia Shay Photography



Clinic Lobby - Photo Credit: Tricia Shay Photography



First Floor Lobby Art - Photo Credit: Tricia Shay Photography

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Project Team and Contact Information

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MEP Engineering	Lev	Zvenyach	IBC Engineering	Milwaukee, WI
Civil Engineer	Steve	Fisco	Graef USA	Milwaukee, WI
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