Ball State Indianapolis Center

An architecture project for ARCH 401
submitted for the Honors College Thesis

by

Whitney Ruckel

December 2006
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Ball State University
Muncie, Indiana
United States

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Abstract

The Ball State Indianapolis Center is currently located at 50 S. Meridian Street – in the heart of the city’s Business District. Ball State has a three year lease for the first three floors of this building.

My goal for this project was to consider the BSU Indy Center, and propose a design for a building that might house the institution in the future.

Our professor wanted this eleven-week project to be a comprehensive project, applying our knowledge of structure, environmental systems, sustainability, life safety, circulation, and the building’s skin.
Our Assignment

Andrea Swartz gave our studio section four options for the program of our assignment.

We could design a charter high school, a cultural center, an urban design center, or a mixed-used project, which would combine elements of the first three.
Choosing a Program

I chose to develop an urban design center, because I felt that it would challenge me the most. I had a lot of experience designing small-scale buildings. I reasoned that the urban design center would most likely require an urban site, which would in turn, require a larger building. So, I chose the design center option as a way to push myself.
We were allowed to develop our project on the old campus of the Herron School of Art, on Massachusetts Avenue, or in the Central Business District.

After interviewing Brad Beaubien, an employee at Ball State’s current Indianapolis Center, I chose the third location. Mr. Beaubien mentioned that over its history the Ball State Indianapolis Center (sometimes called the CAP Indy Center) has been in three locations. The first two were on Washington Street, within hundreds of feet Circle Center’s Arts Garden. One of those locations had a window on the ground floor where students from Center could display their work.

At that time, the CAP Indy Center was working with the city of Indianapolis to help develop a new comprehensive plan. Mr. Beaubien noted that the Center’s storefront position was a key to its success. People would walk in off the street to check out the Center, and in turn, they would learn a little bit more about city planning. It was also helpful for the center to be located near the center of business so that students working on plans for the city could interact with representatives from businesses, developers, and the government. Mr. Beaubien believes that any future location for the BSU Indy Center would need to have access to a street with a lot of pedestrian activity.

For this reason, I decided that I would look for a suitable site in the Central Business District.
Choosing a Site

We were given the choice between three sites for our project. I chose the Central Business District because I felt it would be an appropriate location for an Urban Design Center.
Because the project was for an architecture class, the requirements demanded that I propose a new building in my proposal for the center. After taking a survey of vacant property in Downtown Indianapolis, I chose a site on Washington Street. I felt that it had the right dimensions for a building that would house a small school. I also appreciated the building would be adjacent to an alley, which would lend a sidewall where windows could be legally built.
A Survey of Unused Property

- The Current BSU Indy Center
- Undeveloped (e.g. Parking Lots)
- Proposed Site for New Center
After selecting that location, I walked around the site and noted the dimensions and heights of every building within one block. Later, I used those notes, together with an aerial photograph, to construct a 1" = 40' scale “context model” of the site. I then placed this model on the Architecture Building’s Heliodon (which simulates the sun at different times of the year) to see how much access the site had to direct sunlight.

I concluded that a tall building would have the most access to the sun if it were placed toward the southern end of the site. However, I decided to build against the Northern half of the site so that the building fronted the sidewalk. By doing this, the building would follow the example of the other buildings in its surroundings, and reinforce the urban pattern already in existence.
Site Analysis

After noting the dimensions of adjacent buildings, I built this scale model of the site's surroundings.

By moving the building North, away from the alley, the building has more access to direct sunlight. (Picture depicts sun angle at 12:00 on Dec. 21.)

An 8-story building 0' from the alley  
An 8-story building 120' from the alley
Referring to Ball State’s webpage for its distance education program, I discovered that in addition to the courses that are currently offered at the Ball State Indianapolis Center, the program offers a number of additional programs. I believed that some additional programs could be taught at the BSU Indianapolis Center if it had a bigger facility. Those additional programs included Business, Coaching, Public Relations, and Public Service. The rest of the programs had special demands that required students to take classes in hospitals or schools – where they could be exposed to real-life scenarios.

By examining the schedules of classes currently offered for the Fall Semester through the distance education program, I got a feel for how many classrooms would be needed. It seemed that six classrooms, two computer labs, and two studios could more than accommodate the current needs of the Program. However, my professor encouraged me to put a few more classrooms to accommodate growth within the program.

I also planned a first floor, “storefront” gallery that could display the work of the students. I felt this would create a transitional space between the public nature of the street and the more private classroom spaces.
The First Outline of the Program

<table>
<thead>
<tr>
<th>Type of Space</th>
<th>Net Sq. Ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gallery</td>
<td></td>
</tr>
<tr>
<td>Permanent Exhibit</td>
<td>3500</td>
</tr>
<tr>
<td>Flexible Space</td>
<td>3500</td>
</tr>
<tr>
<td>Administration &amp; Lobby</td>
<td></td>
</tr>
<tr>
<td>Administration Office</td>
<td>800</td>
</tr>
<tr>
<td>Lobby</td>
<td>1600</td>
</tr>
<tr>
<td>8 Classrooms</td>
<td></td>
</tr>
<tr>
<td>x 600 sq. ft.</td>
<td>4800</td>
</tr>
<tr>
<td>2 Studios</td>
<td></td>
</tr>
<tr>
<td>x 1500 sq. ft.</td>
<td>3000</td>
</tr>
<tr>
<td>2 Computer Lab</td>
<td></td>
</tr>
<tr>
<td>x 750 sq. ft.</td>
<td>1500</td>
</tr>
<tr>
<td>Bathrooms</td>
<td></td>
</tr>
<tr>
<td>Janitorial &amp; Mechanical Spaces</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1000</td>
</tr>
<tr>
<td>Subtotal</td>
<td>41,900</td>
</tr>
<tr>
<td>+ 20% for Circulation</td>
<td>8380</td>
</tr>
<tr>
<td>Total</td>
<td>50,000</td>
</tr>
</tbody>
</table>
To get a feeling for how big the classrooms and studios should be, I studied White Design's Studio Building for the University of West England. Their design had a series of balconies that admitted light to the lowest level of the school. I felt that this would be a good idea for the building I was proposing, because it would create visual connections between classrooms, and it would admit natural light into the classes. Thus, I designed a six-story building that included a glass atrium in the middle of the top four floors.

I chose reinforced concrete for the structure. I believed that concrete would not require extra fireproofing, and it would provide thermal mass to store heat from the sun.

I also sought to create a connection with the street. I hoped that I could design the skin in a way that showed the locations of the various elements of its program. I thought that in this way, the building would "communicate" to the street – telling it what types of spaces it housed. I attempted to create this level of communication by moving the fire stairs to the building's street facade, and by using one opaque material for the walls of the classrooms, another for the studios, and a glass curtain wall for the first floor gallery.
The First Design

During this phase of the design, I explored two organizing schemes. The first, shown on this page organizes classrooms along a **central corridor**.

The second, shown on the page 11, includes classroom separated by an **atrium**.

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**The North Facade** incorporates different types of sheathing and window sizes to communicate its program to the pedestrians on the street.

**The North Facade** incorporates different types of sheathing and window sizes to communicate its program to the pedestrians on the street.
I presented this work to Andrea Swartz, Jeff Culp, and Rod Underwood. Rod suggested that rather than create six “pancake” floors modeled off of each other, I instead position the massing of the building in a way that lent itself to the sunlight. For example, I could put classrooms on top of the first six floors in a thin, several-story tower that had windows on three sides of each classroom.

Jeff Culp suggested that I add apartments to the building. They would help to enliven the Central Business District by bringing people there after business hours, and it would justify the price Ball State would need to pay to obtain the prime real estate I had chosen for a site.

I took both of these suggestions to heart, and reorganized the building over the next six weeks.
A Precedent Study that encouraged me to include an atrium in my model.

Roof View - showing the atrium and the skylights admitting light into all of the floors

The East elevation - showing eight (instead of six) floors. Gaps are left in the facade to create a patchwork effect.
Because most of the students were designing their buildings on the Herron School of Art Campus, our professor arranged a field trip to several universities to study the ways that notable architects designed for campuses. We visited the University of Michigan, Cranbrook, and Oberlin College.

While we were at the University of Michigan, I studied the double-skin facade of its new Biomedical Science Research Building. We learned that the outer glass wall trapped hot air in a four foot-wide cavity. In the winter, this space could be heated, and operable windows in the interior wall of glass would allow hot air to flow from the cavity into the adjacent offices. In the summer, vents would be opened at the top and bottom of the space. Instead of trapping hot air, the space would work as a heat-stack, pulling hot air out of the cavity, and out of the offices too.
A Trip to the University of Michigan
Studying the Biomedical Science Research Building
I drew some diagrams of this facade to better understand how it was put together. I later modeled the southern skin of my apartments after this example.
I discovered that this building had a **double skin**. Its two layers of glass helped cool and heat the building. After doing these diagrams, I felt inspired to incorporate a similar approach in the next phase of my project.
Following the suggestions from my review, I added apartments to the building’s second design. I created a tower to the north of the site, where residents could have access to the sun – uninterrupted by the shadows of the parking garage to the south. However, I also added a tower on the south side of the site, so that the two towers would enclose a small courtyard, which would be an amenity to the residents.

To communicate the building’s functions, I pushed all of the stair and elevator towers to the east facade, where (until a building was built on the lot to the East) they could be seen by people on Washington Street. The different window sizes on the North facade also served to communicate the building’s functions. The ribbon windows on the second through fourth floors indicated the classrooms, while the smaller windows on the fifth through tenth floors suggested that they were for apartments.
The Second Design

The first (above) and second (below) designs

The new design stretched the full length of the site and incorporated apartments. The apartments are not necessarily intended to be for the BSU Indy Center Students.
On the south facades, I created an undulating surface. I used different sizes of glass walls, which were set out at different lengths from the south apartment walls. Some of the glass was transparent, some was opaque, and some had mesh screens placed behind them. The effect gave the building a patchwork appearance, making the facade read as an assembly of many apartments.

I intended the undulations to create gaps where air heated by the southern sun could transfer between floors. I thought this would help the building to heat and cool itself.

My fellow students appreciated the way that the glass panels in the southern facade extended various lengths from the balconies. My classmate Stephen Killion recommended that I look at a picture of a certain building he saw while in Europe. The building was designed by Andres Alver and Tiit Trummal. The photograph shows that there are stairs behind the glazing in the middle of the front facade. The ribbon window on the right of the facade seems to communicate that there is a conference room behind it. The different materials used in the model communicate the building’s program and provide a richness that enlivens the facade.
The North, more private, street-facing facade

The Southern facades featured a patchwork of undulating glass, visually breaking down the facade of the high rise into identifiable units.
Instead of concentrating the classrooms on the second through fourth floors of the north tower, I conceived of the building as two towers hovering above a horizontal strip. The horizontal strip would contain a gallery and two levels of classrooms; the towers would contain the apartments.

I had never intended for the apartments to be for Ball State Indianapolis Center students. I envisioned the building as mixed use, with one service on the first floor, and another on the floors above. To create some sense of privacy between the two functions of the building, I placed a stairs on the east side of the building, leading up to the resident’s courtyard, which is on the “second” floor of the building. By using this stair, residents could be free to exit and enter their apartments without walking through the school.
Reorganizing the Building
When I designed the horizontal strip of classrooms, I knew that I couldn’t give all of the classrooms windows with views. Instead, I raised one floor six feet above the sidewalk and I placed the other floor six feet below it. By doing this, both levels could have some access to the sunlight. On the West side of the building, I included a skylight that would admit a small amount of indirect light into the corridor. While this would not keep the corridor or classrooms well-lit, it would give people a view of the sky and an idea of whether it was day or night.
Giving the Classrooms Access to Light

Section A-A  Scale 1:250 at A4

University of the West of England
New School of Planning & Architecture, Bristol

© white design 2003-2004
In response to this precedent, I made the eastern facade more pronounced by using glazing to expose the fire stairs, elevators, and heating systems.

On the north facade, I created a pattern of solids and voids by pushing apartments in and out. Some apartments were flush with the corridor on the north side of the tower. Others were set back five or ten feet from the corridor, creating a wider space where people could gather. The same push and pull occurred on the south side of the tower. These wider and narrower spaces then informed the composition the facade. For example: as shown on page 10, wherever the apartments were pushed back from the north corridor, a screen of wooden louvers was placed in front of the windows, giving this gathering space some privacy from the street.

These louvers were set one foot away from the railing of the corridor, and were positioned between two vertical aluminum panels. A continuous glass skin was then placed in front of these louvers, sealing the front of the building.
Redesigning the Facade

The diagram I drew earlier gave me some ideas that helped me design the final wall section for the building's undulating glass facade.

The new facade incorporates an opaque wall on the south end and exposed stairs, elevators, and structure.
On the south side, the aluminum panels were also used. Instead of strategically placed louvers, though, a combination of translucent and transparent glass was used. The translucent glass would be set out further than the transparent glass, and, like the louvers, would also serve to create a little more privacy for the wider gathering spaces.
A Pattern of Setbacks

Floor Plans

Section thru North Side of Apartments
Location of Site:
50 W. Washington St.
The Final Design

<table>
<thead>
<tr>
<th>Type of Space</th>
<th>Net Sq. Ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BSU Indianapolis Center</strong></td>
<td></td>
</tr>
<tr>
<td>Gallery</td>
<td>730</td>
</tr>
<tr>
<td>24 Classrooms x 400 sq. ft.</td>
<td>9600</td>
</tr>
<tr>
<td>4 Bathrooms x 180 sq. ft.</td>
<td>180</td>
</tr>
<tr>
<td>14 Faculty Offices x 70 sq. ft.</td>
<td>980</td>
</tr>
<tr>
<td><strong>Apartment Complex</strong></td>
<td></td>
</tr>
<tr>
<td>15 Apartments x 1200 sq. ft.</td>
<td>18,000</td>
</tr>
<tr>
<td>3 Apartments x 1000 sq. ft.</td>
<td>3000</td>
</tr>
<tr>
<td>Laundry Room</td>
<td>860</td>
</tr>
<tr>
<td>Recreation Room</td>
<td>600</td>
</tr>
<tr>
<td>Mechanical Room</td>
<td>60</td>
</tr>
<tr>
<td>Enclosed Lobby</td>
<td>3500</td>
</tr>
<tr>
<td>Courtyard</td>
<td>3500</td>
</tr>
<tr>
<td><strong>Total Program Space</strong></td>
<td>41,000</td>
</tr>
<tr>
<td><strong>Actual Gross Sq. Ft.</strong></td>
<td>90,200</td>
</tr>
</tbody>
</table>
Floor Plans

Lower Level:
Ball State Indy Center

First Floor:
Ball State Indy Center
Rec Room

Mech Room
Laundry
Courtyard
Enclosed Lobby for Apartment Residents

Second Floor: Lobby for Apartments

2 BR Apartment
(1000 S.F.)

Third Floor and Above: Apartments

2 BR Apartment
(1200 S.F.)

2 BR Apartment
(1200 S.F.)

Sun Porches

2 BR Apartment
(1200 S.F.)
The View to Washington Street
Accessing Light and the Sun
Technical Details

Insulated Aluminum Panels
(6" x 48" x 12'-0")

Rain Guard:
1/2"-thick Steel Plate

HSS 8 x 4 x 1/2

Aluminum Frame
Windows

L 8 x 6 x 1/2 Anchor
Clips allow for
Thermal Expansion

Guard Rail

Electronically
Controlled Louvers
are closed in the
winter to trap warm
air in the sun porch.
They are opened in
the summer to let
hot air escape.

Window between
Bedroom and Sun
Porch

8" Insulated Stud
Wall

Crown Molding

Dropped Acoustical
Tile Ceiling

Painted Drywall

Wooden Door
connects Bedroom
and Sun Porch

Quarry Tile Floor

2" Structural
Concrete topping

12" Site-cast
Reinforced Concrete
Slab

12" x 24" R/C
Beams at 20' o.c.
Environmental Systems

Wherever the depth of the glass wall changes, there are electronically controlled louvers. Like in the Biomedical Science Research Building, these louvers remain closed in the winter, trapping heated air in the sun porch. In the summer, the louvers open and the heated air escapes. By opening windows and doors from the bedrooms to the sun porches, residents can also help to cool or heat the interior of the apartments.
Reflections

I am glad that I have been able to develop this project as deeply as I have. It was a rewarding experience to really dive into the details of the project.

If I could make any changes to the design, I would try to come up with a system for the glass facades that was less complicated. While I am sure that the design could work, I would like to explore simpler solutions in the future.

So far, I have found that architecture is a very rewarding field, and I am interested in applying what I have learned in real world situations.
Acknowledgements

First, I would like to acknowledge Professor Andrea Swartz, who as my studio professor and honors thesis advisor, kept me on task, and encouraged me to look deeper into the designs for this project.

I would like to thank Professors Jeff Culp, Rod Underwood, and Pam Harwood, for critiquing my designs – either at the mid-review or the final review. Their feedback helped me realize where I needed to improve my project.

Finally, I would like to thank Brad Beaubien, for giving me a tour of the current Ball State Indianapolis Center and explaining the center’s programs and needs.
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<http://www.white-design.co.uk/White%20Design%20/UWE%20Studio%20Building.html>
Credit for Images

pg. 31: Photograph of model at the top left of page downloaded from The Museum of Estonian Architecture’s webpage. URL: <http://www.arhitektuurimuuseum.ee/eam/english/toim/tuhatyks/makett/makett.htm>

pgs. 17 & 29: Diagram at top of these pages downloaded from White Design Co. Colors added on top of diagram by student. URL: < http://www.white-design.co.uk/White%20Design%20/UWE%20Studio%20Building.html >