



WELLNESS THROUGH ADAPTIVE REUSE

LINKING ADAPTIVE REUSE STRATEGIES WITH THE WELL
BUILDING STANDARD TO IMPROVE BUILDING QUALITY
FOR HUMAN WELLNESS

DESIGN

WELLNESS

ADAPTIVE REUSE

WELL BUILDING STANDARDS

- WELL BUILDING INSTITUTE
- TARGETING WELLNESS
- PHYSICAL & EMOTIONAL



Air



Water



Nourishment



Light



Movement



Thermal Comfort



Sound



Materials



Mind



Community



Innovation

← Back to website

☐ Overview

△ Standard

CONCEPTS

🌀 Air

💧 Water

🌱 Nourishment

☀️ Light

↻ Movement

🌡️ Thermal Comfort

🔊 Sound

📄 Materials

⚙️ Mind

🤝 Community

📦 Innovations

SUPPORT

📖 Glossary

📎 Appendix

📎 Resources

🌀 AIR

Overview

P A01 Fundamental Air Quality

P A02 Smoke-Free Environment

P A03 Ventilation Effectiveness

P A04 Construction Pollution Management

4 Pts A05 Enhanced Air Quality

3 Pts A06 Enhanced Ventilation

2 Pts A07 Operable Windows

2 Pts A08 Air Quality Monitoring and Awareness

1 Pt A09 Pollution Infiltration Management

1 Pt A10 Combustion Minimization

1 Pt A11 Source Separation

1 Pt A12 Air Filtration

1 Pt A13 Active VOC Control

2 Pts A14 Microbe and Mold Control

AIR FEATURES

Feature A01

Fundamental Air Quality

Ensure a basic level of indoor air quality that contributes to the health and well-being of building users.

3 pts **PRECONDITION**

Feature A02

Smoke-Free Environment

Deter smoking, minimize occupant exposure to secondhand smoke and reduce smoke pollution.

11 pts **PRECONDITION**

Feature A03

Ventilation Effectiveness

Prevent indoor air quality issues through the provision of adequate ventilation.

3 pts **PRECONDITION**

Feature A04

Construction Pollution Management

Minimize the introduction of construction-related pollutants into indoor air, remediate construction-related indoor air contamination for human health and protect building products from degradation.

11 pts **PRECONDITION**

Feature A05

Enhanced Air Quality

Encourage and recognize buildings with enhanced levels of indoor air quality that promote the health and well-being of people.

3 pts **OPTIMIZATION**

Feature A06

Enhanced Ventilation

Expel internally generated pollutants and improve air quality in the breathing zone through an increased supply of outdoor air or increased ventilation efficiency.

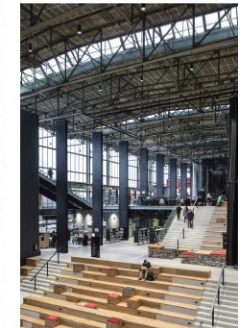
3 pts **OPTIMIZATION**

ADAPTIVE REUSE





















- SUSTAINABLE
- COMMUNITY BUILDING
- INCREASINGLY POPULAR



1 LOCHAL LIBRARY



ADAPTIVE REUSE

 OPENINGS	
 STRUCTURE	
 MATERIALS	
 ACTIVE SYSTEMS	
 PASSIVE SYSTEMS	
 ORGANIZATION	
 CIRCULATION	
 FORM	
 LANDSCAPE	
 ENVELOPE	

WELL

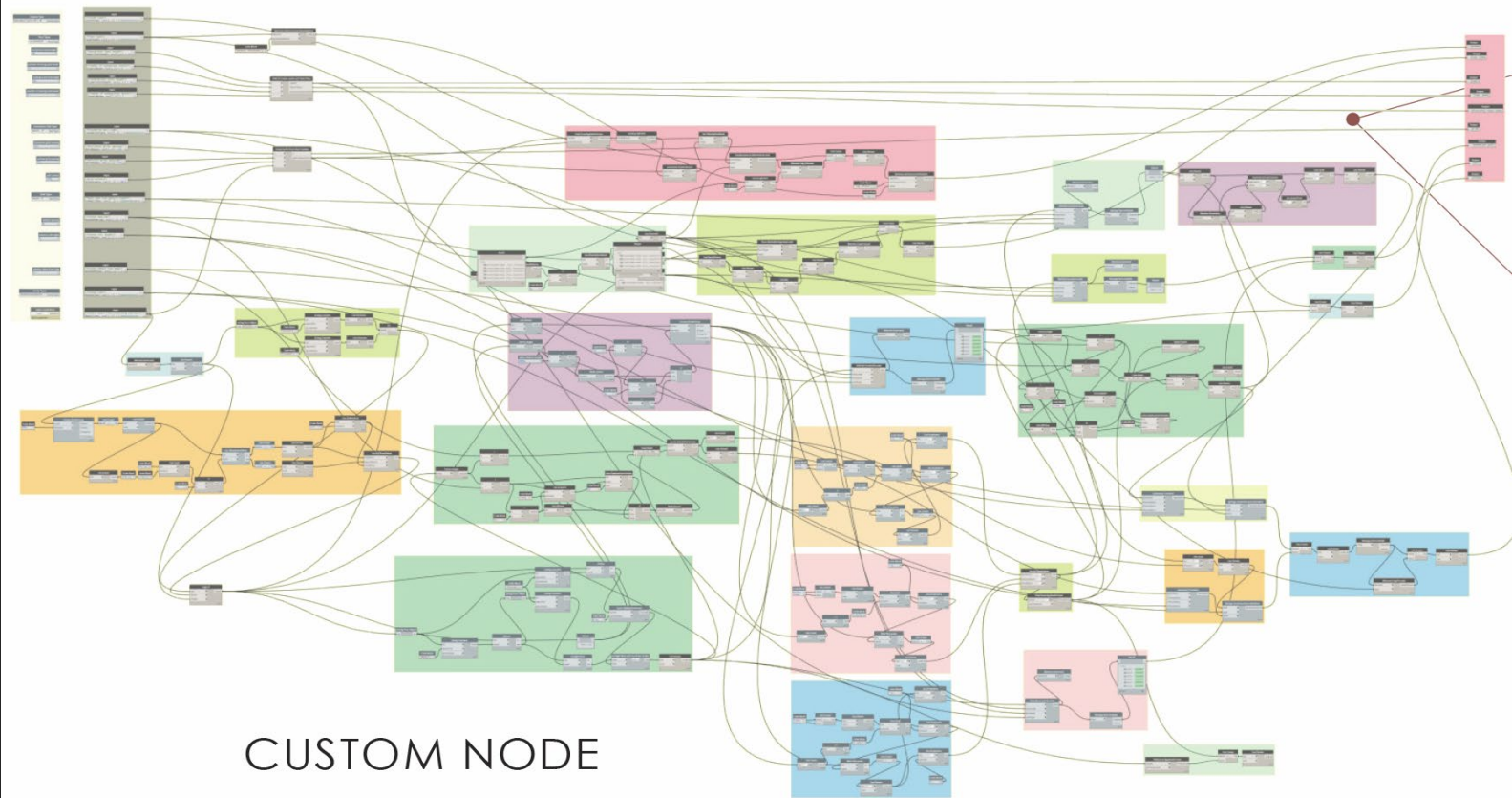


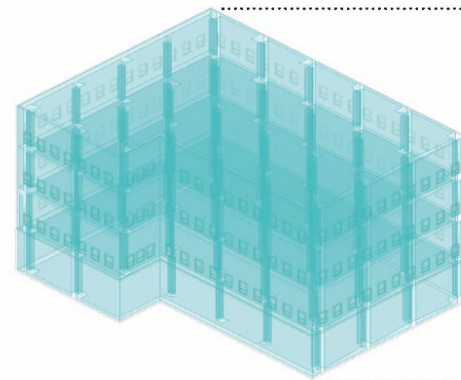
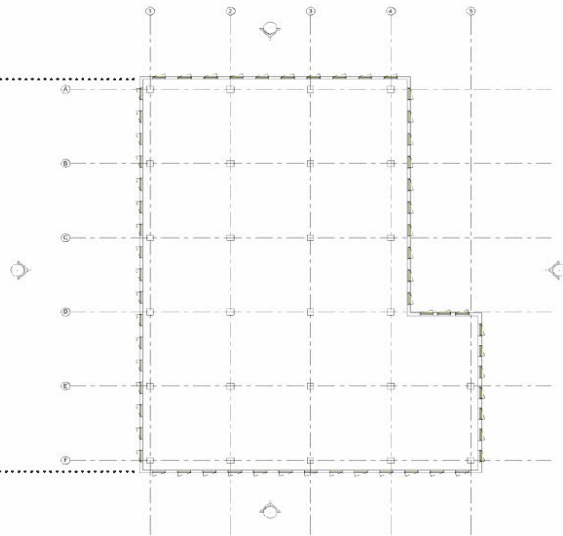
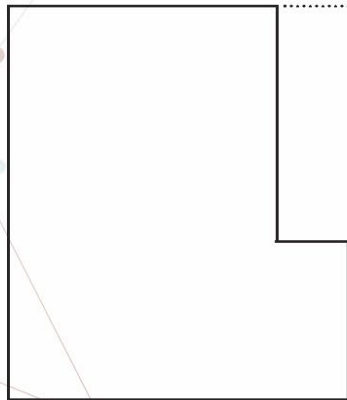
STRATEGY

CURTAIN WALL, VENTING INTO CAVITY
UTILIZE & REINFORCE EXISTING SUPERSTRUCTURE
HIGH PERFORMANCE FINISHES & FACADES
HEAT EXCHANGERS, HEAT LOOPS, FANS
ISOLATED GAIN, SOLAR TRACKING SHADES
OPEN PLANS, WITH NEW PARTITIONS
OPEN, EVOLVING AS NEEDED
RECTILINEAR, NEW DESIGN ELEMENTS
GREEN ROOF, PARKING RAMP, PATIO
DOUBLE GLAZED CURTAIN WALL WITH LOW-E

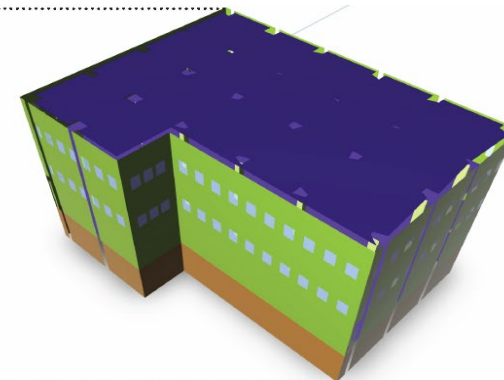
DETERMINING THE SITE

- HOMETOWN CONNECTION
- NARROWING THE SEARCH
- REVIT - DYNAMO – INSIGHT





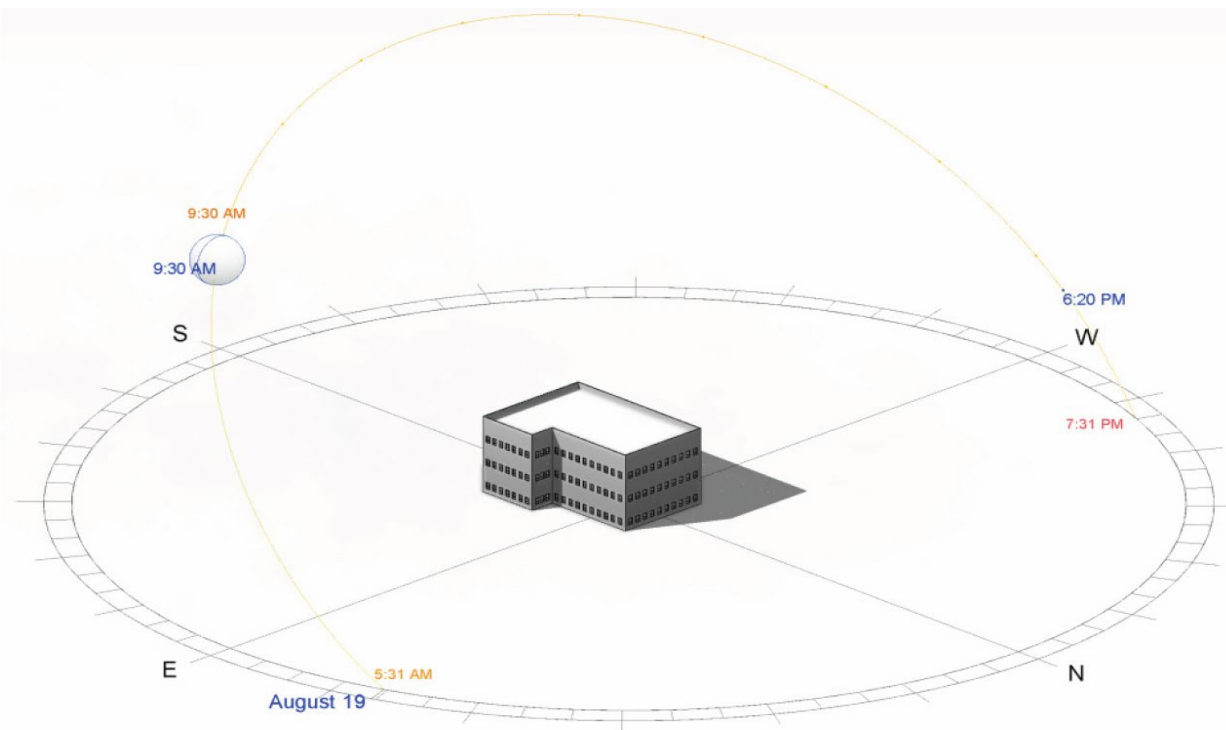
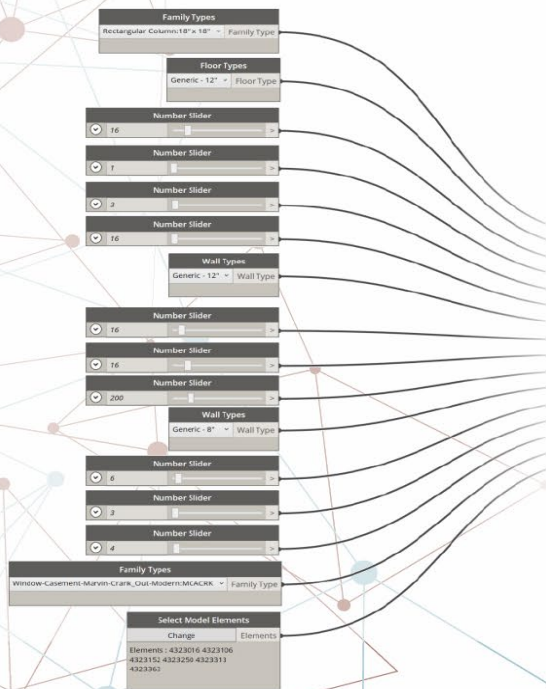
ANALYTICAL MODEL



INSIGHT MODEL

SIMULATION 1

The first simulation uses a simple footprint with one jog. There are 3 total above ground floors and 1 lower level. Floor to floor heights are 16'-0", and the envelope consists of 8" exterior walls, 12" foundation walls, and operable windows. This is an extremely typical building form and design for the upper Midwest, making it suitable to be the first tested and documented.



THE SITE

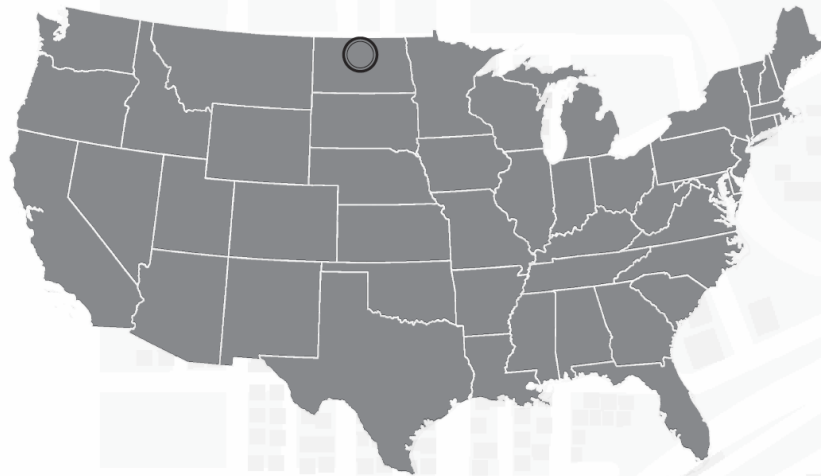
- MINOT, NORTH DAKOTA



Figure 46

123 1st St. SW
Minot, North Dakota 58701

CITY & STATE INFORMATION



Minot, North Dakota Demographics and Land Information

Land Area: 17.45 square miles
Elevation: 1,621 feet above sea level

Figure 47

STATISTICS	CITY	STATE
• Population	47,338	736,162
• Population density/mi ²	1,743	10
• Median age	31.9	35.2
• Male/Female ratio	1.1:1	1.1:1
• Income per capita	\$33,446	\$33,107
• Median household income	\$62,324	\$59,114
• Median home value	\$201,900	\$164,000
• Poverty level	8.1%	11.2%
• Unemployment rate	1.6%	1.9%
• Most comon profession	Health & Education	Agriculture & Ag. Services

SITE INFORMATION

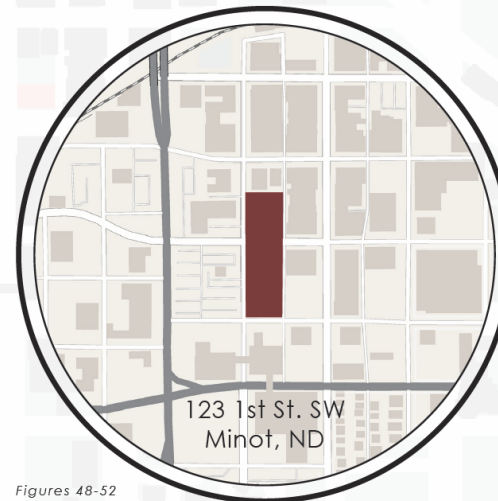


MUNICIPALITY

CITY CENTER

DOWNTOWN

SITE LOCATION



Figures 48-52

Zoning: C3 - Commercial / Mixed Use

The Site for this project is located within Minot's downtown district, which is zoned for commercial and mixed use. It located just one block northeast of the intersection of Minot's two busiest roadways: Broadway and Burdick Expressway.

ZONING

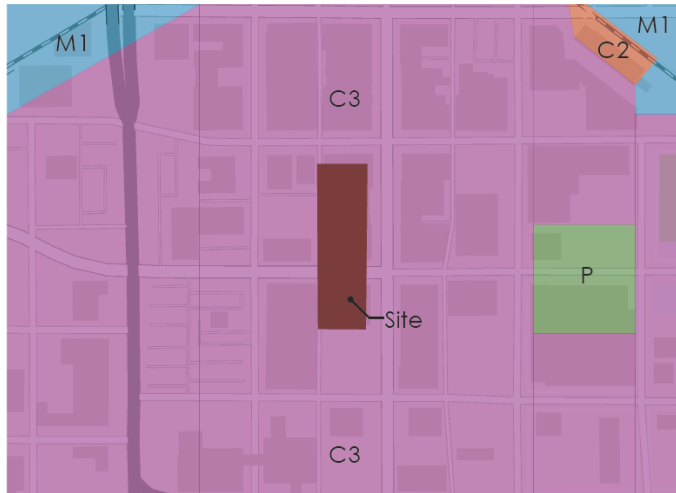


Figure 53

C3 - Central Business

The C3, or Central Business Zone in Minot is the central core business district in the downtown part of town. Multiple uses are permitted within this zone, including but not limited to retail, eating and drinking, business, assembly, public parking, and residential located above commercial use. The number of dwelling units permitted is based on the area of the lot. The C3 zone has seen increased development within recent years as more buildings are being adaptively reused to suit new functions.

A new focus has been placed on pedestrian oriented design in the C3 zone, and an increase in public transit in this area has yielded higher vehicle and foot traffic. Many of the buildings downtown are historic to the city, and emphasis has been placed on preserving their architectural character while repurposing them for future use. Overall, the central business district affords a lot of flexibility for design. The constraints are as loose as they can be in terms of the city's regulations, and the opportunities for reuse are virtually endless.

CLIMATE INFORMATION

The upper midwest is known for its seasonal weather, and North Dakota is no exception. The weather in Minot (and the rest of North Dakota) is characterized by long, cold winters with heavy snowfall, and short, hot summers with high humidity and moderate amounts of precipitation. Fall and spring usually come and go relatively quickly due to the large fluctuation in temperatures between summer and winter. Normal summer day temperature highs between the months of June and August typically average around 79° F. Normal winter night temperature lows between the months of November and March average around 0° F.

Minot's weather is mostly characterized by its variability in temperature, humidity, wind, and precipitation. Local residents are used to this and know that being prepared for any type of weather is vital. It is not uncommon that locals will leave for work in the morning with the heat on in their car and then return home with the air conditioning running.

Though tourism is not a huge industry in Minot, the city is the site of the state fair, which occurs at the end of July, and attracts over a quarter of a million people each year. The warm weather, long days, and break in farm work before harvest make this the perfect time for the event.

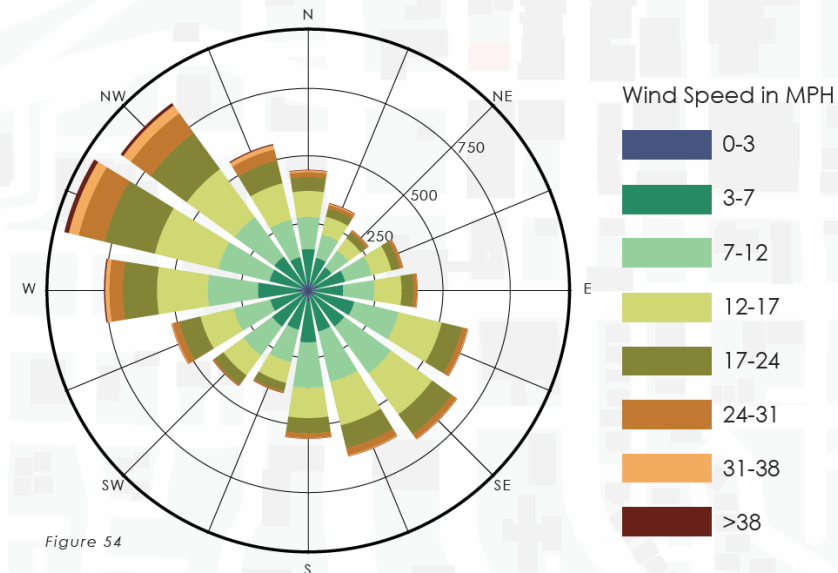


Figure 54

SOLAR ANALYSIS

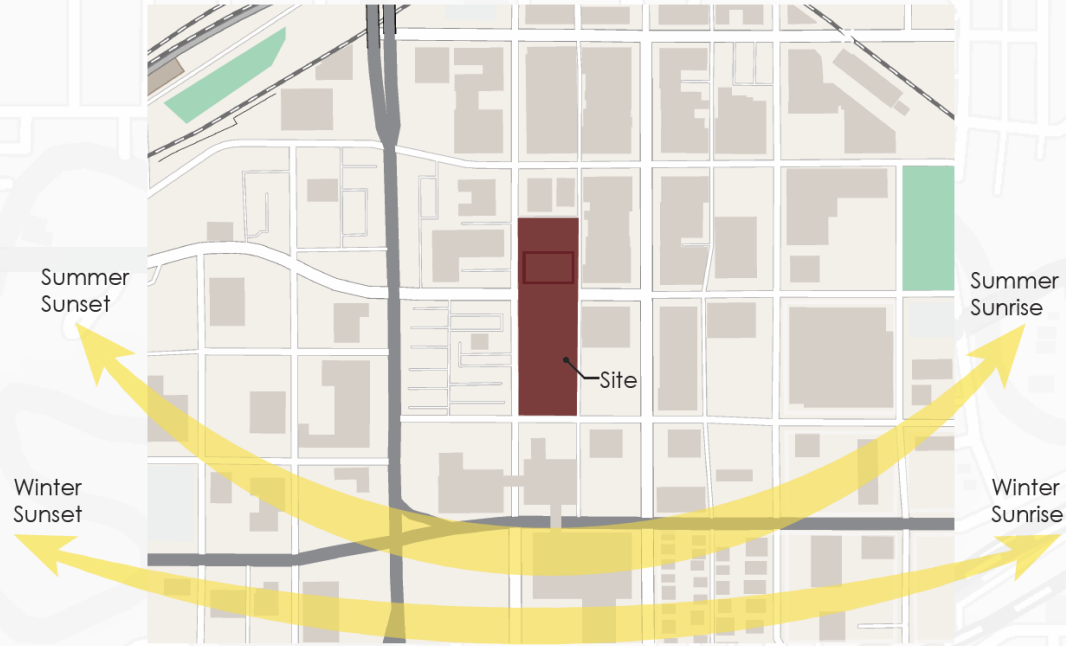
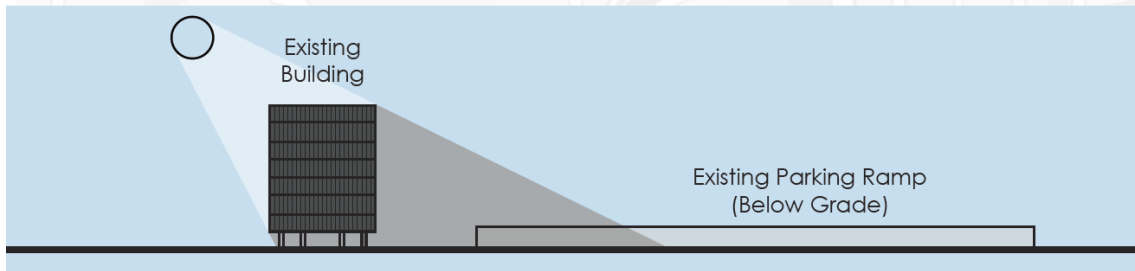


Figure 60

The site has ample access to the sun. The existing hospital complex to the south may block some solar energy on the southernmost parts of the site, but only for a small part of the year since the buildings in town aren't relatively tall. The existing building on site is one of the tallest at 8 stories.

Figure 61

Shading Diagram



SITE VIEWS



View of the existing building on site



Views of the surrounding sidewalks



View of the on site parking ramp

Figures 62-64

The existing building that has been selected for adaptive reuse is located at 123 1st St. SW in Minot. The building is definitely noticeable as it is one of the tallest in town, and the only to sport a completely glass facade. Tragically, the building has been mostly vacant since Midwest Federal Savings & Loan went bankrupt and liquidated the property.

In recent years, Minot has made renewed efforts towards revitalizing its historic downtown area. For years, downtown was a place that was unsafe to be at night. A clean up effort as well as new infrastructure and architecture have transformed this area into an up and coming arts and entertainment district. There is still much work to be done, as vacancy is still high.

For the past few decades, the city has been struggling with the issue of parking downtown. Several years ago, a group of investors proposed two below grade parking ramps with mixed use facilities located on top. Issues arose during construction, prompting the investors to pull out, leaving Minot with two hideous parking ramps that don't have enough drivers to fill them.

TOPOGRAPHY

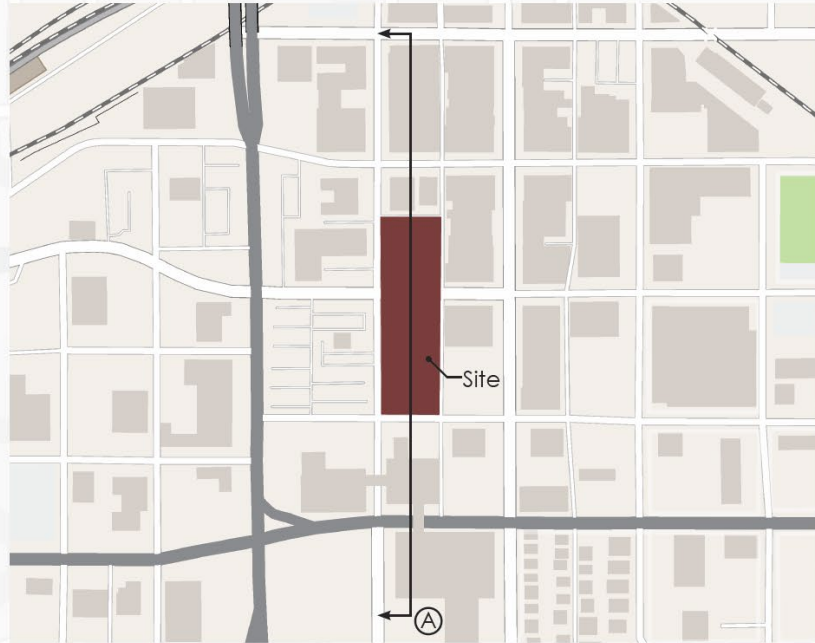
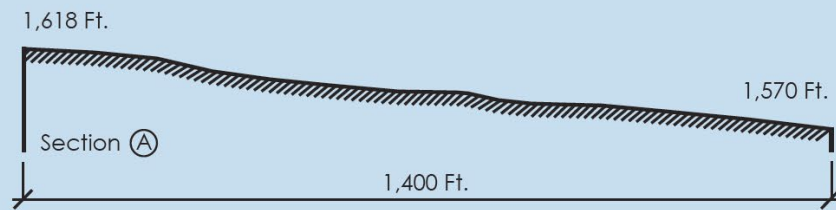


Figure 65

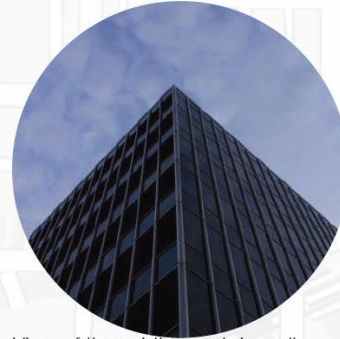
Minot is centered in the Souris Valley, the bottom of which is home to the Souris River. The land gently slopes towards the water, though some areas are much steeper than others. The site is far enough from the river that groundwater is of little concern and flooding is virtually impossible.

Figure 66

Site Section



SITE VIEWS



View of the existing curtain wall

The Midwest Federal Savings & Loan Building, Minot Building, or 'M' Building, was designed in the international style by Brunner, Hoeffel, Bohrer, & Associates, with construction completion occurring in 1962. Like most other international style buildings of that era, this building had high amounts of glazing, little exterior insulation, and a steel structure.



Main street, one block east of site

Main street, which is located just one block to the east of the site, is the epicenter of the rebirth of the downtown area. Many new businesses are being created here, and the community has rallied in their support. Locals take pride in the goods and services that are created and provided by their neighbors, and will spend the extra dollar to lend their support.



North bank of the Souris River

The site is located within a half mile of the Souris River, which cuts through the entire town. In 2011, a record setting flood devastated the city, temporarily displacing thousands and causing millions in damages. Although the site is within close proximity, it is much higher than even record flood levels, leaving it safe from the threat of future flooding.

CONTEXT



Figure 76

The site is surrounded by a variety of other building and business types. The current hospital is directly south of the site, and part of Minot's only public high school (Central Campus [yellow]grades 9 & 10) is located just two blocks to the East. There is little to no public green space downtown.

Figures 77 & 78

- Existing Building
- Parking Ramps
- Medical
- Single Family Residential
- High Density Residential
- Education
- Green Space
- Commercial / Mixed Use



SITE VIEWS



Broadway, with site in upper left

Broadway, a continuation of U.S. Highway 83, is the main arterial road in Minot. Broadway bisects the city running north to south. The site is located just one block east of Broadway, giving it great access to the city's major transportation networks. The site is also just a block south of Burdick Expressway, a major arterial road bisecting the city running East to West.



View of Main St. during the holidays

Downtown hasn't quite become the billboard that Minot would like it to be, but it is on its way. City officials promote downtown events and events (especially during the holidays) to generate excitement in the area, which is a huge benefit for the area.



Vintage photo of ex. building on site

Figures 79-81

When the Midwest Federal Savings & Loan Company was still operating at the 'M' Building, it became the symbol of Minot. This was further reinforced with a large metal 'M' was placed on top of the building. The 'M' stayed lit up at night and rotate around in a 360° circle. Recently, the original 'M' was moved to the local high school football field, and was replaced by a smaller, much less noticeable one.

PROGRAM





















- MIXED USE
- BUSINESS INCUBATORS
- PARALLELS WITH PREMISE

Food & Drink			Retail		
Space	Sq. Ft.	%	Space	Sq. Ft.	%
Advertising	355	5	Advertising	355	10
Kitchen	1420	20	Security	177.5	5
Prep	1065	15	Dressing / Testing Rooms	355	10
Storage	710	10	Receiving	355	10
Cash Registers	710	10	Open Shopping	1242.5	35
Cleaning	355	5	Cash Registers	355	10
Manager's Office	355	5	Customer Service	177.5	5
Dining	1420	20	Manager's Office	177.5	5
Receiving	355	5	Break Room	177.5	5
*Extra		5	*Extra	177.5	5
7,100 100			3,550 100		
Office			Incubators		
Space	Sq. Ft.	%	Space	Sq. Ft.	%
Storage	710	10	Sports & Exercise	1420	10
Private Office	1065	15	Food & Drink	2840	20
Open Office	1775	25	Retail	2840	20
Work Rooms	1420	20	Office	2840	20
Break Rooms	355	5	Music	1420	10
Break Out Spaces	1065	15	Maker Labs	2840	20
*Extra	710	10	*Extra		
7,100 100			14,200 100		
Lobby			Bathrooms		
Space	Sq. Ft.	%	Space	Sq. Ft.	%
Circulation	1065	15	Men's	1597.5	45
Security	355	5	Women's	1597.5	45
Reception	1065	15	Gender Neutral	355	10
Waiting	710	10			
Information	355	5			
Assembly	710	10			
Exhibits	1065	15			
News Stand	355	5			
Vestibules	710	10			
*Extra	710	10			
7,100 100			3,550 100		
Storage			Mechanical		
Space	Sq. Ft.	%	Space	Sq. Ft.	%
Permanent	1065	30	Electrical Chases	100	0.9
Temporary	1065	30	Duct Chases	500	4.7
Dead Files	1065	30	Pipe Chases	150	1.4
Movable	355	10	Mechanical Room	5000	46.9
			Boiler Room	2400	22.5
			Control Room	1000	9.4
			Penthouse	1500	14.1
3,550 100			10,650 100		
Circulation			*Extra Considerations		
Space	Sq. Ft.	%	Space	Sq. Ft.	%
Primary	3195	30	Natural Space	355	10
Secondary	3195	30	Functional Mechanical	3195	90
Tertiary	3195	30			
Entourage	1065	10			
10,650 100			3,550 100		

Sports & Exercise			Office		
Space	Sq. Ft.	%	Space	Sq. Ft.	%
Advertising	355	5	Storage	1065	15
Security	177.5	5	Private Office	1065	15
Dressing / Testing Rooms	355	10	Open Office	1775	25
Receiving	355	10	Work Rooms	1420	20
Open Shopping	1242.5	35	Break Rooms	355	5
Cash Registers	355	10	Break Out Spaces	1065	15
Customer Service	177.5	5			
Manager's Office	177.5	5			
Break Room	177.5	5			
*Extra	177.5	5	*Extra		
1,420 100			2,840 100		
Food & Drink			Music		
Space	Sq. Ft.	%	Space	Sq. Ft.	%
Advertising	355	5	Group Spaces	355	5
Kitchen	1420	20	Instruction	1065	15
Prep	1065	15	Recording	1065	15
Storage	710	10	Sound Engineering	1065	15
Cash Registers	710	10	Production	1065	15
Cleaning	355	5	Music Selection	355	5
Manager's Office	355	5	Instrument Display	1065	15
Dining	1420	20	Listening	355	5
Receiving	355	5	Storage	355	5
*Extra			*Extra		
2,840 100			1,420 100		
Retail			Maker Labs		
Space	Sq. Ft.	%	Space	Sq. Ft.	%
Advertising	355	10	Schematic Design	1065	10
Security	177.5	5	Design Development	1065	10
Dressing / Testing Rooms	355	10	Assembly	1065	20
Receiving	355	10	Testing	1065	20
Open Shopping	1242.5	35	Working	1065	25
Cash Registers	355	10	Receiving	355	5
Customer Service	177.5	5	Customer Service	355	5
Manager's Office	177.5	5			
Break Room	177.5	5			
*Extra			*Extra		
2,840 100			2,840 100		
Site			Summary		
Space	Sq. Ft.	%			
Surrounding Plaza	2500	1.7	<p>The site is situated in the midst of downtown Minot, in close proximity to some of the main thoroughfares of the city. There is a 90,000 square foot parking garage directly south (separated by 2nd Ave SW) that will serve the bottom part of the Site Program (the contents beneath the Joining Structure line). The Enclosed Walkway and Joining Structure will serve as a connection between the two and provide a safe means of travel at all times. Though not the focus of this thesis, the site is important to the project and will influence the interior conditions. As a result, these areas shall be developed to a conceptual level to show intent.</p>		
Porte Cochere	2000	1.4			
Outdoor Patio(s)	2,000	1.4			
Enclosed Walkway	1,500	1.0			
Joining Structure	5000	3.5			
Parking Garage	90,000	62.9			
Hardscape	10,000	7.0			
Green Space	20,000	14.0			
Hardscape	5,000	3.5			
Green Wall Space	5000	3.5			
143,000 100					

Building Program		
Space	Sq. Ft.	%
Circulation	10650	15
Mechanical	10650	15
Bathrooms	3550	5
Storage	3550	5
Food & Drink	7100	10
Retail	3550	5
Office	7100	10
Incubators	14200	20
Lobby	7100	10
*Extra	3550	5
71,000 100		

ADAPTIVE REUSE

 OPENINGS	
 STRUCTURE	
 MATERIALS	
 ACTIVE SYSTEMS	
 PASSIVE SYSTEMS	
 ORGANIZATION	
 CIRCULATION	
 FORM	
 LANDSCAPE	
 ENVELOPE	

WELL

- AI
- WA
- LI
- MO
- TH
- MA
- SO
- IN

STRATEGY

- CURTAIN WALL, VENTING INTO CAVITY
- UTILIZE & REINFORCE EXISTING SUPERSTRUCTURE
- HIGH PERFORMANCE FINISHES & FACADES
- HEAT EXCHANGERS, HEAT LOOPS, FANS
- ISOLATED GAIN, SOLAR TRACKING SHADES
- OPEN PLANS, WITH NEW PARTITIONS
- OPEN, EVOLVING AS NEEDED
- RECTILINEAR, NEW DESIGN ELEMENTS
- GREEN ROOF, PARKING RAMP, PATIO
- DOUBLE GLAZED CURTAIN WALL WITH LOW-E

PROGRAM

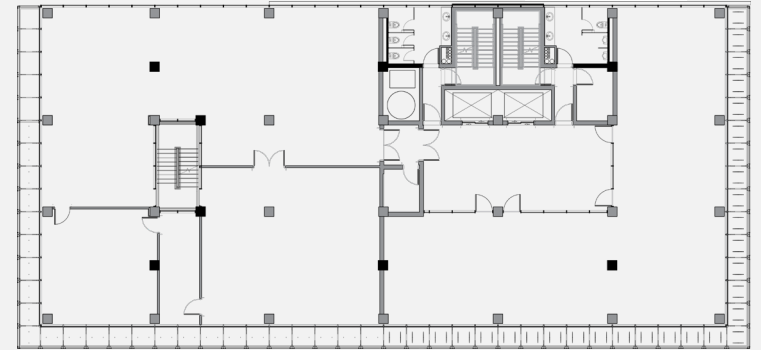
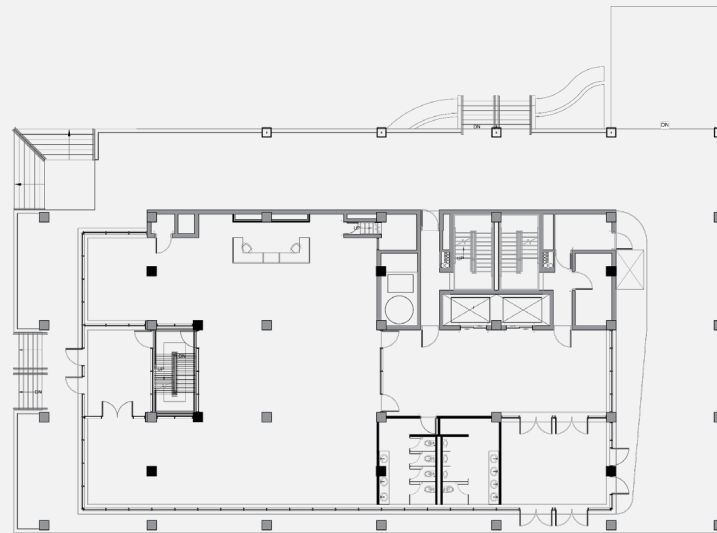
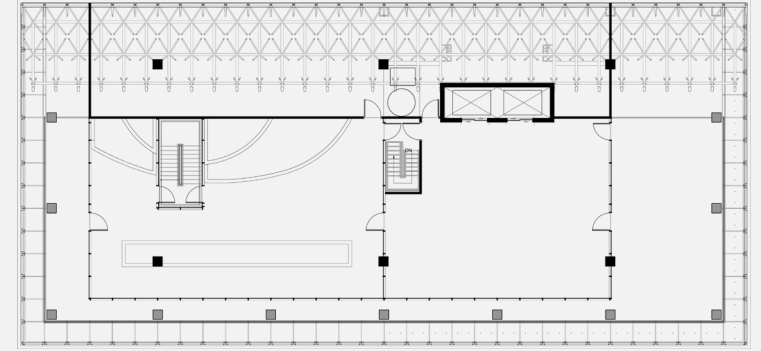
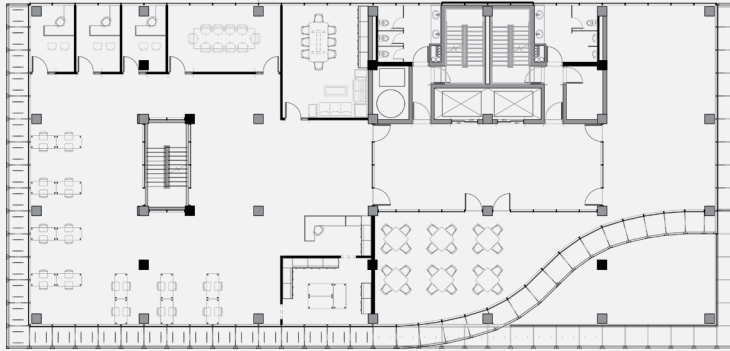
- INCUBATORS
- OFFICE
- FOOD & DRINK
- RETAIL
- CIRCULATION
- MECHANICAL

DESIGN SOLUTION



DESIGN: FLOOR PLANS

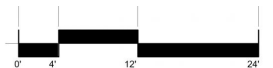
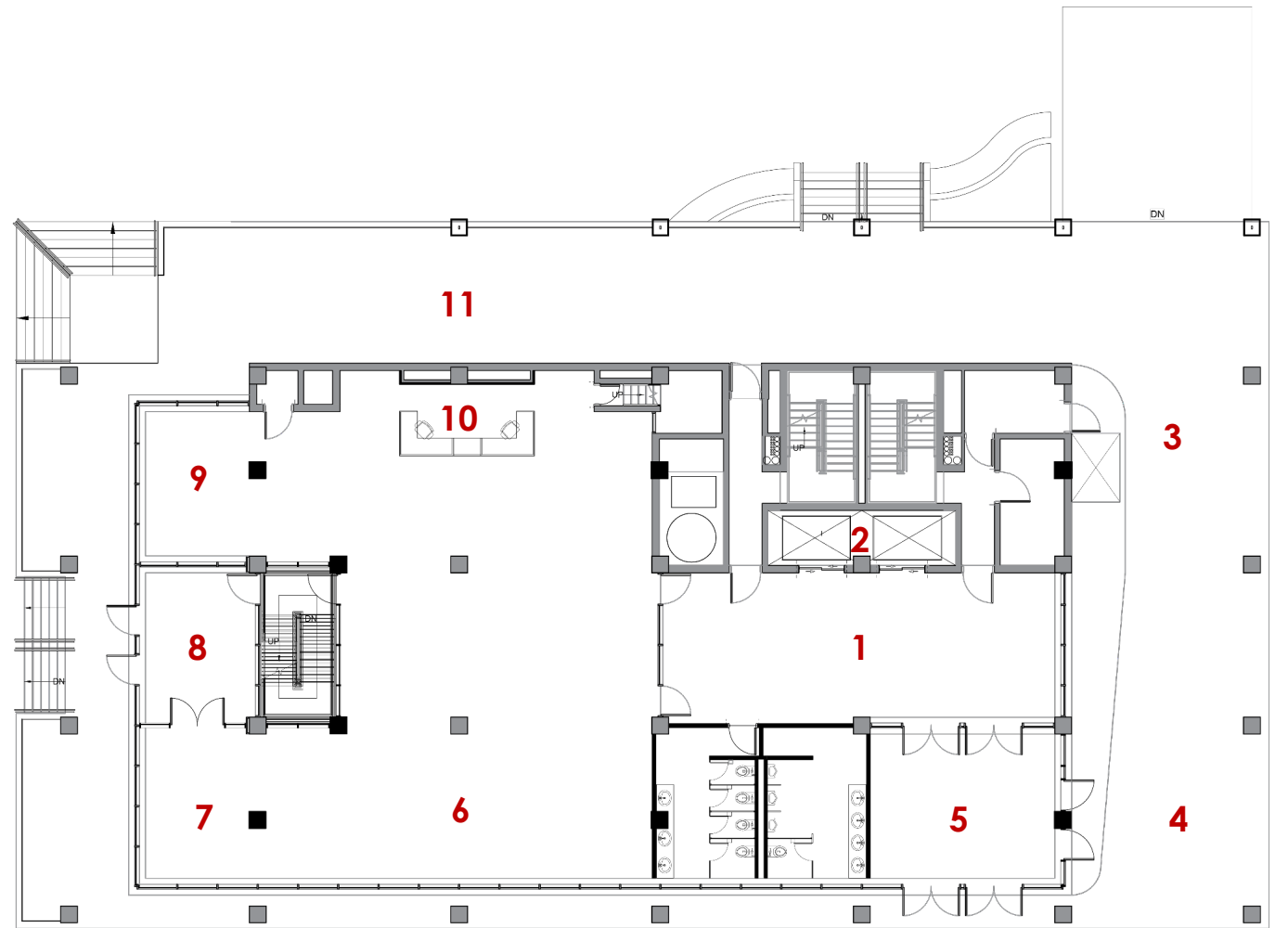
- 1. FIRST FLOOR
- 3. THIRD FLOOR
- 5. FIFTH FLOOR
- 7. SEVENTH FLOOR
- 9. NINTH FLOOR



DESIGN: FLOOR PLANS

LEGEND

1. ELEVATOR LOBBY
2. SERVICE CORE
3. DELIVERY AREA
4. PICK-UP/ DROP-OFF
5. SOUTH ENTRY
6. COLLABORATION AREA
7. ENTRY LOUNGE
8. WEST ENTRY
9. WAITING
10. INFORMATION DESK
11. OUTDOOR PATIO



DESIGN: FLOOR PLANS

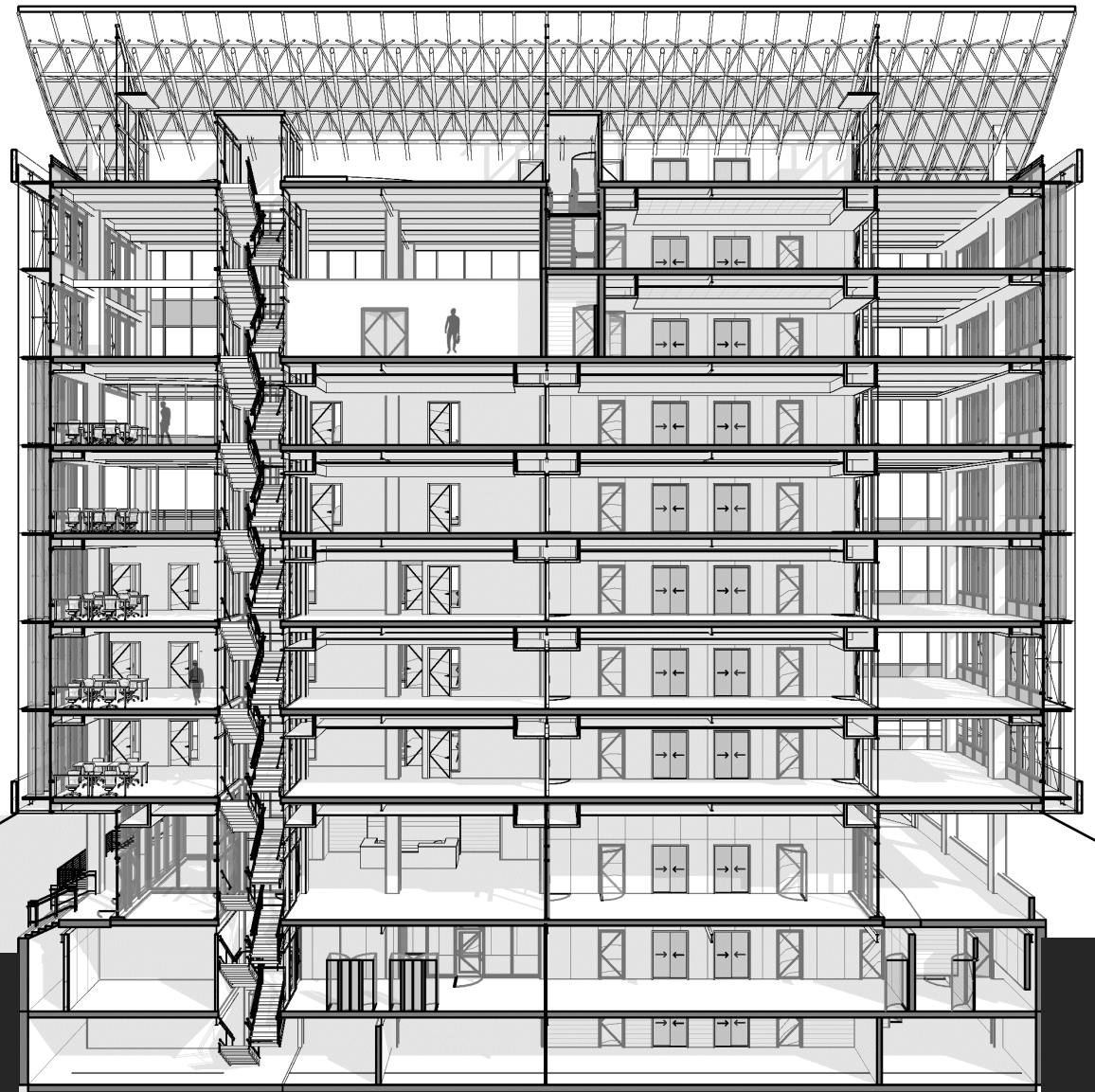
LEGEND

1. ELEVATOR LOBBY
2. SERVICE CORE
3. BACK OF HOUSE
4. OUTDOOR DECK
5. ASSEMBLY / DISPLAY
6. COLLABORATION AREA
7. WORK ROOM
8. OPEN OFFICE
9. PRIVATE OFFICE(S)
10. CONFERENCE ROOM
11. BREAK ROOM



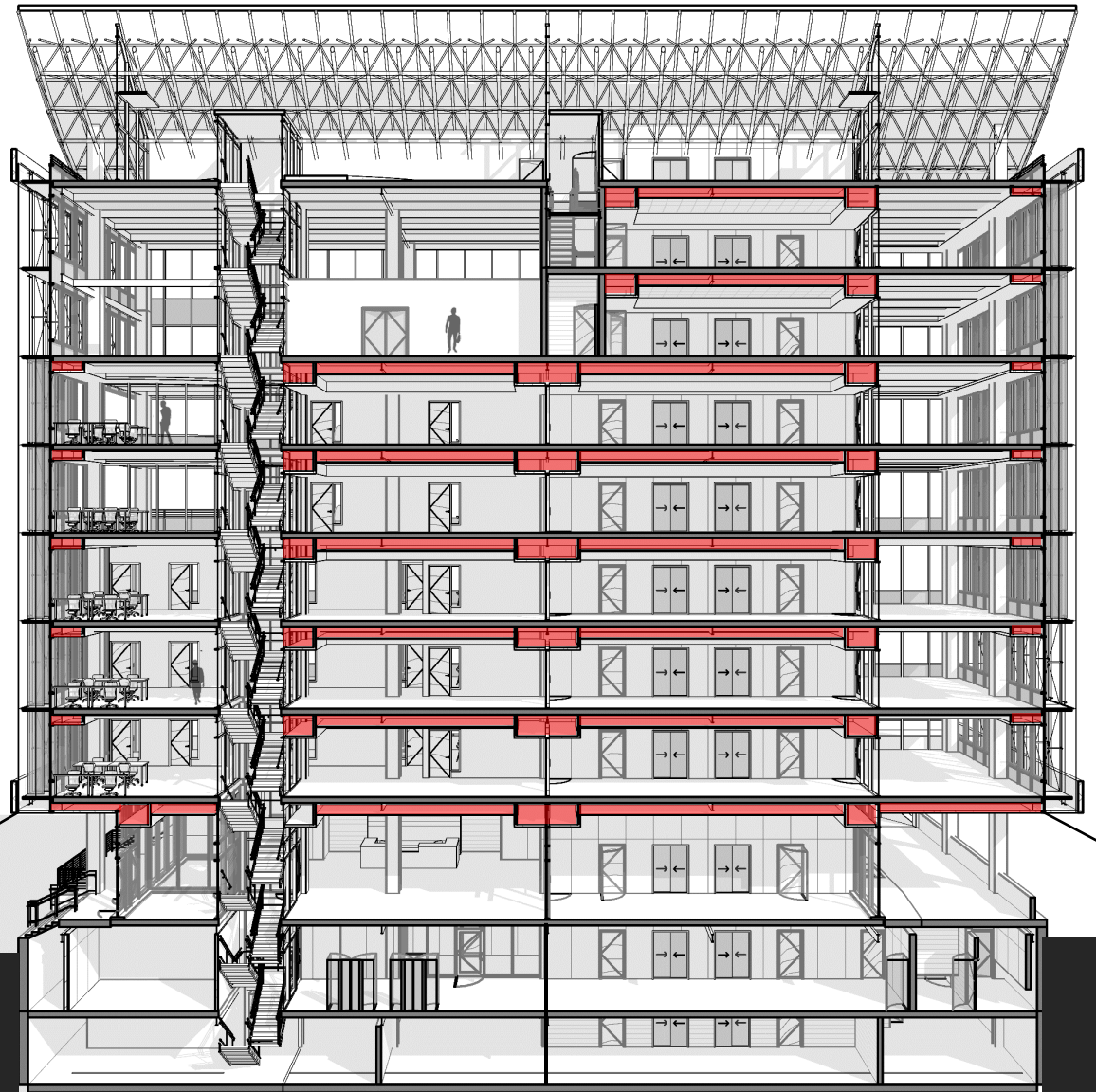
DESIGN: 3D SECTION

- SYSTEM INTEGRATION
- CODE COMPLIANCE
- LIFE SAFETY



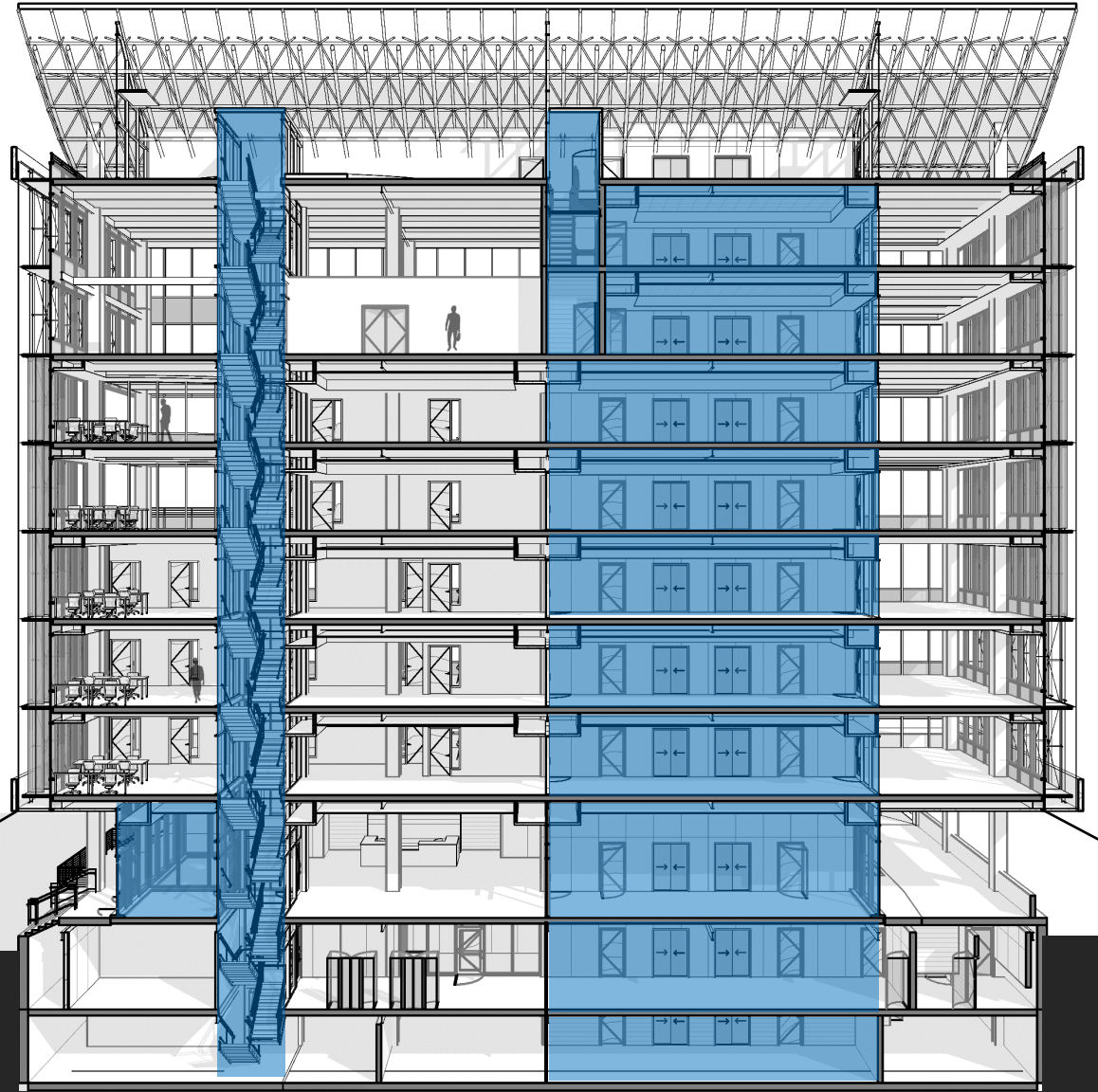
DESIGN: 3D SECTION

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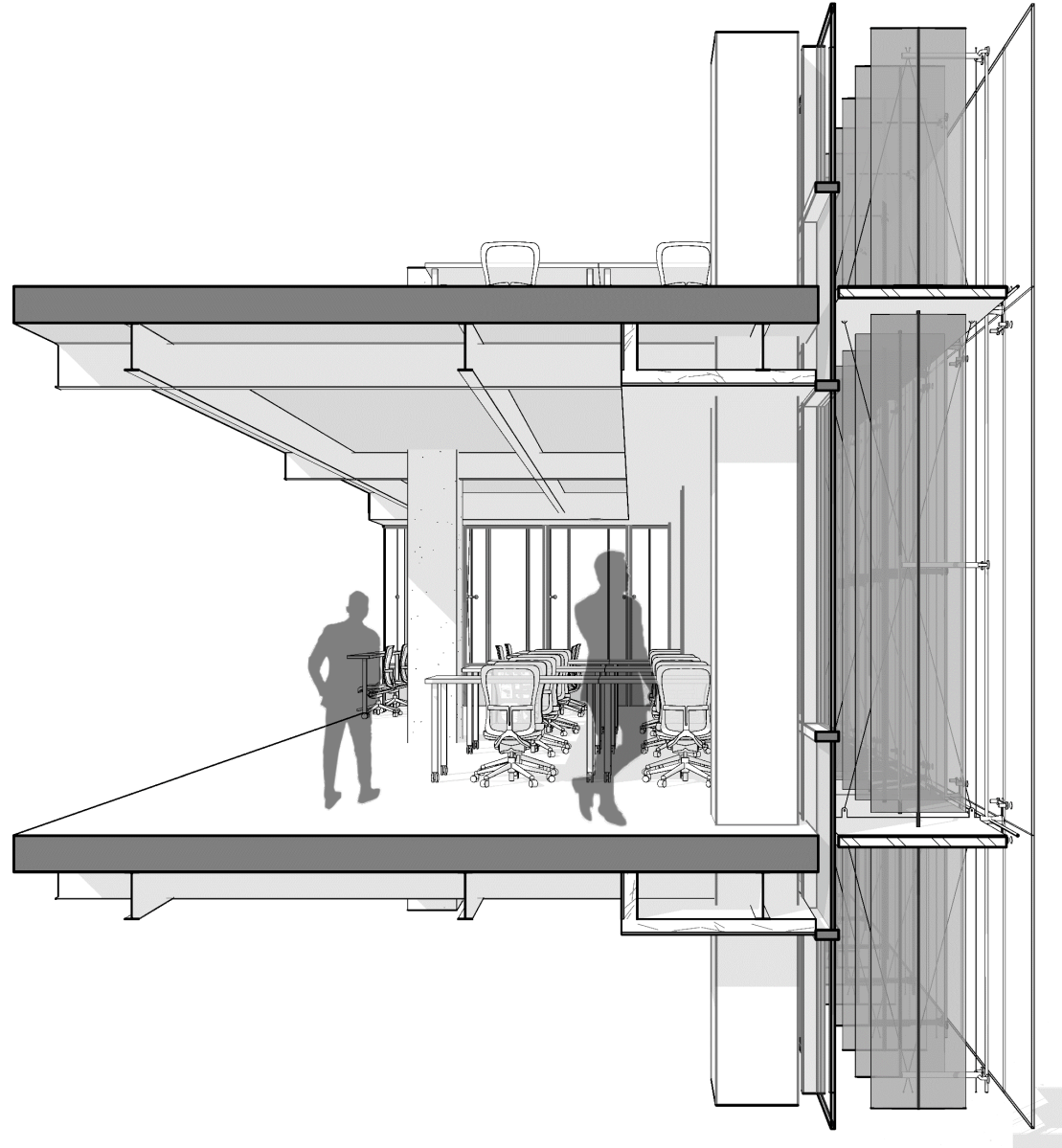
DESIGN: 3D SECTION

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- CODE COMPLIANCE
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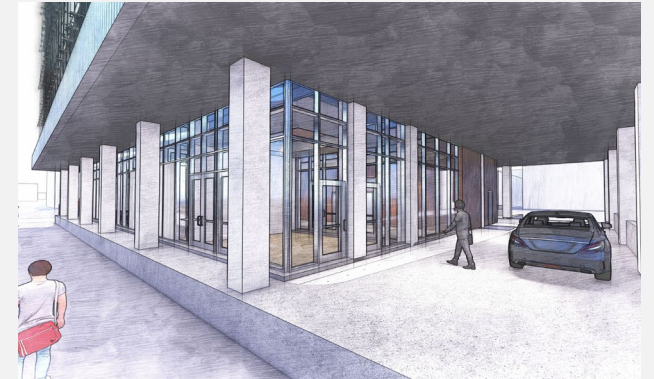
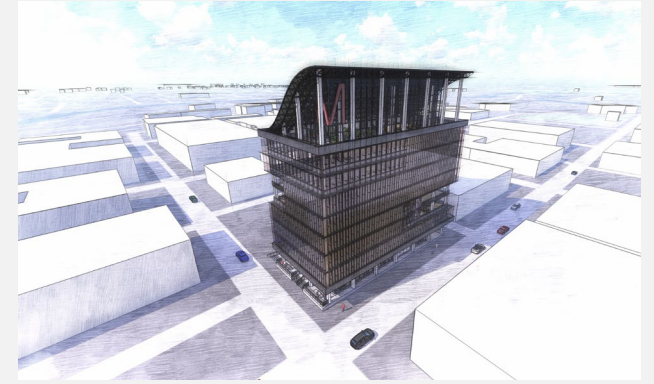


DESIGN: ENVELOPE

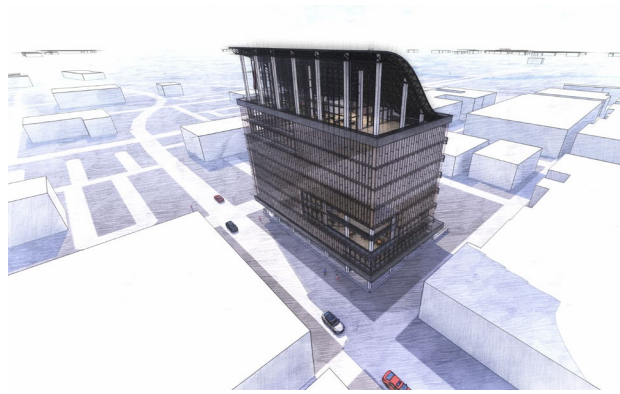
- SYSTEM INTEGRATION
- CODE COMPLIANCE
- LIFE SAFETY



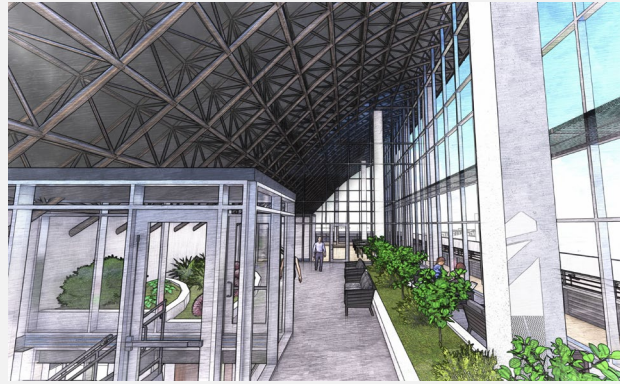
DESIGN: RENDERINGS



DESIGN: RENDERINGS



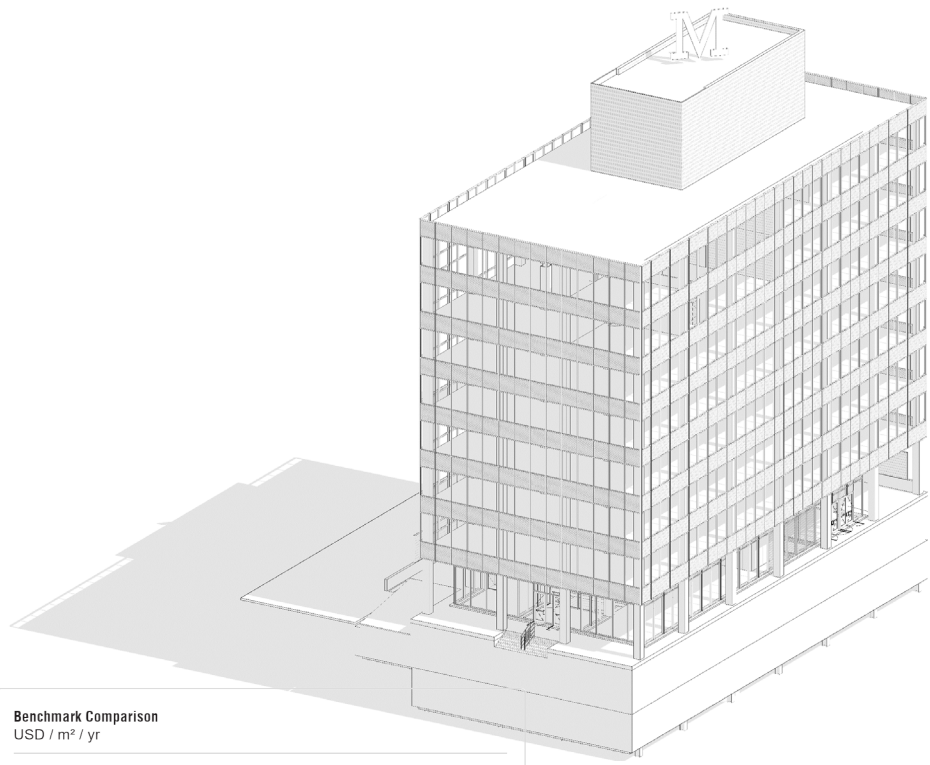
DESIGN: RENDERINGS



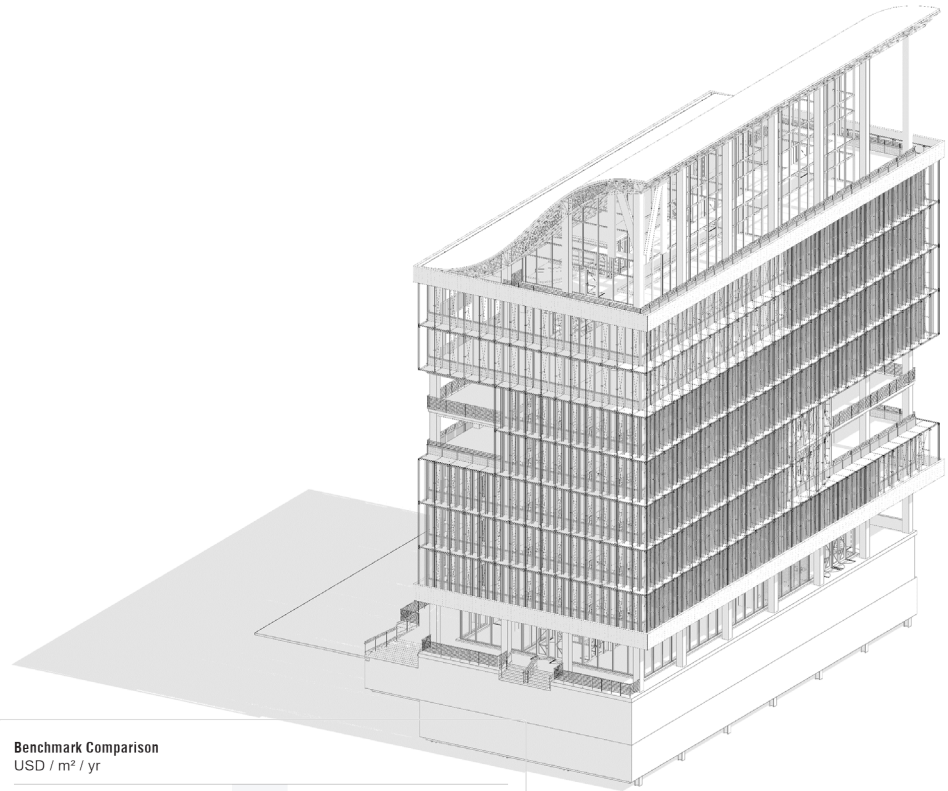
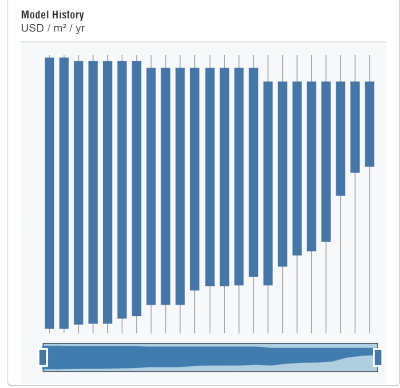
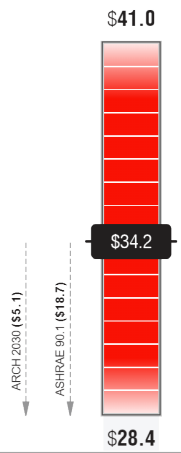
VERIFYING THE PREMISE

- RESEARCH
- PERFORMANCE ANALYSIS
- PROGRAM

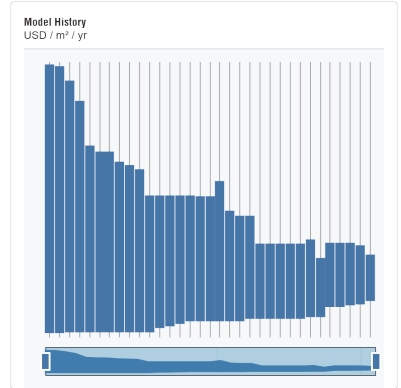
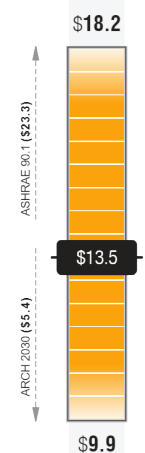




Benchmark Comparison
USD / m² / yr



Benchmark Comparison
USD / m² / yr



“Architecture to me is more than just a profession, it is a form of art that combines the visual arts, sculpture, and sensory experiences all into one harmonious entity. The people that occupy and interact with our buildings are the most important aspect of our designs. I have learned a significant amount about architecture at North Dakota State University, and hope to never stop learning throughout my career.”

- JARED KRAMER

