THE URBAN ROLE OF COLLEGE UNIONS

by

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DEDICATION

I give my self and even far .... to the people who’re like stars. Their knowledge, extremely vast ... is what makes science last
If you, my friend, quest .... in between east and west
In the abyss of oceans .... or beyond imaginations
In Brittia, or Baltia .... in Jaborsa, or Jabolka
You will never whatsoever .... find as noble as they are.
I inscribe it with a key .... at this moment in history :
Their favor is very often .... what made this even happen
2016
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A
BSTRACT
This research views college unions as social and physical constructs in the urban and cultural context. It argues that their role is broader than a campus territory. Unions are urban artifacts that function to hinge campus environment with the cityscape and which must be grounded to a location, a site, and an urban context. Unions are cultural nodes that interweave different ages, disciplines, and ethnicities in one place. This research also argues that the architecture of unions today has lost its historical intention while embracing a contemporary global approach. The research proposes criteria for future designs to help connect to the historical vision. These criteria were arrived at through investigative processes concerning the historical beginnings of college unions in the US, the chronological evolution of their theme concepts, the nature and scale of their programs, verbal and visual surveys, and interviews with people.

The research is linked to a design process through which these criteria are applied, in an attempt, to test their validity through an architectural proposal. While both modes of research must be anchored to a site, they are sited in Portland, Oregon, tied to one of Portland's largest urban developments in a public university, the Oregon Health and Science University (OHSU). The research solidifies its future unions criteria to guide the design process into three core values: Gathering, Diversity, and Heart. Consequently, the process sought to open up the architectural form, in light of these core values, to accommodate public activities as well as private activities, and situate it in a connected urban context that anchors the project to its city/university. The research uses site, program, and regional technology as research topics to approach a synthetic architectural union concept. The research reflects upon the issues that were explored throughout this experiment, other issues that could be explored, and other possibilities that could differently approach union's urban role using the same criteria.
INTRODUCTION
College unions are viewed as the main public, social space that are open to everybody on campus. They are very dynamic spaces; they change over time, but also from place to place. The notion of the union was brought from England to the United States of America. Their program components were scattered on campuses, but over time ended up unified in one place, fulfilling the social life and leading community in them.

Although there is no a fixed recipe for unions, there were certain periods when they held similar trends. These trends could be grouped in three eras: the Social Clubs period, the Community Centers period, and recently, the Shopping Malls period. There is certainly a core value that linked the purpose of a union over the history, but time forces obligated, not only universities, but also cities to change their environments in order to adapt. One of the big changes in the contemporary urban environment is globalization, which impacted cultures, economies, politics, and the built environment. Therefore, universities started to reshape union environments, which gradually blurred the cultural differences between universities, if not between countries.

The challenge today is to revisit the urban role of unions and reemploy it to be as valuable as it was in the past for future urban campuses. Future unions should share common core values that connect all unions in purpose, but respond to local forces of time, site, and culture, reshaping the union idea to suit that particular campus, making it unique to that campus.
1-1: WHY PORTLAND?

Portland is a growing city in the United States that is filled with mixture of natural, environmental, and cultural features. Its development was supported in a unique role by city planning, which had a large role in making the city it is today. The goal was to learn from this experience how urban growth should perform with the environment, and how architecture and urban planning are related.

The project process started with readings, reconnaissance, and research about Portland facts and history. This process was led by a group of master students (class 2016) who expanded their findings into a book, the Portland Book, that will be referred to many times in this research as a base material for site analysis. The book covers the past, present, and future of Portland in three topics: Ecology, Built Environment, and Human.

The main attractive character in Portland is, of course, nature; but also how people perceived it and preserved it. Portland is one of very early experiments in the US that confronted sprawl and established a regional growth management. Sprawl was not a sudden phenomenon, but was an accumulative result of decades of growth of cities. Essentially, it was a result of a post WWII policies to construct millions of homes cheaply and rapidly, which led to new single-family suburban construction. It became a logical and idealized system that is easier to apply for its consistency and predictability. However, the main problem of this system is its dependency on the automobile to serve people, which consequently became an expensive and unsustainable pattern of development. This simply means greater use of energy, pollution, and contribution to global warming. Moreover, very few cities have responded to sprawl as a threat and reacted with solutions, but Portland was one of them.

Therefore, if sprawl was a threat to destroy open space, consume agricultural land, increase utility costs, weaken urban social life, increase inequalities, deplete natural resources, and damage the environment, then its management is very crucial to Portland. Portland’s policies were described as “the longest-running, most extensive, best-documented, and most controversial assault on sprawl in this country”. Launched by the state of Oregon and the Portland urban area, this anti-sprawl attempt was set up statewide for planning and growth management during the “quiet revolution” in the 1960s and 1970s. Eventually, in 1979, in the Portland region, an urban growth boundary was established to conserve scenic landscape, protect agriculture, and control urban growth. This combination of a growth boundary with greenbelt beyond allowed the busy downtown and the quiet green hills to come together, which formed one of the most attractive cityscapes in the nation.
Portland shares a climatic and cultural kinship with both Scandinavia and Japan. Portland also shares a climate zone with Porto, Portugal, region of Chile and Argentina, as well as Cape Town, South Africa.

One of the first steps Portland made towards “smart growth” were the policies they made to control people’s migration and settlement in the city. They looked to avoid to repeating the mistakes made by other cities like Los Angeles, what consequently resulted in concerns of congestion, pollution, and cost of living. Therefore, they wanted people to come visit the city, yet do not live in it, which kept the density lower. Additionally, the other positive step the city made was to create a new transit system instead of focusing on highway construction. This decision pushed public transportation to take over in order to reduce traffic and increase mixed use to induce densities along the transit line, which should stop sprawl.\(^8\) This development was led by Metro, a regional government since 1979, and the Metropolitan Area Express (MAX) light rail system was launched in 1986 by TriMet, which thrived until today.

Therefore, the other logical reason to choose Portland is to learn how a transit-oriented design affects the city’s development, economy, and architecture. Accordingly, the project site will be located somewhere along public transportation path for its strategic benefits.

1-2: FROM A GEOGRAPHIC PERSPECTIVE

Portland, Oregon is located on the West Coast of the United States between San Francisco, California and Seattle, Washington both physically and culturally. The distance between them is about 10 hour and 3 hour drive, respectively, and about one hour and a half drive away from the Pacific Coast.\(^9\)

Being in such a region offered Portland short winter days, abundant forests, maritime culture, and proximity to volcanoes. Because of this, the region shares a climatic and cultural kinship with both Scandinavia and Japan. Portland also shares a climate zone with Porto, Portugal, region of Chile and Argentina, as well as Cape Town, South Africa.\(^10\)
1-3: FROM AN ENVIRONMENTAL PERSPECTIVE

Portland is situated in a river valley between the coast and the Cascade Mountain Range. Being in the Marine West Coast Climate Zone offers warm, dry summers, and cool, rainy winters. However, Portland’s climate remains temperate throughout the year because of its location to the ocean. Portland is well-known for its cloudy, rainy weather; the average cloud coverage in summer is about 40%, and in winter can be more than 80%. It receives an annual precipitation of 36” as well as snow of 4.3”. The Cascade Mountains, on the east side, help trap most of the precipitation on the western side which keeps the city under a constant rain condition, while the east side becomes a rain shadow of semi-arid steppe climate. There are records of extreme temperatures in Portland, however, they are rare cases, and the average daily temperatures stay relatively temperate; it remains around human comfort zone for about seven months of the year.¹⁵

Portland’s latitude is 45.5°, so it receives 8 hours of daylight in the winter with lower sun angles (25°), and 15 in the summer with high sun angles (70°), which is a great source of natural daylight that must be invested in buildings. Although there are many of cloudy days around the year, the overcast sky still offers a generous amount of daylight, which ranges between 2000 to over 8000 footcandles.¹²

Wind direction varies to almost all the directions over the year, however, there are relatively dominant amounts that blow from the southeast, southwest, and northwest between 10% to 15% of the time. Wind velocity ranges between 0 to 25 mph, which are very steady velocities.¹³
Portland has employed many urban strategies to enhance human street/city inhabitation. These are important tools that will be used as clues to lead the site selection process; they also could be applicable on an architectural scale, so it is valuable to study these strategies.

**ZONING**

Portland needed to establish zoning laws while they were crafting their first comprehensive plan in 1978. Zoning was adjusted according to land value changes within the UGB. Therefore, the city created new ideas about growth management that was described as:

“High density apartment and commercial uses would be promoted at centers and along corridors supporting an electric transit system that would provide clean, quiet, transit services… Land outside the centers and corridors would continue to be used predominantly for single family housing… Most of the money available for public facilities… would be used to replace or improve existing facilities along the corridors.”

Therefore, the result was a set of laws that are applicable on a city scale as well as neighborhood scale. These laws include goals, policies, objectives, significant public works projects, and mapped features that control land use designations, street classifications, city limits, and urban service boundaries.

One of the features is that zoning, in Oregon generally, is very dynamic. Oregon planning is a market driven process, so it reacts to the current needs to proceed with land uses. Comparably, in Arizona, change of a zone needs a process of 5 years to get it changed, while in Oregon, it is as short as 4 months. However, any change in land use should be pursued through the Design Review Board which maintains and enhances Portland’s historic and architectural heritage. The board develops design guidelines, reviews major developments and other land use requests, and provides advice and recommendations to the Planning Commission and City Council for establishing, amending, or removing of a design district.

Therefore, it will be interesting to see how the city changed land use according to future urban developments.

**CENTRAL CITY VISION**

The city’s most prominent natural feature is the Willamette River. This location allowed the river to act as an urban theater where the city exhibits its economic and cultural activities, as the city grew on its banks. This happened to be the historic core of the city and the region, the core of the comprehensive plan for the recent years, as well as the Central City which is the plan for the future. The Central City has a very strong urban attitude, yet it faces several challenges as new city plans and policies has developed during the last 25 years. The vision aims to
guide growth until 2040 as a goal year, so it has to adapt to the slight shift in plans and policies. According to the City of Portland, the growth concept “lays out a hierarchy of mixed use areas where growth is to be targeted, with an emphasis on areas that can be well-served by transit. With its adoption, this diagram became the organizing planning diagram for the region.” The plan includes: 

- North/Northeast Quadrant Plan:
  - Lloyd District.
  - Lower Albina.
- West Quadrant Plan.
- Southwest Quadrant:
  - Downtown.
  - Goose Hollow.
  - South Waterfront.
  - University.
- Northwest Quadrant:
  - River District (includes Pearl District and parts of Old Town/ Chinatown).
- Southeast Quadrant Sub-district.
- Central East-side Industrial District.

**CLUE 1:** Areas with new development, in respect to the City Central Vision, are the most valuable ones in the city because they follow market demand, are the parts of the city seeing the most growth, and are targeting future city developments. The site would be located within these areas.
PARKS

According to the City of Portland, Portland has more than 10,000 acres (4,000 ha) of public parks and natural areas. This includes one of the largest urban forest in the US, Forest Park, which is also included inside the UGB to allow urban development in the natural landscape. Because of their ecological impact and scenic beauty, parks were also an important part of Portland’s infrastructural interconnected system. Therefore, they were carefully planned within and around the city, well protected, ecologically healthy, and one of the guiding principles of Parks 2020 Vision. This reflects the abundant care of nature and its continuity from the past to the future, which feels as a legacy that Portland is leaving for future generations.

In a broader sense, parks compose about 29.9% of Portland’s urban area, and in a smaller scale, parks compose about 14.5% of Downtown Portland (2010). So, theoretically, there is about 1,820 sq ft for each person in general, and about 400 sq ft for each person in the denser Downtown areas. This is a large range of park area for people to have a breathing space and healthy environment.

Parks in Portland are unevenly distributed. There are the largest entities of parkland that are more to the North and West, such as the Forest Park and the Washington Park, where the most of Portland’s natural beauty and wildlife is; which is also considered as a natural air purifier, water...
Parks in general are based on a module of a city block that can be repeated as needed to form a certain environment. Therefore, parks in general are based on a module of a city block that can be repeated as needed to form a certain environment. The best example of this is park distribution in the Downtown area, where the rhythm of parks creates different characters in each district of Downtown. A park may be a single city block where buildings are around it (e.g. Keller Fountain Park), or it may be repeated over 2 or 3 city blocks to create larger urban cavities (e.g. Chapman Square + Lownsdale Square + Terry Schrunk Plaza), or it might be even longer up to 5 or 12 city block to have a linear space that opens up inside the urban fabric (e.g. North Park Blocks, and South Park Blocks). No matter what shape they take, parks influence human interaction because they purify the air and create a breathing space for the urban environment. They become not just a healthy breathing space, but also large public spaces that promote human interaction. Activities such as performances, festivals, farmers markets, and family amusement are examples of park functions in the city, which reflect people’s cultural habitats, as we will see in the cultural section.

**CLUE 2:** Parks and green spaces are significant part of people’s culture in Portland, not to mention their environmental impact. Therefore, it is recommended to locate the project’s site close to a parkland for its beneficial impact on site and program(s).
CITY BLOCK

Park distribution was chosen to follow a city block increment not only because it is logical and practical, but also because of its size and scale. The Portland city block is known for its relatively small size of 200’x200’ as opposed to other American cities that have much larger city blocks. There was a reason behind choosing this size, which is to create a more walkable city. Smaller city blocks mean shorter walking distances, and longer street frontage, which offers more places to see, which encourages more pedestrian movement.26

A good method to measure and compare block size in cities is Andrew Price’s method of measuring city grids. This method helps visualize the usability and walkability of a square mile in any chosen city, but it also mathematically shows how much of land is dedicated for blocks versus how much is dedicated for streets. It explains clearly why having smaller city blocks, and consequently smaller street widths, is more useful than a bigger size.27 28
Taking Salt Lake’s city block as the largest urban block in the US (660’x660’ with 130’ street width) shows us that there are 44.67 blocks in a square mile, which compose 69.8% of the square mile, and the remaining 30.2% is street area. The total street frontage in the square is 117,928 ft; so if we considered half of the square mile as an accessible range for walking (note the squares white outline), this makes 43.42% of the square mile accessible within a ± 10 minutes walking distance.

On the other hand, Portland’s city block is the smallest urban block in the US (200’x200’ with 60’ street width), which shows that there are 412.4 blocks in a square mile, that is a huge difference from Salt Lake! However, blocks are only 59.17% of the square and the rest 40.83% is for streets. It seems a little wasteful to have ~40% only for streets. However, the other parameters show the contrary; there are 329,922 ft of total street frontage (almost the triple of Salt Lake). Therefore, by taking the accessible half square mile, it will be 48%. This means that there are more places, choices, activities offered in the same area, which is a good motive for people to walk and interact, which makes Portland’s streetscape more livable and friendly.

**CLUE 3: It is highly preferred to have the site within a regular Portland’s city block for its convenient size, scale and suitability to human interactions.**
STREETSCAPE

Based on Portland's city block, its streetscape became human-friendly, inviting, and alive. Besides the richness of activities that are supported as a result of the small city block, there are many other design elements that help make the streetscape thrive. Despite the relatively low percentage of green space (7%), especially in downtown, the streetscape helps in improving that percentage by having plants along streets paths which helps in improving the street environment as well as a green connector between parklands. The key here is the width of the sidewalk to provide enough room for walking, but also enough room for other elements/activities within it like plants, street furniture, etc. A good combination of sidewalk elements and their surrounding “background”, like signs, doors, display window, awnings, lighting elements, materials and textures, make a perfect set for bringing the street to life.29

Moreover, these settings extend the edge of the curb to include bike routes. Either constructed as a separate bike lane with a physical barrier, or protected by a parking lane, bike routes in Portland are among the most comfortable and safest in the US. They also protect pedestrians from traffic by providing a reasonable traffic hierarchy. This, of course, encourages more biking which is more human and environmental friendly. Thus, this practice of creating a pleasant streetscape also promotes a safe environment with less crime. Because of the streetscape’s livability and energy, the Portland region became one of the safest in the country.30

Clue 4: Portland’s streetscape guidelines should be considered in or near the chosen site.

TRANSPORTATION

Portland has chosen to invest in public transportation as opposed to private-owned modes of transportation. This decision required significant commitment and dedication to make it affordable yet convenient for people to use; it asked for a system that has full access to most, if not all, portions of the city. The best decision that improved system usability is modifying Portland’s urban planning towards transit-oriented development; this means that the region covered by this system will have both commercial and residential mixed-use infrastructure and transportation system.31

The main transit system is TriMet’s MAX and WES light rail and streetcar. Even so, it is worth mentioning that other transportation modes are still available, such as cars, public buses, motorcycles, as well as water transportation (mostly for sports and luxury). In fact, only 12% of Portland’s population uses public transportation, while 67% still travel by privately operated vehicle. This is a low percentage regarding Portland’s public transportation system, which is considered the best in the US. However, it is still a high number of people that uses public transportation daily in one city (nearly 76,000 person).32
CLUE 5: As a transit-oriented city, site selection should also be transit-oriented, which means the site should be along the public transportation network.

FLOOR AREA RATIO (FAR)

There is an interesting relationship between the density of new projects and their distance to transit systems. Now, it is well documented that in the Downtown area that the closer the new developments are to transit lines, the higher their densities get, and vice versa (see the graph). Therefore, it has become that the transit system promotes higher densities, while discouraging the use of automobiles. Consequently, FARs increased in Downtown, the Lloyd District, and the Pearl District first, where the transit line passed, by up to 6:1 and 12:1.

Note: Remarkably, the City of Portland has offered a FAR Bonus for developers or builders who utilize an Ecoroof system. Ecoroof is any kind of sustainable green roof system; use in any kind of development, such as industrial, commercial, residential, etc. can earn developers a larger development footprint or additional floor area above that allowed by zoning codes.

The Downtown area’s FAR is between 6:1 to 12:1. Maximum building heights are between 125’ - 350’.

Portland State University area FAR is 6:1 in general. Maximum building heights are between 100’ - 125’.

The Waterfront area FAR is between 3:1 to 4:1. Maximum building heights are between 35’ - 235’.

1-29. Percent of New Development by Distance from Streetcar. Percentage increased in developments closer to the new transit system.

1-30. Density of Development by Distance from Streetcar. Densities increased in developments closer to the new transit system.

1-31. FAR in the Downtown Area
TILIKUM CROSSING

One of Portland’s remarkable urban scenic views is the view of Portland’s bridges that interweave its urban fabric cut by the Willamette River. Bridges in Portland are urban landmarks, means of transportation, and cultural figures.

Proudly, the City of Portland added its latest bridge in 2015. Called Tilikum Crossing, also known as “The Bridge of The People”, it is the first pedestrian, bike, and transit-only bridge in the US; people see it as a victorious accomplishment for their city for this reason. The bridge was planned to hold the new line of MAX light rail system, the Orange Line, as well as TriMet’s buses. When opened on Saturday, Sep 12th, 2015, accompanied with a big celebration, it recorded 6,356 bikers and 40,000 people taking the Orange Line.

The new bridge links the Downtown core to the rural area of Milwaukie, which brings an increased interest from developers to invest and enhance areas along the Orange Line. One of the best examples that is already executed is the South Waterfront District, which was an old industrial shipping yard, and has now become a high-rise residential area. Another good example for coming developments are the developments of the Zidell family and the Oregon Health and Science University (OHSU), which were also part of the old shipping yard, and now will become a mixed-use development and a university campus. The support for the Orange Line is strong in Portland, therefore, there will be many other development opportunities that come along it.

CLUE 6: The Orange Line offers the most spirited locations for future developments, it is highly recommended that the project site to be located along or nearby it.
1-5: FROM AN ECOLOGICAL PERSPECTIVE

PARKS

Parks compose 29.9% of Portland's urban area; this has a huge environmental effect on purifying the air, with its large tree canopy, collecting water, and controlling erosion. Parks are rich with wildlife and natural beauty, and, since 1899, people have appreciated this and have wanted to settle near these areas. In 1903, John C. Olmsted, the New York landscape architect, proposed to preserve the woods, Forest Park in particular, which became protected in 1948. Parks in general are a signature of Portland and the city is trying to expand the tree canopy by 33% by 2030, especially with the fast population growth.

WILLAMETTE RIVER

As the urban centerpiece, the Willamette River defines Portland. Flowing through the city, it creates places for natural beauty, wildlife habitat, and moments for urban interaction. Through commercial and recreational activities.

The river has a long history in the area with its vital ecological benefits, but also has a significant value in people's beliefs, as well as playing a key role in the city's economy. Sadly, the river suffered from human abuse in the past. After being the main provider for the wildlife and early settlements, since 1792, cities started to grow around the river, and Portland, for example, was a stop station between Seattle and San Francisco. Afterwards, the river was heavily used as a trade route and many steamboats traveled on it. Consequently, many industries started to grow on its banks for easier access, and soon, they started to dump their waste directly into the river. Collectively, when many cities and towns followed the same practice, the river became nearly biologically dead by the 1930s and an unsafe place to swim. The river remained polluted until after World War II when federal sewage treatment facilities and pollution controls began to clean up the river. Life returned to the river by 1972 and it was possible for fish to come back as well as restart human recreation.

The river is also given significant attention in future developments. Part of the Central City Vision, the River Plan / Central Reach is planned to guide, inspire, and facilitate actions along the Willamette River. The plan also sets a new Greenway Plan instead of the old one to insure sustainability, enhance citywide policy goals, allow public access, and establish design guides for the new developments.

CLUE 7: It is highly preferable to have the site located on the Willamette River, not just for views, but also many future developments are happening along it.
People find parks very convenient spaces to practice everyday life, as well as for various events.

Note: It is very important to know that the river floods. The most cataclysmic one was in 1894 as a result of rapid mountain snowpack melt which rose the river about 33' and overflowed the city. The most recent one was in 1996, fed by snow melting preceded by abnormally rainfall. Therefore, awareness of the floodplain level should be given in the chosen site(s).

1-6: FROM A CULTURAL PERSPECTIVE

The intent of this part is to explore another layer of Portland, which is the social aspect. It will add another dimension to areas that were explored in outdoors, transportation, water, and industry.

PARKS

Interestingly, parks seem to hit on more than one subject which shows their vitality to life in Portland. As they become more prevalent in urban fabric, people find them very convenient spaces to carry out everyday life. People casually gather in parks for hanging out, picnics, exercising, or even being with their animals. Portland has the highest number of dog parks in the US (5.7 for every 100,000 residents). Cultural events have a history of 110 years, and play a big role in parks, like musical traditions and concerts, art exhibitions, and even movies and kids shows. Festivals and fairs began in 1905, the most famous ones are Lewis and Clark Centennial Exposition in 1905, which attracted 1.6 million visitors. The Rose Festival started in 1907, (“Rose carnival and fiesta” and “Parade of the Roses” are established events as well), and remain the most popular festival in Portland, attracting 400,000 people. In addition, The Farmer’s Market is considered one of the largest in the country. There are also community events and opportunities for volunteering and fundraising, as well as free classes for several topics that also take place in parks. Thus, the parks are healthy, entertaining spaces for large, mostly free, public gatherings and socializing.

BIKES

Portland is the only large American city to be given a "platinum" rating for bicycle communities by The League of American Bicyclists and was also named the #1 bike-friendly city by Bicycling Magazine for many years running. It also has the highest percentage of bicycle commuters, 7%, which is higher than any large American city, compared to a 0.5% national average. It is also good to mention that there is a tradition of biking the city's freeways and bridges every year. Called the Providence Bridge Pedal, more than 18,000 people participate in it, biking as long as 36-mile route, and offering riders a view of the city from the top decks of the Portland's big bridges like the Marquam and Fremont.
WATER

Interestingly, the areas that are along the river sides have a higher population than areas farther, even out of Portland. Therefore, water was the main reason for Portland to grow, not just feeding the natural life, but also connecting trade and industries between cities. Thus, Portland today takes advantage of the water in a variety of ways. First of all, Portland is always wet by its annual rainfall range, which is nearly 300 days per year of cloudy/rainy weather. However, the rain usually happens in a slight drizzle for which people rarely use umbrellas, making them a fashion faux-pas for Portlanders. Therefore, anyone who uses an umbrella is recognized as foreign to Portland. Water in the river is used for boating and kayaking in good weather. Additionally, the river is an important corridor for salmon, and the city has stipulated that any development along the Willamette River requires a fish expert in the team as a consultant. Water is also found in parks and around the city in fountains where it allows for people interaction, like swimming.46

INDUSTRY

Because of its location between other cities and on the Willamette River, Portland became a home for several industries for its relatively low energy cost, accessible resources, highways, air terminals, intercontinental railroads, and large marine shipping industry. Portland is also known for its lumber and steel industries that existed since before the WWII and became Portland’s main employers in the 1950s. Portland also harbors the largest independent bookstore in the world, Powell’s City of Books, which has over one million new and used books and serves 3,000 customers daily.47

EDUCATION

Portland contains six public school districts, many private schools, as well as public and private colleges and universities including Portland State University, the largest public university in Oregon.48

- 15 High Schools
  - 12 Public
  - 3 Private
- 11 Universities
  - 3 Public
  - 8 Private
- Public Universities:
  - Portland State University,
  - Oregon Health and Science University (OHSU)
  - Portland Community College
- Private Universities:
  - Concordia University
  - Lewis & Clark College
  - Linfield College (Portland Campus)
  - Multnomah University and Biblical Seminary
  - Pacific Northwest College of Art
  - University of Portland
  - Reed College
  - Warner Pacific College
Portland as a whole is an urban area defined by the UGB. The Willamette River cuts it into two halves, east and west; the city is then separated by highways into north and south. Therefore, Portland is known by four major neighborhoods: Northwest, Southwest, Northeast, and Southeast.

NORTHWEST:

A very desirable neighborhood for its convenient location and amenities, which are:

- Forest Park.
- Close to downtown.
- Historically very popular.
- Mostly occupied by students, young professionals, and families.
- China Town, Pearl District.
- Wide variety of retail businesses and restaurants.
- Portland’s industrial and shipping districts.
- Traditional homes, apartments and condos in older buildings.
- The Burlington Northern Santa Fe Railway’s Willbridge Yard.
- Siltronic’s Portland Production Facility.

SOUTHWEST:

The most active and attractive neighborhoods in the city, mainly because of Downtown Portland. Neighborhood features:

- Governmental buildings, such as local government, courthouses, police stations, federal buildings.
- Downtown Portland.
- High-rise buildings, mostly office and bank buildings. Including the Wells Fargo tower which was the first high-rise building in the city in 1972, and the Commonwealth office building by Italian architect Pietro Belluschi.
- Washington Park.
- Art and performance places, museums and concert halls.
- Many single-family housing, it is considered a safe place to raise a family.
- Famous neighborhoods: Multnomah Village, South Waterfront, South Burlingame, Hillsdale, and Johns Landing.
- Big educational institutions, The campuses of Portland State University (PSU) and Oregon Health and Science University (OHSU) are the largest educational entities in the area. They interact and cooperate very frequently with the city to improve policies, increase developments, serve public and social needs, as well as support sustainability and transit-oriented developments, which also overlap with research intentions.
Portland State University (PSU), Oregon Health & Science University (OHSU), Lewis & Clark College, and Portland Community College/Sylvania.

- The south Willamette riverfront along SW Macadam Ave, a former industrial land, which is under redevelopment as a mixed-use, high-density neighborhood.

NORTHEAST:

This section has been settled after opening the Morrison Bridge by which the west side was connected with the east side in 1887. It was settled by German, Russian, Italian, and Polish immigrants and quickly became Portland’s primary working class neighborhood. The North and Northeast neighborhoods were, and are, the biggest industrial zones in the city. However, lately new developments started to grow up providing a variety of commercial and entertainment zonings to the section. The most distinct features are:

- Portland International Airport. (PDX), completed in 1940.
- Lloyd District.
- The Oregon Convention Center.
- Alberta Arts District and the Boise neighborhood.
- Historical Hollywood neighborhood.
- City’s expo and sporting hub.
- The Rose Quarter, a vital African American community of homes, shops, and one of the most vibrant jazz scenes in the country.
- Hayden Island, one of Portland's neighborhoods with housing, boat moorages, a shopping center, and hotels.
- Adidas, a worldwide footwear and sports-apparel company.
- Industrial Swan Island.
- The University of Portland, a private Catholic university, opened in 1901.
- New Columbia, a new urbanist neighborhood, built and occupied after WWII.
- Cascade Station, the regional shopping center, a home to IKEA and other major stores, offices, and hotels.
- Providence Portland Medical Center.
- The Grotto, an internationally renowned Catholic sanctuary, botanic garden, and gathering place.

SOUTHEAST:

Similar to the Northeast section, the Southeast bloomed after opening of the Morrison Bridge, and its population increased dramatically. Now, the sections have a majority of residential areas with many industrial uses.

Neighborhood features:

- Affordable residential and commercial neighborhood.
- Ladd’s Addition, the X-shaped neighborhood.
- Portland Memorial Mausoleum Mural, the largest hand-painted mural in the country.
• Johnson Creek Schweitzer Restoration Project, mimics the features of a natural stream.
• Hawthorne District, a high-density, mixed-use, pedestrian-oriented neighborhood.
• Laurelhurst Park, a 30-acre land designed by Emanuel Mische, listed in the National Register of Historic Places.
• Crystal Springs Rhododendron Garden.
• Reed College, a private academic and intellectual college, founded in 1908.
• The Oregon Museum of Science and Industry (OMSI).
• The Oregon Rail Heritage Center (ORHC), a railway museum that secures a permanent home for the city's steam locomotives and establishes a Rail and Industrial Heritage Museum.
• Lents Area, one of Portland's largest, oldest, and most diverse neighborhoods, with many Asian, Russian, Eastern European, and Latino immigrants.
• Floating Walkway, a 1.5-mile waterfront promenade, built in 1998.
• The Eastbank Esplanade, a pedestrian friendly that connects the east side's inaccessible waterfront. It attracts over 1500 bicyclists a day.

SITE VISIT

Most of the Master of Architecture students (class 2016) had the opportunity to visit Portland. The visit allowed the group to explore opportunities for their sites/programs, meet with professionals, talk to people about daily life, which highly supported their investigation. (See site visit report next pages).

CHOOSING A SITE(S)

The student group collectively chose to shrink the area of research down to 1 mile around the Tilikum Crossing area, influenced by the existing conditions and future prospect developments, where great opportunities for new projects could be found.

In addition to this, overlapping the 8 clues above with the River Plan / Central Reach, which the author chose as a starting point, resulted in very limited locations for his area of research.

The River Plan offers abundant programs for future development in the area, like riverfront attractions with commercial uses, riverbank restoration, potential redevelopment, potential regional cruise ship docking, potential water transit stops with retail activity, major riverfront activity hub, distinct areas / neighborhoods. Site-wise, the whole area is a development, meaning that any site within this region could potentially be an appropriate
However, the clues identified by the author helped make a more specific selection. Four strongest identified clues are: being on the Willamette River, being closer to a parkland, being on the Orange Line, and working with PSU/OHSU developments.

- On the Orange Line: 15 potential sites
- On the Willamette River: 12 potential sites
- Closer to a parkland: 4 potential sites
- PSU/OHSU: 1 potential site

In addition, the Zidell family is also a significant contributor in the River Plan by having a large land of development in the area. They are also thinking about the future goals of the surrounding developments. They have done many housing projects nearby, and now offer many mixed-use opportunities in the current plan.

In conclusion, the proposed sites are within OHSU and Zidell properties.

**PROGRAM RECOMMENDATIONS**

Working along with what has already been proposed by the two big entities in the area, OHSU and Zidell, four sites/programs are nominated:

**Site 1 (OHSU): Research Facility**
- Cancer Clinical
- Basic Research Center
- Industry / OUS Partnerships Research wet lab
- Oregon Brain/Neurological Sciences Institute

**Site 2 (OHSU): College Union**
- Post Office
- Bank Branch
- Restaurant(s)/Cafe(s)/Food Carts
- Guests House
- Commercial Stores
- Public Spaces for Gathering + Events

**Site 3 (Zidell): Mixed Use**
- Commercial
- Residential
- Offices

**Site 4 (Zidell): Housing**
- Apartments
- Grocery
- Commercial
Catch the
1-A SITE VISIT REPORT

Most of the Master of Architecture students (class of 2016) had the opportunity to visit Portland. By the time of the visit, which took place in Sep, 10th - 13th 2015, no site has been chosen yet by anyone. The intent was, after primary research and few seminars prior to the visit, to talk with some of the leading practitioners in the city, tour the city, explore its transit system, interview random people, and come up with observations and recommendations for their prospective site and programs. The site visit was arranged to coincide with the opening of the Orange Line and the Tilikum Crossing bridge, so the group had the chance to ride the new line over the new bridge from Downtown Portland down to Milwaukie, looking for opportunities for sites/ programs.

MEETING / SEMINARS

Students met with some of the local professionals who are leading thinkers and researchers in architecture, landscape architecture, planning, and related research fields. These meetings had a series of discussions and seminars that introduced the students to Portland’s history, planning, and design practice.

- PSU Meeting: Rudolph Barton
  Thursday, September 10, 2015. 01:30 pm
  Urban Planning and River Ecology
  Portland State University
  School of Architecture Office
  Shattuck Hall 235: 1914 SW Park Avenue

Rudolph Barton, Professor of Architecture at PSU, migrated to Portland in 1972, which coincided with development of the city’s central core. He talked about the origins of the UGB establishment and the reasons for people moving to Portland. He explained that even though the UGB was a reaction to sprawl, it might not be a good strategy for every city because it is subject to many restrictions and regulations. He emphasized the legal regulations related to Downtown Portland planning and development, he described matters like zoning & development regulations that affect the urban form concepts, building code, density / floor area ratios, heights regulations, housing incentive programs, and streetscape requirements; matters with clean air plan that put restrictions on parking and transit mall; and matters with public realm and other regulations like the Design Review Commission, historic Preservation, zoning and housing incentives. He talked about some of the developments that happened since 1960, like the current/ future South Waterfront District which used to be a shipping yard. He introduced the Central City Vision as it started in 2010 and its goals for 2035; and explained some of the transit-oriented development implementations on public and private projects in the Lloyd District, Six Eco-Districts, and PSU Districts.
Barton also talked about people’s bike ridership habits and the fact that people ride their bikes in all weather conditions and walk without umbrellas, but use rain coats; and people’s famous food traditions in the city like coffee, donuts, and food trucks which have any kind of ethnic food and offer a variety of choices every day.

Both of Barton and Matthew Brown, a transportation planner, introduced the effect of global warming on Portland and the environmental strategies for buildings. The increase in temperature is resulting in snow melting in mountains and rise of sea level which will eventually result in floods, which is also a threat for wildlife. Speaking of which, Salmon is one of the preserved species in the river that the city is very sensitive about any developments on the river, so they require a fish expert in the team. Interestingly, the environmental strategies used in Portland are very different from Tucson’s desert environment, where students are used to designing and researching. Two main factors architects try to achieve in buildings in Portland are daylighting and protection from water.

• **SRG Meeting:** Stan Barter  
  Friday, September 11, 2015 – 09:00 am.  
  SRG Partnership  
  Pioneer Square, South Waterfront Design Team  
  621 SW Morrison Street, Suite 200

SRG is a research-based design firm that focuses on the use of sustainable strategies to improve building performance on an architectural scale as well as on urban design scale. The meeting was intensely focused on environmental control systems use in buildings. They showed the group extensive research methods they utilize during their design process. They emphasized that daylighting is a high priority for design in buildings, and they highly focused on reducing energy in buildings, like natural ventilation and solar systems. They rely mainly on computer software to calculate and test environmental systems, however, they tend to depend more on physical mock-ups for more accurate testing, which should be within budgets. Their current project at the time of the visit was the second building of the new OHSU campus, the School of Nursing and the School of Public Health Building, which was in the construction documentation phase.
SERA is also a research-based firm that focuses on sustainable design and energy saving for the built environment. Their seminar covered four topics, two of them were about planning, one was from professional practice, and one was theoretical. They started by exhibiting the growth of the light rail transit system in the Portland metro area and the sections/districts it serves, with an emphasis on the key destinations located in each part, such as the PDX (the airport) as the destination of the Red Line, and the Portland Expo Center as the destination of the Yellow Line. Next, they demonstrated a zoning/land use analysis in Portland's transit-oriented development, which showed a variety of typical development models in commercial, residential, industrial, and mixed-use building types, and how it is influenced by zoning code, height, set back, and FAR.

The third topic was related to a recently built project of theirs, the Collaborative Life Science Building and Skourtes Tower, the first building in the new OHSU campus. Finally, they introduced a theoretical concept named “biophilia”, which is a hypothesis that suggests an instinctive bond between human beings and other living systems, with some examples that link it to their practice.

Skylab is an integrated interdisciplinary design studio that cares about creating meaningful, sustainable architectural experiences and is inspired by the influence of place on the human experience. Daniel Meyer, architect and design director at Skylab, lived in Portland for a long time, he received both of his undergraduate and graduate degrees in Portland. He works now as a design director in Skylab. He talked about his interest of exploring intersections between design practices, art and commerce, and emotion and intellect. Thus, he stressed on building the relationships between teams and the necessity of gathering as much expertise as possible in a project, and searching for multidisciplinary people in the team with at least two expertises, or as he called it multi-T-shaped persons. He explained that this has an influence on achieving a connectivity between levels in the design process.

Mayer also talked about climate in Portland as a moving target. He diagrammed the current condition in Portland by four zones (the diagram on x), the desert part is expanding towards the city because of global warming and it needs a rapid adaptation.

Interestingly, he talked about Mount Hood as an iconic element to Portlanders and described it as “being the center of emotions.”
TOURS

• **Planning / Transportation Tour:**
  September 10, 2015, 03:30 pm.

  Brown worked as a project manager in the Portland Office of Transportation for 11 years starting in 1994, and worked closely with the development of Portland transit system. He took the group on a ride through Portland Streetcar's NS Line from the Shattuck Hall to the Pearl District, showing them a regular experience, and pointing out some of the pros and cons of this system.

  He talked about the complexity of the transit system which increases the congestion between transportation modes and the problematic fact of most people are still depending on privately-owned vehicles because of the system's imperfections; for example, it is very difficult to pass a transit line to every corner in the city, therefore people tend to use cars instead. The students noticed that during rush hours, the streetcar was very slow, that walking was faster than taking the streetcar!

  Part of the tour was also exploring two public parks in the Pearl District, Jamison Square and Tanner Springs Park, as well as visiting some of the renovated historic buildings in the Pearl District, like Wieden + Kennedy and a commercial building where the Pearl Health Center is.

• **Collaborative Life Sciences Building & Skourtes Tower Tour:**
  September 11, 2015, 04:00 pm.

  Led by Steven Ehlbeck, the tour explored most of the public spaces in the building, discussing some of the design and construction challenges, pointing out some of the building details in response to certain issues like sun, envelope, program, etc.

  The Skourtes Tower is mainly lab areas, so the tour did not go through it.

  As mentioned in the SERA seminar, this building is the first built building of the new campus for the Oregon Health and Science University (OHSU). SRG are working on their second building, the School of Nursing and the School of Public Health Building. Currently, the main OHSU campus is up on the Marquam Hill, so they used an aerial tram, associated with TriMet's public transportation network, to link the two campuses together. The tour ended by taking the tram up to the main campus.

  Remarkably, the tram is owned by the city and operated by OHSU and funded by both. While the it mainly serves OHSU people, it is also available for public and operated as part of their system. It takes 4 minutes to get to the top, while it offers panoramic views to the city.
• **Informal explorations.**

The goal was to explore areas along the Orange Line, speculating on opportunities for suitable sites in empty lots, or current / future developments; including riding the Orange down to Milwaukee, which tended to be a much slower growing area than Portland. This also included blending with the culture, talking to different people, attending the farmer's market, eating from food trucks, wandering in different parks, exploring public buildings like Powell’s Bookstore, Portland’s Old Church, and Oregon Museum of Science and Industry (OMSI), walking along the banks of the Willamette and areas below bridges, watching people preparing their kayaks on the pier, and attending part of an annual boat racing.

**INTERVIEWS**

Each member of the visiting group had the opportunity to interview 5 – 10 random people, asking them about a few simple but basic question to pulse the everyday habits of people.

It was observed that some people live in Vancouver, WA, but work in Portland. Additionally, while many people favor commuting by bike or public transit, others did so by individual cars. However, there seems to be a social pressure of guilt or shame for those who do so, as the interviewer noticed regretting signs on those people after answering the question. This indicates that people are proud of their transit system and urge everyone to use it from a non-governmental level. There was also a funny attitude about their neighborhoods that 9 out of 11 liked their neighborhoods, but 9 out of 11 were willing to leave them. Finally, many of them have a close place to home for work, grocery, and walking around, which indicates a sufficiency in services in many neighborhoods.
**SITE 1: Research Facility**

- Works in response to site context. (Part of future OHSU campus)
- Works with future development vision.
- On the public transit line.
- The site is 375'x200', which is a little bigger than the desired size.
- The research facility plans to connect with the university, institutes, labs, and industries, so OHSU students/employees are the main target. However, there is an indirect connection with Downtown and the South Waterfront District because students and employees will need places to live or shop, and these are the closest.
- Since the campus is partially sponsored by PSU, it will have a direct connection with it.
- The site may offer views to the river.

**SITE 2: College Union**

- Works in response to site context. (Part of future OHSU campus)
- Works with future development vision.
- On the public transit line.
- The site is about 200'x200'.
- The union offers a variety of programs that could, to some extent, offer whatever program the area misses, like a post office or a bank branch, which could be useful for both on-campus and off-campus users.
- The union’s main target is OHSU students and employees; however, it has places/programs that attract the public, like performances, food, and post office.
- Since the campus is partially sponsored by PSU, it will have a direct connection with it.
- The site makes a direct connection to the South Waterfront District, and Downtown, since students/employees may choose to live, shop, or spend time there.
- The site offers views to the river.
**Site 3: Mixed-use**

- A very popular kind of development in Portland market.
- Works in response to site context.
- Works with future development vision.
- On the public transit line.
- The available lot is about 800’x200’, which is very big. A 200’x200’ maximum lot size should be used instead, location may be adjusted in respect to the river and the transit station.
- The site may offer views to the river.
- The commercial part makes a direct connection to the South Waterfront District, and OHSU campus. It offers choices of retails and food for people living in the neighborhood and OHSU students and employees.
- The residential part makes an indirect connection to the South Waterfront District, Downtown, and OHSU campus. It offers places to live for OHSU students and employees, a social connection to the adjacent neighborhood, and convenient access to Downtown.
- The offices part makes a direct connection to the South Waterfront District. It offers a convenient location for future employees to live in the adjacent neighborhood.

**Site 4: Housing**

- Works in response to site context.
- Works with future development vision.
- Close to the public transit line.
- On TriMet’s Aerial Tram line, which offers a great connection with OHSU Marquam Hill campus.
- The site is about 210’x90’.
- The project will add to the increasing demand of housing in the area. Its main target are people who work at OHSU and adjacent areas, and students of OHSU.
- It has a small commercial part which fills the need of the residents, but also serves the street.
- The site offers a social connection to the adjacent neighborhood, and a convenient location for Downtown for residents who want to work, shop, or spend time there.
- The site may offer views to the river.
- The main disadvantage of this site is it lies on the I-5 highway network, which is a major source of noise for residents.
In conclusion, the College Union site and program seems the most flexible, spirited one that could potentially animate the area by bringing the community into one place, not to mention its location on the river and on the public transportation route, and proximity to Downtown.

1-8: SITE ANALYSIS

SITE HISTORY

The site used to be a neglected, unappealing, and isolated part of the city. It was a brownfield industrial site used for maintaining ships around the WWII period. Even though it is geographically close to Downtown, it was cut off by the I-5 freeway, and therefore with limited connection. After the WWII, the city started to decommission these areas and reclaim waterfronts for public uses. Today, the Zidell shipyard and barge company, south of the site, still run. However, they, along with the City of Portland, are rethinking their future, especially after establishing the UGB and the idea of growing up and in instead of sprawling out. Additionally, it is anchored by public transportation and pedestrian bridges over the I-5. Therefore, the area has witnessed one of the largest urban redevelopment projects in the United States, moving from industrial uses to high-density, mixed-use, walkable and transit connected uses.53

SITE CONNECTIVITY

It is important to know that the site is an extension of the older OHSU campus located on the Marquam Hill. All of OHSU facilities (hospital, schools, labs, research facilities, recreations, services) are on the Marquam Hill campus. The university is now planning on shifting all the educational facilities to the new campus (the site), and keeping the medical facilities on the Marquam Hill campus. The two campuses are connected by TriMet’s Aerial Tram, which was initially constructed to serve students, employees, and patients of the OHSU, but also serves the public as well.

Additionally, the site is very accessible to the public by being almost flat and at the same level at the street and is highly connected to the city by public transportation. The new Orange Line passes right next to it, the streetcar also runs by it and inside the new campus, station stops are a 2 and 1-minute walk respectively. Buses also run by and inside the campus.
SITE DEMOGRAPHICS

According to the City of Portland, the site is mostly occupied by 61.3% of families without children; 40.4% of the population is 22-39 years old people, and 29.1% is 40-64 years old people. 85.5% of people in this area are white.54

The site / area is relatively safer than the rest of the city, especially Downtown, with less than 1 incident per 1000, which is very good compared with over 300 in Downtown.55

SITE ADJACENCIES

The site currently feels isolated, with few immediate adjacencies with activities. However, within 5 to 10 minutes walking distance there are several uses that start to appear. The most well-known places nearby are the South Waterfront high rise condos south of the site, the Oregon Museum of Science and Industry (OMSI), and Portland Opera House, both on the river’s east bank. The South Waterfront neighborhood also contains a park, some restaurants, an auto shop, and the Center for Health & Healing belong to the OHSU. North of that, immediately south of the site, is the Zidell shipyard, with some food carts and commercial spaces. Interestingly, the majority of Zidell’s property is empty. Although they are planning on developing it now, they operate as a drive-in movie theater. North of the site is a combination of single family houses and residential complexes with some office buildings, a hotel, commercial spaces and bars. It also has the end of South Waterfront Park, which is planned to continue down to the Zidell yard across OHSU campus (site); as well as the Riverplace Marina, a moorage facility. West of the site is the I-5, and west of this is a single family neighborhood.
EXISTING SITE

The site, which is part of a larger OHSU property, is mostly empty. The existing structures are the Collaborative Live Science Building (CLSB) and a parking lot. The proposed campus is in design development phase; the CLSB is the first piece of it. The site has a gentle slope towards the river.

FLOOD PLAIN

The existing condition is about 16’ lower than the street level, which lies under the Willamette River’s flood plain. According to SERA, it was discussed that the campus ground plane should be at 2’ minimum above the flood plain, which is equal to 40’ from the river plain. Current site elevation is 30’ (10’ below flood plain), however, the CLSB now (and all of the campus in the future) is at 46’ above the river plain, which is level with the adjacent streets.

Important: It is not permitted to build spaces occupied by humans within the flood plain.

ENVIRONMENTAL FACTS

The site currently does not offer any natural or artificial shade from sun, nor does it shed water. It is gently sloped towards the river, and lies below the flood plain. The site is also open from all directions, which allows wind to pass from all directions and offers a great deal of natural ventilation.

SOIL CONDITION

Because the site was a brownfield site, and being next to the river, the capped soil is a soft contaminated soil which is structurally unsuitable for construction. Most structures on campus will require deep foundations.
View 1
Street Level @ 46’
6’ above flood plain

Existing site @ 30’
10’ below flood plain

The Willamette River

0’ 100’ 200’

Moody Ave

1-70. Site Existing Condition

Flood Plain is 40’

1-71. Flood Plain
In 2008, OHSU started a master plan for its new campus, also known by the Schnitzer Campus; their goals were to create places to live, work, relax, and of course, learn in an active, vibrant environment, as well as setting the bar for being the greenest campus in North America.\(^7\)

The master plan proposes the following programs:\(^8\)

- **Schools**
  - School of Medicine
  - School of Dentistry
  - School of Nursing
  - OGI School of Science and Engineering
  - College of Pharmacy
- **Research**
  - Cancer Clinical/Basic Research Center
  - Industry/OUS Partnerships Research wet lab
  - Oregon Brain/Neurological Sciences Institute
- **Academic & Student Support**
  - Library/Learning Resource (Biomedical Info. Community Ctr.)
  - Student Services
  - Multimedia Learning
- **Collaborative Education Center**
  - Portland Community College
  - K-12 Educational Component
  - Portland State University
  - Oregon University System Institutions
  - Other (Com. Coll., Additional partners)
- **Community / Shared Facilities & Services**
  - Allied Programs
    - **Student Union**
    - Conference Center
    - Faculty Club
- **General Administration and Infrastructure**
  - Physical Plant
  - Auxiliary Services
  - General Administration
  - Information Technology Group
  - Logistics

The student union has been allocated a gross area of 84,500 sq ft. However, it has not been dedicated to a specific site on the master plan yet. Therefore, there is some flexibility regarding its location.

**TRAVEL DISTANCE**

The campus is planned on a pedestrian-oriented basis, so it will be conveniently connected to its institutional neighbors. Within a ¼ mile circle, it is easy to walk or bike between locations on-campus as well as locations off-campus, especially the OHSU related buildings like the Center for Health & Healing, and the Marquam Hill campus (through Aerial Tram).\(^9\)
The student union has not been dedicated to a specific site on the master plan yet. Therefore, there is some flexibility on where to be located.

CIRCULATION

While the new plan encourages walking, biking, and using public transit, cars are permitted to drive inside campus, and there are parking structures in most of campus buildings.

Circulation combines heavy modes (Light Rail, Streetcar, buses, automobiles) and light modes (walking, biking). All modes are facilitated within the campus new circulation paths to make it as accessible as possible. More attention was given to light modes inside campus to encourage green transportation, by designating routes that are only for bikes and pedestrians.
ZONING

The whole site lies within Central Commercial Zone (CX) use. CX is intended for commercial development within Portland’s most urban and intense areas. A broad range of uses are allowed to reflect Portland’s role as a commercial, cultural and governmental center. Development is intended to be very intense with high building coverage, large buildings, and buildings placed close together. Development is also intended to be a pedestrian-oriented with a strong emphasis on a safe and attractive streetscape.

FLOOR AREA RATIO (FAR)

According to the FAR map issued by the City of Portland, the FAR for the site (and the whole campus) is 3:1, which is between 35’ – 235’. However, the city made an exception for OHSU through the Design Board Commission to go as tall as 250’.60

STREETSCAPE

Streetscape is designed to support the concept of pedestrian-oriented environment. Large sidewalks, street furniture, the use of planting, and lighting elements are carefully considered to support that concept. Furthermore, the streetscape is designed to protect pedestrians and bikers from heavy transportation by protecting street elements, like planters or parking spaces. In addition, there are special places dedicated only for pedestrians and bike access, like the campus park and Waterfront Park, which provides exceptional views to the campus and the river.

PARKING

Although the whole area is considered as a transit-oriented development, there is access for private vehicles inside campus. There are four major corridors for car access, as well as basement parking in most of campus buildings.
Figures Citations

All Figures are courtesy of Mahmood Al Musawi unless noted:

1-7. Cloud Coverage + Humidity. Ibid.
1-8. Temperature. Ibid.
1-9. Daylight Hours. Ibid.
1-10. Illumination Range / Global Horizontal. Ibid.
1-22. Cities Comparison by Street Width. Ibid.
1-23. Cities Comparison by Block Size. Ibid. Page 56.
1-30. Density of Development by Distance from Streetcar. Ibid.

2-1 WHAT IS A COLLEGE UNION?

In the 18th Century, there was no such thing as a college union in colleges and universities in the United States, not even fraternities and sororities. There were social groups called literary societies, and/or debating societies, which are believed to be the roots of today's college unions. Originally, they were borrowed from England; the earliest college unions were noted at Cambridge University in 1815, which was a group of three debating societies, followed by Oxford in 1823, for the purpose of supporting the students’ intellectual and social abilities outside the classroom. Thus, college literary societies in the US formed as membership organizations that served a vital purpose in students’ lives that changed the way campuses were viewed. They also supported classroom education with discussions of literature and current events. There would be readings, debate position papers, present plays, and even musical shows or internal sports hosted by society members. They offered opportunities that allowed students to discuss the “real business of living,” and debate about the issues of the day. Such involvement that brought students together had a big effect on them in sharing a common set of social values. Therefore, by the time when reactions and memorizations were the standard in the classroom, the literary societies thrived.

The idea behind these organizations started to change after the Civil War when their importance mostly started to diminish, or in some cases evolve into another form of organization. The cause behind this change was attributed to three reasons: the introduction of fraternal organizations, which caused a significant decline in the literary societies’ prestige, the growing students’ involvements in clubs and athletics, and the expansion of the libraries, which took over literary societies’ purpose of providing a variety of services as well as their availability. However, some of the Midwestern literary societies expanded their role as a response to this change, which evolved later to the concept of a college union.

The first college union in a US university was the Harvard Union, established in 1880 as a social organization (not built until 1901). The Harvard Union chose the name Union “in the hope that out of the debating society a large general society, like the unions at Cambridge and Oxford, would grow,” according to them. The name also had a strong implication on the need for unity among students, teachers, and alumni, the need for meeting each other of all classes, and the need to provide elementary human needs: eating, drinking, socializing, etc.

Therefore, there were a couple of important transitions in unions. One was the quad concept that was also brought from England, that was most campus buildings were arranged around quads, thus every college had their own environment. Later, in the modern movement, this concept was replaced with the grid arrangement, where all buildings took pure strict forms arranged on a grid. The
other was the decentralized location of the union. Since each college environment was contained over their own quads, so did their social organizations, meaning that each college had a “mini union” that is separate from other colleges. As the union idea became more distinct, it became one building for all campus.4

2-1-1 WHY DOES EVERY UNIVERSITY HAVE A UNION?

In the beginning, it was thought that only big universities should have a union building, because it is more feasible, and to help balance the spread of big campuses and unifying their schools in one place; however, later in 1960s, small colleges (as small as 300 students) and even large high schools had a union. It has become a facility that is as necessary as other university’s amenities like the library or the gym. Furthermore, union buildings are among the first three or four buildings constructed in new campuses.5 Why there is such an interest? Why they are given such priority? Especially with the many other various social organizations that are involved with campus life. What is the point of a union building when a campus has residence halls, fraternities/sororities, church centers, and other clubs?

Interestingly, Scott A. Tierno, PhD interviewed some of college union professionals to elaborate on unions role and importance in campus community, and one of them stated that “The thing I tell my students whether I’m conducting an orientation for new student employees, or whoever, is that the College Union building – no one has to come to this building. You don’t have to come here to get your degree. You don’t even have to buy your books from here. None of the programs that we sponsor here offer academic credit to participate in them. So, you can go through your entire academic career, get your college degree, and never step foot in the College Union. So, why does the College Union have the most foot traffic of all the buildings on campus, if this is not necessary for your academic experience?”6

In fact, it was thought that with the large number of social organization on campus, campus life would be at risk of being isolated by having these organizations pull students into themselves, which would divide the campus socially. This resulted in the realization of the initial concept of a union, which is to unify all schools and organizations on-campus in one building, which also offers a place for people who live off-campus when they do not have somewhere to go. In addition, almost all universities and colleges have become concerned with the campus social environment of their students and their use of time. They have noticed that union buildings do not just provide daily basic needs, but also it is part of students learning process when they meet each other or their teachers; in fact, they came to recognize that students learn more from each other and from faculty in informal association outside the classroom.7
2-1-2 THE EVOLUTION OF THE UNION

Since their founding in 1880, college unions took several positions in campus social life and were very flexible in nature. Programs were added and subtracted from unions per need and affordability, but there was not a fixed recipe that applied to all unions. Therefore, every university had their own version of a union, which made it exceptional and unique to that university. However, there were three stages with specific themes that can be identified over time.

The first one was the **Social Clubs** period (1880-1930s), which promoted comradeship among members. Their programs in general were socially oriented for dining, social gathering, and for athletics. Each union in this generation was the first social facility in its public institution, eventually they formed the Association of College Unions International (ACUI) in 1914, when they met and established a set of goals for the union movement.9 10

The second generation was the **Community Centers** period (1930s-1990s), which coincided with the development of general community recreation and cultural centers and was largely influenced by their success. People started to see the possibility of integrating students’ interests outside their working hours at their leisure as a positive recreational and educational mission to achieve. Thus, it was the age when the unions opened to a variety of programs that exceed the basic daily needs, bringing all together the sense of community in a wide range of facilities with multiple functions in one place. The ACUI described it that “the union has become an all-purpose community center of the first order, with an identity and meaning of its own.”11

Moreover, during the 1960s and 1970s, unions became a campus gathering places for political reactions, where students crowded to protest, especially during the Vietnam War and civil rights. Because unions were primarily for community building and gathering, students found it a perfect place for congregating, there were even other places on campus dedicated as free speech zones.12

The third generation is the **Shopping Mall** period (1990s-2010s), which has been influenced by globalization. On a city scale, public spaces have been “renovated” to meet standards of globalization. Mark Dery, a cultural critic, wrote about the Disneyfication of public space, the landmark neighborhoods that were replaced by commercial simulacra, the city streets that are being theme-parked for mass consumption, and the new town square called the food court, as serious changes of today’s public space. Moreover, these places are even desirable for many people because they thought that the new movement serves the local government economically, reduces crime violence, and it just seems right for the time.14 Therefore, being part of public space, today’s college unions are caught in this trend too.
Besides globalization, the other part of the issue, especially in the US, is related to sprawl. Sprawl is known for five major components: housing subdivisions, also called the suburbs, where people reside; office parks, with places only for work; civic institutions, such as schools, churches, town halls, etc.; roadways, the long wide streets that connect all other components; and finally shopping centers, also called strip centers, shopping malls, and big-box retail, which are exclusively for shopping (hence the connection to our case). From a broader view, Sprawl “caused urban decay, death of civility, and the end of community,” and “the city has twice been humiliated by the suburbs: once upon the loss of its constituency to the suburbs and again upon that constituency’s return,” which has affected cities’ urban system in general. However, from a specific view to shopping, the relationship between shopping and the city has inverted, meaning that the city now is taking place in shopping rather than shopping takes place in the city. In other words, “shopping has infiltrated, colonized, and even replaced, almost every aspect of urban life. Town centers, suburbs, streets, and now airports, train stations, museums, hospitals, schools, the internet, and the military are shaped by the mechanisms and spaces of shopping.” Of course, college unions are among these affected typologies as well.

Shopping has become a prerequisite for urban life and the defining activity of public life, to a degree it was thought that the urban in the beginnings of 21st century could not be understood without shopping. This dramatically refashioned the city. It has assembled an unequal connected fluid urban experience that has consolidated a density of events, which stirred up a dynamic range of activities. It switched the historic notion of shopping where it was connected to nature to be disconnected. Historically, the public life emerged with the marketplace through the bazaar, the arcade, the plaza, the Greek agora, etc. and their connection to nature and the outdoor environment. However, today it become self-contained interiorized realms that perform autonomously from the outside. Therefore, shopping’s function as an urban connector was lost.

Furthermore, with the aid of technological revolution, shopping was largely promoted to happen in indoor controlled environments, isolated and independent, what detached it from the outdoor environment. An artificial environment, regulated by air-conditioning and electricity, encouraged shopping to happen regardless of time, place, and climate. This was revolutionary in the science of buildings, but also in people’s lives, making shopping centers to be comfortably popular for spending time and money inside them.

The combination of the two, globalization and shopping, facilitated fast spread of them inside college unions. Andrea Peterson wrote in The Wall Street Journal (1997), “Student [college] unions have become increasingly important marketing tools because, along with residence halls, they are the buildings most students
and parents ask to see. ‘You need an attractive union to be competitive with other institutions that are pulling out all the stops,’ says Wayne Anderson, president of the Association of Colleges of the South” (Peterson, 1997, p. 1).22 Additionally, Gary Ratcliff, PhD have argued that the “Mall Concept” is the most significant architectural trend in college unions in the 21st century. They attribute it to its large open atrium in creating a central gathering space for students, but also ‘an architecturally viable solution for creating community’.” (Ratcliff, 2001) 23 Further, according to ACUI, “some college unions lease operations such as retail stores, bookstores, and dining services to outside companies. Often these unions find their campuses prefer nationally branded stores and eateries instead of campus-operated services.” (ACUI, 2012) 24

Therefore, today’s model of college union is qualified by global store chains, situated in enclosed environments, and, with slight variations, similarly perform. This made them timeless and placeless architectural artifacts that could be found anywhere anytime, fairly blurring the cultural differences, at least between universities, which is a strong reason for change.

2-1-3 COLLEGE UNIONS: THE PRESENT

The ACUI are committed to the duty of college unions and revisit their role periodically. In 1992, they highlighted two themes that embody the origin of the College Union Idea, originally defined by Porter Butts in 1971, that should be implemented in contemporary unions. The two themes are: “the college union is part of the educational program of the institution. Its organization, facilities, services, and programs exist to enhance the intellectual, social, and personal development of students through the extracurricular arena of campus life;” and “the college union serves as the community center, offering services, conveniences, and amenities needed in daily campus life and providing the source for the building of community through its organization, programs, and facilities.” 25

Moreover, over the years, they have established seven principles that govern the role of today’s unions:26

- **Community**: “the union is the community center of the college, serving students, faculty, staff, alumni, and guests.”
- **Programs**: “the union complements the academic experience through an extensive variety of cultural, educational, social, and recreational programs.”
- **Development**: “the union encourages self-directed activity, giving maximum opportunity for self-realization.”
- **Facilities**: “today’s union is the gathering place of the college.”
- **Services**: “the union provides services and conveniences that members of the college community need.”
- **Diversity**: “the union serves as a unifying force that honors each individual and values diversity.”
- **Loyalty**: “the union fosters a sense of community that cultivates enduring loyalty to the college.”
Additionally, they elaborate on the union idea thoroughly to restore its value in college communities. They refer to it as “the living room of the campus” because it has never been a classroom or a student residence. It is “the campus city hall” because it houses the student government and organizations offices and meetings. It is “the campus leader in building community”, and “a neutral space for both social and intellectual interactions.” It is “the campus welcome center” because it is a campus tour stop, and provide hospitality for parents, alumni, and guests. Finally, they believe that the union idea is embedded everywhere on-campus as “mini-unions”, however the union remains the one place where all members of the community mingle.27 28

2-1-4 COLLEGE UNIONS: THE FUTURE

According to Robert Rouzer PhD, in 1960, A.C. Berry predicted that:

“In 2014 college union professionals may find that ‘Permanent hair cuts may eliminate our barber shops. We may not need coat rooms as plastic domes cover campuses, or even cities. Or maybe it will only rain at night in 2014. Nutritional requirements may be met by multi-purpose pills and reinforced Metrecal. Instead of providing food service we may be refueling strap-on-helicopters. It is difficult to believe that services of some sort won’t be needed’.”29

While today does not resemble this prediction, the lesson from this statement is that it is difficult to foresee the future. However, college union professionals have found that there are two major factors that affect college union work on campus: the racial and ethnic diversity, and technology. 30

The ACUI in their recommendations persist on two points when thinking about future, capability of multi-uses and adaptability to change. Since the 1980s, higher education has witnessed an increase in students enrolling in college. There are three components for this increase, the native population growth, the increase of immigrants from other countries, and the rise of international students. This change in student demographics has two impacts: one is on capacity, which makes sure there is enough space to absorb the new change, and the other one is on diversity, which responds to the increase of ethnic and racial groups on campus. Therefore, many campuses witnessed a communal change in general, where many ethnic and racial centers/offices, gathering spaces, and residence centers were established on campus, but also a programmatic change in unions to accommodate the numerical increase (e.g. more seating areas, more food stores), as well as the cultural change, such as adding spiritual, prayer and meditation spaces.31

Therefore, the possibilities of expansion should be considered basic in union planning, as ACUI recommends. From their universal experience, ACUI expect unions to expand through a minimum of one addition; however,
they have recorded instances where some unions have expanded to five, or five times larger than when they first open! One example is Adams State College in Colorado, which used to be a two-year college with a 1500 potential enrollment, so its union was planned accordingly. Suddenly, the college became a four-year college, doubling the enrollment, leaving its union with no way to expand but to move to another location. Therefore, successful unions are the ones that could best foresee their campus future development, allowing enough site area for building to grow.32

The challenge now is not just a problem of capacity, but much importantly a problem of character. The challenge is to employ the union to simulate an exclusive educational experience of a university blended in its local cultural context. There is so much diversity in the world, yet it is not diverse anymore; it is a spacious mysterious place, yet it became a small ordinary town; it offers a common base for people, yet they still somehow separate; it provides unique resources for life, yet most people are not as careful about them. Cities have cooled off the warmth of their history that they become a completely different body today. Collectively, this caused most of the problems the urban environment, and the globe, encounters. Therefore, any category lies under the canopy of architecture must act towards this change. Many of architecture-related professionals are working on making better cities by studying, comparing, and analyzing the old cities with the new ones. A special care is given to improve public space in cities. A big movement is taken towards reversing the effect of global warming, an urban-caused dilemma. And more thought and care is given towards the environment, use of energy, and waste control.

Future college unions must address these global issues in the first place in order to be a good “citizen” in the architectural realm.

Future college unions should not only be for students, faculty, and alumni, but also for schools’ employees, officials, and for the public in general. Unions should have a broader role beyond campus walls, making a community inside universities, and linking it with local communities.

Future unions should be functional to their first duties in providing the basic daily needs of eating, meeting, etc. and should be multi-functional in their secondary duties in providing flexible spaces for periodical programs, like events. However, they should also be specific to few uses rather than be overloaded with many uses in the avoidance of creating “multi-useless” spaces.

Future unions should offer a level of engagement that stirs motivation and excitement to visitors, which encourages them to use the space over and over.

Future unions should reflect an iconic theme, unique to their host universities, distinguishing it from other unions. In this case, the OHSU, it should reflect a theme about health and science, which may result in a healthy environment mixed with a scientific technological representation.
Future unions should convey a sense of time that it feels they were “born” at that time. They should model the best trends of what a union should look like, but also interpret the core values of a union and plant these for future unions.

Finally, future unions should embody a sense of place, so that they belong to a specific place. They should be anchored to their specific sites, not even the adjacent properties (in this case the OHSU campus), where every site has a unique privilege(s) that distinguishes it from other sites. Moreover, they should convey an anchorage to the host city (in this case Portland), so they reveal their rapport to that city and no any other city in the world.33

2-2 STUDENT NEEDS IN A UNION

In order to start the program inventory, one should take into consideration the needs of the primary class of users targeted in unions, students. As the author is from a different cultural background, he was not familiar with the function of the union at the beginning of this research. Therefore, he extended a short survey to students to help him understand how they perceived unions as a concept and how they used it as a facility. The survey assisted in extracting a wide range of program concepts. (See next pages)

SURVEY CONCLUSION

People who participated in the survey were combining different qualities they experienced in more than one university they had attended, and may overlap what actually exists and what is desired in the future. However, the first three columns with the highest percentages may reflect the essential need/meaning for a union to students. A union is certainly a place for food, it is about eating, and it fills a huge need for campus by its varied choices; it is a large social “landmark” on campus, which adopts “community” as a motto; and it is a complex of different services and resources for daily uses, which may collectively give the union a distinction from other unions.

By observing the complaints that students made through their responses, it is clear that they experienced places that did not account for future change/expansion, thus the importance of flexibility to adapt to future changes, as recommended by the ACUI.

2-3 THE IMAGE OF THE UNION

The author had more curiosity about how people viewed and pictured unions. This curiosity led into research that conveyed how important the union is to people’s lives that at some point they sorted it in their memories and was one of the first things they recall when they are asked about a university. These people were not necessarily students of that university and it is fascinating how they could recall it. The research method is based on architect and urban planner Kevin Lynch’s method of perceiving cities, which is known by drawing cognitive maps for cities34. (See Cognitive Maps report next pages).
The result of this research showed that most people recalled the union among the memorable buildings on campus. This reflects how important, vital and dynamic unions are that they stick in people’s memory. It does not need people to study in a university to be able to recall its union, even visitors that see campus for shorter time can recall.

2-4 PROGRAM INVENTORY

It can be identified from the survey that there is a wide range of spaces that could build up the program of the union. However, there are always limitations that put a cap on how large the program can be. Therefore, the author conducted a quick comparison between programs of existing unions from different universities and from different eras; the intention is to prioritize more and less important programs. 16 union buildings were chosen from a combination of public/private, old/new, and large/small universities for this comparison.

- **Houston Hall**  
  University of Pennsylvania  
  Philadelphia, Pennsylvania  
  1896

  The first building in the United States constructed explicitly for union purposes. It contains lounges, dining rooms, reading and writing rooms, an auditorium, games room, and student offices.\textsuperscript{35}

- **Harvard Union**  
  Harvard University  
  Cambridge, Massachusetts  
  1901

  About 20,000 sf facility, contains spaces for meeting, gaming, and food.\textsuperscript{36}

- **University Union**  
  University of Michigan  
  Ann Arbor, Michigan  
  1904

  About 60,000 sf building, housed recreational facilities, dining, assembly, and reading rooms.\textsuperscript{37}

- **Student Union** (unbuilt)  
  Illinois Institute of Technology  
  Chicago, Illinois  
  Mies Van De Rohe. 1939

  About 27,000 sf facility, Meeting place for students, staff and faculty, an auditorium, a banquet room, an interior open court, a cafeteria, dining rooms, offices, and meeting rooms.\textsuperscript{38}
2-A SURVEY

The survey composed of three questions, designed to prompt survey-takers to brainstorm their daily uses in unions, but also speculate about their future. 122 people (mostly students) from the University of Arizona, Michigan State University, Portland State University, and UC San Diego, participated in the survey; their responses were very helpful in positioning unions in today's life, but also in educating the author's perception of unions.

Q1: “What does a Student Union mean to you?”

The intention behind this question is to identify how people see unions, and what is the value of a union in their eyes. There were no multiple choices or premade list to choose from, instead, people were allowed to respond freely as how they felt about it. Therefore, most replies collectively did not have a single description limited to one use, most of them kept listing multiple things that they do not necessarily have in their union to describe how they perceived it, which was valuable. This means that, union, certainly meant more than one thing to people on campus, it is a collection of feelings.

45% of people looked at the union as a place to eat, a place to find food, a convenient place to offer food choices, the cafeteria of campus, and an alternative place for on-campus residents who actually have food produced by their organizations. 45% of them looked at it as a place for community enhancement, a place to socialize, meet students/faculty, gather in groups, communicate with peers, hang out with buddies, interact with other people, congregating, and being unified. 26% described it as a multi-service facility that accommodates a wide range of activities, filled with different resources for students, offering a highly convenient place for running errands like banking, sending packages, getting lunch, shopping, copying/printing, seeking information, etc.

11% of people saw the union as a private place to study, work, do homework, and also as a quiet place. 11% felt it is a central place, a main place, the center of campus, the center of community, and the social heart of the university. 10% found it a place to relax, forget school, sit, lounge, get a nap, meditate, and get inspiration. 5% saw that it is a place for performance, an auditorium, a theater, a place for art, music, and movies. 5% saw it as a place for commerce, bookstore, retail, and shopping. 4% found it a place for fun, recreation, gym, entertainment, games, TV, and events. 3% saw it for business, office work, administration, organizations, and conferences. 2% felt it is a place of safety; 2% found it as a checkpoint, a stop station to get something, or just waiting. There was 3% of people whom the union did not mean anything to them.

One person just wrote “Life”.

However, with the many expressed positive responses, there were some complaints about the size of space, the high expenses of food and commodities, and the healthiness of food, that found their ways into their perception of unions.

Q2: “What would you like to do in a Student Union?”

The intention of this question differs from the first one because it reflects people's actual use(s) of a union rather than what it represents to them. This time there was a major use that seem to be dominating the other uses offered in the union, food. However, it was not the single thing they did, it was mostly accompanied with other activities.

65% of people used the union for food, eating/drinking. 36% of them used it for socializing, meeting others, especially other majors, and gathering. 27% used it for studying/working, in public spaces but also in private quieter places. 15% used it for relaxing, 5% used it to run errands. 4% used it for shopping. 3% used it for recreational and entertainment, playing games, watching TV. 3% came to it for people watching. 3% came to it to attend events (music, art, movies). 2% used it for business, working in offices and administration of the union. 4% did nothing or did not come to the union at all.

Q3: “What would you love to see in a Student Union?”

This question prompt people to talk about what they miss in their current union, but also open the door about potential activities in the future. Surprisingly, food appears again on highest demand as if there is no food in unions at all! However, some of the demands specified healthier food per se.

37% of people loved to see more food in unions, especially low-cost healthy choices, and even free food. They conducted a range of good ideas: some of them desired specific styles like a cafeteria or open buffet setting, others demanded cultural brands (e.g. Mexican food, like Chipotle), and some suggested less famous brands (e.g. Starbucks, Burger King). One of the reasons of why people needed more food is probably because of crowding issues and long queues in rush hour, where all food spaces are over packed. 14% wanted more sitting areas with more comfortable seats for relaxing and laying down. 14% desired more performances, music venues, artistic performances or exhibitions, art, and murals.

10% suggested special services attached to unions, like an open kitchen for students to cook and prepare meals themselves, zero-waste programs (e.g. more composting and compostable containers), and IT/technical support services, health programs. 10% wanted more places or more events for socializing, linking the union with the rest of campus, special events at different times, events that reflect school spirit, Activities that would bring students and faculty together, events that linked to local communities, and events to showcase student organizations work. 8% wanted more private/quiet spaces for studying. 7% wanted more recreational and free interactive activities (football, bowling, etc.). 4% wanted more open public space. 3% wanted some connection with nature, like more landscaping and views. 3% demanded to see more girls. 2% wanted more shopping options for gifts.
Q1 WHAT DOES A STUDENT UNION MEAN TO YOU?

Q2 WHAT WOULD YOU LIKE TO DO IN A STUDENT UNION?

Q3 WHAT WOULD YOU LOVE TO SEE IN A STUDENT UNION?
2-B COGNITIVE MAPS

A research was done on the University of Arizona campus to test the most memorable and imageable places on campus. The research was set according to architect and urban planner Kevin Lynch’s method of perceiving cities. The method is structured on five elements: Path, Edge, District, Node, and Landmark, which are used to identify a city. For example, a Path could be a street, a walkway, a transit line, a canal, etc. An Edge could be a shore, a railroad cut, a wall, etc. A District could be sections or blocks of a city. A Node could be a public space, a park, a transit center, etc. A Landmark is an iconic city feature such as a monument, a building, or a natural element such as a mountain. Lynch’s analysis measures how people perceive the urban environment of a city, what places are memorable to them, and describes their image of that city. He interviewed people and made them draw maps of their cities as they experienced them. These people were not trained or prepared to do so, so the results were vernacular drawings, he called them cognitive maps. These maps were neither comprehensive or detailed, but were very simple and highlighted the individual perception of each one. Collectively, the sum of the maps showed places that everyone remembers, such as landmarks and nodes of their city, and places that are commonly remembered, and places that rarely or not remembered at all, such as some paths, edges, and districts of their city.

This research followed the same method for the UA campus. It was extended to 50 people, including UA students, Pima Community College students, high school students, graduate alumni, UA employees, architects, shuttle drivers, and parking monitors. The majority of the participants were met within or around the UA campus, but there were a number of them who were met off-campus. They were asked, without advance notice, to draw the map of the UA campus in just two minutes. This allowed them to flush out the places that are on the very top in their memory on paper, which reflected their most commonly remembered places. Collectively, there were places that almost everyone remembered such as the UA Mall, Old Main, UA Student Union Memorial Center, and UA Main Library. Other places were common that many people remembered such as UA Administration Building and some buildings that around the UA Mall. Other places were rarely or not remembered such as the UA Stadium, UA Medical Campus, and other individual colleges, dorms, and social clubs, depending on the person.

72% of the participants were able to remember the UA Mall, Old Main, and the Student Union. 44% of them were able to remember the Main Library. 32-12% remembered some of the most common colleges and buildings on campus. 10% remembered individual places.
This demonstrates the most known places on campus, and, for the interest of this research, most of people were able to recall the union building because it is the strategic spot that represents a node within their daily activities. The union is a prime junction on campus that making it an extremely dynamic place on campus. This conclusion adds to the importance and vitality of the union to people’s needs and memory.
• **Harvard Graduate Center**  
Harvard University  
Cambridge, Massachusetts  
Walter Gropius. 1948

The project is about 235,000 sf composed of 8 buildings arranged about a courtyard. It contains dormitories, common-rooms, refectory and a lounge convertible into a meeting hall for 250 people.

• **Perkins Student Center**  
University of Delaware  
Newark, Delaware  
1960s

About 70,000 sf facility, includes cafeterias, a student lounge, a faculty lounge, an employee lounge, meeting rooms, administration offices, a small library, a music room, an exhibition gallery, an auditorium, a ballroom, and a party room.

• **OHSU Student Center** *(current)*  
OHSU  
Portland, Oregon.  
1970s

Located in the Marquam Hill campus, current OHSU Student Center is a small facility of 40,000 sf. Contains an art center for students, faculty, employees, local artist, and patients to exhibit their work; a computer & study room for groups and individuals; a game room with several table-based games; a gymnasium that hosts a collegiate-size basketball court serving OHSU community, as well as OHSU guests; media room used for OHSU and non-OHSU organizations for social and academic activities; wellness room; and swimming pool.

• **Student Union Memorial Center**  
University of Arizona  
Tucson, Arizona  
MHTN Architects. 2003

A 405,000 sf facility, contains office spaces, meeting rooms, multipurpose rooms, a multicultural center, an information center, a computer lab, a poster graphic service, an art gallery, a bookstore, a TV lounge, a multipurpose lounge, quiet/reading lounges, a cafeteria, a food court and a food service area, dining room, locker/coat check area, a ballroom, a theater, a ticket office, and gaming area.
• **Student Union**  
  Langara College  
  Vancouver, Canada  
  TEEPLE architects Inc. and associate architects IBI/HB architects. 2007

A 10,800 sf Y-shape building that slides between two existing classroom buildings and tying them together. It includes informal study lounge areas, a restaurant, and student union offices.\(^{42}\)

• **Student Union**  
  University of North Florida  
  Jacksonville, Florida  
  Rink Design Partnership, Inc. 2009

A 157,415 sf facility, includes branded food restaurants, a snack bar, a pub, dining room, TV lounges, a multicultural center, a student organization suite and storage area, two information centers, e-mail kiosks, gallery, copy center, bookstore, retail area, games room, spiritual room, meeting rooms, theater, multipurpose room, administrative offices, and graduate student lounge.\(^{43}\)

• **Student Life Centre**  
  Kings University College  
  London, Ontario  
  Perkins + Will. 2014

A 50,000 sf facility integrated with the existing library; it has student union offices, 500-seat auditorium, fitness and recreation areas, classrooms, student commons, a games room, campus theatre, and multi-faith space.\(^{44}\)

• **Tinkham Veale University Center**  
  Case Western Reserve University  
  Cleveland, Ohio  
  Perkins + Will. 2014

An 89,000 sf facility, organized to into social and cultural, meeting and event, and food and beverage spaces, but also for studying and relaxing.\(^{45}\)
• **Student Union**
  Parkland College
  Champaign, Illinois
  Perkins + Will. 2014

  A 108,000 sf facility, links three existing disconnected building wings, and provides a formal entry to campus. The building also provides a student/staff common gathering place, admissions and records, financial services, offices for the dean of students, various student life spaces, testing and assessment rooms, a bookstore, and a career center.\(^\text{46}\)

• **Student Union**
  San José State University
  San José, California
  Perkins + Will. 2014

  A 210,000 sf facility, a renovation/expansion project from a 1960s existing building (140,000 sf existing + 70,000 sf expansion). It includes food services, large event rooms, ballroom and meeting rooms, outdoor dining and socialization spaces, bookstore, auditorium/theater, recreation center and lounge spaces, Spartan shops, multicultural center, and offices.\(^\text{47}\)

• **Lory Student Center**
  Colorado State University
  Fort Collins, Colorado
  Perkins + Will. 2014

  A 220,000 sf facility, another renovation project of a 1962 mid-century building. It includes a main food court, dining, a performance venue, a main ballroom, a student art gallery, retail tenants, meeting rooms, small and large lounges, and all student programs and services.\(^\text{48}\)

• **University Crossing**
  University of Massachusetts Lowell
  Lowell, Massachusetts
  Perkins + Will. 2014

  A 230,000 sf facility, serving three campuses in a central location. It is also renovating 85,000 sf of a decommissioned hospital and extending a new 145,000 sf. Perkins and Will described it as it goes beyond a traditional student center, that it includes student clubs and organizations, retail dining and food service, meeting and conference space, lounges, bookstore, health and counseling, career services, student engagement and enrollment success, the welcome center, the chancellor’s suite, registrar, bursar, financial aid, information technology services, the police department, and parking and transportation.\(^\text{49}\)
2-5 PROGRAM SPACES ANALYSIS

By comparing the given unions’ programs over the history, four categories can be established to prioritize them:

- **Vital**: these are vital programs which are the core of a union and it seems that every union has them. These programs are: Food Spaces (e.g. restaurants, cafés, cafeterias), Social Spaces (e.g. lounges, social meeting spaces, commons)
- **Common**: these are common programs that most unions have frequently. These programs are: Commercial Spaces (e.g. bookstores, retails), Performance Spaces (e.g. venues, theaters, auditoriums), Office Spaces, and Recreational Spaces (e.g. gyms, game rooms, TV lounges, fitness centers).
- **Infrequent**: these are probable programs that some unions have. These programs are: Private Spaces (e.g. study rooms, computer labs, spiritual spaces), Events Spaces, Gallery Spaces.
- **Rare**: these are occasional programs that unions rarely have. These programs are: Leisure Spaces (e.g. relaxing spaces, meditation spaces), Educational Spaces (e.g. classrooms), and Special Services (e.g. Hotel, Post Office, Bank, Copy/Printing Center, IT services, welcome center, parking & transportation services, police stations).

From the broad range of programs that could be combined to make the union, it may be exciting to have everything in one union. However, there are always limitations by space and/or funding. In fact, having everything in one building might not make it a great facility. Instead, being selective and working with what is available might be the most realistic approach. Therefore, a maximum list of programs is listed based on site/university size, priority of programs, and what OHSU and the area miss.

Proposed Program:

- Food
- Bookstore
- Open+ Enclosed Public Space for: Social interaction, Public Events, Casual Sitting, Art/ Musical events
- Private Space for: Relaxing, Studying, Meditating
- Exercising spaces
- Multi-purpose Auditorium
- Post Office
- Bank Branch
- Guest House

2-13. Unions Main Categories
2-6 PROGRAM AREA ANALYSIS

In order to start adding area values to the proposed program, it is important to note the expected number of users. Since the OHSU are moving their educational campus down to the Schnitzer Campus, the union is expected to serve students, faculty, researchers, employees, and occasionally the public. According to OHSU fact-book (2014), total student enrollment (all schools and all degrees) was 2,861, there were 2,608 of faculty, 1,255 of researchers, and 1,223 of employees. If the same group move into the new campus, the total campus population would be 7,946. By applying a 0.15% growth factor (brought from recent years’ growth= 0.01% each year) for campus goal year (2030), the expected enrollment would be 3,290. By adding the other groups (3,290 + 2,790 +1,340 +1,300), the expected population would be 8,720.\(^5\)

The ACUI classified universities with approximately 1,500 students as Small Colleges and universities with approximately 6,000 students as Medium Colleges. Since it has been discussed that unions are not just for students, OHSU would be categorized as a Medium College. Thus, ACUI gives area recommendation for commonly adopted facilities, totaling about 91,600 sq. ft. in gross area.\(^5\) The gross area is very close to what was proposed by the OHSU master plan in their draft program summary (2008), which was 84,500 sq. ft.\(^5\) The study will proceed with ACUI recommendation to leave a space for future considerations.

Based on the survey responses and the program spaces analysis, the author dedicated four major program components, and broke them down into percentages of the main program, independently from site, as a draft. The four components are:

- **Food:** (17%) 15,572 sf
- **Social:** (25%) 22,900 sf
  - Public Space (20%) 18,320 sf.
  - Private (5%) 4,580 sf.
  - Guest House (1.5%) 1,374 sf.
  - Study Rooms (1.5%) 1,374 sf.
  - Meeting Rooms (1%) 916 sf.
  - Rest Area (1%) 916 sf.
- **Cultural:** (25%) 22,900 sf
  - Auditorium (8%) 7,328 sf.
  - Exercising (7%) 6,412 sf.
  - Bookstore (10%) 9,160 sf.
- **Services:** (32%) 29,312 sf
  - Post Office (1%) 916 sf.
  - Bank Branch (1%) 916 sf.
  - Services (15%) 13,740 sf.
  - Structure/Circulation (15%) 13,740 sf.
  - **Total** 91,600 sf
Since the OHSU master plan has not dedicated a site on campus for the union, at least on their first phases, the study will explore multiple sites to assess how large the union could expand. In the Site Analysis section, it was recommended to locate the union on the east corner of OHSU campus, with three adjacent lots (not yet assigned in OHSU plan) to explore any required expansion.

A simple comparison between site and program tells that:

- **Option 1**: sprawling over all three lots (total 80,000 sf.) gives the opportunity to distribute the program evenly almost all on grade, with a unique opportunity to capture the SW River Parkway in the middle as a university gate. However, it will need more time to thoroughly develop the project, which is a design challenge.

- **Option 2**: using only two lots to the east of the street (total 50,600 sf.) gives a program distribution as low as two stories, with a wide façade towards the river. The property is a medium size for the design time frame.

- **Option 3**: using only one lot (35,000 sf.) consolidates the program to be on three stories. However, it will be more reasonable for design to manage in the given time frame.

2-18. Union Program.

2-19. Site VS Program Options.
Further, in order to have a better idea about how much a union needs, a comparison between some of the previous selected campuses is made. The study will show how many students are enrolled versus how big is their campus and union.

In conclusion, one may think that a university union should be huge to absorb all population, which make us think about sizing the union up as much as possible. However, the truth is that not everybody on campus will visit the union at once. In fact, there may be some people that do not come to the union daily, if not at all. By looking at the data provided, it can be found that even large universities like the University of Arizona and the University of North Florida have a reasonable union size.

For example, by comparing OHSU enrollment (3,290) with the University of Arizona enrollment (42,236), it is 14 times smaller, which suggests that OHSU union site should be 9,640 sf. (135,000 sf./14).

By comparing OHSU campus area (26 acre) with CWRU campus area (155 acre), it is almost 6 times smaller, which suggests that OHSU union site should be 14,830 sf. (89,000 sf./6)

By comparing OHSU campus area (26 acre) with PSU campus area (120 acre) (since they are in the same city), it is 4.6 times smaller, which suggests that OHSU union site should be 4,780 sf. (22,000 sf./4.6).
These suggestions seem very small, but give a better sense that this campus is very small compared with other larger universities. Perhaps, the best clue to guide the decision is the size and enrollment of Langara College, it is the closer in campus size to OHSU (LC= 24 acre, OHSU= 26 acre), and also closer in the number of users if we added OHSU whole population (LC= 9,641 students, OHSU= 8,720 students, faculty, etc.).

Therefore, the research led to the decision to develop a proposal for the smallest site between the three lots, which would be sufficient to hold a union for the OHSU. The study will proceed with the one (35,000 sf.) closer to the river and public transportation.
2-7 CASE STUDIES

Three case studies will help understand the architectural relationships between spaces and their zoning in the building. The cases are on three scales: small, medium, and large unions.

- **Langara College Student Union**
  - Vancouver, CA
  - Area = 10,800 sf
  - Architect: TEEPLE architects Inc. and associate architects IBI/HB architects.
  - 2007

The building is located east of the library building “at the geographic heart of the campus”. A Y-shape building that slides between two existing classroom buildings and tying them together. It includes informal study lounge areas with dining areas, a restaurant, and student union offices. Circulation is very important in this building because it formally link the campus together by creating a “circuit-like hub”. Because it links two buildings, it was challenging to solve the change in elevation between them. The spaces are linked by series of ramps and stairs to resolve the elevation differences. The higher lounge opens up to the university quadrangle in the front, but the restaurant seems tight, and the offices are separated in different level and linked by two connected stairs. There is ramp that runs to the outside of the building to link with the two existing classroom buildings.53
• **Tinkham Veale University Center**  
Case Western Reserve University,  
Cleveland, OH, USA  
Area = 89,000 sf  
Architect: Perkins + Will  
2014

The building is a medium size, organized into social and cultural, meeting and event, and food and beverage spaces, but also for studying and relaxing. Also links part of campus that was previously separate and offers unity and engagement to the university. The most distinct part of the building is its green roof, which tends to blend with the grass plaza from an aerial view. The lounge area is the main common area. With its double volume, it connects the two floors in various ways visually, physically, and socially. By having a multi-purpose stair in the middle it allows people to take the stair or just sit and watch or study on the stairs while it has a nice view towards the outside plaza. Additionally, another connection made by having a large screen running all over the double volume, which is meant for entertainment, so people can play games on the first floor and others watching them from the second floor or even from outside, hence it is also visible. Some other spaces link directly to the lounge like the kitchen, dining area, the ballroom, and some of the offices. Main circulation simply links to the lounge and runs out from it into short corridors to reach other spaces like offices, meeting rooms, and services. Entrances are located on each end of the triangular shape, which leads to a corridor and then the lounge.
The building is a large, 3-story facility; it includes food services, large event rooms, ballroom and meeting rooms, outdoor dining and socialization spaces, bookstore, auditorium/theater, recreation center and lounge spaces, Spartan shops, multicultural center, and offices. The spaces are linearly arranged along a main, wide corridor, to which the building entrances link. The corridor occasionally expands vertically to double height for visual connection, but also to express hierarchy for surrounding spaces. Meanwhile, it opens up physically to other spaces to add more activities on the main path; for instance, on level 1, where it joins the dining area, and on level 2, it opens up visually to below spaces.


2-8 RELATIONSHIPS

From the case studies, it can be identified that there are two sets of relationships that need to be achieved, horizontal and vertical. The horizontal relationships are mostly achieved through immediate zoning for related spaces or by corridors for less related spaces, and the vertical relationships are mostly achieved by vertical circulation or visual connection. It appears that most of the common activities need to happen at grade for its smooth accessibility, mostly food spaces, social gathering, and the bookstore. While the rest could be on other floors, but as close as possible to the ground floor, some unions arrange their buildings in a basement and an upper floor to do so.
The first organizing idea is to make public-space-oriented everywhere. This means that there should be a public space at each floor that links all spaces, but also acts as an organizing social hub, creating hierarchy between floors, where the lower levels have a bigger public gathering space, while the upper have smaller hidden public spaces. Thus, a main public space should be located on grade linking other programs directly with the bookstore, food spaces, post office, and bank, and so on the other levels.

The second organizing idea, in response to the survey, is to have as much food as possible on each floor. The notion behind this is to distribute food spaces, avoiding one crowded space, while also serving other important spaces on upper floors, such as the auditorium, giving a reason for people to occupy upper floors, and serving people who works there on upper levels.

Finally, other spaces such as offices and private rooms are located on upper floors to not be disturbed by the busy public spaces.

2-9 ZONING

Zoning is a very early schematic layout, it is only to explore how the program would fit on site. It allows to brainstorm ideas about what faces the street, campus, and the river, where to locate entrances, what responses should be made to adjacencies, what places need light/ventilation, and so on.

SCHEME 1

This scheme explores a functional idea of arranging spaces around a round courtyard, while filling the shape of the lot with programs. This offers a central checkpoint between campus and the river, and suggests that study/private rooms and offices should face the river on an upper level and the auditorium covers the entrance towards campus, but both have a connection to the courtyard.
SCHEME 2

It also explores a functional idea but with different arrangement. By shaping the site with a proportional square that fits on its right corners, this arrangement allows to have a central courtyard, but also a public space towards the street in the left zone to its south, which is a great inviting connection to the public. While, the interior courtyard only connects directly to the river, it connects indirectly, through food/commercial spaces that surround it. Upper floors are all suggested to have a view to both of the river and campus.

SCHEME 3

This scheme explores environmental considerations for orienting spaces. It suggests a very open arrangement from all sides to allow as much daylight as possible to seep through, as well as thin loose arrangement to allow wind to ventilate spaces. These forms also shape a central, but much open, courtyard that connect in all directions with the river, the street, and campus. Upper levels are stepped to receive more daylight, but also covered with green roofs, which allows for creating stepping terraces that are accessible from adjacent spaces.
2-10 DESIGN CRITERIA

To this end, all the data analysis is “lifeless” and may not create a great architectural project, because it is missing the core concept. The performance criteria should assist in generating and leading the design concept, which could turn the project alive.

There could be a long list of performance criteria that could be inserted to govern the performance of the building. However, three criteria are chosen to frame the concept of the project for more clarity and intensity of meaning. The criteria are brought from the main principles of a union role and the core values of what makes a union it is. They are:

GATHERING

The project is a public meeting space that congregates people from different ages, different disciplines, students and faculty, and university and the city. The gathering aspect should induce the social interaction between students, making them feel as a family, where they can meet as groups, share ideas, and build stronger relationships.

DIVERSE

Diversity is the element that give people more reasons to come. Diversity provides more choices, kills the routine, and introduces new ideas to campus. The diversity of food, cultures, events, and programs will enrich the experience for the users. Diversity gives strong support to the Gathering feature. Therefore, people will would like to come and socialize with a mix of experiences all the time.

A HEART

The heart is the center of the body, the center of emotions, and to the project, it is the center of the campus. It does not need to be physically at the center, but it is at the center of the community. The center that it magnetizes people to it because it is very important to campus life. The Heart is the secret element that makes the union successful, it does a magical “circulation” on-campus to enrich people’s lives. It is the master of the two other features. The Heart will “gather” students from campus, send them into the “diverse” spaces, and release them back to campus energized and ready for more. Therefore, the Heart is an organizer and an energizer for the project.

Endnotes:
2. Ibid.
3-1 WHAT IS IT?

“If we are to create a sustainable world – one in which we are accountable to the needs of all future generations and all living creatures – we must recognize that our present forms of agriculture, architecture, engineering, and technology are deeply flawed. To create a sustainable world, we must transform these practices.” Van Der Ryn.

Peter McCleary, Professor of architecture in the University of Pennsylvania, tracked the history of technology in order to define the term. According to him:

“Technology, today, is understood at best to mean mental effort to save physical effort, but it is more often misunderstood to mean ‘applied useful skill,’ or is even limited to the techniques of machines. In the seventeenth century, technology was known as the scientific study of the arts. In the fourteenth century, the art of architecture meant the skill of building, and the science of architecture meant the theoretical roots of the discipline; “techne” then was understood to be the theoretical or scientific roots of the skill of building.”

Therefore, technology has two sides: art and science.

Based on that, McCleary set up an intellectual framework to study the relationship between man and nature. He diagrammed that relation between Man (Society), which are Producers and Consumers (Making/Using), and Nature (Environment), which is the holder of Materials and Energy. He then made an argument between them through Technics, Products, Processes, and Theory. He argued that “nature is seen by the builder to yield both material and energy.” And “While man is giving order to Nature as materials and forms of energy, the society, in the act of building, is itself structured as producers, those who make, and as consumers, those who use the projects.” However, in his conclusion, he left us with the question “How does the relationship between technology and culture manifest itself?”
Since the beginning of life, humans have explored different ways of using energy in parallel to their discovery of materials and ways to process them, starting with fire, and then coal, oil, and electricity. On one hand, as cities grew, population rose; and as cities saw industrial advancement, more and more people moved to urban areas. Therefore, they needed more area, they consumed more power, and thus used more energy. On the whole, cities started to establish infrastructures to hold their power systems. On the other hand, the necessity to maintain this infrastructure to counter daily issues, natural disasters, economic crises, political conflicts, and epidemic diseases was excessively expensive.

However, cities have continued to maintain their infrastructures with whatever resources were available, regardless of any considerations to lack of energy, as there appeared to be an abundant amount of resources. This thinking reached a point in the 1960s when energy consumption was considered such a trivial concern that in some cases, “buildings were designed without light switches because it was believed that it was more economical to leave the lights on continuously.”

However, not until the 1973 energy crisis, people widely realized the value of a wise use of resources. Additionally, they started to notice a change in the behavior of the climate and the natural environment, that they speculated to be caused by the extreme use of energy. It became clear that the planet’s resources were limited, and that they could be depleted if this condition continued. Climate scientists, ecologists, architects, urban planners, environmental engineers, energy engineers, as well as governments have been aware of climate change, significantly global warming, and are working on reversing its effect. In the built environment industry, it was realized that 35% (2001) and 48% (2009) of energy consumption in the US is attributed to building industries between manufacturing, construction, and buildings operation. Additionally, this effect lasts longer as most buildings are expected to last at least 50 years while automobiles last only about 10 years. Therefore, buildings are the main cause of energy consumption and global warming.

Thinking even more broadly, architect Mohsen Mostafavi argued that although architects are aware of global warming, working on making design, fabrication, and building processes to be sustainable, their focus is still on the building scale not on a city scale. Therefore, the given effort is still minimal, and it requires finding another design approach that considers applications larger than those previously considered.

Mostafavi offered several approaches through a philosophy of ecological urbanism. He advocated leaving the conventional solutions and looking for “speculative design innovations” to deal with the “fragile” planet and its resources. Ecological urbanism should recognize the scale and the scope of the impact of ecology. It should be regional and holistic in its approach, and demonstrate a multi-scalar quality with its national and global
considerations, which should result in a more “cohesive regional planning”. This position is further supported because ecological urbanism uses density as an important determining criterion. Mostafavi showed that current planning methods are unable to respond to the change in city density as the world tripled its population in the last century. Therefore, ecological urbanism should find ways of “long-range planning” that can face these conditions. 

Mostafavi also referred to the French philosopher, Félix Guattari, who said:

“The appropriate response to the ecological crisis can only be achieved on a global scale, ‘provided that it brings about an authentic political, social and cultural revolution, reshaping the objectives of the production of both material and immaterial assets’.”

Finally, in response to McCleary’s question “How does the relationship between technology and culture manifest itself?”, technology reveals itself regionally. Regional technology is an important tool for creating an ecological urbanism, and a major sustainable method for buildings not just to raise environmental awareness, but also to give a cultural distinction. Architecture professor Norbert Lechner acknowledged that the future of architecture is sustainability; a new architecture is being created by responding to human needs, regionalism, and climate in combination with modern science and technology. However, the main issue of sustainability is energy, and “the design of energy-responsive buildings will yield a new aesthetic that can replace both the blandness of most modern buildings and the unimaginative copying of previous styles.”
Buildings in Portland confront a variety of environmental factors that need environmental responses, including: seismic actions, daylighting, passive cooling, solar energy, water collection, moisture protection, and use of wood.

- **Seismic**

Portland falls into a seismic area, where the eastern Cascade Range is an active volcanic zone. The zone was hit by earthquakes 41 times over the past 10,000 years, roughly every 243 years. While there are many earthquakes that hit the area every year, many of them happen outside of cities and in small amounts (2.0-3.0 magnitude). However, the last massive seismic event was 350 years ago, which means scientists are expecting a new event soon.\(^{10}\)

Some of the design considerations for seismic actions are to note the location of the nearest fault, the unconsolidated natural or man-made fills present, investigating the potential for landslide or liquefaction on or near the site, identifying the vulnerable transportation, communication, and utilities connections, assessing any hazardous materials on the site, and estimating any potential for battering by adjacent buildings.\(^{11}\)

Some of the design solutions used to protect buildings from collapsing in a seismic event are:\(^{12}\)

- Diaphragms: having rigid horizontal planes in the structure helps to transfer lateral forces to vertical resisting elements, e.g. Floors and roofs as diaphragms to walls or frames.
- Shear Walls: rigid solid vertical elements that help to resist lateral forces, prevent the structure from swaying or twisting, and transfer loads from roofs and floors to the foundation.
- Braced Frames: vertical elements that make diagonal triangulation in the structure to help resisting lateral loads and preventing it from swaying or twisting. They are used where shear walls are impractical.
- Moment-Resistant frames: also called rigid frames that provide the structure with fixed connections that resist moments caused by lateral forces. Using them will eliminate the space limitations of solid shear walls or braced frames.
- Energy-Dissipating Devices: used to minimize shaking that may damage the contents or the function of the building.
- Base Isolation: by separating the building from the foundation. This strategy helps to absorb shock, so that when the ground moves the building moves at a slower pace as result of the isolators dissipating most of the shock.
• Daylight

Because of the overcast sky condition most days throughout the year, daylighting becomes a precious element for natural illumination in buildings and interior spaces. The most common practice in Portland is allow as much light as possible into buildings. This could be achieved by many strategies including surface materiality, orientation, the amount of exposure, etc.

The desire to have buildings be naturally lit faces certain issues that are connected to each other. Therefore, the design should thoughtfully find the appropriate solution that suits every variable. The cycle of issues includes:

- Illumination
- Heat Gain
- Views

Illumination is the main purpose of daylighting. However, it will be accompanied with heat gain. Therefore, trying to increase glazing will increase light, views as well as heat gain, and vice versa. It is a challenge to find a balance to achieve as much illumination and views as possible with the least amount of heat gain.13

Some of the design solutions to increase illumination in buildings are:14

- Having a proper orientation to the North and South, which will limit heat gain and improve daylighting and potentially have good views.
- Using Low-E glazing for all elevations except South to allow passive solar in winter.
- Use of skylights and clerestories.
- Trees should not be located in front of an opening at any time to avoid blocking light.
- Using enclosed glazed outdoor spaces will increase illuminated occupied areas.

• Passive Cooling

Because of Portland’s mild weather, the region enjoys breezy summers and wet winters, which is a great source of natural ventilation and passive cooling systems. Since wind velocity does not exceed 25 mph annually, there is no need for extra protection from wind.

- Some of the design considerations for passive cooling in buildings are:15
  - Careful placement of windows will encourage a successful air current in a space.
  - Considerable window size, shape, and orientation will affect the amount of airflow in space.
  - The use of an indirect natural ventilation principles, like spinning ventilation turbines which count on a thermodynamic law of hot air rises up/out and fresh air is pulled in.
  - The use of green roofs, which is also highly recommended by the city.
3-5. Passive Cooling Strategies

- Window location, orientation, size.

3-6. Solar Energy Strategies

- Direct Sun
- Trombe Wall
- Sun Space

- The stack effect
- Double skin façades

- Thermal Mass
- PV System

3-7. Water Collection Strategies

- Window location, orientation, size.

- Double skin façades are a common method in Portland that provides a medium air space to control airflow in the building. They are also a compact way to integrate other systems and services, shading devices, ducts, fans, etc.

- **Solar Energy**

  Although most of the sky condition is overcast throughout the year, solar energy is still abundant, and according to Solar Energy Industries Association (SEIA) – Oregon Solar, it is considered an excellent quality solar resource. They demonstrated that Portland has a growing solar PV capacity of 15 MW. Solar energy is also a great source of direct passive heating in buildings.¹⁶

  Some of the design considerations for passive heating in buildings are:¹⁷

    - Direct solar access into buildings provides a desirable heat gain in winter.
    - Use of any type of layered envelopes like Trombe wall systems, sunspaces, or double skin façades. All of them are based on using greenhouse effect by creating a trapped air cavity that increases heat gain.
    - There are a variety of applications for passive/active solar energy such as PV systems, which could provide power for heating systems, and solar hot-air collectors, which are based on using the sun to heat a liquid that is either used directly to heat spaces, or used as part of a larger heating system.
    - Use of thermal mass is possible, but undesirable. Because of the small temperature swing in Portland’s mild weather, it is more preferable to be in contact with the outside temperature rather than delay it other times by using thermal mass.

- **Water Collection**

  Because of the abundant rainfall in Portland, stormwater runoff is a problem that should have attention. Collecting water has two dimensions. The first action is to reduce the amount of water runoff that causes street floods, and also has a negative effect on river ecology, since these floods are channeled to the river and thereby affect natural habitats. The second component is to allow for opportunities to reuse the water in building or city systems.¹⁸

  Some of the design considerations for collecting water are:¹⁹

    - The use of green roofs, which are supported by the city through Portland’s Ecoroof Program.
    - The use of bioswales, which are areas that provide a broken water path with harmless compounds that help to slow the stream down. They are commonly used in parking lots and sidewalks.
• **Moisture Protection**

Another issue that arises with the ample rainfall is to make sure that it does not get inside buildings. Buildings need to be perfectly sealed from moisture penetration, but also have properly ventilated skins, otherwise, the result will be leaky, rotten, or moldy building skins.\(^{20}\)

Some of the design solutions for protected building skins are:\(^{21}\)

- A considerable air cavity within conventional building envelopes to allow the skin to breathe, drain, and dry out. Building code in Portland requires a 1/8” gap minimum.
- Use of a rainscreen system, which is a method that has a designed air gap that allow the skin to perform properly.

• **Wood**

Wood is an abundant material in Oregon, usually harvested in rural areas of the state. Wood is processed in-state and into several products (e.g. logs, boards, beams, boards, panels, plywood, etc.), and transferred to cities or building sites. Therefore, it has a low embodied energy, which is a positive characteristic as a building material. Although most codes restrict the use of wood as a structural material because of its combustibility, many architects use it in other ways for its aesthetics and availability, and sometimes as a structural material with proper fire protection.

**DESIGN FOCUS**

Because of time limitations, the design will focus on one regional technology as a core design theme, and a major supporter for the design concept. The author chose to focus on daylighting due to its importance in architecture in Portland, and its direct effect on architectural perception and spatial experience.
3-3 CASE STUDIES

• **Mount Angel Abbey**
  St. Benedict, Oregon  
  (40 miles south of Portland)  
  Alvar Aalto  
  1970

The project was approached in three ways: scale, materiality, and daylighting.

A sense of scale is achieved by taking advantage of the site's location on a steep hill, which allowed the entry to be located closer to the top of the hill. This allowed the façade to be more appropriate for human scale on one side, and in harmony with the landscape on the other. Therefore, when approaching from the South, the building opens up to an indirectly daylit space with views of the Willamette Valley to the North.\(^\text{22}\)

The choice of materials helped to achieve a uniform lighting condition. The highly reflective walls helped pull indirect light into the building, while the darker, less reflective floors and furniture helped to absorb light coming from top and prevent glare, and a red colored stone was placed around the north windows to help balance the hue of the cooler northern light.\(^\text{23}\)

In terms of daylight, there were three strategies utilized to capture it: conical skylights for direct light from above, a larger roof monitor for indirect light, and high clerestory windows along the Northern edges of the building. The attentive capturing of natural light in these spaces created a rhythmic sense of time and light throughout the day. Interestingly, electrical lighting was only used to aid the existing daylight, rather than replace it.\(^\text{24}\)
• The Portland Building
Portland, Oregon
Michael Graves
1982

This building might not be a good example for an architectural articulation of daylight, but it has good lessons to learn from.

The first notable defect is the small window openings, which create dark interior spaces that also limit a comfortable access to views. However, while there are larger areas of curtain wall glazing, they are not 100% useful in terms of daylighting. There are some areas that have transparent glass, but the rest are opaque spandrel glass, with several areas that face a concrete structure or an interior furring wall. This caused only 18% of the floor area to receive a useful amount of daylight for more than 50% of occupied hours, and thus, the use of artificial lights is very necessary to satisfy a comfortable interior illumination.\textsuperscript{25}

Furthermore, the type of glazing that the building uses is poor for daylighting. Instead of using a clear glass, a spandrel glass, mirrored glass, and tinted glass is used, which greatly decreases the amount of daylight as well as impairing views to building occupants. Another minor detail is that all building windows are provided with horizontal blinds. These blinds are not used because they do not work properly and are not user-friendly, which reduced the light quality of the office spaces.\textsuperscript{26}
A LEED Platinum certified building, the new headquarters building at Portland International Airport is a good example of high performance building design in the region.

In regard to daylighting, the building is oriented east-west, and has a huge north glazed façade that provides plenty of direct daylight to mainly office spaces, and also offers great views of Columbia River and Mount Hood. Deeper interior office spaces that have no direct windows to the exterior are arranged in three parallel bars, interrupted by two atria capped with skylights to bring daylight deeper into these spaces. The south-facing façades are glare protected by large interior baffles that diffuse the direct sun light. On the south and west sides, special window blinds are provided to bounce light off the ceiling.27

ZGF also worked on maximizing façade performance by customizing a curtain wall system of laminated clear and opaque glass to balance energy performance, natural-light infiltration, and noise reduction. Additionally, a computer-based system was added to control the ambient artificial lighting according to the outside daylight condition. The system balances the interior light with the time and level of cloudiness of the day.28
Endnotes:

7. Mostafavi.
12. Ibid. Page 117.
13. Ibid. Page 118.
15. Ibid. Page 125.
19. Ibid.
20. Ibid. Page 126.
21. Ibid.
22. Ibid. Page 134.
23. Ibid.
26. Ibid.

Figures Citations

All Figures are courtesy of Mahmood Al Musawi unless noted:


SYNTHETIC INTEGRATION

This section presents a synthetic integration to test the research hypothesis about the value of unions in urban contexts. It also shows the importance of urban investigation, union investigation, and regional technology and the enduring core values of unions in an architectural proposal.

4-1 UNION AND SITE

Architecture starts from a place, which defines its identity. As part of architecture, unions should be anchored to their sites. Sites strengthen the relationship between a union and its users through their spatial experience, which makes them unique and memorable.

If “architecture is part of the city, not in the city,” so should the union be an integral piece of its campus. Being part of Portland gives the union an identity of being in the Northwest, an experience of being wet, a need for daylight, a desire to engage with nature, a privilege to be walkable and bikeable in the urban landscape, an interest to be connected by transit system, and an opportunity to meet people and their culture.

The union should respond to urban forces adjacent to it and site shape and size. Site forces are major definers for the union form and how it expresses this response to visitors, to how the building should be oriented, where the main entrance is, and where to welcome visitors. This is also a major definer for the relationship between the inside and the outside, for how much is visually exposed and how much is privately enclosed, and for building a visual and physical connection with the surroundings (which ties it to Portland).

The union establishes a spatial relationship between itself and campus, and itself and the city. The best place for a union on campus may be in the center so it can be reached equally from all areas. However, it also has a relationship with the city, which suggests pulling it to the shared location better reached by both campus and the city. Moreover, when there are other site forces, such as the river and the transit line, they generate a “current” of forces that makes the circulation on site dynamic. This is an important link to the Heart aspect, which allows the project to take advantage of this flow of forces and create a meaningful role for it in this context.

Additionally, the place has a strong impact on how people feel, behave, interact, and learn in and from their environment. In fact, it is an indirect tool of learning, as college union professionals have realized. The American philosopher John Dewey said that “We never educate directly, but indirectly by means of the environment. Whether we permit chance environments to do the work, or whether we design environments for the purpose makes a great difference.” Therefore, the relationship between people and their environment is an important factor for people’s habits in space.
4-2 UNION AND PROGRAM

Program tends to support the relationship between the union and users through the relation between public and private spaces. The program is a means to organize spaces and activities that enhance students’ educational experience through their social interaction, while also providing other supportive services. It seeks opportunities to switch the scale of activities in the union from being a campus hub to a public hub for the city. The program aims to serve OHSU students, students from other universities (e.g. PSU), and the city (Downtown and South Waterfront neighborhoods).

According to the earlier case studies, there were no unions with 100% public programs, nor 100% private, but a mix of both with different percentages. While most unions use the term “public/private” to refer to on-campus students’ activities (e.g. food, gathering, or studying, meeting), the OHSU Union also must consider the relation between campus and the city under that term.

Determining the line between public and private in the union is challenging. Is the union a university building or a public building? Is it partially or completely open to the public? This is especially difficult for private universities. While OHSU is a public university, this tension is less stressful. However, there are still some administrative and operative contradictions in engaging the public in university properties. The common practice that universities usually follow is to limit public access, mostly for security and safety reasons. Therefore, increasing public access may stimulate security on campus, which is a concern. However, public access is economically beneficial because it brings more people to union/campus, as well as increasing the social diversity of people, ages and backgrounds, particularly in the union, which then increases social interaction and strengthen students’ relationships with nearby communities.

Since crime rates are generally lower in Portland, compared to national crime rates, and even lower in the South Waterfront district compared to local crime rates, the OHSU Union is proposed to be mostly open to the public with some restriction on certain private spaces.

The other important relation between union and program is their effect on human spatial experience. Place and program send “non-verbal cues” for users about what they are about, and how they might be used, which reflect the values of the union. For instance, if a union focuses on student support, it should convey that through its key spaces and programs, such as advising, financial aid, admission, etc. If a union focuses on student leadership and social engagement, it should convey that through its theme spaces and programs, such as student organization offices, collaborative spaces, multicultural programs, etc. OHSU Union focuses on Gathering and Diversity, therefore, spaces are built on variety of gathering programs, such as student/faculty gathering, multi-disciplinary gathering, public gathering (e.g. event), and private gathering (e.g. studying); and diversity of programs, such as educational, entertainment, cultural, and social.
Places and programs also affect people’s behavior on a personal scale. They determine whether people are comfortable or not, want to wait or leave, and to come back or not. For instance, clean ample spaces may give positive, welcoming signs to visitors, while dirty crowded spaces may give negative rejecting signs. Clear entrances with clear gathering spaces may be more inviting than complex confusing spaces. Isolated versus shared seating arrangement could be inconvenient if only one of them is offered. These factors affect people’s engagement, social interaction, and learning. College union professionals tend to “engineer experiences” for students, by facilitating movement between spaces, making flexible spaces, providing a varied mix of programs, and increasing people’s sensory of space in light, sound, and smell, in order to enhance interaction.4

4-3 UNION AND REGIONAL TECHNOLOGY

Since increasing interest in sustainability as an architectural movement in the 1970s, universities have seen it as a research topic, but did not necessarily apply the findings to their built environments. However, in the 1980s, they started to move towards energy efficiency and recycling as campuses expanded. Finally, in the 1990s, many research projects pursued more practical achievements and connections between higher education and its environmental practices. In 1990, the University Leaders for a Sustainable Future (ULSF) was formed upon the report and declaration of the Presidents Conference on “The Role of Universities and University Presidents in Environmental Management and Sustainable Development”, which set a foundation for green design on campuses. Now most universities seek to achieve “green campuses”, and spent an effort to educate, urge, and motivate students, faculty, and staff about green matters.5

Since unions are the most active places on campus, they are the most suitable places to convey the green concept and awareness of the environment. Having a green union is also beneficial for both administrators and users. Loren J. Rullman, PhD, urged college union professionals to consider sustainable construction and technological changes, not just for their effect on the environment, but also for their effect on operations, services, and cost.6 On the other hand, Tom Wojciechowski, director of student development at Northland College, stressed that unions could teach users about sustainability and communicate environmental lessons through their architecture, since they were active learning tools for students in the first place. He stated that

“If we are committed to student learning, experiential learning, cross- or inter-disciplinary pedagogy and co-curricular opportunities, green design offers the union professional another occasion to engage students in powerful ways.”7
Additionally, some environmental strategies such as daylighting, and natural ventilation have a positive psychological effect on users and their productivity in space. Studies have showed that people are more energized, alert, and productive when they work under daylight compared to artificial lights. Similarly, natural ventilation provides positive environmental benefits which also enhances people’s productivity in the space.

4-4 UNION AND CONCEPT

The Heart aspect of the Union’s design criteria is a major inspiration for the architectural proposal. First, because the union is in a medical university, the Heart makes a direct connection with the university medical disciplines. Second, the Heart reflects the Union’s figure on campus as the social center of the campus community. Therefore, the analogy of the biological work of the Heart is the initial concept of OHSU Union and the main theme for the way it operates.

The human heart gathers depleted blood from the body, sends it to the lungs, which replace it with rich blood, and sends it back to the body. The Union, as the campus Heart, gathers students from campus, distributes them into the diverse project’s spaces, and releases them back to campus. The union works as a pump that pushes students in a push and pause experience, which enriches their spatial experience that generates a desire to come back whenever they need to. Therefore, the design challenge is to discover the nature of this journey, and its applications on the form, function, and social interaction within the space.

CONCEPT GUIDELINES

Four initial concepts are formed based on the union’s design criteria: Gathering, Diverse, and Heart.
• Concept 1

This concept aims to capture the gathering space and circulation paths in a formal way represented by the structure of the building. The huge covered atrium will give the space dominance over all other project elements. It meant to celebrate the gathering space as a monument to campus and the city, where everybody congregates under one giant roof. Its dominance is physical, but also visual in that it is visible from most angles on site, as well as internally from most of the project’s levels. In addition, it addresses the environment by allowing light and wind to pass through, and protecting from water.

Additionally, the building’s design language is brought from the site context. The main gathering space is similar to a regular plaza in Portland. It is about the same size, surrounded by buildings, and easy to reach. Also, it is compatible in a way that appears as part of the campus, where most buildings are rectilinear. However, it does not adapt to its property lot (e.g. the curved street and the bridge edge).
• Concept 2

This concept aims to capture the gathering space inside circulation paths. Two circulation paths, one starting from the university side, and the other starting from city side, interlock together to shape a central gathering space that is visible from all levels. In addition, it responds to the environment by allowing light and wind to pass through, and sloped surfaces creates opportunities for water collection.

Similar to concept 1, the building language is brought from the site context. Therefore, it is compatible in a way that appears as part of the campus. However, it does not adapt to its property lot (e.g. the curved street and the bridge edge).

• Concept 3

This concept is more abstract. It brings the site’s three major entities, the campus, the city, and the river, together as three distinct elements to form a mass and/or an experience. This formation is similar to the work of the heart. It imagines the movement of people up and down in the project through these three elements.

Since this concept is abstract, nothing appears to work in response to the site context, the form is totally free from both the order of the campus and site forces.

• Concept 4

This concept starts from a simple representation of a circle. A circle could represent gathering and circulation at the same time, which are the main criteria for the union. Therefore, any configuration of this geometry should work with concept criteria, which opens endless possibilities. Therefore, repeating this element will give more gathering spaces and allow for more circulation. However, in order to introduce some Diversity, a decentralized formation is preferred to provide different spaces, different scales, and different programs, which will generate different experiences in each space. Additionally, elements are repeated lightly in a way that respond to the environment, allowing light and wind to pass through, and may give a chance to capture water somewhere in between.

The form does not follow the site context language. However, the circle can be constructed with some flexibility to allow it to follow the site’s property line.
4-5 CONCEPT INFLATION

Based on the design criteria, the concept was transformed from the early four iterations into eleven other iterations. Each of them shares a genetic aspect with an earlier one to explore a new dimension of the concept. The primary ideas that the author was most interested in exploring were the three entities (concept 3), and interlocking geometries (concept 4), which all the eleven iterations tried to achieve. Three of which were elected as the best to proceed with (5, 9, and 10). All had a strong concept; therefore, the author compared their pros and cons in order to be more critical in selecting a successful scheme, 10 (see comparison chart). Concept Schemes:

1. Three different, multi-size courts that use individual spiral circulation, and uses the in-between space for services. There is no interlocking geometry in this scheme.

2. Three interlocking ribbed cylinders that can create more overlapping spaces, which could be a benefit for public/private gathering.

3. Two open circles represent two courts and a third solid circle represents services. The three circles interlock to create more spaces, but also step up to break the rigidity of the extrusion in scheme 2.

4. A combination of scheme 2 and 3 that integrates an elliptic geometry to resolve the complexity of scheme 3.

5. Geometries in scheme 4 were fused to free them from the constraints of the round geometries, resulting in stepping solid contours with interlocking interior voids.

6. A combination of concept 2 and 3, spiraling the three entities (fingers) around one large courtyard. Each finger represents a different starting point for the project, so each entrance will lead the visitors through different programs, and they interlock vertically with each other.

7. A development of scheme 6 with a more realized path width, but integrated with a cylinder to house the services. Each tone shows the different paths of the concept. It is a very interesting idea to have each path programmed differently, however, spatially they are the same.

8. A combination of concept 3, and schemes 1 and 6 resulting in a one long loop that forms the three interlocking courts as it rises up.

9. An inversion of scheme 8 where three interlocked triangular loops rise up to cut the site into three separate courts. Each loop represents a different starting point for the project (similar to scheme 6, 7).

10. A combination of concept 1 and scheme 2 resulting in three interlocking ribbed cubes with more spaces in between, which could be a benefit for public/private gathering.

11. Another level of development for scheme 2 and 10 which changes the geometry to a triangle. The scheme holds the same properties of 2 and 10, but the sharp angles of the geometry ultimately makes it hard to work with.
4-6 CONCEPT DEVELOPMENT

After choosing the most successful scheme, a sectional moment was undertaken to explore the way the scheme could be inhabited and how it could manifest the poetics of the concept. The section showed a main public space shared by everyone and accessed physically and visually from most parts of the building, and another public space used by other people for a different event, while a private gathering is happening in upper levels with other private activities. The shift and interlock of geometries assisted in giving these spaces variations of visual access and light qualities, which enriched the spatial experience for each activity. The section also showed an integration of landscaped surfaces along with these geometric variations to improve the sensory experience of the resultant spaces.

Furthermore, another set of schematic iterations of the selected scheme was made to adjust it to meet program and site requirements, such as areas, entrances, light, views, orientation, etc. These iterations were done with three variations: moving the middle square, scaling its width, and thickening of the other squares. These iterations were meant to explore light access and the ability of the spaces in-between to fulfill the program requirements.

1. Change in location of the middle square
2. Change in width of the middle square
3. Change in thickness of the outer squares

The structural system was chosen to support the architectural concept. Therefore, the structural research explored several strategies that serve the architectural intentions of the form. The concept section suggested that some volumes be cantilevered to express floating levels, but also to provide flexibility and openness in plan. Therefore, the structural research studied strategies for cantilevering in different scales: a walkway, a floor, and a whole building.

Walkway Scale: this scale was intended for the interlocking segments between the squares where they ran straight from one point to another. The strategy was successful as long as the profile of the walkway slab changed to a thicker one.

Floor Scale: this scale was more flexible in its applications, so it was explored in more variations. This scale was explored in two sets of iterations: cantilevers as beams, and as entire floors. The beams iterations started with a conventional beam cantilevering system, but ended with an unusual system. The latter was two stepped bays that were held by two columns. When it was adjacent to a lower or higher bay, they were linked by a small column to support them and distribute forces between them. The floor iterations started from simply supporting the floor with a shear wall, to changing the profile of the slab to a fold system or a truss system.

Building Scale: this was represented in two variations, the first being two three-leg square structures, and the second giant cantilevered volumes attached to a central core. The first represented two square supporting each other. The two structures held themselves successfully, but their free ends were fragile when loaded. This iteration was the least applicable because it was hard to apply to a multi-story building. The second was more realistic for a multi-story building; it also can extend farther because it collectively formed two entities that supported each other. However, these cantilevers held a huge amount of load and needed large profiles, which consumed a huge amount of space.

From this point, the design changed to work with a combination of building and floor scale strategies as a starting point. The first structural visualization for the concept was a truss system that formed each square individually with 3 legs as well. The resultant squares supported each other by interlocking the trusses. The fourth leg was removed to allow free access on the first floor. This scheme resulted in series of trussed walkways that only had space for circulation with no room for program, which did not reflect the qualities of the section concept.

Therefore, the outer squares were extended to make room for program activities in a way similar to concept development no.3 (figure 4-20) and the conventional cantilever strategy (figure 4-23), with 3 cores similar to extended cantilever strategy (figure 4-25).
Two three-leg structures supporting each other

Supporting with a shear wall

Changing slab profile for an entire floor to a fold system

Changing slab profile to a truss system


2 - 3 stories high cantilevers tied to 3 cores

2 - 3 stories high cantilevers tied to 3 cores with horizontal and diagonal support

4-8 DESIGN DEVELOPMENT

The concept of interlocking geometries was very interesting, but, on this scale, was rather complicated and impractical when trying to create meaningful and adequate spaces for the program. This made the scheme lose some of the design qualities. Therefore, the design development process edited the scheme in order to better achieve these.

The first test for the concept in light of the design criteria was to ensure that the given geometry was capable of holding the program. The scale of the building was not large enough to take advantage of every interlock, thus, there were several dead spots in the building. Three interlocking geometries were competing with each other, creating busy spaces that were not necessarily useful. One of the three had to be scaled down not only for schematic clarity, but also to make breathing room for the program.

Therefore, the two outer squares were scaled up as the project's main mass to house program spaces, and the middle square was scaled down as an intermediate void that connected the two masses, and also created more voids by its geometric intersections.

The second test was about making hierarchies in the program to support the gathering and diverse nature of the Union. The east mass was centered on culture and housed the bookstore, the theater, and some of the private spaces such as the guests, meeting, and study rooms. The west mass was devoted to service and contains the food spaces, offices, post office, the bank, and the rest of the private spaces such as meeting and study rooms.

The design development process tested and developed the final proposal on three phases: Preliminary Phase, Pre-Final Phase, and Final Phase. The preliminary phase was the first test that responded to program and site forces. Geometries were still similar to the initial concept development scheme, which resulted in collisions between program spaces. The pre-final phase edited and solved conflicting spaces in light of the design criteria. The final phase refined most of the details to the anticipated resolution of the design criteria.
4-8-1 PRELIMINARY PHASE

This phase tested the ability of the form to hold the proposed functions. It interacted with the exterior site forces and the interior program forces. The goal was to ensure that the program had enough room in this building form to perform. The two main questions that were asked are: how does the building function from a regular operational view, where are people coming from, how do they enter, what do they see, etc. The other is how does the building implement the values of the Union and the design criteria.

This phase studied the most popular points of entry to the site. According to the project entry points diagram, the most intense access points are the north and south corners of the site. Therefore, the project’s main program spaces, such as the main plaza, and the bookstore were located accordingly.

The main plaza is open to the public, there was no boundary or fence that separated it from the street. The main plaza also occupied the void of the south square, which made it visually accessible from upper floors. This gave people on upper floors the chance to see what is happening without the need to travel down. The bookstore is next to the plaza and visually and physically connected to it. Food kiosks, food trucks, the post office, and the bank were located on the ground floor in order to be fully accessible by the public.
The middle square, which was supposed to link the two masses together, was implemented as a series of ramps that travel from one mass to the other in half-story segments. This ramp is unique to the concept as well as to the project because it is the single element that ties all project spaces together. On one hand this means that visitors will not miss anything from the project, but on the other they will be exposed to a series of spatial and visual experiences that shift their perception of the project between light/dark, large/small, public/private, dry/wet. Furthermore, each stop (landing) on the ramp focused the visitors’ attention to a specific scene.

The first flight of the ramp started at the bookstore as a dark corridor, but opened up at the first landing to the view of the Willamette River and Tilikum Crossing while being surrounded by the summit of trees planted on the ground floor. The next flight brings the visitors back to the main plaza where they can see what is happening while they are ascending. The ramp also creates a unique effect; instead of being stacked vertically as in regular vertical circulation modes, it shifts by one structural bay at each level. This shift creates a stepping in landings, which creates a large amphitheater that overlooks the main plaza and the river. Additionally, this shift changed the experience, light quality, and the view at each step, which made walking the ramp a unique experience.

The ramp opened up to a smaller public space when it met the void of the north square. This meeting created the second public space in the building on the second floor on top of the bookstore, which was the roof garden. The roof garden is another public space for gathering, but also had the same visual connection with upper floors and the stepped ramp. It also hosted skylights that provide daylight and a visual connection with the bookstore below.

The ramp continued up to merge with lobby of the theater, making visual connections to spaces below, and reached the rest of the program: the offices, and the private rooms.
4-8-2 STRUCTURE REFINEMENT

The structural system is refined to a simply supported beam system with cantilevering wings to the east and west of the building using the conventional strategy (figure 4-23). Choosing this system provided great flexibility in managing the schematic changes. The system is cast-in-place concrete beams and columns laid over a grid of 16’. The proposed system is bound by three structural cores of concrete shear walls to resist lateral forces. Because of the soil conditions, deep foundations were used. The foundation system bears on a group of four 20” concrete piles capped by 80”x80”x36” concrete cap under each column. The foundation changes under the cores to be a series of the same piles, but capped with a 36” deep mat footing.

Columns are located at every cross of the grid for two reasons. One is to minimize the size of beams to save space in shallower heights caused by the shift between the ramp landings. Therefore, most beams are only 8” deep. The second is to create a colonnade that strengthens the directionality of the public spaces and circulation paths, which makes unity and purity in spatial definition.

However, at cantilevers, beams are thickened to increase floor profile depth for structural resistance. In fact, at cantilevers, a local structural system is used within its allocated grids. The floor system switches to a ribbed slab system that spans for 64’ to the north and 48’ to the east. Because the spanning area is mostly surrounded by columns, the spanning system becomes a one-way pan joist concrete slab of 24”x6” joists with 36” spacing.
4-40. Typical Framing Plan.

4-41. Foundation Plan.

4-42. Section 1. Structure.

4-43. Blow Apart Structure Isometric View.
STRUCTURAL HYPOTHESIS:

Gravity Loads: In a regular beam and column system, gravity loads (which are dead + live loads) tend to pull the system downward. This will generate compressive forces in all columns and foundation piles, and most beams will have compression forces at the top of the beam and tension forces at the bottom of the beam. However, this scenario switches at cantilevers, at which compression is at the bottom and tension is at the top of the beam. General deformation for vertical members is buckling, while general deformation for horizontal members is bending or sagging. All structural connections are rigid connection (reinforced concrete), therefore, they will resist moment forces generated by bending forces.

Wind Loads: Wind loads are mostly developed on wall surfaces which need to be transferred to the structure. They tend to push the system sideways. Usually this develops overturning moment on foundations. All foundation connections are rigid connections (reinforced concrete), therefore, they will resist these forces. For the rising structure, this will develop buckling in columns and horizontal shear forces in beams, tending to displace beams in the direction of wind load. Since all connections are also rigid connections, they will remain in a 90° position. At cantilevers, where there is a free end, the beam will move towards the wind direction leaving an obtuse angle with the column. Compression and tension forces will generally stay the same.
4-46. Column Details.

4-47. Connections Forces Diagram.
Gravity Load.

4-48. Connections Forces Diagram.
Wind Load.
4-8-3 PRE-FINAL PHASE

This phase attempted to solve the problems created by the previous phase, but also to bring the design criteria to the level of development. It took the main project’s spaces individually and tested several implementations of the design criteria. The design was successful in creating primary spaces that embody the concepts of gathering, diversity, and the heart.

Gathering is embodied in the main public spaces, the main plaza and the roof garden. The main plaza became a large popular space that connected multi-levels as well as multi-classes of people from inside and outside campus, rich in its physical and visual accesses. The roof garden, the second public space, was negotiating the relationship between the inner spaces of the bookstore, the theater, meeting rooms and guest room. It attempted to perform as a second amphitheater by bringing all surrounding programs together through rich sectional relationships. Therefore, the gathering was achieved by the literal gathering of people, as well as the programmatic and visual gathering of adjacent spaces. Private gathering was achieved through separate rooms that were suspended out of the major mass of the building, but also had a mutual visual connection with the public. Some of these rooms were for studying, and students can reserve them. Some were for students, faculty, or employees’ meetings, and some were small units for meditation and privacy that could also be used for napping.

Diversity was achieved programatically and spatially. The program provided the public gathering, events spaces, commercial, food and services on the ground floor, while the entertainment, dining, and private spaces were higher in the building. The interlocking stepped ramps with the building masses adds a spatial diversity to the programmatic diversity. Different light qualities, views, spatial sizes, and visual and physical intersections enrich the building with diverse experiences.

The heart is embedded in the collective work of the three squares. Their interlock creates microenvironments that housed the programs at the core of the building. Moreover, the ramp runs in between the two masses as veins that binds and connects them together. The interlocking act of the ramps creates a hide/reveal effect.
so the experience of each side and each level is a different arrangement of programs, which adds surprise and excitement to the experience.

However, the ramp has a complex relationship with the spaces it penetrates programmatically and environmentally. Therefore, this phase attempted to resolve these issues. It also studied the relationship between the bookstore, the roof garden, the theater, and the river, to strengthen its visual and physical access.
The plaza is the main public space in the project, and the most accessible from campus and the city. However, it is contained within the boundary of the south square and defined by the edges of its mass. This definition helps to organize and focus the purpose of the plaza, which is for casual gathering, people watching, having food, reading, and holding musical or artistic events and farmers’ markets. Being surrounded by a built mass gives unity and uniqueness to a plaza space. It draws people into a diverse spatial sequence, which is an important quality to be experienced by the visitor.

From the southwest façade where people are most likely coming, the large mass of the square is very pure and evident with a relatively small opening on each side. It offers a transition from the vast, quiet, open space outside the building, to a shallow, darker opening. The opening bridges between the inside and the outside of the plaza, and then opens up to the plaza space where a loud collision of activities occurs. The rest of the path is experienced with the same spatial transition, but with a different result. The northeast side of the plaza is landscaped with two rows of trees to make room in the middle for walking. As people proceed on the path, the trees reveal a view of the Tilikum bridge, which is a memorable way to end this spatial sequence. Moreover, this landscaped area links the plaza with the South Waterfront Park that runs from the north, in front of the site, and slides under the bridge, which is another connection to the river edge.

While the plaza is open to the sky, which provides it with natural light, the strips of the ramps with the bodies of people on it will block part of that light. Therefore, the ramp will be made from a translucent material to allow for more light. Another reason for making the ramp translucent is the shadow effect. When people are moving on a translucent floor, their shadows will move on the lower walls, creating an effect that brings the walls alive. Another strategy to bring more light into the plaza is to make openings and voids in the surrounding mass to bring light indirectly.
4-60. Plaza Light Studies. Diagrams.

Noon - ramps loaded with people

Noon - ramps without people

4-61. Plaza Light Studies. Renderings.
THE BOOKSTORE DEVELOPMENT

The bookstore is at a strategic location. It is on grade (easy access), the second popular entry point to the project (figure 4-28), and lies next to the plaza and below the roof garden, which are the two main public spaces in the project. Since the bookstore has a reading area as part of its space, there will be a need for daylighting here. Therefore, it attempts to do that along with refining its relationship with the adjacent public spaces.

The first daylight strategy is through a skylight. Having a skylight will allow for visual communication not just with the roof garden but even upper floors such as the theater and the guests and meeting rooms (see section 2. Phase 2. Figure 4-54). It is very strong relationship that binds the entire cross section together. The skylight will allow light to reach the main level of the bookstore, where most of the books and other merchandise are located. The bookstore has a mezzanine floor which hosts the reading areas. Being closer to the ceiling, and thus the skylight, it will receive more daylight. Several geometries were explored: an aquarium-like shape skylight, a straight void, and a trapezoidal shape. These geometries were explored for their potential to refract light deeper in space. The lab test showed a range of illumination between 110-176 fc (1200-1900 lux), while the digital rendering showed a range of 132-278 fc (1420-2990 lux). These are very high illumination levels for reading, which is a good indication for the amount of light coming through the skylight (recommended illumination levels for libraries and reading rooms are 46 fc (500 lux))8.

The second strategy is through a glazed curtain wall. This will allow for visual communication with plaza and opens up the view to its activities, which expands the smaller bookstore’s atmosphere towards the larger plaza. Since the curtain wall is double heighted, it will be beneficial to the reading space as well. For this strategy, the lab test showed a range of illumination between 93-106 fc (1000-1150 lux), while the digital rendering showed a range of 147-276 fc (1580-2970 lux), which are also high illumination levels and are good indications for the amount of light coming through the curtain wall.
Strategy 1:
4 sensors were inside:

Li-Cor light meter readings:

#1: 1.9 x 1000 = 1900 lux
#2: 1.5 x 1000 = 1500 lux
#3: 1.25 x 1000 = 1250 lux
#4: 1.2 x 1000 = 1200 lux
Sky: 13.5 x 1000 = 13500 lux

Conversions

#1: 1900 / 10.764 = 176 fc
#2: 1500 / 10.764 = 140 fc
#3: 1250 / 10.764 = 116 fc
#4: 1200 / 10.764 = 110 fc
Sky: 13500 / 10.764 = 1254 fc

Daylight factor

#1: 176 / 1254 x 100 = 14%
#2: 140 / 1254 x 100 = 11%
#3: 116 / 1254 x 100 = 9%
#4: 110 / 1254 x 100 = 9%

Strategy 2:
4 sensors were inside:

Li-Cor light meter readings:

#1: 1.15 x 1000 = 1150 lux
#2: 1.4 x 1000 = 1400 lux
#3: 1.2 x 1000 = 1200 lux
#4: 1.0 x 1000 = 1000 lux
Sky: 13.5 x 1000 = 13500 lux

Conversions

#1: 1150 / 10.764 = 106 fc
#2: 1400 / 10.764 = 130 fc
#3: 1200 / 10.764 = 111 fc
#4: 1000 / 10.764 = 93 fc
Sky: 13500 / 10.764 = 1254 fc

Daylight factor

#1: 106 / 1254 x 100 = 8%
#2: 130 / 1254 x 100 = 10%
#3: 111 / 1254 x 100 = 9%
#4: 93 / 1254 x 100 = 7%
THEATER DEVELOPMENT

The theater is the single space in the project that frames the view of the Tilikum Crossing bridge. It is the space that best ties the project to its place. This space shows that this Union is meant to be in Portland, sit on the OHSU campus, and look at the Tilikum bridge. This will not happen in any other location on earth, not even on the adjacent property. The theater establishes a visual relationship with the bridge so that it becomes part of its space. The theater location in the project is also unique because it overlooks the roof garden on the other side. Therefore, it attempts to strengthen its relationship with this space because of the popular nature of the roof garden.

The iterative process tries to negotiate these two relationships with the bridge and the roof garden. On one hand, the process tests several edge conditions to the exterior and interior, and compares their effects on the geometric expression of the square, the light quality of the theater’s indoor spaces and spaces below the mass of the theater, and the performance of the building envelope. The sloped edges allow for a desirable stepping that could be integrated with the theater setting as seats or balconies. Some of them suggest a continuation of the stepping of the roof garden, so part of the theater could potentially serve it in a way that reverses the theater to the outside. In other words, the stepped roof garden could be a place for performance and the surroundings, including the stepped theater edge, could serve as places for audience.

The second set of iterations test the nature of interior surfaces. Because the allocated space for the theater is a rectilinear space, it will have many acoustical problems. Additionally, the use of glass (for the visual connection with the bridge) will increase the reverberation time, which is undesirable for some activities, especially lectures. Therefore, the iterations propose a corrugated, folded, or stepped walls, with plain, curved, or irregular ceiling reflectors to solve this problem. Also lighting is proposed to balance the light quality at the back of the theater.

The theater is designed to hold several public and semipublic activities. It is used during the day mostly by the OHSU as a classroom, but at night it will be more inclusive to host guests and talks, as well as musical events and even movie watching. In order to achieve more flexibility for such varied uses, the type of glazing in the curtain wall is selected to be an electronic glass, which could control the privacy, opacity, and tint of the glass according to the scheduled event. Moreover, the electric glass is also able to perform as a presentation screen for lectures, and also as large screen for movies.


Theater at night. Musical Performance.

Theater at day. OHSU Class.

Theater at night. Guest Lecture.

Theater at night. Movie.
BUILDING ENVELOPE

The envelope concept supports the project’s main intentions of linking the Union to its surroundings. Elevations to the northwest and southeast that have fewer connections are blocked with an opaque material, and elevations to the northeast and southwest are made transparent to allow for visual connection to the campus and bridge.

The envelope system is chosen according to architect Thomas Herzog’s performance criteria of façades: air permeability, light permeability, energy gain, variability, and control. In light of that, the building envelope will provide ventilation, daylighting, views, solar energy, color, and operability of windows. Ventilation is provided through the same envelope concept of transparency by having windows in the same direction for proper ventilation. Daylight and views are obvious. Solar energy is achieved through using a type of glass that has transparent and semitransparent photo cells, which gain energy without altering the other tasks of daylight and views. Color is achieved through the performance of the theater’s electric glass, which changes the mood of the room along with the current activity.

ENVELOP PERFORMANCE CRITERIA

Facade Construction Manual. 2.1 The Structural Principles of Surfaces

Air Permeability  
Ventilation

Light Permeability

Daylighting + Views

Energy Gain

Solar Energy

Variability

Color

Control

Operable
4-8-4 FINAL PHASE

The major focus of this phase is to make sure that the design criteria have been met and implemented in the final product. Starting with gathering, this phase edits the building geometry in a way that brings a new approach to embody the gathering aspect of the project. After creating three complete squares that interlock with each other and securing them with three structural cores, the middle structural core is removed and any connection made through it to outer squares is broken. This evacuated the middle square from any interlocking and gave it purity and dominance over the two other squares. Moreover, shifting the plaza from the south square and centering it on the middle square resulted in a monumental public space. Plaza volume becomes the most strong and powerful space in the project that embodies the main value of a union: gathering. This movement established a hierarchy in the privacy of spaces from main public, to smaller semipublic, to private (see building order diagrams, figure 4-74).
This new order affects the diversity of activities, spaces, and experiences. The diversity works with the hierarchy of the building order. The main spaces will be accompanied with a certain diversity of programs, people, and activities, while the secondary spaces will have another set of diversity. For example the main plaza is a public space with public programs such as the bookstore, food, and post office, and bank, that attract all kinds of people to engage in both casual and planned public events. On the other hand, the roof garden is a smaller public space accompanied by the less public spaces of the theater, the restaurant and study rooms. What is new in this phase is that the set of diversities are organized according to the hierarchy of the building order.

The ramp acts as the heart of the project. It is the main artery that feeds all programs in the building, and all main traffic must go through it. The ramp organizes the spatial sequence of programs for the visitors as it takes them through the hierarchy of the building order from a main space and passes them to secondary spaces until they get to their destination.
THE RAMP AS A HEART

While the ramp is the main circulation path that travels through all floors and connects all program elements, it does more than just that.

The ramp is an urban connector that it ties the project to its surroundings physically and visually. It starts from the city edge and the campus environment, interlocks with project spaces, and connects back to the city with a final image of the bridge.

The ramp is a spatial transformer that exposes people to different spatial experiences. It starts from the plaza’s massive space, steps into the bookstore, pokes into the plaza space again with balconies, links to bookstore’s reading spaces, opens up to the roof garden, steps into the theater’s lobby, branches into meeting, studying, and private napping rooms, and links to Tilikum Crossing at each level and at the path’s final destination where it opens to the view of the river on the roof terrace.
The ramp is translucent. It allows light to seep through to spaces below. Moreover, when it overlaps with a portion of one of the building’s floors, it performs as a skylight where the concrete floor recedes to allow the ramp’s translucent floor to extend. This allows light to enter interior spaces.

The ramp’s length allows people to use it for exercising and running, which will draw more groups of people to use it.

Through its cross-programming, the ramp creates its own program for people to do multiple activities as they make their way through the project. The ramp becomes a space that holds the majority of people and activities in the Union, which makes it the heart of the project.
MAIN PLAZA

The main plaza is the dominant space of the project. It is pure in its order, it is the center of public activity, and it is democratic in its access for everyone. All ages, disciplines, and backgrounds can participate in its activities, and all levels of the building connect visually to the space. The ramp is what defines these qualities for the plaza. It creates straight edges along the long sides to support the space’s directionality towards the river. It is also stepped on the short sides to create terraces from its landings that are stepped towards the plaza and the river, turning the space into an urban amphitheater.

The ramp also creates a destination at each landing. The first landing is at the bookstore, which links the entrance of the bookstore with the plaza. The first two landings towards the river slide partially under the mass of the theater, which creates two wings of shadow and light, hidden and revealed under that mass. The intermediate small landings poke into the volume of the plaza as floating balconies to break the long straight edges, and to allow visitors to step in and experience a different view. The rest of the ramp landings merge with the floor of the coming levels and act as foyers for each adjacent program.

POWELL’S BOOKSTORE

Powell’s, a large bookstore in Portland, is placed to take the role of the OHSU bookstore. Powell’s is the first stop on the ramp; it is elevated above ground floor, and overlooks the plaza. It contains two spaces in two levels, the merchandise section on the ground floor, and the reading section on the second floor. The two daylight strategies provide illumination for both. The glazed curtain wall connects the bookstore with the plaza/ramp space, so that people on the ramp can see people browsing or reading. The trapezoidal skylight connects the bookstore to the roof garden and creates a material directionality that supports that connection. People on the roof garden can see people browsing or reading.

ROOF GARDEN

The roof garden is the second public space. It lies right in the middle of the path of the ramp. It is surrounded by the north mass on three sides, and opens towards the plaza/ramp space on the remaining side. The ramp interacts with the roof garden space in several ways. It merges two of its landings with the roof garden’s floor, and pokes one of its floating balconies above the bookstore’s...
4-88. Visual Connection of the bookstore, the roof garden, the theater, the Tilikum bridge.

4-89. Water Collection System.


skylight. Such a position exposes people an experience different from other balconies that pokes into the plaza space. While it allows people to engage with activities that are taking place in the roof garden, it gives them the chance to look below through the skylight and see people who are just arriving at the bookstore.

The roof garden setting allows it to act as a lobby to the theater, and as extra seating for the restaurant, which brings the entire floor all together. The roof garden also makes several visual connections with its surroundings. Besides the surrounding spaces, it allows for a glance of the Tilikum bridge through the theater space, when it is set to all opacity mode. This ties back to the location of the site and strengthen the path of sectional communication between the bookstore – the roof garden – the theater – the Tilikum bridge.

While the skylight brings light to the bookstore during the day, this condition reverses at night. The skylight brings the artificial lighting of the bookstore upwards to the roof garden, which creates an atmosphere that differs from that during the day.

The roof garden is also part of a water collection system in the building. The system takes advantage of all green roofs in the building, in addition to the water running on the ramp, and stores the water in a reservoir below grade for future use. The north wall of the roof garden is also a living wall that participates in this system, but also brings art and amusement for its space.

THEATER

The theater is the space that expresses the project’s relationship to Portland through its strong visual connection with Tilikum Crossing. One proposal is to use the space for televised interviews, which could use the live background of the bridge for its setting. The theater can also be used for public events such as musical performances and movies using the technological accommodations of the electric glass. The theater is also used for university events such as guest lectures, and for its educational uses as a classroom. While these events could also make use of the electric glass, the theater is provided with curtains for more convenient control of visual and acoustical qualities. Moreover, a projection screen is provided in case there is no need to use the electric glass, or there is a need to close the curtains entirely.

The effect of the projection of the electrical glass creates a color change for the room’s atmosphere depending on the kind of the projected images. Additionally, this effect could be also reversed outwards where it can reflect to the public what is being projected, which adds to the performance of the façade of the theater. The projection creates colored lighting on the surrounding environment, which could bring attention to the building so people on the South Waterfront Park, on the Orange Line, on a boat on the river, or even on the other side of the river can see these periodical changes.

4-98. Theater Setting for TV interviews. Phase 3.
MEETING AND STUDY ROOMS

Private spaces also contribute in this encounter of activities. However, because of the nature of privacy, they are treated differently. While all private rooms, including the meeting, study, napping, and guest rooms, have visual access to the plaza/ramp space, and physical branches from the ramp, they are set at the narrowest part of the building mass as arms that extend out of the main mass to be isolated from other public activities.

These narrow forms allow for an abundant amount of daylighting and fluid natural ventilation, which allow people to engage with and adapt the space to their exterior environment as they needed. The glass operable walls of these rooms facilitate this, as well as connects it visually to the river, bridge, plaza, and campus, depending on their location in the building.

Additionally, these rooms, specifically the meeting and study rooms, are connected immediately to their adjacent floors. The meeting rooms are located farther from the ramp, so they are leveled with the main floors of the buildings, while the study rooms are located closer to the ramp, and they are accessed through its intermediate landings. This allows meeting rooms, which are mostly used by employees, to be accessed closer to their work spaces, and the study rooms, which are mostly used by students, to be accessed closer to students’ spaces. Because entry points for these rooms are not at the same level, it results in a shift between the two rooms. This shift supports the function of these rooms in two ways. The shift blocks direct visual contact, which is desirable;
when employees have their meetings, they only see part of students studying in the other room. The rooms are also provided with curtains for extra control. Additionally, the roof of each room is landscaped with plants to fill the other half of that shift, and provide a visual attraction and pleasant sensory stimuli for these spaces.
The final destination of the ramp is the roof terrace. The roof terrace concludes the visitors’ experience with the view of the Tilikum Crossing bridge and the Willamette River as the project’s final image that ties it back to Portland. The roof terrace is accessed by the public; it is used for casual gathering of students and employees, family picnics, tourist attraction, or even for public personal occasions such as engagements or marriages. However, when the roof terrace is adjacent to the guest room, so it could be used for private occasions as well, such as meeting brakes, guest welcoming, or parties.
Endnotes:

6. Rullman. Page 44.
7. ACUI. From Vision to Reality. Page 60.

Figures Citations:

All Figures are courtesy of Mahmood Al Musawi unless noted.
CONCLUSION
The biggest challenge in this research was to discover the reason behind the shift in American college union trends over time, and the missing piece in their values. While college union professionals have established logical criteria to determine the role of unions in campus environments, unions still lack cultural diversity in the way they are implemented. Although college union professionals are discussing, proposing, and implementing ideas to support the role of unions and improve their educational roles, unions in the United States of America started to be produced similarly and they blurred their cultural and architectural boundaries. In fact, college union professionals have stated that geography, era, sustainability, and university architecture are “factors that impact the creation of a university union,”¹ which makes it even more confounding why this cultural blur is still happening.

The research indicated two reasons for this. First, schools across the country have used similar rules in creating and operating unions; and second, they have followed the contemporary fashion of turning the union environment into a shopping experience and joined the globalization trend of public space, which spread extensively in most building typologies in the 21st century.

This research highlighted the missing piece in the values of the college unions, which is architecture. Although college union professionals have addressed that the influence of the architecture and the impact of its facilities affects the union environment and people's behavior in it ², there was less attention given to architecture. The architecture is the medium that transforms the values of college unions into mental and physical experiences, which facilitates a better approach to achieve these values in a way that supports and distinguishes the culture of each union, and promotes diversity between campus cultures.

The research brought to light guidelines that frame the architectural nature of the union differently for each university. These guidelines give unions identity and belonging on a regional and local scale. Future unions should be: Environmentally Conscious, Inclusive, Multi-Functional, Engaging, Human-Oriented, Cultural, Time- and Site-Related. While many of these guidelines overlap with what has already been proposed by college union professionals, being human- and cultural-oriented first, and time-, site- and environment-focused second, is what will make a difference in future unions.

The urban role of college unions is a key element in distinguishing and diversifying union environments. American architect Franz Schulze has beautifully described the urban role of architecture in general on cities and people, which is also true for unions:

“I became sort of interested in another aspect of architecture; not interested alone in architecture as a series of individual projects ... but to see how those various projects began to influence other people’s lives.
who weren’t our clients necessarily, became a matter of interest to me so I became really interested in this thing called urbanism.

Unions are not just campus buildings, they are public buildings. Unions are not just part of the campus, they are part of the city. Unions are not only part of campus community, but a hinge between a campus community and a city community. The urban role of college unions influences places and people that are not necessarily related to the host university.

Additionally, Unions react to urban forces, which connect them to their surroundings and make them customized to only one place. Unions connect architectural uses with urban uses, which expands their program perspective. Unions form their microclimates to match their macroclimates, which makes them belong to a region. The urban role anchors unions to a place.

The research extracted three core values that should be used in each union as design guides. These core values give unions a unique place and improve their architectural qualities. The core values are Gathering, Diversity, and Heart. Gathering induces the social interactions between people, Diversity gives them reason to come to the union, and Heart is the element that makes the union alive, successful, and different from other unions. In other words, Gathering is the basic nature of the union, Diversity offers choices that are local/regional to that union, and the heart is the way these two are arranged and experienced.

The research did not find a fixed combination of programs for each union. Programs in unions could be as diverse as their cultures. However, it generated a list of program elements, and ranked them according to how often they appear in unions. The list highlighted four categories: Vital Programs, such as food, and social programs; Common Programs, such as, commercial, performance, office, and recreational programs; Infrequent Programs, such as private, event, gallery programs; and Rare Programs, such as leisure, educational, and special service programs.

These criteria were applied in a design process on one of the public universities in Portland, Oregon, the Oregon Health and Science University, to test their outcome.

The design was able to meet most of the guidelines. The Union is designed to be Environmentally Conscious; it makes use of daylighting, natural ventilation, green roofs, and reclaimed water, which are part of Portland’s regional technology. It is Inclusive in allowing the public and college community to use its facilities. It is Multi-Functional in allocating spaces for different uses in different times; the plaza, the courtyards, the roof terrace, the theater, and the ballroom, all do more than one function. It is Engaging in the way that the ramp takes its visitors through series of hide/reveal experiences to interior and exterior spaces. It is Human-Oriented in response to human needs and human scale. It is Cultural in response to Portland’s tradition of wet space through its uncovered public spaces, as well as to OHSU’s tradition of hosting public events such as
farmer’s market, art and musical events. It is Time-Related in response to sustainability and the environment as well as to reverse the effect of globalization by being local - no chain restaurants, no food courts, no branded shops, and no more malls. It is Site-Related by responding to site forces that helped in generating the design concept, as well as anchoring the project to Portland and OHSU by orienting the building towards the Tilikum Crossing bridge and the Collaborative Life Science Building.

The design was able to achieve all of the three core values. For Gathering, the program was arranged according to different scales and privacies of gathering. The Main Plaza is the central democratic, public gathering space. It is open to everybody on/off-campus, of every age, and every background. It is very open to the public in that it could hold a public fair, a farmer’s market, or even a political protest. The Roof Garden and Roof Terrace are the secondary public spaces that are allocated for smaller gathering groups. Food spaces are distributed to support public gathering in every event and on most floors, and they are entirely accessible by the public. The Theater and the Ballroom are semi-public spaces, the theater is mostly allocated for university classes, lectures, and talks, but it also holds public events, TV interviews, and performances, and the ballroom is also mostly for university uses. Meeting Rooms, Study Rooms, Offices, Nap Rooms, and Guests Room are spaces for private gathering.

For Diversity, the program provided variety of Food, social, commercial, business, services, public/private, entertaining, and educational choices. Food diversity is found in the restaurant, the kiosks, and the food trucks. Social diversity is for students, faculty, employees, and the public. Commercial diversity is found in the bookstore. Business diversity is found in the offices, the post office, and the bank branch. Services diversity is found in the ballroom, post office, and the bank branch. Public/private diversities is found in plaza, courtyards, theater, ballroom, reading areas, meeting rooms, study rooms, nap rooms, and guests room. Entertaining diversity is found in plaza, courtyards, and the theater events. Educational diversity is found in theater, reading areas, and study rooms.

For Heart, the design’s ramp plays this role. The ramp takes visitors from campus/city and distributes them to other programs. It links the two masses of the union like arteries. The ramp makes the building read as a geode, crusty and rough from the outside, but beautiful and soft on inside. Without the ramp, the union is just another building. It is a circulation path, a running path, an urban connector, a spatial transformer, a skylight, a program, and a space.

This research, through the design process, has explored the connection between the Union and site and the reaction to urban forces, the connection between the Union and program and the definition of public and private boundaries, and the connection between the Union and Portland’s regional technology. Through the design investigation of form finding, program adaptation, and concept promotion, the project was able to meet the
research's design guidelines in the final proposal. It was able to explore the major public spaces as the core nature of the Union, such as the main plaza and its volumetric relationship to adjacent spaces, the bookstore and its light qualities, the roof garden and its horizontal and vertical relationships to adjacent programs, the theater, its multi-function and its connection to the bridge, and the roof terrace, its public/private relationship and connection to the river and the bridge. Private spaces were also an important counter balance to the public spaces where individuals can find a spot and have privacy to meet, study, or even nap, within the Union's public environment.

The research was also able to explore the technical side of the building where it investigated the structural system with a level of details, in addition to an initial concept of the building envelope and a moment in its details.

The urban role of college unions is too vast to be viewed from one perspective; there are so many directions from which it can be approached. As far as this research went, there were fifteen initial concepts and fifteen sub-concepts that were developed within the regional considerations of Portland. Within this scope, if one factor changed, it would lead to a whole other set of results. Therefore, by using the same design guidelines and core values, one can ask what would happen if the union was for another university? What would happen if the union was sited farther from public transportation? What would happen if the site changed to another location on campus or in the city? What would happen if the union was even in another city or state? These variables would fundamentally change the framework that constrains the design concept and lead it in a totally different direction.

While the research cut a specific path through this process to commit to an architectural form in order to test its proposals, it offered a variety of opportunities to be explored. Starting from the urban role of unions, how could they be more engaged with the city? Could they be extended out of campus property to engage in an urban phenomenon? Could they be extended, for example, to be part of a city park, a marina, a bridge, or a public transit station? Could that extension happen vertically as opposed to horizontally so their participation is not necessarily a physical engagement with the city, but rather a visual engagement with the city skyline? Could they be free of the conventional building setting to allow more of the urban forces and reshape their environments? How could the public/private relationship between the university and the city be revisited? In OHSU's case, this relation was fairly open for economic reasons as well as safety reasons, where OHSU is located in a safer neighborhood. However, the conversation may be held to revisit the public/private relationship depending on the willingness of a university to open its gates to the public, or sometimes, when political, safety, and security matters rise up (in Portland or in another city) that force the university to change its permeability to the public.
From a programmatic perspective, the research induced the thinking of program diversity as opposed to program size. It questioned how large, how diverse, and how meaningful a program of a union can be. The questions that are still open are: does a union need to be programatically comprehensive in order to be called a union? How does this prevent unions from drifting in the stream of globalization? What should then be considered a minimum to fulfill regular needs in a union, especially for small universities such as the OHSU? Since the public/private relationship is still developing, how much of the program could be dedicated to public use and how much could be for private use? How to determine where the line lies between public and private programs? How much program that engage the public should be included in a union?

Finally, the research demonstrated several regional technologies in Portland and focused on daylighting as a driving theme to support the project's concept. This resulted in a design that was daylight-oriented that was ultimately expressed with building mass and transparency. How would the Union properties change if another regional technology was selected? How do the spaces of a union respond to a wind-oriented, water-oriented, or material-oriented design? And in case the union was even in another region, how would it respond to other regional aspects such as shading from sun, solar energy, geothermal energy, etc.?

It is fascinating how college unions could grow and diversify to house a vast range of programs and develop a character unique to their university culture and city. What is more fascinating is that they share the same passion with architecture of being centered on people. People are the vital element that makes both of them alive, interesting, attractive, enjoyable, memorable, and functional. What could happen when a vibrant typology such as unions takes place in a vibrant field such as architecture? How many possibilities from this collision could be made to form a new idea for unions? How could the architecture of the union negotiate the urban role of architecture and the urban role of unions? No matter what path it takes, the architecture of the union should craft powerful urban artifacts instead of themed shopping experiences. Such artifacts focus on social and human experiences, creating rich cultural nodes in the city, which also increase diversity between universities.

Endnotes


