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The Built Environment and Well-Being: Designing for Well-Being in Post-Industrial Communities During the Age of Urbanization

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THE BUILT ENVIRONMENT AND WELL-BEING:
DESIGNING FOR WELL-BEING IN POST-INDUSTRIAL COMMUNITIES
DURING THE AGE OF URBANIZATION

A Thesis Presented

by

TYLER DAVID O'NEIL

Submitted to the Graduate School of the
University of Massachusetts Amherst in partial fulfillment
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Department of Architecture

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ABSTRACT

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MAY 2020

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Well-being is a major cultural concern today and is increasingly a priority for architects and designers. However, the meaning of well-being is hard to define and often misunderstood. Well-being is frequently seen rather narrowly, even though it is essentially a holistic concept that includes physical, mental, social, and economic well-being. To achieve a state of well-being these different aspects must remain in balance. In the age of urbanization, with the world's urban population expected to nearly double by 2050, the notion of well-being becomes especially important for architects and urban designers when considering the implications for the urban environment to accommodate this influx of people.

This thesis focuses both on understanding the impact that the urban built environment has on holistic well-being across a variety of factors as well as understanding how architecture and design can support well-being in changing urban environments. By clearly defining well-being, assessing current standards for well-being, analyzing a variety of case studies, and ultimately proposing a new, mixed-use development in Providence, RI as an exemplar of urban design

and architecture that supports well-being, this thesis outlines a model for how to design for well-being in a way that both supports existing communities while anticipating the growth of these communities as a result of continued urbanization.

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CHAPTER 1

INTRODUCTION

With the increasing population living in urban areas; smaller, secondary and tertiary cities are naturally going to start seeing an increase in new residents and are going to become more developed as a result. This may be good for the economics of the city as whole, but in some cases becomes an issue for the communities that already exist there. Development in these cities should prioritize well-being as a means to both strengthen existing urban communities while also supporting the influx of newcomers as a result of urbanization. This thesis focuses both on understanding the impact that the urban built environment has on holistic well-being across a variety of factors as well as understanding how architecture and design can support well-being in changing urban environments.

The first chapter advances a definition of well-being, as the term can be ambiguous and mean different things in different contexts. Having a clear definition of well-being is critical for using it as a basis for design. This chapter also details the different dimensions of well-being with respect to design, including mental, social, physical, and economic well-being. This chapter will also assess how each of these components of well-being are impacted by the urban built environment and will cite both negative and positive examples of this.

The third chapter assesses current standards in the industry that are in place to address well-being. This includes the WELL Building and Community Standard, from the International Well Building Institute, as well as Fitwel, from the

Center for Disease Control. This chapter also critiques these current standards and outlines potential issues stemming from the generalized nature of these standards.

The fourth chapter examines case studies at different scales as well as different programs to assess both the successes and shortcomings of projects with respect to well-being. These case studies include projects that have been WELL Certified or Fitwel Certified, as well as projects that have addressed well-being without meeting specific certification requirements.

Building on this research, the final chapters propose a hypothetical mixed-use development for a specific site in Providence RI. This proposal serves as a model for prioritizing well-being in the design of urban environments. The fifth chapter summarizes the site selection process, site analysis work, and outlines the basic site design and programming strategies employed at the scale of the city, the neighborhood, and the individual site. The sixth chapter details the specific architectural proposal for the site. Finally, chapter 7 assesses and critiques – both the successes and the shortcomings – of the design project with respect to supporting well-being on the specific site and as a model for designing for well-being.

1.1 Defining Well-Being

The first step in understanding how to design for well-being is of course by defining well-being, which can be a difficult task. The Center for Disease Control states that “there is general agreement that at minimum, well-being includes the presence of positive emotions and moods (e.g., contentment, happiness), the

absence of negative emotions (e.g., depression, anxiety), satisfaction with life, fulfillment and positive functioning.”¹ It essentially means that one feels good and has a positive outlook on life.

In an article from the International Journal of Well-Being titled “The Challenge of Defining Well-Being” (2012), Rachel Dodge, Annette P. Daly, Jan Huyton, and Lalage D. Sanders discuss how the definition has changed over time and they offer a more modern take on evaluating well-being. Evolving from a primarily psychiatric term, well-being originally meant getting a patient back to “0” from a state of negative mental health, Now, however, the term is a goal for all humans to achieve and is understood as a positive state of general health. The authors of this article argue that there have been many different ways of explaining well-being however they have all focused primarily on the different dimensions of well-being instead of attempting to specifically define it.²

After analyzing various “definitions” of well-being, the authors developed a definition that they believe to “be simple, universal in application, optimistic and a basis for measurement.”³ They also state that “This definition conveys the multi-faceted nature of wellbeing and can help individuals and policy makers move forward in their understanding of this popular term.”⁴ The definition that they propose is that well-being is the “balance point between an individual’s resource pool and the challenges faced.”⁵

¹ Center for Disease Control and Prevention 2012

² Dodge, et al. 2012

³ Dodge, et al. 2012, 222

⁴ Dodge, et al. 2012, 222

⁵ Dodge, et al. 2012, 230

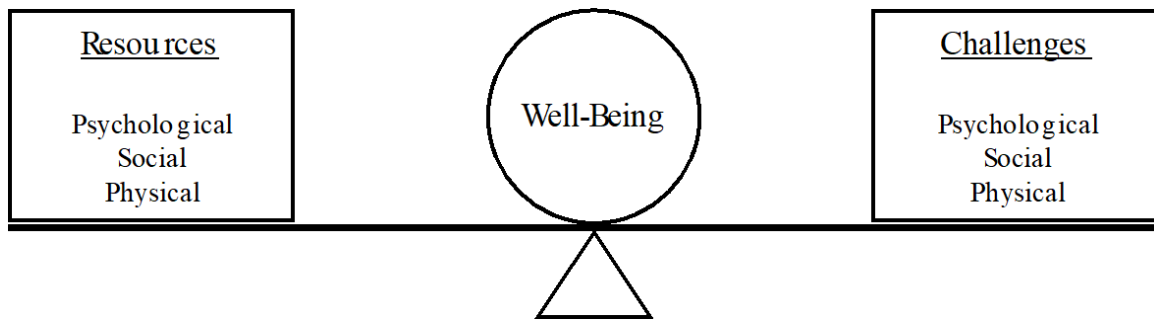


Figure 1: Resources vs Challenges Diagram (diagram, Dodge, et al. 2012, "The challenge of defining wellbeing." International Journal of Wellbeing)

This definition is interesting because it draws attention to the fact that challenges are not always a bad thing. Challenges are necessary in some cases, and without challenges life becomes mundane and stagnant, which in turn will cause well-being to dip. Instead of eliminating all challenges, it's important to make sure that a person has the resources necessary to be able to overcome said challenges and keep this "see-saw" in balance. The article states that "stable wellbeing is when individuals have the psychological, social and physical resources they need to meet a particular psychological, social and/or physical challenge. When individuals have more challenges than resources, the see-saw dips, along with their wellbeing, and vice-versa."⁶

This definition also helps in developing a method that helps with designing for well-being on a site-specific basis. An architect or designer can look at the challenges that the inhabitants face and get an idea of what resources may be lacking that could help them address these challenges. On the other side of the spectrum, an architect or designer can look at what resources are already

⁶ Dodge, et al. 2012, 230

prevalent and accessible for the inhabitants and can prioritize providing resources that are not already present.

When defining well-being, it is also important to understand that there are many different dimensions of well-being. For the purposes of this project, the research will focus on four main dimensions that have direct relations to the built environment. This includes psychological, social, physical well-being, and economic well-being.

1.1.1 Psychological

Based on Carol Ryff's Six-Factor Model of Psychological Well-being, psychological well-being includes six key components: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance.⁷ Ryff based this model of psychological well-being on Aristotle's Nicomachean Ethics, "where the goal of life isn't feeling good, but is instead about living virtuously".⁸ While some of these are not directly influenced by the built environment, it is still important to have a general understanding of what each means in terms of their effect on overall psychological well-being.

Autonomy is the ability to make an informed, uncoerced decision. In plain terms, this means the ability for a person to think for themselves instead of "following the crowd". The ability to resist social pressures that don't fall within one's own beliefs is a major aspect of psychological well-being. Environmental

⁷ Ryff 2014

⁸ Afsana 2016, 35

mastery is focused on the ability for a person to successfully complete tasks and manage responsibilities in a way that suits their goals or desired outcome. One has mastered their environment when they know exactly how to make use of their skills and their time in a way that benefits themselves the most, which leads into the next component of psychological well-being, personal growth. This essentially means that a person can be open to learning and open to the fact that people may change over time. People who have positive ideas on personal growth have a desire to progress toward their goals and progress as a human instead of being complacent with where they are at. Personal growth is very closely related to purpose in life and self-acceptance. People with purpose have a desire to fulfill their “purpose” and this is specific to the individuals. Self-acceptance means that an individual understands that they have strengths and weaknesses, and they understand that these strengths and weaknesses make them who they are.

Finally, psychological well-being also includes having positive relations with others and the ability to sustain healthy relationships. Quality is far more important than quantity here, and well-being depends on developing positive relationships with others regardless of how many.

The impact that the built environment has on psychological well-being varies depending upon the context. One concern with the built environment is that it may cause a feeling of “helplessness”.⁹ Helplessness is defined as “when

⁹ Evans 2003

opportunities for control over the environment are thwarted”.¹⁰ Therefore, it is essential to give inhabitants some form of control over their environment, which could include community input when developing a project.

1.1.2 Social

Social well-being is the next dimension of well-being that can be affected by the built environment and is also an important dimension to focus on in general. Social well-being, as defined by the United States Institute of Peace, is “an end state in which basic human needs are met and people are able to coexist peacefully in communities with opportunities for advancement.”¹¹ With new technology, the presence of online social networks is becoming more and more commonplace and some people may exist primarily online. Social media has put society in a place where people really don’t need to go out and speak to each other in person in order to communicate, but part of social well-being involves in-person human connection.

A study done by the University of Chicago has shown that extreme loneliness increases chances of premature death by 14%, and while this percentage seems small, this is a very preventable statistic. Social health does not mean having a lot of relationships with different people, but it means that a person can make meaningful relationships.¹²

¹⁰ Evans 2003, 544

¹¹ USIP n.d.

¹² (Hawkey and Cacioppo 2010)

The problem here is that different people face different struggles when trying to make and maintain meaningful relationships. Understanding what these struggles are, and what resources are needed to encourage in-person social interaction is important when designing spaces that people will find themselves spending most of their time in, such as the workplace.

Social well-being is impacted by the built environment by providing spaces that encourage social interaction as well as compactness of communities. Kostas Mouratidis states that “compact urban forms enable residents to maintain larger networks of close relationships, socialize more frequently with friends and family, receive stronger social support, and enjoy increased opportunities to make new acquaintances.”¹³ This aligns with Jane Jacobs “eyes on the street” concept which states that keeping eyes on the streets and sidewalks enables a community to feel closer and interact with each other simply by passing each other by during a walk.¹⁴

1.1.3 Physical

Physical well-being is the dimension that most people immediately think of when they hear the term well-being. This is also the dimension that is most easily quantified and most easily understood. The CDC states that physical well-being is simply “feeling very healthy and full of energy”.¹⁵ Most of physical well-being involves physical fitness, but nutrition also plays a role.

¹³ Mouratidis 2018, 1

¹⁴ Jacobs 1961

¹⁵ Center for Disease Control and Prevention 2018

Physical well-being is affected by lifestyle choices including exercise, diet, sleeping habits, etc. and is a way to ensure one avoids preventable diseases and conditions. Physical well-being is often a result of a person's individual decisions, but the built environment can play a role in encouraging specific behaviors that may result in positive physical well-being.

The built environment can impact physical well-being first by its walkability. The more walkable an urban area is, the more likely people are to stay out of cars and walk instead. More specifically, Michele J. Josey and Spencer Moore state access to physical fitness facilities also lowers physical inactivity, however not in socially isolated adults.¹⁶ This is important to note, as it emphasizes how important it is to take a holistic approach to well-being.

1.1.4 Economic

Economic well-being is one dimension of well-being that is often overlooked. It is defined as "having present and future financial security."¹⁷ Economic well-being is not simply the amount of money a person has, but is rather of measure of whether or not a person has the resources needed to fulfill the basic human needs such as food, housing, health care, transportation, etc.

Economic well-being includes not only having the resources to meet these basic human needs but also having the resources to build financial knowledge and skills. Some ways a person can be in a state of economic well-being are

¹⁶ Josey and Moore 2018

¹⁷ Center for Disease Control and Prevention 2018

secure employment, an affordable cost of living, access to affordable food and access to affordable healthcare. While some of these are difficult or impossible to help from a design perspective, there are still certain ways the built environment can help provide resources that allow people and communities to be in a state of economic well-being.

The impact that the built environment has on economic well-being is primarily in the realm of social equity. When someone moves throughout a city, drastic differences in the built environment can be seen in different neighborhoods. Certain neighborhoods and communities may have access to certain amenities and resources that others may not, therefore it is important for development to occur that allows all communities to have equal access to the same resources.

CHAPTER 2

CURRENT STANDARDS

2.1 WELL Building and Community Standard

The WELL Building Standard has been around since 2014 and is “a standard for buildings, interior spaces, and communities seeking to implement, validate, and measure features that support and advance human health and wellness.”¹⁸ This set of standards was developed through scientific and medical research on environmental health, human behavior, health outcomes, as well as risk factors among certain demographics. WELL Certification is administered through Green Business Certification Inc., the credentialing body that also handles LEED Certification.

To address wellness at a district or neighborhood scale, WELL introduced the WELL Community Standard, a 150-page document that provides a framework for designing a district that promotes well-being for the community it serves. The WELL Community standard consists of ten concepts: air, water, nourishment, light, movement, thermal comfort, sound, materials, mind and community. Each concept consists of features totaling to 110 features, and these features result in over 200 parts. These parts result in over 700 requirements that a community should meet in order to be granted WELL Certification. Some features are listed as preconditions, and some are optimizations. Features that are listed as preconditions must be met to achieve any certification.

¹⁸ IWBI n.d.

1. **AIR:** ambient air quality; strategies to reduce traffic pollution; strategies to reduce exposure to pollution.
2. **WATER:** drinking water quality; public water sanitation; facilities provisions; strategies for managing contaminated water on a systems scale; strategies to promote drinking water access.
3. **NOURISHMENT:** fruit and vegetable access, availability and affordability; policies to reduce the availability of processed foods; nutritional information and nutrition education; food advertising and promotion; food security; food safety; strategies to support breastfeeding.
4. **LIGHT:** maintained illuminance levels for roads and walkways; strategies for limiting light pollution and light trespass; glare and discomfort avoidance.
5. **MOVEMENT:** environmental design and operational strategies to reduce the risk of transportation-related injuries; mixed land use and connectivity; walkability; cyclist infrastructure; infrastructure to encourage active transportation; strategies to promote daily physical activity and exercise.
6. **THERMAL COMFORT:** strategies to reduce heat island effect; policies to deal with extreme temperatures; policies to manage sun exposure and ultraviolet risk.
7. **SOUND:** noise exposure assessment; planning for acoustics; techniques to reduce sound propagation; hearing health education.
8. **MATERIALS:** strategies to reduce exposure to hazardous chemical substances in cases of uncontrolled/accidental release and contaminated sites; strategies to limit use of hazardous chemicals in landscaping and outdoor structures.
9. **MIND:** access to mental health care, substance abuse and addiction services; access to green spaces.
10. **COMMUNITY:** health impact assessments; policies that address the social determinants of health; health promotion programming; policies that foster social cohesion, community identity and empowerment; crime prevention through environmental design; policies and planning for community disaster and emergency preparedness.

Figure 2: WELL Concepts (WELL Community Standard, 2017, International WELL Building Institute)

The type of certification awarded; Silver, Gold or Platinum, is based on how many optimizations are present in the project. There are 10 preconditions and 100 optimizations. Each optimization is worth 1 point, while 10 points can be awarded for Innovation.

An example of this, within the “Nourishment” concept, states a precondition of “Supermarket Access” which states that a produce market must be within .5 miles walking distance from the site of development, or one must be included as part of this development. An optimization that supports this precondition would be “Healthy Food Procurement” which states the importance of healthy concessions and prepared food vendors within proximity of the site.

Up to 30 points can be added for communities with buildings that also become LEED Certified. This gives extra incentive for individual buildings within a community to also be sustainable. 50 points are awarded silver, 60 points are awarded gold, and 80 points are awarded platinum. For a project to be considered in the community scale, it must meet at least two of these requirements:¹⁹

- Planned daytime or nighttime population of 500 people or more
- Planned total floor area of 50,000 sqm (538,000 sqft) or more
- Planned total building count of 10 or more
- Total land area of two hectare (five acres) or more

¹⁹ IWBI n.d.

And also meet at least two of these requirements²⁰ :

- Multifamily residential
- Office and/or retail
- Public use recreation or leisure accessible from dawn to dusk

2.2 Fitwel

Fitwel is another building and community standard and certification in place to address well-being, this being administered by the Centers for Disease Control and Prevention. The Center for Active Design is responsible for the third-party certification. Fitwel organizes its strategies into 12 sections:

1. Location
2. Building Access
3. Outdoor Spaces
4. Entrances and Ground Floor
5. Stairwells
6. Indoor Environment
7. Dwellings
8. Shared Spaces
9. Water Supply
10. Prepared Food Areas
11. Snack Bars
12. Emergency Preparedness

²⁰ IWBI n.d.

Fitwel also operates on a point-based system, much like the WELL Standards. In this case, 90-104 points receives one Fitwel star, 105-124 points receives two stars, and 125-144 points receives three stars. Fitwel states:

“The Fitwel Scorecards include 55+ evidence-based design and operational strategies that enhance buildings by addressing a broad range of health behaviors and risks. Each strategy is associated with unique point allocations, based on the strength of associated evidence and the demonstrated impact on occupant health.”²¹

This same scorecard is applied to each building type that is acknowledged by Fitwel and those include retail, community, workplace, and residential. Fitwel is largely recognized as a less expensive, less stringent alternative to WELL. Fitwel does not require a building to meet specific prerequisites to become certified like WELL does, so it is an attractive option for many developers and building owners.

2.3 Critique

While both the WELL Standards as well as Fitwel are proof that the building industry is making an effort to increase the awareness of the built environment’s impact on well-being, there are still a few concerns and issues that can be seen with this type of approach.

The first major issue is how generalized these standards are in practice. Both standards can be looked at as a checklist of spaces to include and strategies to utilize within their building, however every building type and every

²¹ Fitwel n.d.

site location could require vastly different approaches. For example, both standards offer large amounts of points for including some form of fitness center within the building. Sometimes, if the inhabitants have no other option for physical fitness, this could drastically improve well-being. However, if there is an affordable or public fitness facility within proximity to the site, then including a fitness center in the project would be a waste of not only resources but also a waste of space that could be utilized to address something that the inhabitants actually need. This type of situation is where looking into Resources vs Challenges of a site is very important, however a developer or an architect spending money to achieve WELL or Fitwel certifications may see the inclusion of fitness space as an easy way to earn major points.

The second potential issue with these standards is simply the cost. In order to become WELL or Fitwel certified, the owner must pay both a registration fee as well as a certification fee. WELL could be up to a \$12,000 dollar registration fee and a \$25,000 certification fee. While in the scale of some projects this may not be a large chunk of the budget, that is still \$35,000 that could've been saved and put back into providing spaces that the community or inhabitants need in order to balance their well-being.

In conclusion, while both standards provide effective, science-based strategies that can address well-being, it is very easy to lose sight of who these buildings serve, and that is the inhabitants. The generalized nature of these standards makes it difficult for them to be equally effective when applied to different sites in with different socioeconomic conditions. This stresses the

important role that designers and developers have when utilizing these standards. Instead of just using cost as the basis to determine which features to include, developers and architects should first closely evaluate which wellness supporting features and strategies are most needed in a particular community and use that as the basis for design.

CHAPTER 3

CASE STUDIES

3.1 Cambridge Crossing

Architect: CBT Architects

Location: Cambridge, Massachusetts

Type: Large Scale Community

Size: 43 Acres



Figure 3: Cambridge Crossing Master Plan (Rendering, CBT Architects, <https://www.cbtarchitects.com/project/cambridge-crossing-master-plan>)

Cambridge Crossing is a 43-acre development located in Cambridge,

Massachusetts that is aiming to drive the growing fields of STEM in the city of



Figure 4 Cambridge Crossing Perspectives (Renderings, CBT Architects, <https://www.cbtarchitects.com/project/cambridge-crossing-master-plan>)

Boston. It is targeting both WELL Community and LEED SITES certification and trying to have all buildings LEED certified as well. CBT Architects state that their major focus on well-being is shown in the types of spaces they decided to incorporate into the site. These spaces include ten acres of public green space, water features, athletic fields, basketball courts, as well as spaces designated for outdoor events. Furthermore, the design of this project focused on integrating alternative means of transportation by creating infrastructure that supports walking, cycling, as well as the use of public transportation. This project acts as a connector between two existing pedestrian pathways and links Bedford all the way to the Charles River. The man-made water features within the site also reference the proximity to the Charles River. There are safe, pedestrian walkways separated from the street that provide direct access to MBTA stops on both the Green Line and the Orange Line.²²

This project is successful in addressing well-being not only because it is attempting to become WELL Certified but also because of how well it addresses the specific needs of the site. A major aspect of this project that helps address well-being is the inclusion of ten acres of green space. These ten acres easily could have been developed into more leasable space to increase the profits for the developer. However, these this green space creates urban oasis that helps address almost all aspects of well-being: physical by giving space that allows for physical activity as well as mitigating urban heat island effect, social by giving

²² CBT n.d.

space for people to interact with one another, and mental by providing proximity to nature.

3.2 Lot Fourteen

Architect: Woods Bagot

Location: Adelaide, South Australia

Type: Large Scale Community

Size: 17 Acres

Lot Fourteen is a 17-acre project located in Adelaide, South Australia. It is the revitalization of a former hospital campus intended to catalyze the city of Adelaide's economy and create a start-up hub of approximately 650 workspaces and offices. The architects and planners, Woods Bagot, were focused on not only addressing the well-being of the people who would be working within the campus but also the well-being of the people within the surrounding city. They referred to this concept as Grand vs. Fine Grain; The grand scale includes how the development affects the greater context of the city and the fine grain includes how the development affects the people within the development itself. ²³

To address the greater context of the city, the development includes cultural attractors and destinations such as the National Aboriginal Art and Culture Gallery and a Contemporary Art Space. This gives a space for the community to come socialize and network with each other, thus supporting social well-being.

²³ Renewal South Australia n.d.



Figure 5: Lot Fourteen Master Plan (Rendering, Renewal South Australia, <https://renewalsa.sa.gov.au/projects/lot-fourteen/>)

To address the well-being of the people situated directly on the site, a major decision was made to bring the adjacent, previously disconnect, Adelaide Botanical Garden into the site to provide direct access to green space from all buildings that are part of the development and to create a gradual transition between the urban and the natural environments. Both major design decisions, along with improvements in pedestrian circulation, are shown in the image on the following page. (Renewal South Australia n.d.)



Figure 6: Lot Fourteen Diagrams (Lot Fourteen Master Plan, Renewal South Australia, <https://renewalsa.sa.gov.au/projects/lot-fourteen/>)

3.3 Heart of the City

Architect: Valode and Pistre

Location: Issy, France

Type: Small Scale Community

Size: 7 Acres



Figure 7: Issy Master Plan (Rendering, Valode & Pistre, <https://www.issy-coeurdeville.com/artistes.php>)

Heart of the city, a seven-acre mixed-use residential development located in Issy, France aims to achieve WELL Certification. While urbanization can have a positive impact on well-being, the negative aspects such as lack of green space, building scale, and urban heat island effect are also well known. The architects of this project, Valode and Pistre, take an approach that exemplifies how a space can both support rapid urbanization while simultaneously mitigating some of the associated negative effects.²⁴

To maximize the green space on the site, the architects designed a central courtyard to create a “green flow” throughout the site. The central courtyard

²⁴ Valode and Pistre n.d.

occupies three acres and has access from all corners of the site, creating a true pedestrian district that is both visually separate from the urban environment but at the same time easily accessible from the surrounding community.

To ensure this central courtyard and pedestrian district remains at a pedestrian scale, the architects used an interesting strategy when designing the residential buildings on the site. Lining the first floor with storefronts, every floor above this was stepped backwards. This makes sure to utilize available vertical space without creating an environment that feels overwhelmingly tall from a human perspective. As a result, this development feels much more like a low-rise neighborhood while still being very urban, as seen in the perspective views above.

3.4 JLL Shanghai Office

Architect: iDA Workplace and Strategy

Location: Shanghai, China

Type: Office Building

Size: 49,514 square feet

JLL Shanghai Office is a roughly 50,000 square foot office building located in Shanghai, China. This is a WELL Platinum building, but its true strengths include both the design process as well as its creative use of space. First, the designers made sure to include the employees of the company in the design process. After all, they would be the ones directly affected. Each department had the opportunity to elect a representative that was responsible for brainstorming ideas, visiting site locations, voting on design concepts, etc. to ensure that the

well-being concerns of the employees were directly addressed. Throughout the entire project, these representatives would stay in constant communication with the design team as well as with the employees so that they could track progress, make decisions, and get feedback. This resulted in a workplace that addressed specific concerns from the employees and included specific spaces desired by the employees. ²⁵



Figure 8: JLL Shanghai Photos (Photography Kevin Wu, Mooten Studio, iDA Workplace + Strategy)

One specific concern that employees had was that they didn't feel as though there was enough social interaction within the office, particularly between different departments. The issue with traditional office layouts is that people often don't socialize with anyone outside of their department since offices are typically organized in a way that keeps them separate. To address this concern with social well-being, the designers opted for an open office layout that includes

²⁵ iDA Workplace and Strategy 2018

various workspaces such as private cubicles, open desk space, café workspace, and collaborative workspaces. This gives the employees the choice of where they want to work each day and allows them to interact with people that were previously separated into a different area of the office. Some of these workspaces included standing desks to also address physical well-being by preventing prolonged sitting.²⁶

Another interesting space included in this design is the “15-minute room” which is where office team meetings are held. The trick is that the lights in this room turn themselves off after 15 minutes of occupation. Employees stated that typical office meetings were often not an efficient use of time and were often mentally draining because they dragged on longer than they should. The “15-minute room” was the solution to this, encouraging meeting efficiency and reducing the mental strain and prolonged sitting caused by meetings that drag on longer than they should.

3.5 Bow Market Square

Architect: Boyes-Watson & Winny Architects

Location: Somerville, Massachusetts

Type: Mixed-Use Building

Size: 30,000 square feet

²⁶ WELL Building Press Team 2018



Figure 9: Bow Market Square (Photo, Bow Market Square, <https://www.bowmarketsomerville.com/>)

Bow Market Square is an approximately 30,000 square foot adaptive reuse project located in Somerville, Massachusetts that has been a significant driver of social and economic well-being for the community since it opened in Spring 2018. Developer and Architect Matthew Boyes-Watson took this former carport and adapted it to become over 30 storefronts.²⁷ Because of the small format of the storage spaces, approximately 170 square feet each, there was a unique opportunity for over 30 local, small businesses, from brewers and makers to chefs and artists. These merchants, who may have operated food trucks or primarily operated online due to the high costs of storefronts in the Greater Boston area now had the opportunity to become part of the community with a brick and mortar store, allowing the people of Somerville to keep their money recirculating within their own community instead of spending it at larger, more

²⁷ Cain 2017

corporate companies. Part of economic well-being within a community is the ability to put money back into the community and providing affordable store fronts is a critical step to support this.

Not only did Bow Market Square improve the economic well-being of the community in Somerville, but it also improved the social well-being. The courtyard in the center of the development is fully open to the public, and this encourages people to come and sit and interact with each other without the pressure of having to purchase anything. This courtyard is also home to many free shows highlighting local talents within music and the arts, again giving the community a free place to go to have a good time and build a larger social network.

One of the major problems with encouraging social interaction is that oftentimes social events cost large amounts of money and therefore excludes certain people that may not be able to afford attending. Holding free events like Bow Market Square does not only solve this problem but does so in a way that gives an opportunity for local artists and musicians to showcase their talents. This project did not purposefully aim to improve the well-being of the community, but it ended up doing so anyways due to its community involvement and economic analysis of the surrounding areas.

CHAPTER 4

SITE INVESTIGATION: CITY OF PROVIDENCE

4.1 History

Providence, Rhode Island is emblematic of the many secondary and tertiary post-industrial cities within the Northeast that are figuring out how to best accommodate increasing urban populations. Like other smaller cities in the region, Providence is gaining in popularity as people begin to be priced out of larger metro areas such as Boston and New York city. There is a natural migration out to smaller, more affordable metro areas such as Providence, Hartford, and Worcester. As such, Providence is a compelling test case for exploring how to support well-being within an urban context

At its heyday, Providence was a center of the Industrial Revolution in the United States and one of the wealthiest cities in the Northeast. Along with many other cities, its economy suffered significantly as manufacturing jobs moved to the south and overseas. Wealthier citizens relocated the suburbs and by the 1970's, the downtown experience significant crime, poverty, and lack of public or private investment.

The 1970's brought upgraded infrastructure to the neighborhoods within the city, specifically downtown and the commercial districts. The 1990's then brought more development beginning with the relocation of the Woonasquatucket and Moshassuck Rivers. This made space for Waterplace Park as well as the Woonasquatucket River Greenway which are to this day two of the better public spaces in the city.

The city has been on a gradual upswing with new developments going on in various parts of the city. These new developments are hoping to better connect the city through bringing higher paying employment, more public space, and a more pedestrian friendly environment to the city.

4.2 Development

There are two major developments currently occurring in Providence; The first is the I-195 District – also known as the Innovation District – and encourages construction of development specifically supporting technology and health sciences buildings. Due to the nature of this development, it's more targeted at attracting new people to move to the city instead of providing space for the existing communities.²⁸



Figure 10: 195 Parcels (Map, 195 commission, <https://www.195district.com/about/district-land/>)

²⁸ 195 Commission 2020

The second major development, which is more targeted at supporting the existing communities already in Providence is the revitalization of the Woonasquatucket River Corridor between the Woonasquatucket River Greenway and Providence Place Mall.

This district was once the manufacturing core of the city and a major driver of the economy in the city. However, with the exodus of manufacturing jobs and decline of industry, it is now littered with both vacant and underdeveloped industrial buildings. Despite this, it is also home to a growing community of artists, makers, and smaller manufacturers. The Riverfront Revitalization plan is a 20-year plan put in place by Mayor Jorge Elorza and hopes to support existing local businesses as well as to bring more opportunities to the thriving arts and food scene in the area.²⁹



Figure 11: Woonasquatucket Corridor (Map, City of Providence, <https://www.providenceri.gov/planning/woonasquatucket/>)

²⁹ City of Providence 2018

While the 195 District hopes to be an Innovation District that brings new markets and new industry to the city, the Riverfront Revitalization hopes to be an innovation district that supports the markets already existing in the city. The city hopes to develop this area analogous to the way that the city of San Antonio developed their own riverfront neighborhoods into a thriving community of small businesses and locally owned restaurants by creating walkable corridors and developing a real sense of place. Towards this end, the Woonasquatucket Vision Plan lays out a series of strategies and ideas for development.

CHAPTER 5

SELECTED SITE: NARRAGANSETT BAY COMMISSION SITE

This thesis will focus on a specific site – the so-called Narragansett Bay Commission Site - within the Riverfront Revitalization corridor. A major concern of well-being is ensuring that the concerns of the affected community are incorporated within the planning and design process. As part of the Woonasquatucket Vision Plan there is ample documentation of community feedback and priorities for potential development.



Figure 12: Site Birdeye (Author)

5.1 Summary

The Narragansett Bay Commission Site is listed as a catalyst site in the Vision Plan for the Woonasquatucket Riverfront Revitalization project. This site has a total of roughly 4.3 acres and would be a combination of new construction as well as adaptive reuse. This site calls for no residential, but instead development geared towards commercial use. The existing buildings on the site originally served as the Governor Dyer Public Marketplace, which was once a local produce market for the city. Focusing on the former use of a public market,

the Vision Plan calls for this site to include a similar marketplace as part of the redevelopment. The Vision Plan also states that this site is an important green connection due to its potential as a green corridor between Davis Park to the north of the site and the new pedestrian waterfront to the south of the site.

5.2 General Program

The Riverfront Revitalization general goal is to provide spaces that support and improve the current surrounding communities. This makes public space and commercial space the top priority. An excerpt about the Narragansett Bay Commission Site from the Vision Plan states:

“The site is well-positioned to help accomplish several community priorities, including preserving and creating affordable space to anchor the Woonasquatucket Corridor as a place for creative, manufacturing, and food uses to flourish. Care should be taken with any redevelopment of this site to celebrate and build from its heritage as a public market.

Redevelopment of this site should also further connect the River to surrounding neighborhoods. A greenway connection can be made coming down the hill from Davis Park through the Narragansett Bay Commission block and connect directly to the Woonasquatucket River Greenway.”³⁰

Based on this excerpt, initial, general programming for the site includes:

- Public Plaza/ Marketplace
- Affordable storefronts to support local businesses
- Green space/ public park connection to the riverfront

³⁰ City of Providence 2018, 135

- Makerspace/ craftsperson space/ art studio space
- Space to showcase and sell local food
- Miscellaneous commercial space
- Outdoor space shared with adjacent Paul Cuffee School
- Locations for public art

5.3 Site Context

The first step in thinking about how to address the well-being of the surrounding communities of the site through a design project would be to assess how the site fits into the context of both the city of Providence as a whole as well as the surrounding neighborhoods around the site. This section will start to explore this through a series of mappings done at various scales.

5.3.1 City Scale

To understand how the site fits into the greater context of the city of Providence, the main things to understand are pedestrian paths, public transit routes, and access to support spaces along these routes. With the rise of urban population, without public transit infrastructure it could be very easy for a city to develop a problem with automobile congestion such as the problem seen in cities like Los Angeles. Therefore, stressing the importance of public transit servicing the community plays a major role in inhabitants well-being. The map on the following page shows the network of bike paths and the network of public transit in the city, along with the support spaces that can be found along these paths.



Figure 13: City Scale Mapping (Author)

Red denotes the site and the purple shape represents a 15-minute walking radius around the site. The green lines represent current bus routes within the city and the yellow, orange, and blue lines represent the network of bike paths in the city. Orange maps the existing urban trails, blue maps the proposed and funded urban trails and yellow maps the proposed and unfunded urban trails.

The important thing to take from this map is the lack of existing bus routes servicing the Woonasquatucket River Corridor, as well as the fact that most support spaces within the city would need to be accessed via public transit because most are outside of the 15 minute walking radius. Not only are they outside of the 15-minute walking radius, the walking routes within the 15-minute radius are not extremely pedestrian friendly.

5.3.2 Neighborhood Scale

At the neighborhood scale, it's critical to determine what support spaces presently exist in the area and improve the pedestrian network surrounding the site. This ultimately led to making a connection between different spaces that provide the surrounding communities with food access, including Gotham Greens and Farm Fresh Rhode Island.

Gotham Greens is a 100,000 square foot hydroponic farming facility providing pesticide, herbicide, and bacteria free vegetables that are sold in grocery stores and restaurants across the region, including Farm Fresh Rhode Island. Farm Fresh Rhode Island is the future home of the Farm Fresh RI Food Hub, a Non-Profit organization that holds a year-round indoor farmers market. It is expected to open Fall 2020 and will provide the community with access to fresh, local food. It is also expected to provide the area with roughly 150 jobs.

Gotham Greens and Farm Fresh RI provide support spaces where food is grown and where food is sold, respectively. This presents an opportunity for a support space within the Woonasquatucket Valley where food is prepared and served. This will be a major programmatic element of the development on the Narragansett Bay Commission Site.

The next step in addressing the surrounding neighborhood would be to improve the pedestrian circulation around the site, ultimately improving access from both the neighborhood communities in the North and the South of the site. A few strategies can be used in order to do this. The first is to rehabilitate former railroad bridges to the southwest of the site to create new pedestrian bridges

over the river. The second is to open up a historical pathway coming from Davis Park, North of the site, providing a gateway from the Smith Hill and Valley neighborhoods into the Woonasquatucket River Greenway. The third step is to integrate the site with an autonomous vehicle pilot program that runs East-West throughout the corridor. These strategies are mapped below:

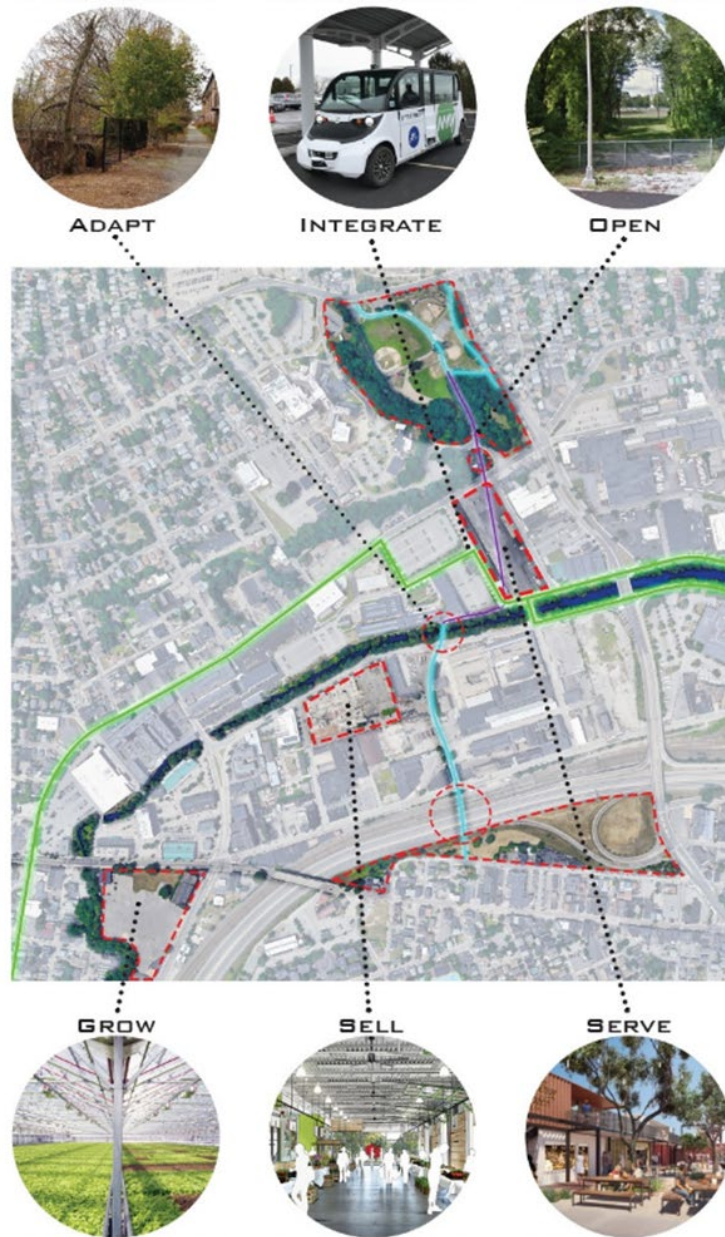


Figure 14: Neighborhood Scale Analysis (Author)

5.3.3 Site Scale and Resources vs. Challenges Assessment

When addressing the site itself, a resources vs challenges method is used to determine strategies to address the site as well as specific programmatic elements to be included on site. Assessing current resources in the neighborhood, as mentioned previously, there is a theme of food access. There are spaces for growing food and spaces for selling food. This creates opportunity to support these resources and further promote local food access by creating a space on site to prepare and serve food.

A challenge in the neighborhood is a lack of access to coworking spaces, which have been shown to help small business owners and entrepreneurs further their economic well-being. There are many co-working spaces in downtown Providence, but not in the Woonasquatucket corridor. Further challenges include a lack of public recreation center to support physical well-being. Providing a space for this on site would create another opportunity for physical fitness alongside the Woonasquatucket River Greenway.

A resources vs. challenges assessment was also used to assess how the site would fit into the neighborhood as a whole, primarily focusing on pedestrian networks and utilizing the site to further enhance networks and connections throughout the area. A challenge is that the neighborhood does not have very pedestrian friendly streets, so providing off street pathways connecting major resources in the area would increase the accessibility of these resources for the surrounding communities. An example of this is providing an off-street pathway from the Smith and Valley neighborhoods all the way to the Farm Fresh Rhode

Island facility to give those residents easy access to local and fresh groceries. These resources and challenges were used to develop the following strategies for site design and interventions.

The first strategy is to continue improving the pedestrian network. With the rehabilitated pedestrian bridge to the southwest – and the new open gateway coming from Davis Park in the North – there is a perfect opportunity to connect these two pedestrian extensions completely through the site in order to create a continuous pedestrian corridor connecting the communities in the North to the communities in the South.

Alongside this pedestrian corridor, a second strategy is to daylight a stream that currently runs underneath the site and outlets through a culvert to the main river. Daylighting the stream supports well-being by creating a green corridor of that connects a series of outdoor green spaces and enhances biodiversity within the neighborhood.

Specific programming for the site is based upon a combination of analyzing the surrounding support spaces and the Woonasquatucket River Vision Plan. Program includes art studios, maker spaces, performance space, an outdoor recreation area, boathouse, and kayak launch. This program and general site strategies are mapped on the following page along with some sketches that show possible ways to organize the site.



Figure 15: Site Scale Analysis (Author)

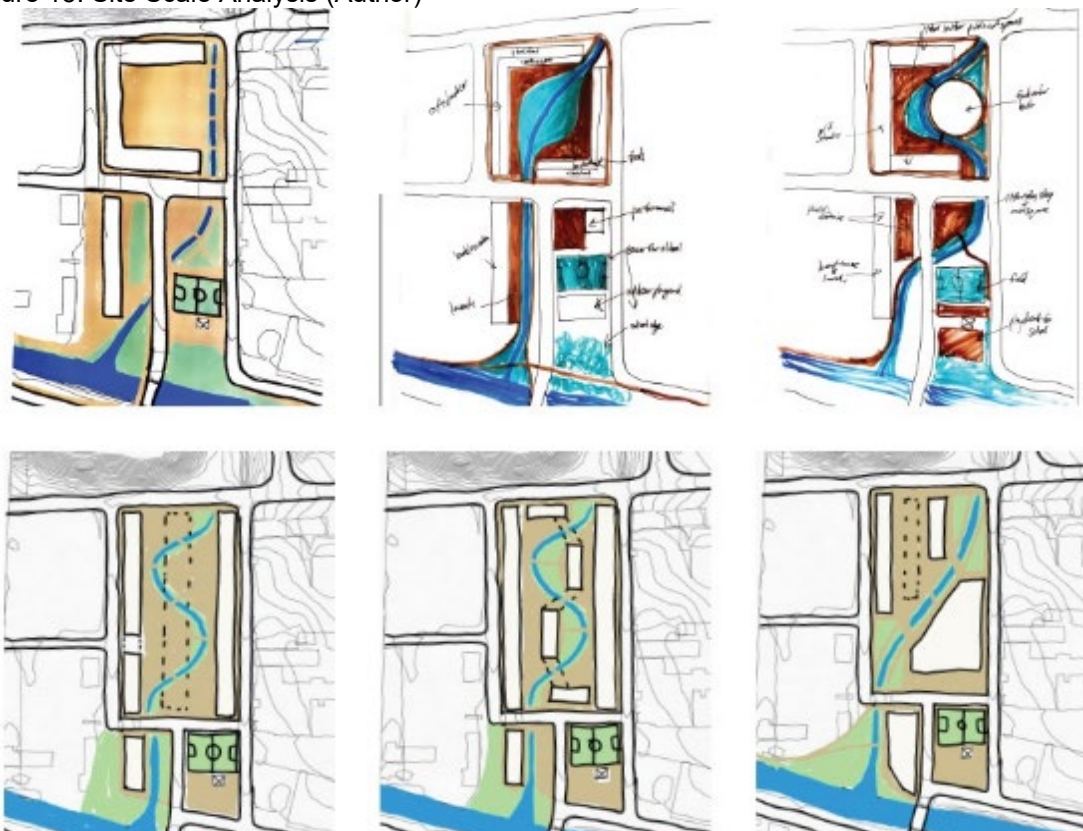


Figure 16: Site Sketches (Author)

CHAPTER 6

DESIGN PROJECT

6.1 Site Design

The master plan of the site was created through programming based on the community feedback provided by the Woonasquatucket Vision Plan as well as by the resources vs challenges assessment. As a general site design strategy, the buildings will provide a perimeter along the hard edge of the streets binding the site, while the spaces in the center of the site create a green corridor of public space to provide access to the stream. The buildings are then divided according to main circulation points and programmed to create three different zones on site. One zone for art and public space, one zone for food access and coworking, and one zone for recreation. The plan development is outlined in the sequence of diagrams below, starting the site and existing building massing:

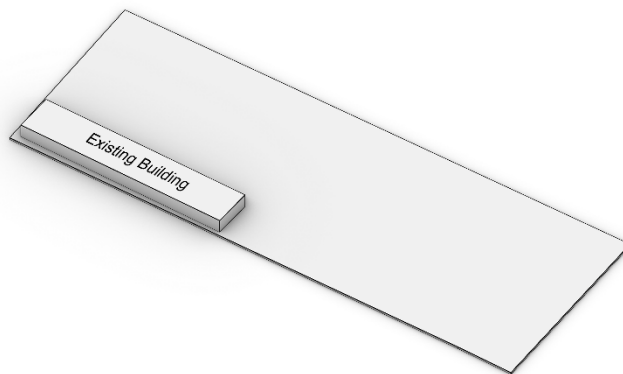


Figure 17: Site Diagram 1 (Author)

The first step in designing the site is to daylight the stream to create a green corridor through the site connecting Davis Park to the North to the Woonasquatucket River to the South. This will address the challenge of walkability by providing a walkable, off-street corridor as a resource. This stream will also become a resource for mental well-being, as biodiversity has been shown to have a positive impact on our mental health in urban environments.³¹

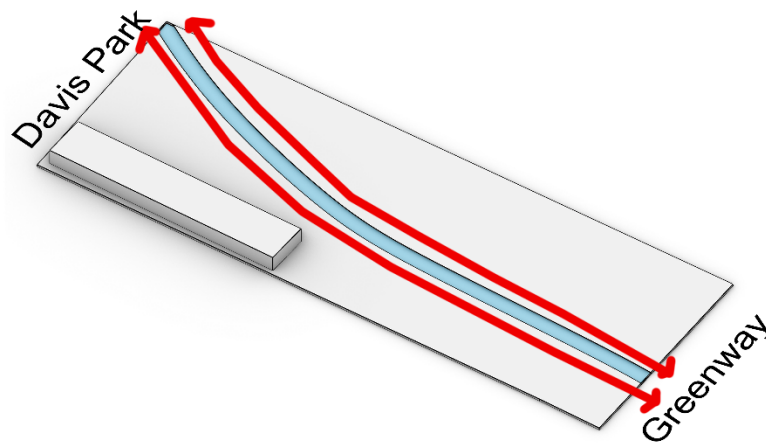


Figure 18: Site Diagram 2 (Author)

The second step in designing the site is to utilize the main pedestrian route coming from the commercial/residential corridor to the West of the site. This route will enter the site directly alongside the existing building on site and will frame the “art zone” of the site. This zone will include programmatic elements including art studios and makerspaces inside the existing building, a shared public gallery space, an open square, as well as an outdoor amphitheater to host public performance events. These programmatic elements will address economic

³¹ (Taylor and Hochuli 2006)

well-being by providing space for local artists and artisans to work as well as sell. Social well-being will also be addressed through the inclusion of public art and performance space, giving the community a place where they can go and socialize.

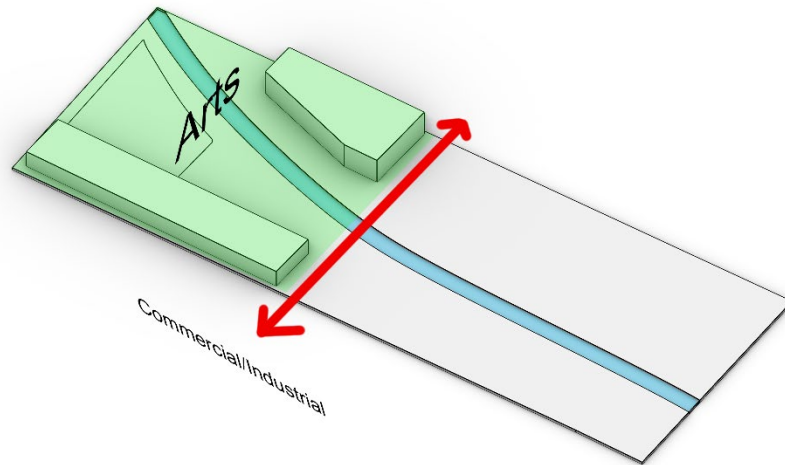


Figure 19: Site Diagram 3 (Author)

The next step is to utilize the pedestrian path connecting the parking lot to the West to the Paul Cuffee School to the East. This will frame the zone that will be used for the food spaces and workspaces – the food hall and coworking space and the food production space. The food hall and support food production spaces will further provide local food resources to the neighborhood. The coworking space and food hall will also help with the economic well-being of the community by giving small businesses the opportunity to work as well as by giving local chefs the opportunity to start managing a small-scale restaurant. This will ultimately help keep the money circulating within the community.

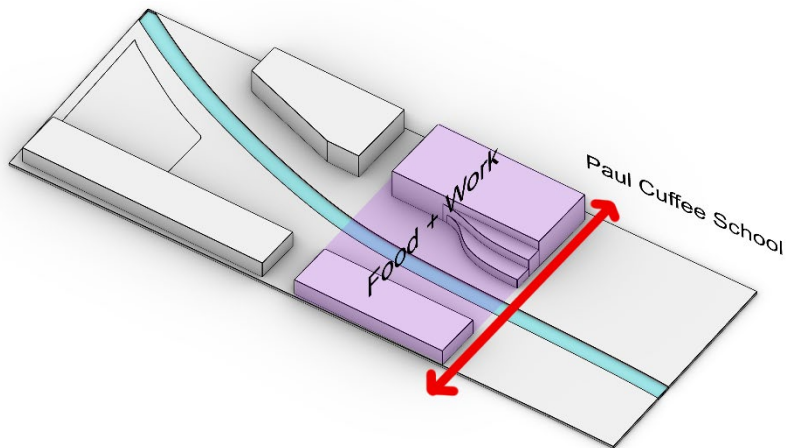


Figure 20: Site Diagram 4 (Author)

The final step in the site design ties it into the Woonasquatucket River Greenway, creating a recreation zone right alongside the riverfront. This will primarily focus on physical well-being, including a soccer field to support the Paul Cuffee School, a recreation center for the public, and a boat launch alongside the river provide the community with access to the waterfront.

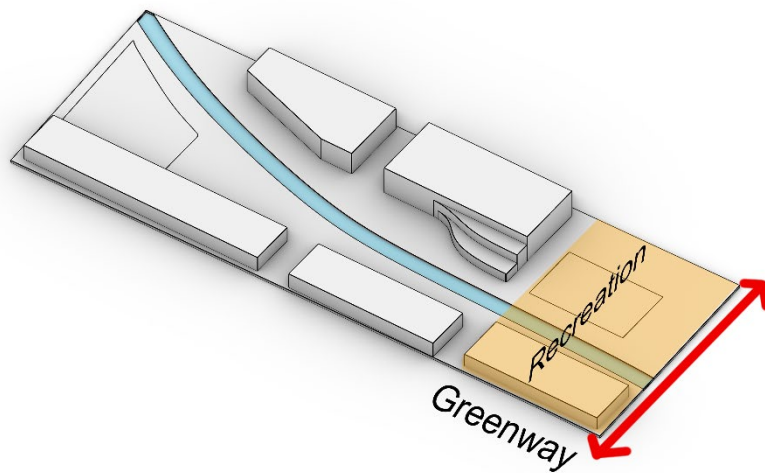


Figure 21: Site Diagram 5 (Author)

Below is the final site plan with program labelled:

1. Artist Studios/Makerspaces
2. Gallery/Indoor performance
3. Open Square
4. Outdoor Amphitheatre
5. Food Production
6. Food Hall/Coworking space
7. Recreation Center
8. Boat Launch
9. Soccer Field/Play
10. Parking
11. Little Roady Stop

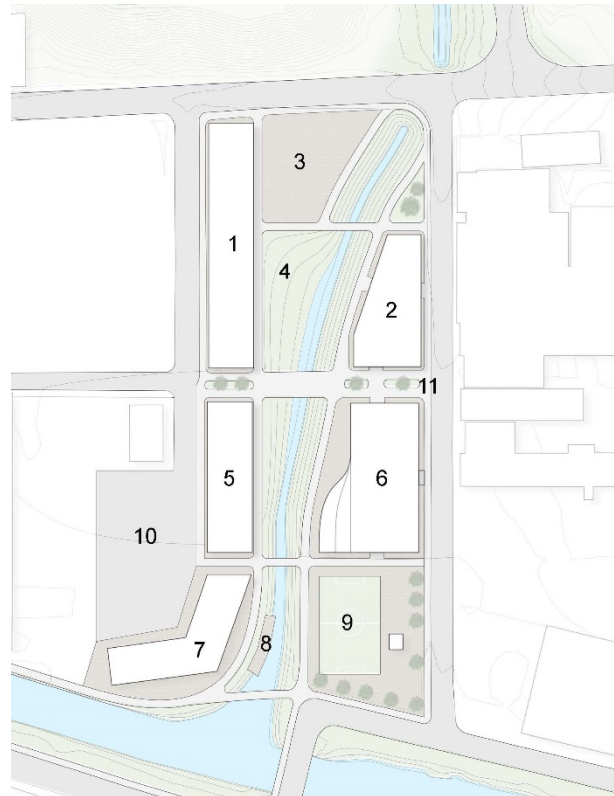


Figure 22: Site Plan (Author)

6.2 Schematic Design

The main building design intends to address two of the resources that the neighborhood would benefit from in terms of economic, social, and mental well-being. These resources include the food hall and the coworking space.

Taking a similar approach with the site design, more private, enclosed spaces are oriented toward the hard edge of the street while more open, public spaces are oriented toward the natural edge of the daylight stream. Private, enclosed spaces include the vendor stalls, café, brewpub, and enclosed

coworking offices. Open, public spaces include seating for the food stalls, café and brew pub, and open coworking spaces.

The next step in the design was to take the south west corner of the building and pull it out to engage the stream, emphasizing the connection between the interior spaces and the view out to the stream. A set of terraces are then placed on this southwest corner to provide every level with an outdoor space, providing views to both the stream on site, the Woonasquatucket River, and the industrial corridor.

Materials were then chosen, utilizing a glass fiber reinforced concrete façade for the more private spaces and a weathered steel cladding alternating with glazing for the more public spaces. These materials reference the industrial past, while providing views and daylight where necessary. The following sequence of diagrams outlines the design process for the building form.



Figure 23: Building diagram 1 (Author)



Figure 24: Building diagram 2 (Author)



Figure 25: Building diagram 3 (Author)

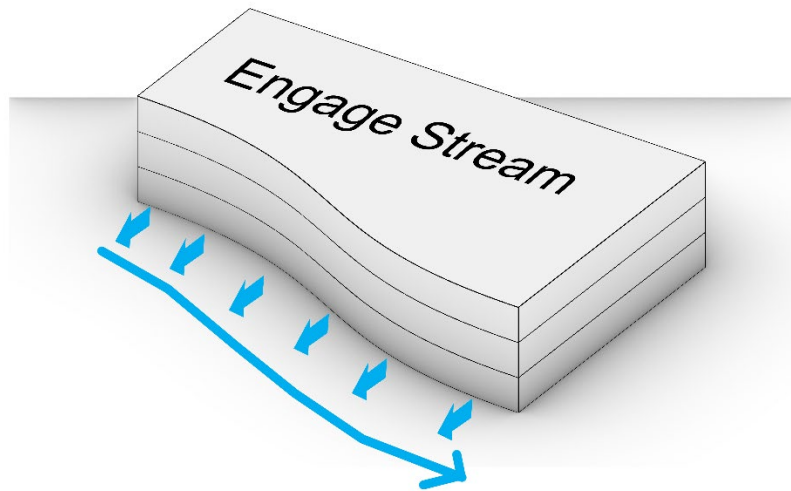


Figure 26: Building diagram 4 (Author)

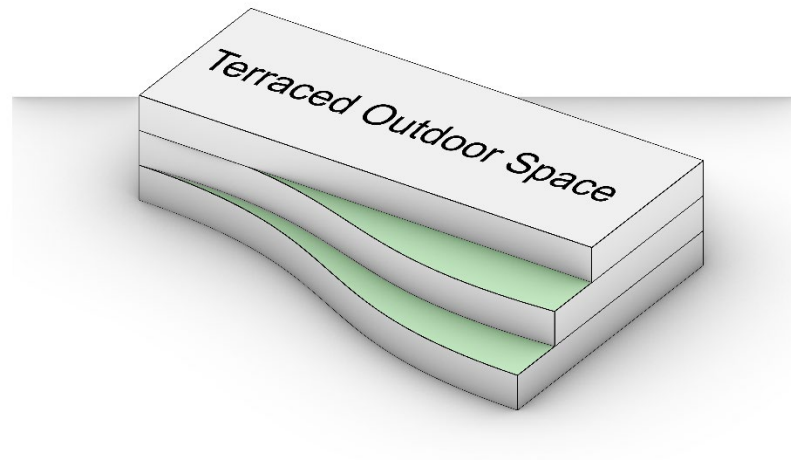


Figure 27: Building diagram 5 (Author)

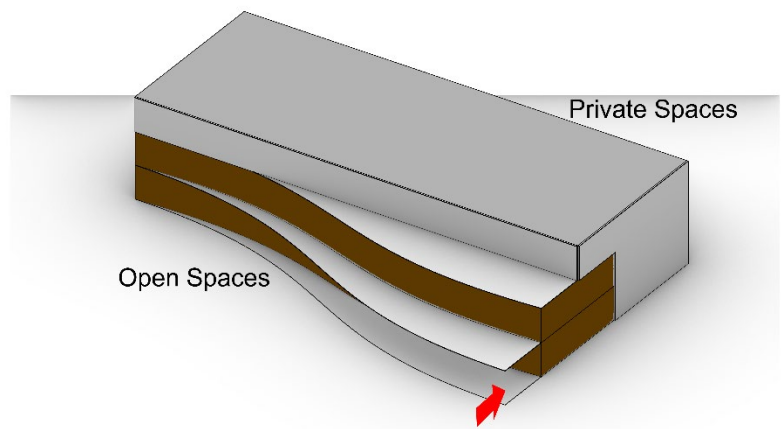


Figure 28: Building diagram 6 (Author)

6.3 Design Development

Building Overview

1. Vendor Stalls x 8
2. Brewpub x 1
3. Coffee Roaster x 1
4. Private Office Space x 10
5. Open Co-Working Space
6. Conference Rooms x 3

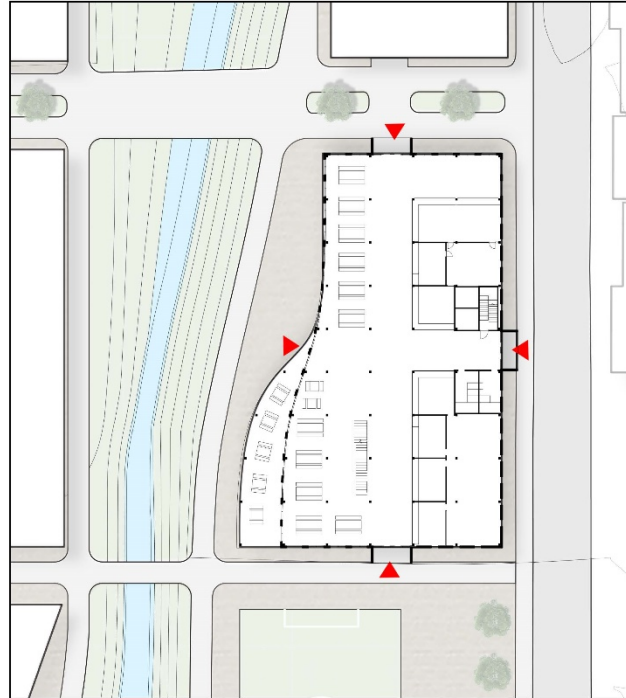


Figure 29: Site Plan (Author)

Organizing the interior spaces, it was important to keep a free flow of circulation into and out of the building to promote social interactions both on the interior and exterior of the building. On the first floor, the food hall stalls are oriented along the hard face of the building, so that the shared storage and trash areas have direct access to the adjacent street. The open seating areas are oriented toward the daylight stream to maximize the both the views and the immediate connection to nature, essential to psychological well-being. This can be seen in the building site plan as well as the first floor axonometric.

The second floor consists of a brewpub and a coffee roaster, along with seating to support both spaces, These two tenants would be the anchor tenants of the food hall, and would ideally be local business. The “back of house” operations such as storage space, kitchen space, and restrooms are all oriented toward the street edge. This also gives both spaces access to a service elevator from the storage space on the first floor, allowing for easy access to deliveries. The seating is oriented toward the river, with an outdoor terrace offering outdoor space and views to the natural environment both on site and to the surroundings.

The third floor will be the “penthouse” coworking space. The private offices are oriented toward the street edge while the more open coworking space is oriented toward the river edge. There are also shared conference rooms that are situated in the center of the space. This allows for variation in the scale of the open coworking spaces, creating some spaces that are more open and collaborative and some spaces that are more private that would allow people to work on their own.

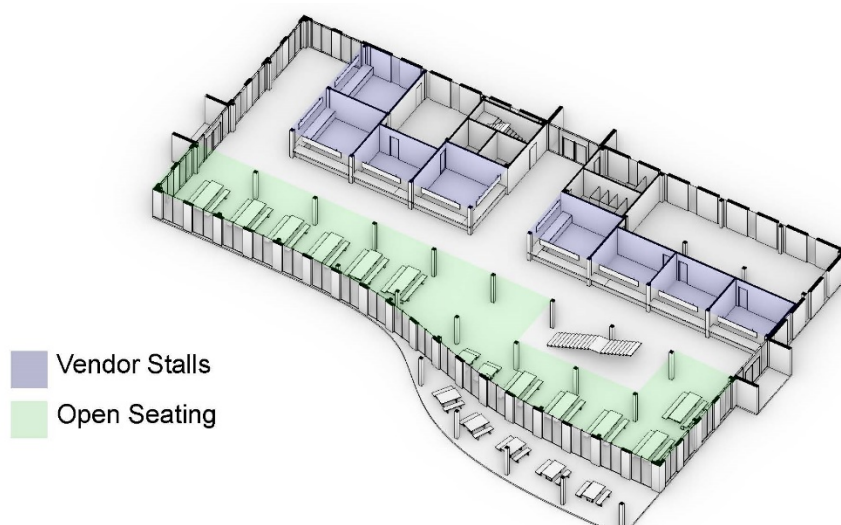


Figure 30: First Floor (Author)

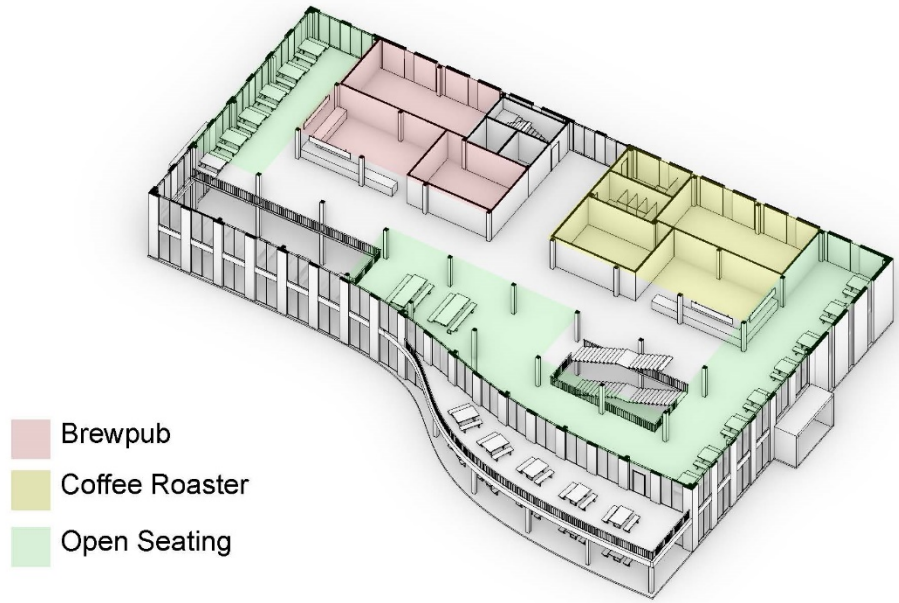


Figure 31: Second Floor (Author)

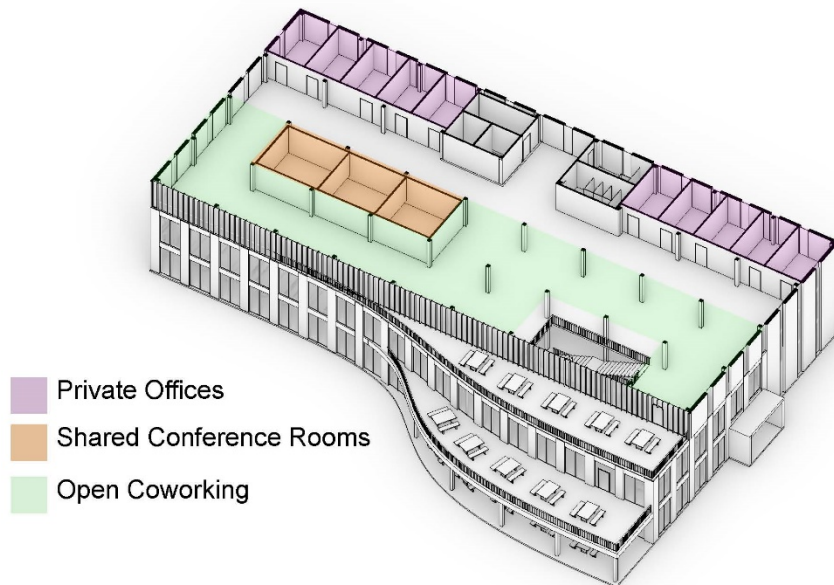


Figure 32: Third Floor (Author)

A main design strategy used in the form of this building is the terraced spaces engaging the stream on site. To emphasize the new landscape, the building form steps down each story to create outdoor space at each level. On the interior, there is a three-story atrium space to allow maximum daylight as well as to provide space to include an interior garden on each level. Biophilia, as stated in the WELL Building Standard, is beneficial to all components of well-being.³² The section drawing below shows this interior atrium, as well as the relationship between the interior public spaces, the exterior public spaces, and the waterfront.



Figure 33: Section (Author)

³² IWBI n.d.

6.4 Final Project Renderings



Figure 34: Aerial Perspective (Author)



Figure 35: South Perspective (Author)



Figure 36: Interior Perspective (Author)



Figure 37: Northwest Perspective (Author)

CHAPTER 7

CONCLUSIONS

During the early stages of research for this thesis, I was primarily concerned with the theoretical aspects of how the built environment impacts human health and well-being. The impact that the built environment has on how we feel, act, and interact with one another should not be undervalued and so I felt interested in learning more about this and learning how to design in a way that creates a positive impact on our well-being. This theoretical research – in combination with current industry standard – set a solid base for understanding how design can improve, or impair, human well-being.

Moving forward into an actual design project, the two most important aspects of research were the resources vs. challenges assessment as well as community feedback. A perfect example of utilizing community input to help improve well-being through design is shown in the JLL Shanghai project. The architects allowed not just the business owners but also the employees to become a part of the design process every step of the way. As a result of this, the end design for the office space suited their specific needs in terms of well-being and productivity.

Community input – along with an assessment of the challenges that the community faces and the resources that it has to overcome these challenges – seems to be the best combination of strategies to ensure that a project suitably addresses the needs of the people that it is serving and should be used as often as possible throughout the design process.

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