

LINEAGES

An inter-generational approach to the urban environment

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Abstract

Lineages: An inter-generational approach to the urban environment

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Waste of the material and social environments defines North America's urban centers, promoting a monoculture of buildings and people. Neighborhoods are steadily homogenized; urban residents represent a narrow segment of the population as children and seniors are relegated to the fringes in an environment with little use for non-professionals.

This thesis proposes how architecture can create both social and material lineage by addressing past incarnations, designing for today's needs, and respecting future adaptations. The topic is explored at the urban, building and program scales using the historic Standard Oil Company buildings on Lake Union's north shore. The site is transformed into an inter-generational hub designed to promote better integration of ages with a food preservation center at its heart.



LINEAGES

An inter-generational approach to the urban environment

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For Eliza and her Nana and for those who came before and those who will come after.

And for Bryan.

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THE END

0: THE END

This thesis begins with the end. The end of buildings, the end of family heritage, and the end of social continuity. The culture of waste in North America extends past the physical environment to the social environment. Cities have become monocultures of buildings and people with children and seniors relegated to the fringes. This thesis proposes how architecture can create both material and social lineage.

Massachusetts Institute of Technology's (MIT) Building 20 is an example of how inter-generational buildings can create lineage (Figure 2 and Figure 3). Built in 1943 during World War II as a temporary structure to conduct wartime radar

Figure 1: Chapter Heading. The demolition of MIT's Building 20. Image: <http://clui.org/ludb/site/building-20-site>

research in a secret radiation laboratory, Building 20 outlived its initial purpose and went on to incubate unique and revolutionary achievements.¹ It was considered by many to be one of the most creative spaces in the world and housed numerous MIT departments including ...an electronics department, laboratory for nuclear scientists, linguistics department, machine shop, piano repair facility, cell-culture lab and the R.O.T.C. among others.²

It was often referred to as "The Magical Incubator" for the many innovations it housed including the first linear accelerator and food irradiation discoveries.³ Harold "Doc" Edgerton's famous high-speed photographs were also taken within the walls of Building 20 and it was here that the study of modern linguistics began with the work of Professors Noam Chomsky and Morris Halle.⁴

Building 20 was a successful inter-generation-



Figure 2: Building 20's regular geometric form and flexible wood structure made it ideal for a multitude of innovations. 1945. Image: <http://webmuseum.mit.edu/detail.php?t=subjects&type=all&f=&s=Building+20&record=1>

al building for several reasons. Its adaptability came from its flexible timber structure, heavy-load tolerance, long span bays, and exposed services that allowed easy updates (Figure 4). Longevity has no chance without serious structure..."construction for long life is what invites the long-term tampering it takes for a building to reach an adapted state."⁵

Flexibility made the building an ideal experimental space.

Building 20 was commonly known as, "The only building on campus you can cut with a saw."⁶ Its wood structure allowed users to enlarge the working environment either horizontally or vertically.⁷ Most notably, Professor Jerrold Zacharias cut holes in two floors so that he could assemble the world's first atomic clock.⁸

Age plus adaptivity is what makes a building come to be loved. The building learns from its occupants, and they learn from it.⁹

For the fifty years after its initial construction, Building 20 kept pace with the ever-changing spatial needs of its occupants. Operable windows and narrow floorplates aided natural daylighting and ventilation adding to Building 20's appeal for multiple generations of users.



Figure 3: Building 20, MIT, 1945. Image: <http://webmuseum.mit.edu/detail.php?t=subjects&type=all&f=&s=Building+20&record=1>



Figure 4: Exposed services inside MIT's Building 20, 1945. Image: <http://webmuseum.mit.edu/detail.php?t=subjects&type=all&f=&s=Building+20&record=1>

In 1999 the durable multi-purpose structure that served generations of inhabitants for over 50 years, was demolished and replaced with a new building that ignored virtually all of the elements that gave Building 20 inter-generational integrity and strength. Building 20's regular geometric and horizontal form gave way to Frank Gehry's irregular and vertical Stata Center (Figure 5).

The Stata Center's irregular structure is neither durable nor easily adapted to a changing cast of occupants. Less than three years after its construction, Gehry's Stata Center was plagued with construction and design-related problems such as leaks, cracked masonry, mold growth, and poor drainage.¹⁰ Architecture critic Robert Campbell stated that:

...it is inevitable that there will be problems in any

unconventional building like the Stata Center, which has roofs colliding at different, odd angles.¹¹

Inevitably, these issues led to litigation. MIT stated in its lawsuit against Gehry that it originally wanted a building complex that would "catalyze interactions and innovations among MIT's faculty and students..."¹² Ironically, MIT demolished the building that was already providing the ideal environment for these interactions.

Although the unpretentiousness of Building 20 made some people feel like they were being overlooked, it was liberating for other professors who felt freer to be creative and make the most out of the available space. MIT never seemed overly concerned about Building 20 (quite possibly because everyone knew it was a "temporary" building), and MIT generously gave space to new student clubs and new departments.¹³

The invisibility that made Building 20 so ideally suited to innovation was also its biggest weakness, leading to its demolition. It can be said that

Building 20 was the archetype of an inter-generational building: understated and overlooked yet adaptable and loved. This thesis brings attention to the inherent advantage of the invisible and, in the spirit of Building 20, defines and proposes an inter-generational approach to the built environment to create social and material lineages.



Figure 5: The Stata Center, Building 20's replacement. Image: <http://interestsoftheday.blogspot.com/2012/09/mit-stata-center-building-20.html>

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THE CONIFER FOREST

1: THE CONIFER FOREST

Generations are created by the repeated process of individuals passing genetic material to offspring. Thus the term "generation" is commonly considered to mean "a body of living beings constituting a single step in the line of descent from an ancestor," or in other words, "a group of individuals born and living contemporaneously."¹ While this definition may imply isolation, focusing on a single link in a chain, a species in fact thrives on the coexistence of parent and offspring, multiple generations existing simultaneously. Often these generations exist in a symbiotic relationship. The survival and success of a "new" generation depends on the existence of the "old," just as an older generation can rely upon the younger community.

Figure 6: Chapter Heading: Multi-generational conifer forest. Image: www.4.bp.blogspot.com

This phenomenon can be demonstrated in nature through the life cycle of the conifer tree (Figure 7). Saplings, mature trees, and dying trees perpetuate the species through their coexistence, creating an inter-generational community. Mature trees germinate, shedding seeds for new life. Their branches protect the saplings from harsh winds and intense sun while old trees, known as "nurse logs," fall to the forest floor and provide nutrients for the young. The saplings aid in decomposition of dying trees and ensure the perpetual survival of the species as a whole. The antithesis of inter-generational coexistence is monoculture. Invasive species, for example, do not support an inter-generational community but replace long lineages of special diversity with single generations that are more suscep-

tible to disease and pests, reduce soil fertility, and decrease the ability of future generations to grow.

It is not difficult to draw parallels between the natural world and that created by humans, both built and social. Like the conifer tree forest, the most vibrant communities are those with a range of generational diversity. The communities that welcome a diversity of built ages, those that have grown over time and been allowed to adapt to changing needs, are also the most vibrant. Yet despite the benefits of an age-integrated environment inter-generational building stock is a lost ideal in conflict with the monoculture of traditional urban development. The Brookings Institution estimates that approximately 82 billion square feet of existing buildings, or

25% of today's building stock, will be demolished and replaced between 2005 and 2030.² The demolition of MIT's Building 20 is just one example of the trend toward replacement, regardless of whether the replacement structure presents equivalent value.

Like building lineages, social lineages are increasingly broken. Ages are segregated and cities are typically designed for a narrow age range, ignoring the benefits of an inter-generational community. Polar ends of the age continuum, children and seniors are relegated to the fringes. The needs of children are largely overlooked and seniors often are housed in elderly care facilities that isolate them from fast-paced, active communities in which they can no longer function.

Despite these practices, there are many benefits of maintaining physical and social lineages. Material lineage in the built environment develops economic diversity, retains a historical link to the past, preserves culture, supports environmental responsibility, and ensures future practice. Maintaining social lineages are equally important and create communities that are more adept at educating youth, caring for the elderly, leveraging economic power, and maintaining cultural traditions.

Today's North American cities are monocultures that prioritize a single-generation of people and buildings. The loss of built and social lineages has resulted in fractured communities, divided families, forgotten histories, and an entire culture

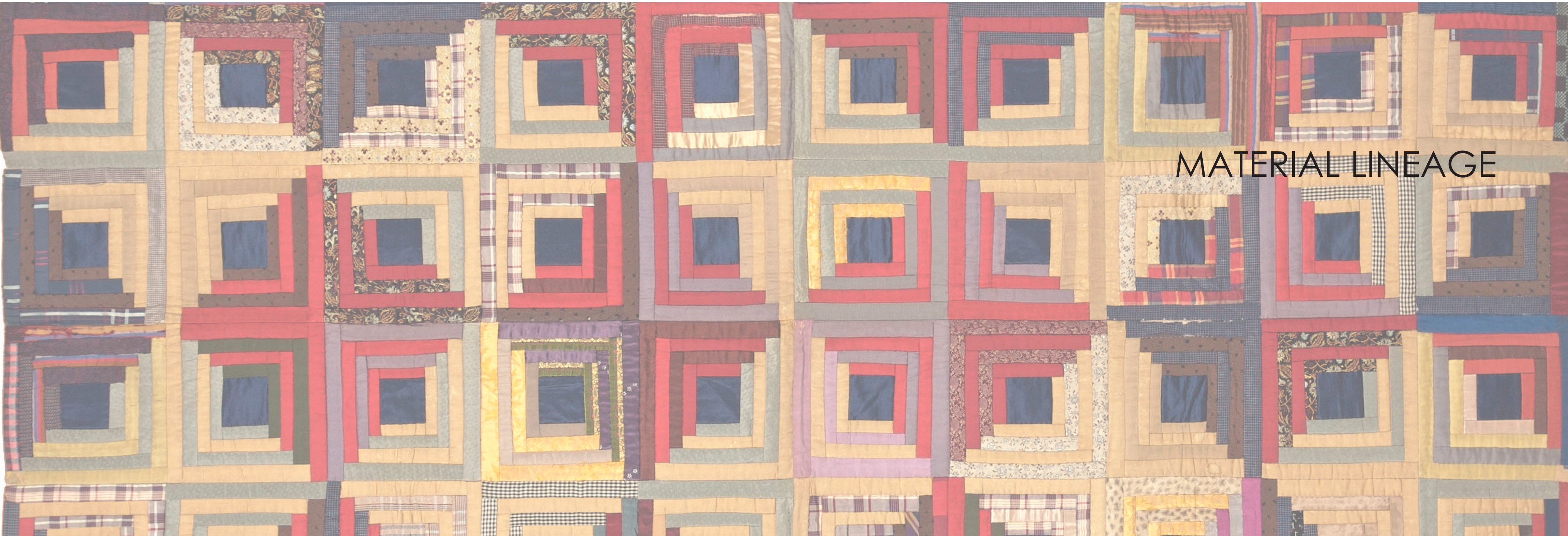


Figure 7: An aged nurse log nourishes young saplings and other species while the young plants help decompose the fallen tree. Image: <http://www.phlumf.com/gallery/gorge/larch-mountain/image-003.jpg.php>

based on disposable materials and waste. Newness and innovation is more appealing and more valued than historical precedents or proven solutions. This thesis will propose and explore the ways that urban, building, and program design can support both material and social lineage.

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MATERIAL LINEAGE

2: MATERIAL LINEAGE

While American society began as a repair culture, valuing durable materials and skilled artisans, technological advancements and global manufacturing of the early 1900's encouraged a cycle of consumption that eliminated any need to preserve the old, particularly when there was a readily available and increasingly inexpensive replacement. The culture of disposal can be traced to the Industrial Revolution when technology enabled quicker, cheaper production of new materials.

While waste is a necessary part of life, the current concept of "trash" is fairly new. Before the Industrial Revolution most waste came from

Figure 8: Chapter Heading: The iconic American quilt is an example of inter-generational reuse. Image: www.worn-through.com

compostable sources such as plants and animals as more durable goods were repaired. In early America "production and disposal were part of the same process"¹ and people's repair and reuse skills were fundamental to sustaining life.²

A prime example of the repair culture in pre-Industrial America is the iconic American quilt (Figure 8). Quilt materials were often a mixture of old scraps and new materials. Intricate designs on the quilt's front came from worn-out clothing while the back came from new fabric.³ An 1845 article in the *Lowell Offering* sentimentalized the coexistence of newly purchased and reused quilt fabrics:

"How many passages of my life seem to be epitomized in this patchwork quilt." The quilt included pieces of "that bright copperplate cushion which graced my mother's easy chair," ...and "a fragment

of the first dress which baby brother wore when he left off long clothes." She was also nostalgic about the material she purchased: "Here are pieces of that [which] I thought so bright and beautiful to set off my quilt with...."⁴

Each square told a story and became part of a larger pattern of materials, colors, and memories. Eventually, threadbare or worn-out quilts were used as chair upholstery and padding.⁵ Ultimately, the padding would be disposed in the ground, composted over time, and used to nourish plants, giving rise to food or new materials. The quilt makes waste a positive process, turning garbage into lineage. It celebrates the diversity of eras and ages, of materials and memories. This thesis is not only about the reuse of an existing building but designing an adaptation while imagining its future.

In addition to the repair culture present in pre-Industrial America, waste was also minimized by the biodegradable nature of materials. Evidence of this ideology is demonstrated in early Native American middens (Figure 9). Middens are Native American "landfill" sites but are little more than piles of broken shells, sometimes the only material evidence left behind by an entire Native American community.

The Industrial Revolution brought more permanent waste. Early urban planning sited cities near rivers to implement a "dilute and disperse" disposal system, using waterways to assist in waste removal.⁶ As urban and industrial centers expanded, the "dilute and disperse" strategy no longer could keep up with waste disposal needs as water quality and public health began to de-



Figure 9: Native American midden at Midden Beach, BC. Image: <http://spiritgill.blogspot.com/2013/08/sullivan-bay-to-echo-bay.html>

teriorate. Waste disposal then shifted to a “concentrate and contain” system, which favored local collection points for waste disposal. While open dumps were used at first, the smell, unsightly appearance, ground and surface water contamination risks, pest problems, and public health concerns quickly gave way to landfills.⁷

Modern landfills are a relatively recent phenomenon first introduced in the United States in 1904 in Champaign, Illinois.

By 1945, about 100 American cities had “sanitary” landfills and within 15 years, that number increased to about 1,400.⁸

Today, landfills are regionally based with urban transfer stations serving as hubs for centralized dumping facilities far outside the city limits. The City of Seattle, for example, sends five mile-long trains of waste each week over 200 miles away

to northern Oregon.⁹

While the availability and invisibility of landfills may have been part of the shift away from the culture of reuse and repair, the other factor was production. New manufacturing methods lowered the cost of goods, decreasing the need to repair and reuse. Manufacturers also began making disposable items such as packaging out of durable materials, resulting in permanent landfill waste.¹⁰ Between 1960 and 2007 disposable products and packaging waste tripled – increasing at more than twice the rate of the U.S. population.¹¹ Today, almost 75% of Municipal Solid Waste (MSW) consists of disposable products and packaging.¹²

Production and disposal rates are at peak levels

in the United States. In 1900 less than 250 tons of raw materials were consumed each year.¹³

Today that amount has increased more than ten times to approximately 3,200 tons of raw materials used annually.¹⁴ The U.S. construction industry is the greatest consumer of new materials worldwide. Of these 3,200 tons of raw materials, approximately 2,200 tons were dedicated to production of construction materials.¹⁵ This consumption supports the construction of approximately 170,000 new commercial buildings each year.¹⁶ In other words, every three minutes a new commercial building is constructed in the United States. And while global material consumption doubled between 1970 and 1995, the United States remains the greatest user, consuming about 3 billion tons,¹⁷ or one-third, of the world’s total new materials.¹⁸

In the United States material production and disposal rates are locked in an endless cycle of consumption and waste. New materials are needed when old products are discarded and old materials sometimes are disposed of just to create space for the new. One stream prospers at the expense of the other. The United States is home to only 4% of the global population but contributes 30% of the world’s waste.¹⁹ In 2011 Americans generated roughly 250 million tons of MSW, equating to “4.5 lbs of garbage per person, per day.”²⁰

While individual U.S. waste rates are high, Construction and Demolition Waste (C&D) rates are astronomical. C&D from the United States is one of the largest sources of waste in the world at

nearly 136 million tons.²¹ This number is not surprising given the prevalence of demolition in modern American cities.

Every year, approximately one billion square feet of buildings are demolished and replaced with new construction in the United States.²²

This equates to approximately 44,000 commercial buildings and 250,000 residential buildings each year.²³ This widespread practice results in 136 million tons of landfill waste, or 30% of the total waste stream annually.²⁴

Not only does the production process drive an ever-growing waste stream but the energy required to extract, transport, manufacture, install, maintain, and dispose of these raw materials has serious environmental impacts.²⁵ Energy used in buildings accounts for 47.6% of all the energy produced in the United States [followed

by transportation (at 28.1%) and industry (at 24.4%).]²⁶ While building operations account for approximately 43% of U.S. energy use, another 6% represents building materials production.²⁷ The energy required to process, deliver, and install construction materials is only a fraction of total energy used each year. But considering the fact that “embodied energy accounts for the majority of a building’s energy footprint for approximately the first 15-20 years...”²⁸ this statistic becomes more significant, especially given the shortened life-spans of U.S. buildings.

The higher the embodied energy, the more time it takes to negate the building’s demolition. ...It takes 10 to 80 years for a new building that is 30 percent more efficient than an average-performing existing building to overcome, through efficient operations, the negative climate change impacts related to the construction process.²⁹

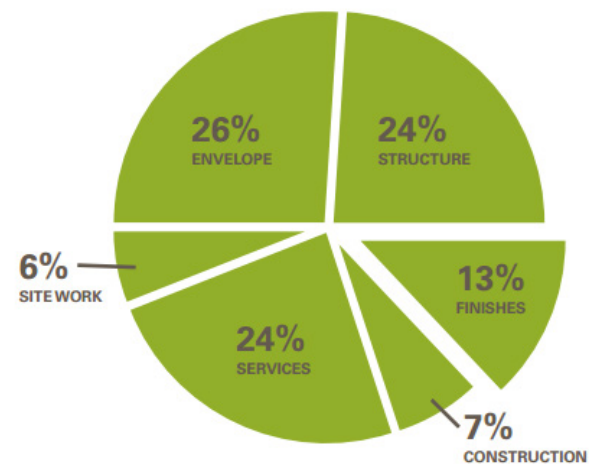


Figure 10: Initial embodied energy of the elements of an office building. Image: <http://media.cannondesign.com/uploads/files/MaterialLife-9-6.pdf>

In this sense, existing buildings are “nutrients” in the strongest sense of the word. They are quarries of gathered, raw materials.

These eternal changes and permutations among old buildings can be called makeshifts only in the most pedantic sense. It is rather that a form of raw material has been found in the right place. It has been put to a use that might otherwise be unborn.³⁰

Embodied energy tends to be highest in the structure, envelope, and services of a building meaning these are the areas most valuable to preserve (Figure 10). Preserving structure and site alone would result in a 30% embodied energy savings. Preserving the envelope as well results in an embodied energy savings of 56%.

Not all materials hold the same embodied energy value. Concrete has the highest embodied energy followed by steel, plastic, masonry, and ceramic.³¹ This fact leads to several conclusions, namely that the reuse of buildings can interrupt the disposal-production cycle and have a positive impact on both streams simultaneously, that buildings with higher embodied energies should be prioritized for reuse, that low embodied en-

ergy materials should be used for adaptations, and that future building construction should focus on durability and flexibility to ensure long-term relevancy and usability, overcoming initial embodied energy material costs.

WASTE AS NUTRIENT

Recycling is often regarded as the solution to the global waste problem. Proponents tout benefits such as waste reduction and energy savings. However, in *Cradle to Cradle* William McDonough and Michael Braungart describe the recycling process as “downcycling” or reducing material quality over time.³² For example, while some recycling advocates claim that recycling aluminum takes 95% less energy than making it from raw materials,³³ this energy savings is not a long-term solution because it results in a con-

siderably weaker product that may wear out sooner and be only slightly delayed from entering a landfill. The standard production and recycling process of an aluminum can illustrates this “downcycling” concept:

The typical soda can consists of two kinds of aluminum: the walls are composed of aluminum, manganese alloy with some magnesium, plus coatings and paint, while the harder top is aluminum magnesium alloy. In conventional recycling these materials are melted together, resulting in a weaker - and less useful - product.³⁴

McDonough and Braungart coined the term “monstrous hybrid” to describe a product that combines technical and organic nutrients in a way that prevents them from being easily separated for reuse.³⁵ Plant fiber carpet (such as Sisal) with a PVC backing is one example as its components are very difficult, if not impossible, to separate into compostable and reusable ma-

terials.

McDonough and Braungart propose a long-term solution to production and disposal based on separating materials into “technical” and “biological” nutrients. “Technical” nutrients are those that belong to the synthetic world, recyclable for future technical-based products. “Biological” materials are those that belong to the natural world. These materials are biodegradable and harmless to animal and plant life.

In McDonough and Braungart's vision, products would either be made entirely of one nutrient type or be designed for disassembly and disposal into their respective waste streams. Products made of biological nutrients would be composted at the end of their useful life while products

made of technical nutrients could have a continuous life-cycle in the technical realm without deteriorating quality. The process they propose is a closed-loop, multi-generational system where components of a product are absorbed back into the nutrient stream from which they originated.

THE CULTURAL NUTRIENT

McDonough and Braungart propose a manufacturing strategy for *future* products but what about products that already exist in the environment? What about *buildings*? A third nutrient must be added: the “cultural” nutrient. Cultural nutrients can be defined as artifacts, such as existing buildings, that are more valuable to retain for their cultural significance than to demolish.

Focusing purely on the biological and technical nutrient streams will create a more efficient, less wasteful system of reuse but at the same time promote a transient system where every element is disassembled into its component parts, restarting its history. It would result in reuse to the point of transience. Valuing the cultural significance of a building along with its biological and technical nutrients will build an inter-generational environment, nourishing the roots of future lineages.

INTER-GENERATIONAL BUILDINGS

Inter-generational buildings are not just old structures that serve era after era, but buildings that celebrate their history, latest adaptation, and future transformations. Like the picturesque American Thanksgiving table that seats every generation from great-granddaughter to great-

grandfather, the built environment can be all-inclusive;³⁶ inter-generational buildings simultaneously celebrate the histories within them, newest innovations, adaptations over time, and future changes. In *How Buildings Learn* Stewart Brand describes the inter-generational building as follows:

Between the dazzle of a new building and its eventual corpse, when it is either demolished or petrified as a museum, are the lost years-- the unappreciated, undocumented, awkward-seeming time when it was alive to evolution.³⁷

Brand analyzed how buildings change after their initial construction. He found that certain building types were designed to change more frequently than others. Commercial buildings, for example, changed frequently to keep pace with competition, residential buildings changed steadily to keep pace with a family's needs and

anticipated growth, and institutional buildings changed very little, if at all, possibly in an effort to convey a message of stability to the public.³⁸

Each building type presents expected lifetimes for its different components. Brand builds on Frank Duffy's argument that "...there isn't such a thing as a building... A building properly conceived is several layers of longevity of built components" by creating a layered system of six component parts with different rates of change: site, structure, skin, services, space plan, and "stuff" (listed from least adaptable to most metamorphic) (Figure 11). The site, or geographic location and orientation, is eternal. The structure, considered to be the "building," is expensive to renovate and therefore the component part most resistant to change. Its average life expect-

tancy is between 30 and 300 years. The skin can also be long-lasting and is expensive to change but can adapt to technological advancements or trends. Brand estimated that building skin typically changes every 20 years. "Services" pertains to a building's working systems such as electrical, plumbing, and HVAC, and are replaced every 7 to 15 years due to technological advancements. The "space plan," or interior layout of walls, doors, windows, and floors, changes every 3 to 30 years. And the "stuff" within, furniture and possessions, can change daily, monthly, yearly, or not at all.

Awareness of the life expectancies of these different systems benefits architects in several ways. As Duffy states,

Thinking about buildings in this time-laden way is very practical. As a designer you avoid such clas-

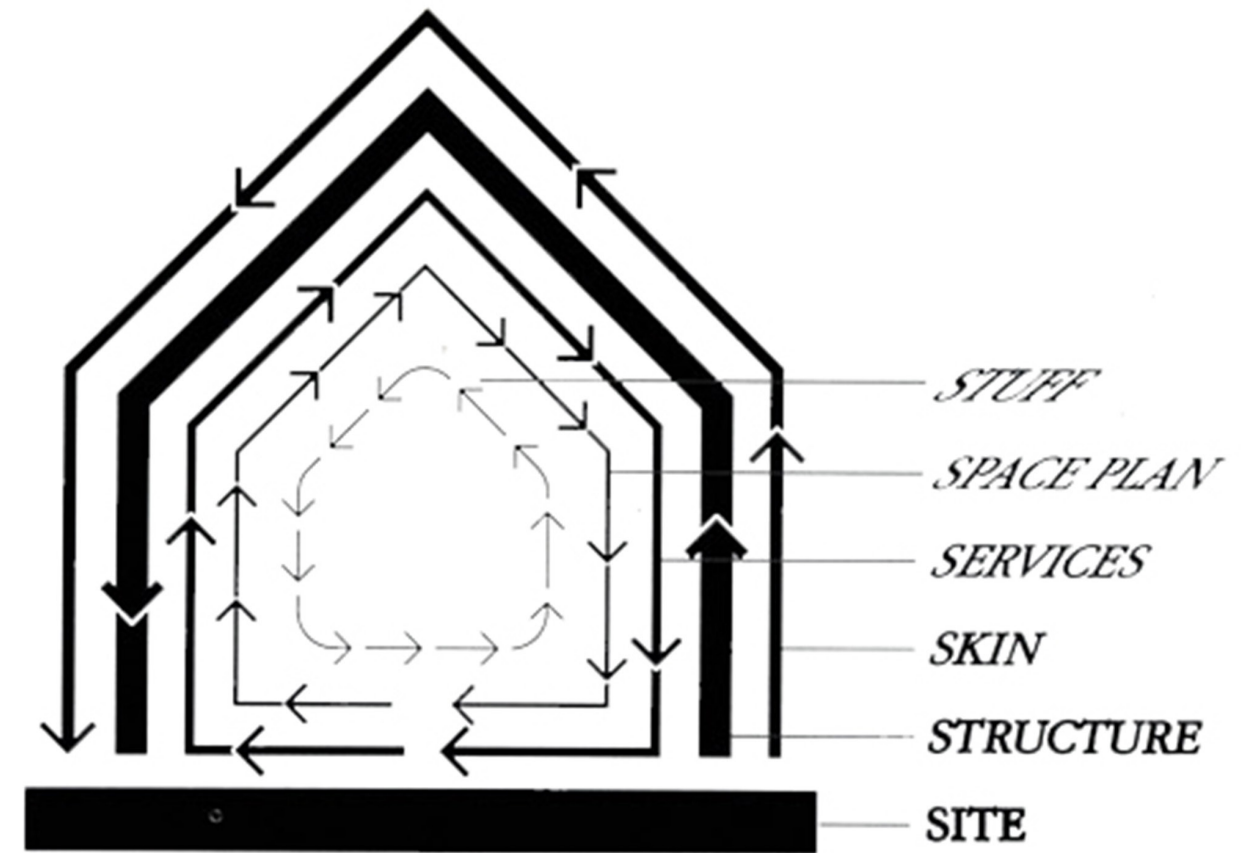


Figure 11: Shearing layers of change. Image: *How Buildings Learn*

sic mistakes as solving a five-minute problem with a fifty-year solution...It means you invent building forms which are very adaptable.³⁹

Understanding these life cycles can help architects design new adaptable buildings as well as identify opportunity in existing ones.

Brand advises that adaptable buildings allow: ...slippage between the differently-paced systems of Site, Structure, Skin, Services, Space plan, and Stuff. Otherwise the slow systems block the flow of the quick ones, and the quick ones tear up the slow ones with their constant change.⁴⁰

For example, the “slab-on-grade” concrete foundation is a rigid system since it buries services and doesn't provide a basement for future storage needs, expansion, or upgrades and maintenance. Highly integrated buildings that integrate ventilation and electrical systems with structure are other examples of rigid systems since they limit the potential to accommodate

adaptations.

LOW ROAD BUILDINGS

Brand categorizes buildings as either “High Road” or “Low Road.” High Road buildings are characterized by duration of purpose, continued maintenance, and devoted caretakers. “By spanning generations, [High Road buildings] transcend style and turn it into history.”⁴¹ In that sense, High Road buildings are like heirloom furniture. “The tiresome furniture of one's grandparents is put into storage to be rediscovered by one's grandchildren.”⁴² The High Road building, however, cannot be defined as inter-generational, in the purest sense, since its continuity over time is more valued than its changing uses and users.

Low Road buildings, on the other hand, are shabby and discarded structures with low visibility. They are valuable for precisely their lack of apparent worth. Brand explained: ...the most inventive creativity, especially youthful creativity, will be found in Low Road buildings taking full advantage of the license to try new things.⁴³

The unassuming nature of Low Road buildings make them potential candidates for perpetual reuse, becoming records of their varied uses over time. But not all Low Road buildings are apt for inter-generational reuse. They must have adaptable structures; flexible materiality; exposed services; high embodied energy; geometric, vernacular forms; and traditional materiality. If you start boxy and simple, outside and in, then you can let complications develop with time, responsive to use. Prematurely convoluted surfaces are expensive to build, a nuisance to maintain, and hard to change.⁴⁴

MIT's Building 20 exemplified Brand's Low Road

building concept. It used structure, materiality, geometric form, and the separation of its layers to appeal to multiple users for many different purposes.⁴⁵

Low Road buildings also create space for users from diverse economic means. The low cost space of Building 20 always “had space for the beginning project, the graduate student's experiment, [and] the interdisciplinary research center.”⁴⁶ As a Low Road building it provided diverse spaces to a variety of users and uses, contributing to the overall quality of the MIT campus.

The economic benefits of Low Road buildings also are heralded by Jane Jacobs in *The Death and Life of Great American Cities* as creating urban vitality through business diversity. She ex-

plained:

Cities need old buildings so badly it is probably impossible for vigorous streets and districts to grow without them. By old buildings I mean not museum-piece old buildings...but plain, ordinary, low-value old buildings, including some rundown old buildings. If a city has only new buildings, the enterprises that can exist there are automatically limited to those that can support the high costs of new construction.⁴⁷

Chain stores and restaurants are often the tenants of new buildings while the more place-making, locally-owned establishments, such as local bookstores, antique dealers, neighborhood bars, and galleries are often housed in old buildings. Social services are also prime candidates for old buildings.

...hundreds of ordinary enterprises, necessary to the safety and public life of streets and neighborhoods, and appreciated for their convenience and personal quality, can make out successfully in old buildings, but are inexorably slain by the high overhead of new construction.⁴⁸

For these reasons, the most vital neighborhoods are inter-generational in nature, having mixtures of building ages to support a robust economy. Areas dominated by buildings of a single era and purpose (either all new or all old) are ineffective at serving cultural, demographic, and business diversity.⁴⁹ An inter-generational built environment can support economic diversity over a longer timeframe. As Jacobs so succinctly stated: “One century's building commonplace is another century's useful aberration.”⁵⁰ As one generation's “new” luxury building ages, it turns over to a new group of users who use it as an economically-depressed entry point for start-up business ventures. “Old ideas can sometimes use new buildings. New ideas must use old buildings.”⁵¹



Figure 12: The Bullitt Center in Seattle's Central District was designed for durability and flexibility. Image: <http://greentechadvocates.com/2013/04/23/greenest-office-building-sets-a-standard-for-energy-efficiency-tech/>

DESIGN FOR DURABILITY

While not categorized as a Low Road building, a modern example of architectural durability and flexibility is the Bullitt Center in Seattle, Washington (Figure 12). The wood and concrete structure is designed to last 250 years. The building's long-term strategy includes planned system upgrades such as the photovoltaic panels, curtain wall, and shading devices.⁵²

...the core structural components are designed to endure for centuries. "Once you get past 100 years, who knows how long they might last—150 or maybe 400 years..."⁵³

In addition, the Bullitt Center is designed for flexibility with its wood structure and open floorplates, much like MIT's Building 20.

AN INTER-GENERATIONAL EXPLORATION

The flexibility and adaptability essential to inter-generational buildings can be studied on a

smaller scale using furniture. These studies offer insights relating to time adaptability and user flexibility.

Designed in summer 2012 as part of Jim Nicholls' furniture studio at University of Washington, "Generations" is a pair of tables that transforms for inter-generational use (Figure 13, Figure 14, and Figure 15). Conceived as new heirloom furniture, the pieces were designed by a daughter for a grandmother to give to her granddaughter. The tables rotate and split apart depending on user needs. The first generation coffee table orients the tables together, with each planar top resting on its own angled and slab legs and a portion of its partner table. The second generation orientation is a pair of side tables. The original orientation is rotated so that the planar



Figure 13: A pair of tables accommodates inter-generational use over time. The "Grandmother" orientation is a coffee table.



Figure 14: The transition from the "Grandmother" orientation to the "Granddaughter" orientation.



Figure 15: The "Granddaughter" orientation is a pair of side tables.



Figure 16: Reading Chair provides inter-generational flexibility for young and old sitting together or separate.

top becomes a leg and the slab leg becomes the surface. The tables are made from an Elm tree harvested from a city tree-removal project and combines live and cut edges. The table is a study of inter-generational use over time.

“Reading Chair” offers another perspective on multi-generational design (Figure 16). Rather than changing users over time, the chair accommodates inter-generational users at a single point in time. The chair leverages the angles from typical adult chairs, shrinks the height, and widens the seating area to allow dual seating for parent and child or more comfortable seating for an older adult. This chair provides a case study for architectural works by prioritizing multi-user flexibility.

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SOCIAL LINEAGE

3: SOCIAL LINEAGE

The segregation of generations that defines North American cities today will change with the impending demographic shift of the population. At the same time that the country's most populous generation ages (the Baby Boomers), the Millennial generation represents a larger population of youth.

By 2040, the proportion of people over the age of 65 will top 20 percent, and people under the age of 18 will make up almost 23 percent of the population.¹

The oldest and youngest populations will make up almost half of all U.S. residents (Figure 18).²

While the aging of Baby Boomers will be a harbinger of change, this demographic shift signals only the beginning of a larger transforma-

Figure 17: Chapter Heading: Four generations of women. Image: http://www.rootsweb.ancestry.com/~momonroe/wetmore_vantinedalbum.htm

tion. Longer life expectancies through medical advancements mean that the next few generations will exceed the population of children resulting in a larger number of seniors needing care than caretakers.³ One solution to this challenge is creating inter-generational, geographically dense communities.

Historically, the elderly have been removed from society, segregated in senior living facilities and senior centers and completely separated from the younger generations. Seniors live with other seniors taking occasional special day trips to the outside where younger generations live, work, and play. Seniors lucky enough to "age-in-place" in their own homes spend their days at special senior-only day-care facilities where a younger generation may serve meals or teach

classes but have little meaningful interaction.

The suburban environment can no longer meet the needs of an inter-generational community that relies on walkability for basic services.

...the original homeowners, now "empty-nesters" reaching senior years and driving less (or not at all), have needs that profit-oriented subdivision developers never provided. For example: nearby medical and social services, libraries and social centers, people-friendly parks, farmers markets, and safe, walkable and bikeable environments.⁴

This is because city planners, for decades, have designed for the car owner. To create an environment that will support an inter-generational community, today's priority is

...to design our cities, our entire economies, as if every age group matters, including both children and "aging baby boomers who do not wish to be shuffled off to enclaves of only older adults."⁵

At the National Building Museum's panel discussion, "Designing Homes and Neighborhoods for an Aging Population," Christopher Leinberger of

the Brookings Institution stated that:

Over the next generation, we don't need to add another square mile to metropolitan America. We are eight times less dense than metropolitan Paris and I don't think anyone would say that metropolitan Paris doesn't have a very high quality of life that a lot of seniors would like to live in.⁶

At the opposite end of the age spectrum, children are also kept at the periphery of city living. The standard migration pattern in the United States is a dance between urban centers and suburban developments. Single men and women spend their early professional years in the city before deciding to raise a family. Then, they migrate to the suburbs in hopes of larger yards, better schools, and bigger homes. Once grown, suburban children return to the city until they marry, start a family of their own, and migrate to suburban neighborhoods. Families opposing the suburban move, opting to raise their children in

Between 2011 and 2040...



The population of children will increase from 73 to 83 million.



The population of adults 65+ will increase 80% from 41 to 73.5 million.



The population of adults 85+ will triple from 5.7 to 14.1 million.

Figure 18: In the next 25 years children and seniors will make up 50% of the population. Statistics from The Administration on Aging.

the city instead, often must endure unfavorable conditions such as poor quality public schools, limited safe outdoor space, and fewer social opportunities with other families and children.

The residential building market has embraced the shift to an inter-generational community. With more than 50 million Americans living in multi-generational homes⁷ residential developers are building multi-generational spec homes. Unfortunately, the commercial sphere lags behind. Planners and designers have yet to acknowledge the approaching demographic shift.

Seniors, families, young adults, and children share the same needs, interests, and concerns for livable environments such as:
...safe, walkable neighborhoods, a complete range of services nearby,... an opportunity for civic

engagement, affordable and mixed use housing, and adequate transportation options.⁸

Assets for seniors and children include proximity to child care and senior centers, parks, food stores, health care, theatres, and cafes; cultural diversity; recreational activities; and tolerance for diversity.⁹

Urban environments have the capacity to meet these needs. City living helps children develop exposure to and appreciation for diversity, provides access to public services, and encourages independence through learning how to use public transportation and walkability to schools and other destinations. Urban areas allow seniors to enjoy independent living because of nearby social and health services, physical activity through walking, and a different form of mental stimulation through varied social interactions.

Inter-generational urban environments provide an even richer experience for children and seniors at both the individual and societal levels. Individual benefits of age-integrated communities include teaching social skills such as empathy and respect and encouraging productive activities. Inter-generational communities also improve society at large, providing cultural, economic, and social benefits.

Fostering social lineages ensures the passing of history and tradition. Seniors have inherent knowledge built from years of life. In short, they are wise. This knowledge is not only valuable to all community members but particularly children. The pairing of the most receptive members of society with the most knowledgeable creates lin-

eage. Older community members, like old buildings, become the mavens of cultural heritage.

Seniors and children also represent economic strength. Seniors make up the majority of the membership base of many nonprofit organizations and are also some of the greatest philanthropists.¹⁰ Performing arts institutions such as museums and symphonies may simply not exist without the support of seniors. Children also represent underappreciated economic strength. "Families with young children represent the true 'Big Money.'"¹¹ The average family will spend approximately \$800,000 on each child, supporting housing, health care, child care, and education.¹² This spending, which creates jobs and bolsters the local economy, is often overlooked by cities in favor of the 20 and 30-year old single

professional.

Further, tomorrow's vibrant city depends on a productive population of workers and spenders as new urban residents. Cities cannot rely on a new work force following historic migration patterns from suburb to city because the suburbs are becoming centers themselves, threatening the return of younger generations. Cities must raise new residents by creating a supportive urban atmosphere where every age can thrive.

The culture of waste that defines North America's material environment has infiltrated the social environment. But architecture is a means by which material and social lineages can be fostered. Site, building, and program combine to create space and opportunity for an eternally

vibrant city.

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PROGRAM

4: PROGRAM

A program best-suited to support an inter-generational community is one that creates space for age-integrated activities while addressing the challenges effecting both populations. The current approach to raising children and caring for the elderly isolates the generations however new research is spurring new, age-integrated programs.

FOSTERING AGE-INTEGRATION

A program in Ithaca, NY uses seniors as caregivers in a pre-school environment, co-locating childcare and elder care. The pre-school is permanently housed in a retirement community and seniors work with pre-schoolers on a variety

Figure 19: Chapter Heading: Preserved foods. Image: <http://manitowoc.uwex.edu/2012/09/24/do-you-have-a-canning-obsession-with-your-garden-goods/>

of activities such as reading, singing, and crafts. This multi-generational program allows older people to mentor younger community members.

Studies of such structured interaction between young children and the elderly show children become more helpful, empathize with older people, and develop better self-control as a result.¹

While inter-generational programs to promote relationships between youth and seniors traditionally focused on a teacher/student relationship, there has been growing interest in developing programs that create inter-generational teams to jointly provide services to the larger community. These "inter-generational community service projects" are designed to create "community service opportunities, where participating youth and older adults work together to study community issues, improve local condi-

tions, and help people in need."²

There are several beneficial outcomes for these types of projects. Working side by side to improve community conditions, inter-generational teams expand each other's understanding of societal problems and reconceptualize how they view their own role as "citizens."³ Further, the community projects have defined goals and timelines and are often completed, instilling pride and increasing quality of life for both generations.⁴ The collaborative process of these programs teaches youth and senior adults that they can be valuable contributors to society. They gain new insights into community issues, a deeper appreciation of community diversity, and better knowledge of community needs.

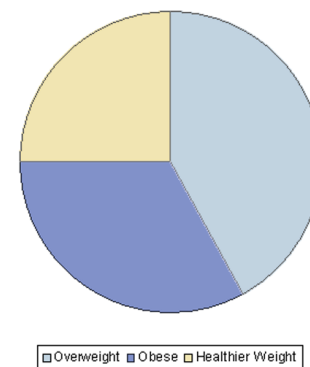


Figure 20: Approximately 75% of people over 60 are overweight and about 33% are obese.

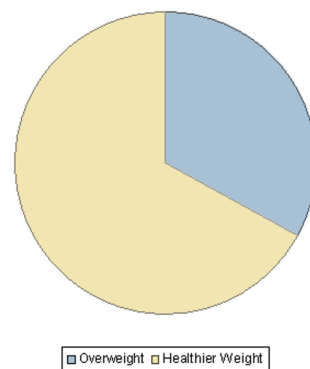


Figure 21: One third of all U.S. children and adolescents are overweight or obese.

SHARED CHALLENGES

Another challenge faced by youths and seniors alike is access to healthy lifestyles and nutritious foods. Nearly 80 percent of men and 70 percent of women over 60 are overweight and about 33 percent are considered obese (Figure 20).⁵ The statistics on childhood obesity are equally disturbing (Figure 21). One-third of all U.S. children and adolescents are either overweight or obese.⁶ This means that less than half of these combined populations are at a healthy weight. Obesity rates soar even higher for low-income children and seniors due to lack of access and proximity to healthy food choices.⁷ "A study of more than 200 neighborhoods found that there are three times more supermarkets in wealthy areas than in poor areas. These are all indicators of the need to rectify the built environment in a

manner that allows for frequent physical activity and provides access to quality food in the local neighborhood."⁸

FOOD PRESERVATION CENTER

Food preservation centers are recognized as providing access to nutritious food, promote physical activity, and encourage inter-generational teaching, learning, and service delivery.

The purpose of a community food preservation center is to provide more food for better nutrition; to make equipment available for those not able to own it; to provide opportunity for less experienced persons to work under supervision on food preservation processes; to give volunteers practice in working together for the good of the community.⁹

Food preservation facilities also allow fruit that would otherwise be wasted to be harvested and consumed. Canning facilities ...prevent waste of locally abundant foods and improve the nutritional level of lower income groups



Tree Owners: Donate!

We can help you harvest your:
 - Apples, Plums, Pears, Asian Pears, Cherries, etc.
 (Worm- & Pesticide-free)

All donated fruit goes to food banks, meal programs, shelters, etc.

Please contact the Seattle Tilth Garden Hotline at 206.633.0224 or help@gardenhotline.org.

Become a Volunteer!

- Scout for fruit trees
- Harvest fruit with new friends
- Deliver fruit to food banks, meal programs, shelters, etc.
- Lead teams of volunteers as a Harvest Leader.

Harvests occur July - October.

Contact Mariah at fruitharvest@solid-ground.org or 206.694.6751.

Figure 22: The Community Fruit Tree Harvest harvests fruit from Seattle's urban orchard that would otherwise be wasted. Image: <http://blog.seattlepi.com/wallingford/2013/06/21/help-harvest-fruit-trees/>

by preserving home-grown foods for use at a time when fresh produce is relatively high in price.¹⁰ Seattle's cool climate and short growing season make it a fitting location for food preservation facilities. The abundance of summer fruit can be harvested and preserved for winter use or future years. Canning facilities can be used by the public to preserve fresh fruit and vegetables grown in home and P-patch gardens as well as produce purchased from local farmer's markets.

Fruit harvested by third-party services from community trees can also be preserved in a canning center. The Community Fruit Tree Harvest (CFTH) was started in 2005 to eliminate waste and supply local food banks with fruit from Seattle's urban fruit orchard (Figure 22).¹¹ Each year thousands of pounds of fresh fruit from privately-owned fruit trees fall to the ground and rot. CFTH volunteers

pick this organic fruit from July to October from Seattle's "urban orchard" and donate the harvest to people who would not otherwise be able to afford fresh, organic produce, "thus completing the full circle of keeping fruit within the same neighborhood, from seed to table."¹² Since 2005, the program has donated over 60,000 pounds of fruit to over 63 organizations including food banks, meal programs, shelters, and senior centers.¹³ The CFTH helps private property owners who either lack the time or skill to harvest their own trees. The fruit trees also benefit from CFTH's efforts since harvesting reduces pests and possibly the spread of disease caused by insects and rotting fruit.

WALLINGFORD PRESERVATION CENTER
 The Wallingford Preservation Center (Center) will

mirror the Wallingford community with a mixture of residential, commercial, industrial, and community spaces. It will include food preservation facilities, a fresh foods market and preserved foods market, residences for a displaced senior population who wishes to stay in the neighborhood, a daycare, and public outdoor spaces (Figure 26). The food preservation facilities will include kitchens for canning, pickling, fermenting, and dehydrating. The Center will also include classrooms and assembly space for lectures and community gatherings as well as recipe archives. The building will create space for older generations to pass on cultural knowledge, younger generations to learn new skills, and inter-generational teams to support the nutritional needs of less-fortunate community members. Further, the complex will create a mixed-use retail center for



Figure 23: The younger teaching the older at a canning class in Lecanto, Florida, 2010. Image: <http://americanprofile.com/articles/community-canneries/>



Figure 24: Fostering age-integrated activities and promoting healthy eating. Image: www.providencelodge.blogspot

the neighborhood. The canning and pickling activities require basic commercial kitchen elements including food preparation tables, stovetops, sinks, and a labeling area.¹⁴ Fermentation activities require a

sealed room to contain odors and ventilation to cycle in fresh air.¹⁵ Dehydration is conducted with commercial dehydrators. All activities require storage of clean jars and containers. A 1946 pamphlet entitled "Community Can-



Figure 25: Interior of Jacksonville, Florida Canning plant, 1940's. Image: "Community Canning Centers"

ning Centers" outlines program requirements such as an outdoor receiving area for incoming produce; a prep area with sinks, tables, and storage; a processing area separated from the prep area with stovetops and filling tables, and finally a labeling and check-out area.¹⁶ Storage for empty jars must also be provided.



Figure 26: Program for the Wallingford Preservation Center

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SITE

5: SITE

The 1.7 acre site is located on the north shore of Lake Union in Seattle's Wallingford neighborhood, at 3301 Densmore Avenue North (Figure 28).¹ It occupies an entire city block bordered by N. 34th Street to the north, N. Northlake Way to the south, Densmore Avenue N. to the east, and Woodlawn Avenue N. to the west (Figure 29). The Burke-Gilman Trail runs along its southern edge. The site was chosen for its proximity to public transit, access to outdoor space, inter-generational history, current condition, future potential, and the high embodied energy of the existing structures. The neighborhood's central location, demographic diversity, and proximity to fresh fruits and vegetables from local P-patch

Figure 27: Chapter Heading: Standard Oil Company's south plaza, 1937. Image: Washington State Archives, Puget Sound Regional Branch.



Figure 28: The Wallingford neighborhood is located on the northern shore of Lake Union.

gardens and community fruit tree harvests provides ideal conditions for a food preservation center.

HISTORY

Prior to the late 1880's the site was forested. Evidence suggests that Native Americans occupied the area starting in the 1880's and an archaeological buffer hugs the shoreline (Figure 54). In the late 1800's settlers new to the Seattle area constructed a railroad to bring industry to Lake Union's north shore to serve the growing population. By the early 1900's Seattle residents needed an affordable source of energy, leading to the opening of the Gasworks plant in 1906. Gasworks initially converted coal to gas but eventually converted oil to gas. During this period more industrial businesses filled the shore

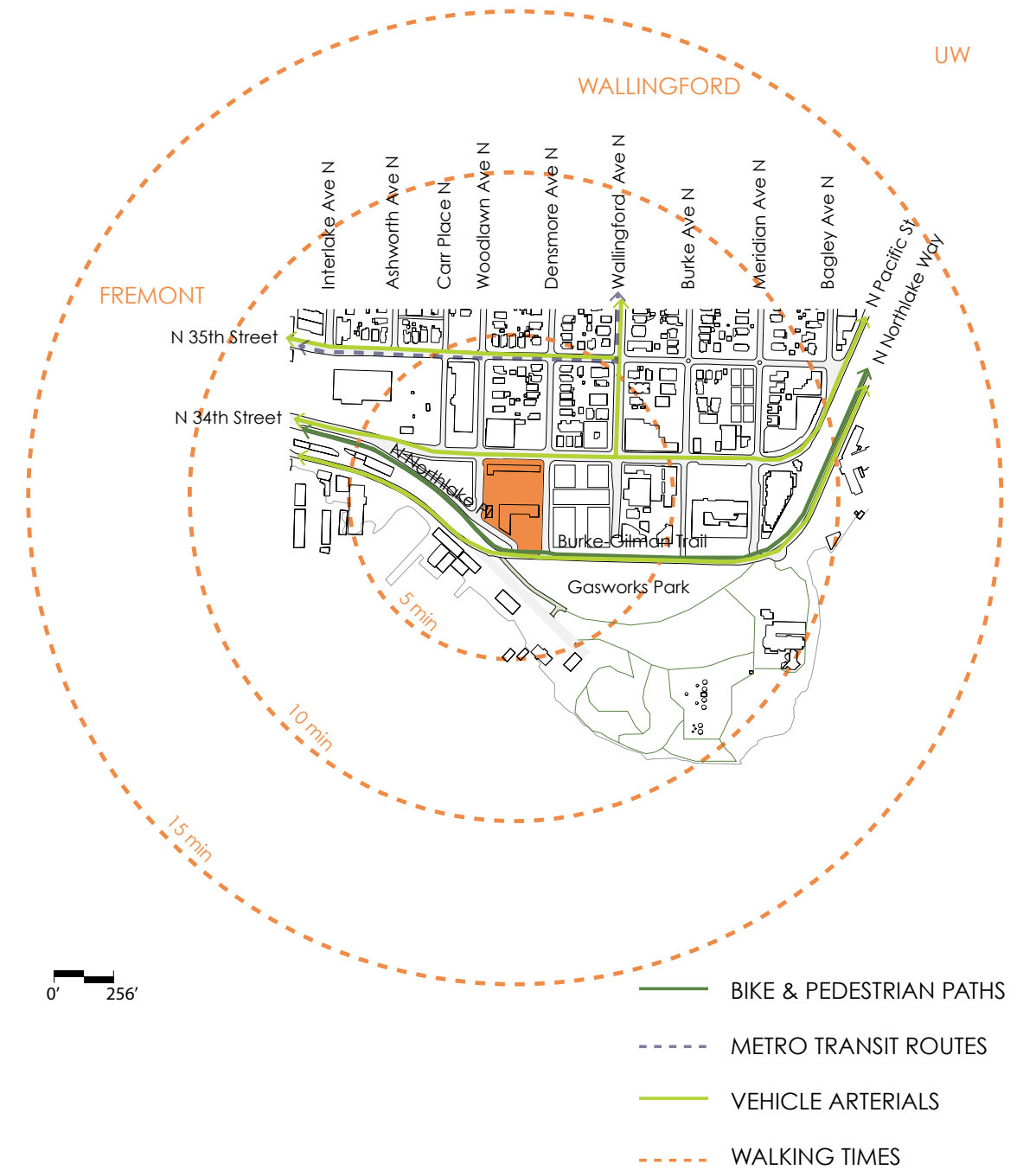


Figure 29: The site is walkable to Fremont, Wallingford, and the University District. It is bordered by the Burke-Gilman Trail and Gasworks Park to the south.



Figure 30: The North Shore of Lake Union with Gasworks Park in the foreground and single family residences receding towards Greenlake in the distance, 1971. Image: The Seattle Times

including the Standard Oil Company (Figure 30).

Standard Oil Company (later operated by Chevron) opened a fuel storage facility in 1927 to meet increasing demand from the automobile industry. The buildings were designed by Standard Oil's in-house architects. In 1982 the site was purchased by Metro Transit with the intent to buy and store discounted, bulk diesel fuel for its transit operations.² Between 1982 and 1989 Metro stockpiled diesel fuel in the original Standard Oil tanks but discontinued the practice in 1992 and converted the site to a maintenance facility.³ In 1999 the fuel storage tanks were removed during an effort to remediate site contamination. Touchstone Development purchased the site in 2006 and it was nominated as a historic landmark in 2007. The site failed to

receive this designation and now plans are underway to demolish the structures in Spring 2014 and erect an office building with street retail and a public viewing area designed by architecture firm Perkins Will.⁴

Originally, the site consisted of Standard Oil's main facility, still in existence, and a parcel to the southeast with dock access to Lake Union.⁵ Barges would dock in Lake Union and pump fuel to the main facility's storage tanks via underground pipelines. From there, fuel would be pumped into delivery trucks for transportation to local distribution centers serving the public.⁶

The main facility was composed of five elements: the north building used for garages and containing a pump house, the south building used

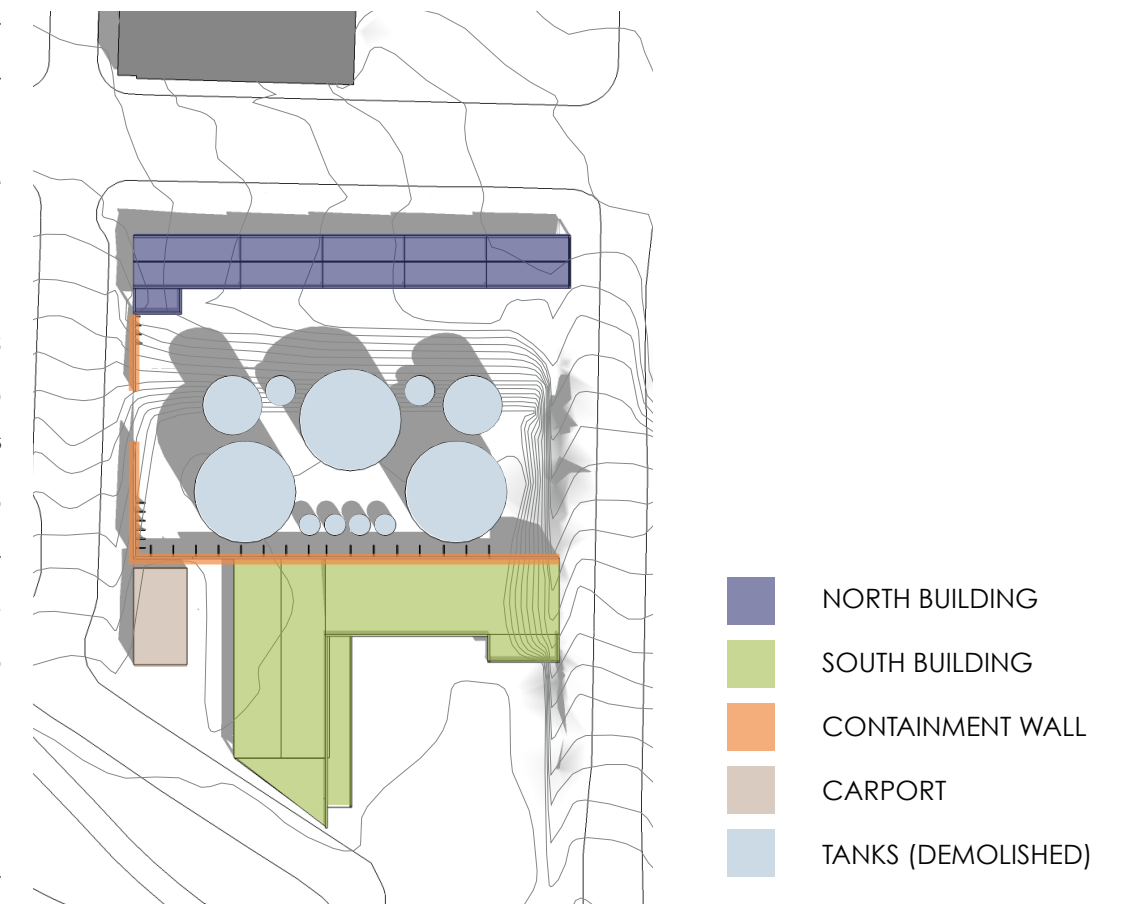


Figure 31: The original site plan of the Standard Oil facility, 1927-1999. Image: Historic Landmark Nomination Form

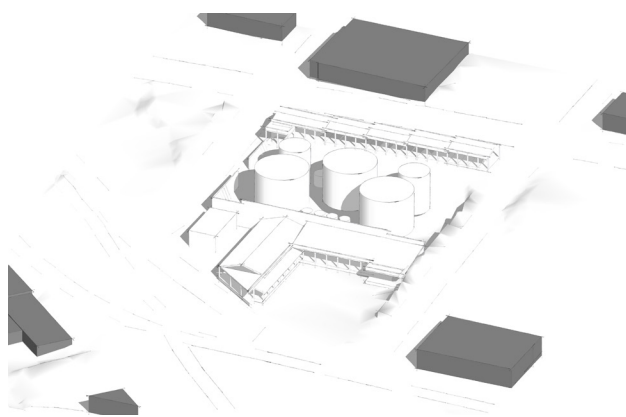


Figure 32: Original condition of the Standard Oil facility, 1927

for offices and barrel storage, a containment wall partially surrounding the central courtyard, a carport at the southwest corner (now demolished), and oil tanks that once occupied the center of the site but have since been removed (Figure 31). Site topography slopes steeply to the southwest with a 38-foot elevation gain. The parcel is rectangular in shape with the southwest

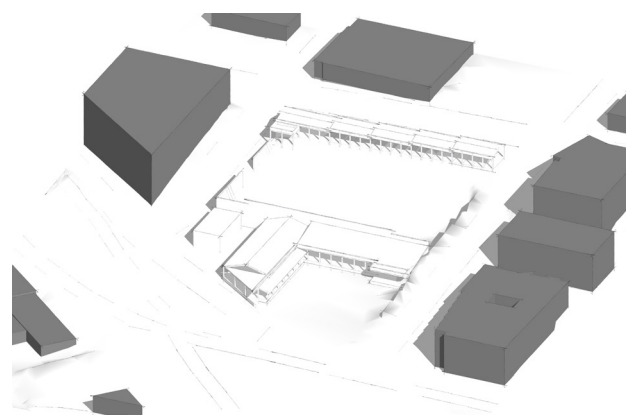


Figure 33: Existing condition of the Standard Oil facility, 2014

corner cut off by N. Northlake Place. Today, the site contains three buildings (Figure 32 and Figure 33). The north building runs east-west along N. 34th Street, the south building occupies the lowest portion of the site, closest to the Burke-Gilman Trail, and the carport is a utilitarian, open-air structure sitting on the southwest corner. These three structures surround a flat, paved courtyard

space, where Standard Oil storage tanks once stood. The courtyard is still bordered by the concrete "containment wall."

NORTH BUILDING

The north building, 7,182 sf,⁷ housed Standard Oil Company's garage, staff rooms, and workshops. The pump room is a small appendage on the southwest corner of this otherwise linear building (Figure 37). The building is cast-in-place concrete with an exposed concrete floor and concrete columns that were pushed to the perimeter to maximize floor area. The gable roof is supported by steel trusses and the building is clad with light-colored stucco with blue trim. It is divided into five segments that march down N. 34th Street to the west (Figure 34). Each segment is divided into 4-5 bays and featured a roll-up

garage door that is now sealed shut (Figure 35).

The western-most segment has windows instead of roll-up garage doors, indicating that this space was used for personnel, perhaps as staff rooms. Three red brick window sills on the east and west elevations are the remnants of the original windows, now in-filled (Figure 37). Originally, this building would have been naturally daylighted but its skylights were covered in 1985. The building has minimal decoration but each corner and peak of the gable roof is capped by small, red concrete hemispheres (Figure 38). The south elevation faces the central void space that once housed the fuel storage tanks. This facade has no windows or doors but is articulated to define the five structural segments. Today, the north building is a storage facility for Wallingford



Figure 34: The north building at N. 34th Street and Woodlawn Avenue, 1937. Image: Washington State Archives, Puget Sound Regional Branch.



Figure 35: The north building's roll-up garage doors and unique floor condition, 2013.



Figure 36: The north building's sloped and flat floor condition to accommodate the sloped topography of 34th Street, 2013.

community organizations and recently held King County voting records.⁸

The interior has exposed concrete floors and walls for fire protection.⁹ The interior floor consists of a series of level parking pads and sloped transitions to follow the natural contour of N. 34th Street (Figure 36). Original details such as the roll-up garage door fixtures, push-button lights, and a sliding fire door still exist.¹⁰ The pump room contains a series of valves once connected to each fuel storage tank, all located against one wall, and a vat that was filled with animal blood which was used as a fire suppressant.¹¹

SOUTH BUILDING

The "L" shaped south building, 10,694 sf,¹² sits on the lower portion of the site. Like the north build-

ing, it is constructed of cast-in-place concrete with a steel-truss gable roof and covered in light-colored exterior stucco siding. The building is at grade on the south side but the north facade is partially underground and braced against the containment wall. A concrete parking lot occupies the crook of the "L" and a loading dock mediates between the parking area and floor of the south building (Figure 50).

The northeast arm is divided into ten structural bays. The three easternmost structural bays project forward slightly to be used as loading docks (Figure 50). The following six bays are either in-filled with concrete block or punctuated with windows, doors, or concrete roll-up garage doors. The final structural bay is under a covered porch, the point at which the two arms meet



Figure 37: The entrance to the pump house along Woodlawn Avenue, 2013.



Figure 38: Red globes kiss the corners throughout the complex, 2013.



Figure 39: The south building's covered porch and loading dock, 2013.



Figure 40: The facade under the south building's covered porch, 2013.



Figure 41: The interior of the east arm of the south building, 2013.

(Figure 39 and Figure 40). An accessibility ramp runs the length of the northeast arm. A shed roof, supported by steel trusses, protrudes from the containment wall (Figure 41). Skylights, covered in 1985, punctuate the shed roof along with ventilation shafts added for Metro Transit's paint shop.

Originally, the northeast arm was used for oil delivery and storage. The steel roof trusses provided large floor expanses to maximize barrel storage capacity (Figure 41). Like the north building, the bare concrete floor and walls provided fire protection. Metro Transit later used this wing for carpentry and painting.¹³ The steel roof trusses and ductwork are clearly visible in the open space.

The southwest arm of the "L" is trapezoidal-shaped with the southwest edge following the street edge of N. Northlake Place, a minor roadway (Figure 50). The angled southwest facade is punctuated by five openings, four with aluminum-framed windows and one with a ventilation panel. The main roof structure of the southwest



Figure 42: The carport was constructed in 1991 after the original structure was demolished. 2007. Image: Historic Landmark Nomination Form

arm is a steel truss gable roof but a flat roof covers the angled southern appendage and a shed roof covers the porch on the east facade. The porch is supported by concrete columns and divided into six bays (Figure 39). Two sets of stairs provide access to the covered porch. A series of aluminum-framed windows and doors punctuate the stucco envelope (Figure 40). The west



Figure 43: The original carport, 1937. Image: Washington State Archives, Puget Sound Regional Branch.

facade, facing the carport, is articulated into eight structural bays with a series of concrete block in-fill, windows, doors, and roll-up garage doors. Light monitors punctuate the roof at each structural bay but are now covered with corrugated metal. A ventilation shaft protrudes out of the northernmost light monitor. The same spherical detailing adorning the north building caps

each corner.

Standard Oil used this wing for its corporate offices. In 1972, 1988, and 1991 a series of interior renovations led by architects James Ellison (1972 renovation) and John Walser (1991 renovation) converted the warehouse space to private offices, a lunchroom, and locker rooms.¹⁴ The renovations resulted in interior partitions, drop ceilings with fluorescent lights, and carpeting. The space is currently in a state of disrepair; it is now vacant and occupied by squatters.

CARPORT

Built in 1991, the open-air carport, 726 sf¹⁵, is just west of the south building (Figure 42). Divided into three bays, the shed roof protrudes from a concrete masonry unit (CMU) wall and is sup-



Figure 44: The buttresses of the containment wall facing the interior courtyard. 2014.



Figure 45: The fuel storage tanks originally occupied the central courtyard, 1937. Image: Washington State Archives, Puget Sound Regional Branch.



Figure 46: The containment wall facade facing Lake Union still shows evidence of the original "Standard Oil" sign. 2014.

ported by steel beams and concrete columns. The original structure on this footprint mimicked the form and materiality of the north and south buildings (Figure 43).

CONTAINMENT WALL AND STORAGE TANKS

The central space once contained eleven storage tanks but is now empty and surrounded

by a concrete containment wall with buttresses (Figure 45 and Figure 44). The containment wall divides the site roughly in half and the Lake Union-facing facade still shows evidence of the original Standard Oil sign (Figure 46).

Metro Transit most recently used the remaining flat concrete pad for storage and to park and

repair transit vehicles. The main entrance to this area is off Woodlawn Avenue N. and a secondary, pedestrian entry is located off Densmore Avenue N..

BUILDING INVENTORY

Prior to design the buildings were sketched, measured, and evaluated for their potential to

create lineage based on durability, materiality, historical character, and visibility. In the north building the structural bays and openings along N. 34th Street were determined to have the highest potential for lineage (Figure 48 and Figure 49). The in-fill, made of lower quality material, was deemed less important. The interior quality of the north building has the most potential of the entire complex and served as inspiration for the massing scheme. Each vehicle bay is marked by the structural grid as well as a change in floor height (Figure 35 and Figure 36).

In the south building the covered porch, loading dock, and containment wall were identified as having the most potential and the exposed structure of the former paint shop was considered secondary (Figure 50 and Figure 51). From

the pedestrian vantage these are the most striking features (Figure 39, Figure 40, and Figure 41). The gable roof structure has less potential since it is not visible from the pedestrian vantage.

The containment wall is painted on the street-facing facade with exposed buttresses jutting into the interior courtyard (Figure 44 and Figure 46). The facade facing Lake Union still shows a faint image of the original Standard Oil sign, giving it high potential for creating historical lineage (Figure 46).

CONTAMINATION

The site was long used as a fuel storage facility, resulting in extensive contamination. Metro's 1992 renovation revealed widespread petroleum contamination and in 1999, Chevron and



Figure 47: Containment wall detail along Woodlawn Avenue N., 2013.

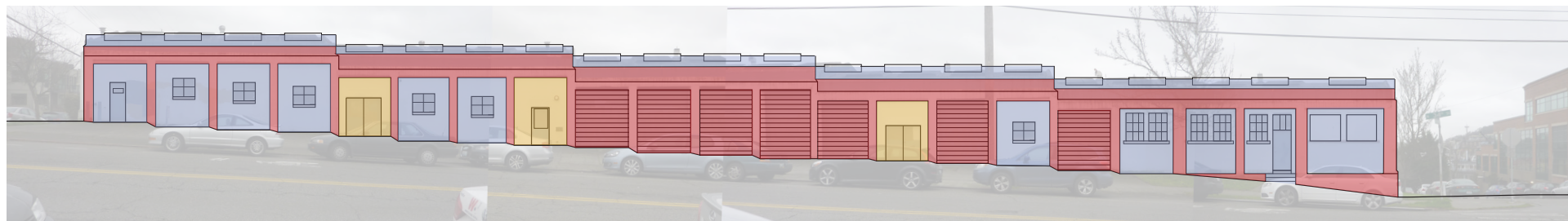


Figure 48: Inventory of the north building, Elevation

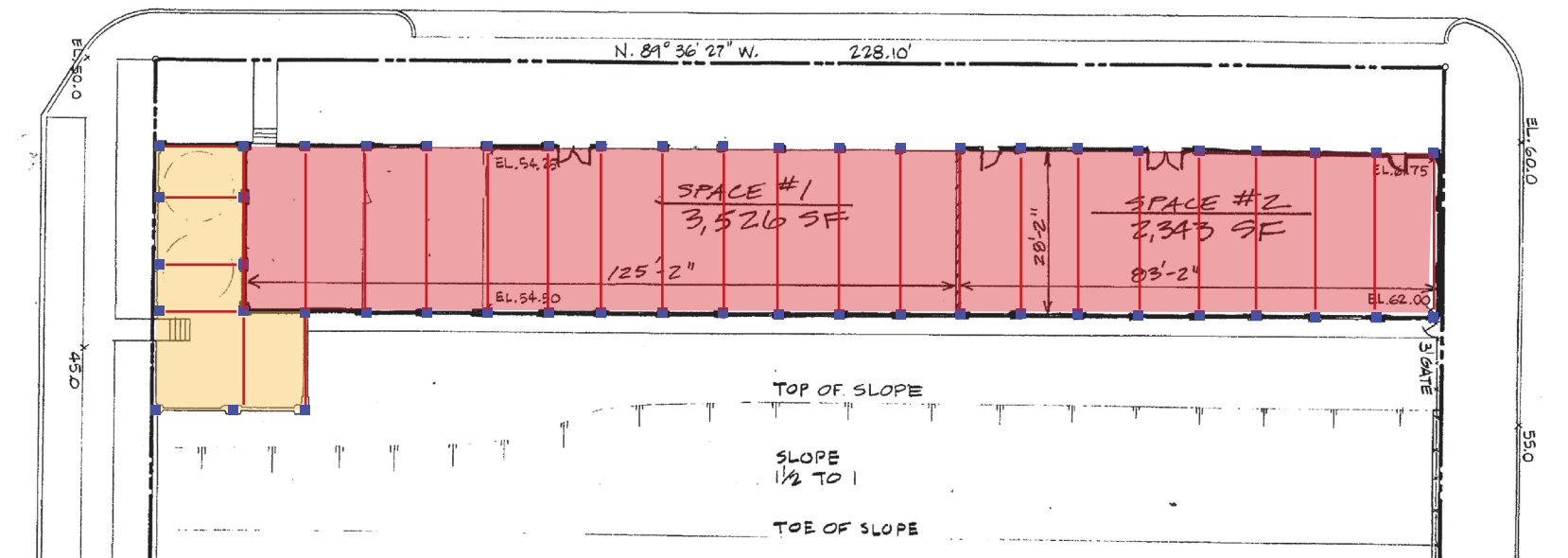
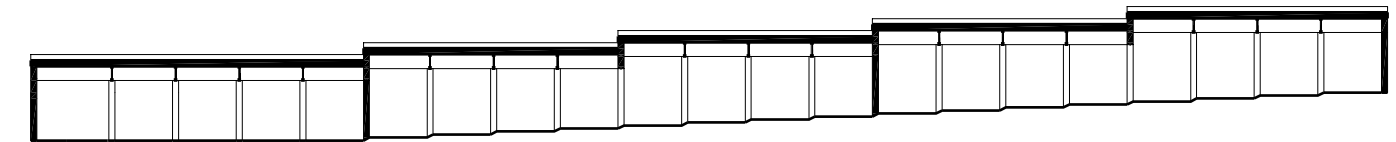


Figure 49: Inventory of the north building, Section + Plan

King County collaborated with the Washington State Department of Ecology to develop a cleanup strategy.¹⁶ They identified toxins such as petroleum, benzene, toluene, poly aromatic hydrocarbons (PAHs), dissolved lead, and arsenic in shallow and deep soils, as well as the site's ground water.¹⁷

Toxic site clean-up can follow several strategies: removing the contamination or isolating the contamination and sealing it in place. Gasworks Park, for example, is located just south of the site and was once also highly contaminated. There, clean-up crews pushed contaminated soil into a hill formation and capped it. Today, the capped hill is a favorite among Seattle residents for festivals, flying kites, and enjoying views of downtown, with many park-goers blissfully unaware

that they are standing on contaminated soil.

The clean-up strategy currently proposed for decontaminating the Standard Oil facility site is building demolition and soil removal. For purposes of the proposed food preservation facility, a superior strategy would be to cap the central open space where the fuel storage tanks once stood. This way, the most contaminated area of the site could be reused as public open space with the courtyard's void retained as a historical record.

STANDARD OIL IN SEATTLE

Standard Oil was an important part of Seattle's history. The company opened plants across the state in Spokane, Seattle and Tacoma and in 1907, some believe, opened the first service sta-

tion in North America at the intersection of Holgate Street and Western Avenue. In 1922 Standard Oil began oil exploration in Alaska and made Seattle the port through which all Alaskan oil traveled.

Standard Oil operated ten plants in Seattle with each plant located close to rail and/or water.¹⁸ The buildings were sited to streamline the process of moving oil into tanks and from tanks into various distribution vehicles.¹⁹ While the Wallingford site was ideal for its proximity to rail and water, its steep slope was less desirable. The plant had to be designed specifically for the site. Buildings at other Standard Oil sites tend to sprawl across flat ground but the Wallingford site is concentrated and terraced (Figure 52).²⁰

Design features common to all Standard Oil facilities included a need for fire protection, a large open floor area, and natural daylight. All of its buildings combined cast-in-place concrete for fire protection and steel trusses to maximize open floor area. These features possess the characteristics Brand believes are essential for long-lasting, flexible buildings.

Further, these same architectural features meet the needs of food preservation centers. The 1946 publication "Community Canning Centers" outlined several ideal features for a preservation facility, among them open floor plans, natural daylight, and concrete floors.²¹

THE SITE TODAY

Light industrial activities such as marine services



Figure 52: A typical Standard Oil facility on flat ground near the railroad, 1916. Image: Museum of History and Industry



Figure 53: Figure ground of the Wallingford neighborhood showing a mixture of industrial, commercial, and single and multi-family residential.

and lumber mills once occupied neighboring properties. However, today the area features a mixture of residences, businesses, and light industry (Figure 53). The area contains several multi-family, mixed-use retail developments as well as some modest single family homes concentrated just northeast of the site. The site is bordered by Essential Baking Company's cafe, baking facility, and distribution center to the north; a mid-rise office building to the west; a mid-rise, mixed-use residential complex to the east; and Gasworks Park to the south. The City of Seattle Solid Waste Transfer Station is located two blocks to the northwest (Figure 53). The site is zoned for a 45-foot height limit but the neighborhood is trending towards increasing the limit to 65-feet (Figure 54).

While the Wallingford Preservation Center intends to benefit the city at large, it is particularly well sited in Wallingford because this neighborhood has a very active urban orchard and P-Patch network. Wallingford's urban orchard yields the second-highest fruit harvest, has the second-highest number of privately-owned fruit tree donors, and has the most volunteer fruit pickers.²² In 2005, the Wallingford neighborhood yielded 500 lbs of fruit; by 2012 the harvest yielded 3,675 lbs of fruit. While plums, apples, and Asian pears are most common in the Wallingford area, cherries, grapes, pears, kiwis, and raspberries also are harvested.²³ The site is currently surrounded by community gardens with the Fremont, Good Shepherd, and University District P-Patches all located within a one mile radius.

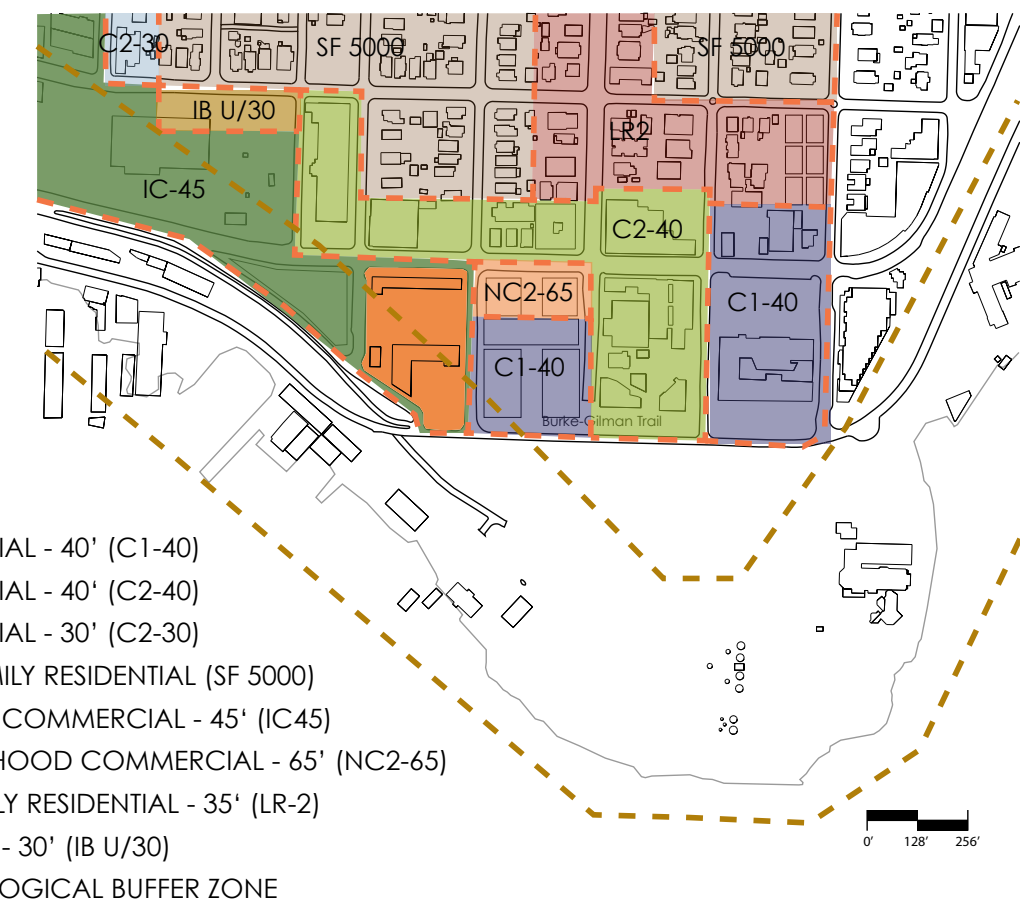


Figure 54: The site is zoned Industrial Commercial to 45' but the neighborhood is trending towards a mixed-use 65' height limit.

The site also is close to many farmers' markets, another source of fresh, local produce that could be used for preservation activities. Wallingford has the highest concentration of farmer's markets in Seattle, and the Ballard, Fremont, Greenlake, Phinney Ridge, University District, and Wallingford farmers' markets all are within 2.5 miles of the site.

The proximity of fresh fruits and vegetables, central location, and site and building characteristics make the former Standard Oil facility an ideal location for inter-generational adaptation. The structures are utilitarian and geometric, prototypical Low Road buildings that garner little attention and possess great flexibility and adaptivity. These same characteristics defined MIT's Building 20 as an inter-generational building,

able to adapt to different needs for decades.

The buildings at 3301 Densmore Avenue N. are ready for their inter-generational journey, having finished their primary purpose and now poised to adapt to a new use.

While the buildings are Low Road, the site location is High Road - waterfront property nestled on a major thoroughfare connecting University of Washington and Fremont. Real estate values in the area have increased dramatically, with nearby properties under development. The combination of Low Road utilitarian buildings on a desirable High Road site offers a prime opportunity for sustained inter-generational reuse.

NOTES

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4. "Northedge," Touchstone Development, accessed 1/1/2014, <http://www.northedgeseattle.com/index.html>.
5. Kimberly Demuth, "Standard Oil Building" (Seattle: The City of Seattle Landmarks Preservation Board, 2007), 10.
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8. Paul Klansnic, Project Manager at Touchstone Development, Interview by author, Personal interview and tour, October 12, 2013.
9. Demuth, "Standard Oil Building," 6.
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11. Demuth, "Standard Oil Building," 6.
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15. "3301 Densmore Ave N 98103."
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17. Touchstone Corporation, *Northlake Technology Center Site Cleanup Action Environmental Checklist*, 4.

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19. Demuth, "Standard Oil Building," 14.
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21. *Community Canning Centers*, 3.
22. *Community Fruit Tree Harvest, 2012 Annual Report*, 4-6.
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INTER-GENERATIONAL DETAILS



6: INTER-GENERATIONAL DETAILS

An inter-generational approach to the urban environment transcends program and site. For users, the power of an inter-generational built environment lies in its details. Most buildings today serve a narrow segment of the population, designed for the able-bodied, adult user. Adopting features originally developed for children, seniors, and disabled individuals will allow architecture to serve a greater community. The concept is that design "...can address the needs of every member of society."¹ This is a core component of "Universal Design," defined as the "design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design."²

Figure 55: Chapter Heading: Unstructured play space, King George V Playing Field, Ealing, London, UK. Image: <http://thesecretgardenatlas.files.wordpress.com/2013/07/p1010030.jpg?w=1440&h=400&crop=1>

The curb cut is a classic example of universal design. Originally designed for wheelchair users, the curb cut is just as useful for people pushing strollers, travelers with wheeled luggage, and bicyclists.³ Accessible bathroom stalls also exemplify universal design, as they can be appreciated by disabled individuals, parents with young children, and travelers with luggage, among others. Following William H. Whyte's statement that, "If circulation and amenities are planned with [the disabled] in mind, the place is apt to function more easily for everyone,"⁴ designing for the very young and very old can create spaces that are used by all, cherished by all, and therefore long-lasting. In short, designing for the widest range of ages and abilities creates inter-generational architecture.

Like the curb cut or accessible bathroom stall, designing for inter-generational users relies on identifying synergies between different populations and designing for the common denominator. The following presents some of the details to be considered when designing for an inter-generational environment.

MICROSPATIAL EPISODES

In *The Social Life of Small Urban Spaces*, Whyte describes seating as the most valued element of exterior space.⁵ He observed that seating areas offering protection and respite were more valued than less enclosed spaces.⁶ Children are drawn to protected seating areas as

[c]hildren are small...their smallness can make them vulnerable and insecure, so they are naturally drawn to small cubbies and small-scaled areas... Providing small microcosms within the whole gives

children a sense of safety, control and belonging.⁷

Dutch Architect Herman Hertzberger integrated this same concept into school design. Hertzberger created occupiable spaces within the building's structure,⁸ resulting in "micro-spatial" architectural moments. The Apollo Schools in Amsterdam, built in 1983 show the integration of structure, protected space for children, and seating (Figure 56 and Figure 57).

RAMPS

Using ramps for primary circulation is another strategy to increase inter-generational value. The Seattle Public Library, designed by OMA, serves a wide variety of users - from librarians wheeling book carts to patrons of different ages and abilities. The building is designed around a central ramp for not only organizing books but



Figure 56: Unstructured play space at Hertzberger's Apollo School, Amsterdam. Image: <http://wharferj.wordpress.com/category/architecture-urban-design/page/3/>



Figure 57: Protected space grows out of the architecture in Hertzberger's Apollo School, Amsterdam. Image: <http://www.flickr.com/photos/doctorcasino/2912909073/>

to provide access for a wide segment of the population (Figure 58 and Figure 59).

RAILINGS

Required by code but considered an eye-sore by many architects, railings often follow a minimalist approach. Minimalist railings may meet code requirements but serve a narrow segment

of the population. The addition of a hand-hold mid-way between the floor and top of the railing increases functionality for the young. In this manner, Alvar Aalto designed the railing in the Teaching Practice School and Gymnasium in Finland to accommodate both children and adults (Figure 60).

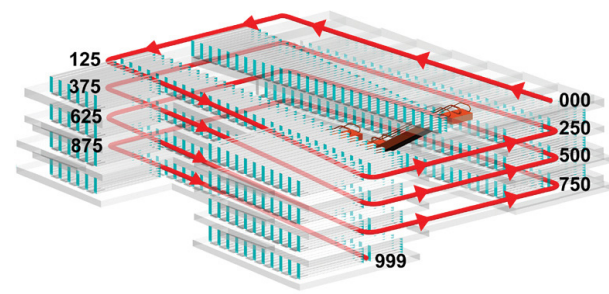


Figure 58: The continuous ramp at the Seattle Public Library. Image: www.wordsinspace.net



Figure 59: The ramp of the Seattle Public Library. Image: www.justupthepike.com



Figure 60: An inter-generational railing in the Teaching Practice School and Gymnasium (1952-54) by Alvar Aalto, Finland. Image: http://alvaraaltosarchitecture.blogspot.com/2011_04_01_archive.html



Figure 61: Unstructured playground, King's Garden, Copenhagen. Image: <http://parentinvolvementmatters.org/articles/playgrounds-in-norway-and-denmark-173.html>

MULTI-SENSORY EXPERIENCE

The use of textures and colors presents another shared design aspect to accommodate children and seniors. For children, varied use of color and texture creates stimulating environments. For seniors, the use of color and texture allows better understanding of space because it can

call upon multiple sensory methods.

Perhaps the most common approach, a rough principle of universal design, is to make information about an object or a building available through several senses at once.⁹

UNSTRUCTURED PLAY

Children and seniors are at risk of settling into inactive lifestyles that can lead to obesity or other

significant health issues. Municipal governments provide playground space and equipment for children, but the playsets, ladders, and swings designed for toddlers do not invite inter-generational interaction. Unstructured play areas, common in Scandinavia, can benefit both children and senior populations. The King's Garden play-

competencies and resiliency that they need to face future challenges. Moreover, environments that promote imaginative play develop the thinking areas of the brain, which leads to greater adaptability.¹⁰

Unstructured play areas provide older adults with active, park-like, outdoor spaces that are stimulating and fanciful yet inclusive. Inter-generational architecture allows each user to imagine himself or herself at the center of the design.

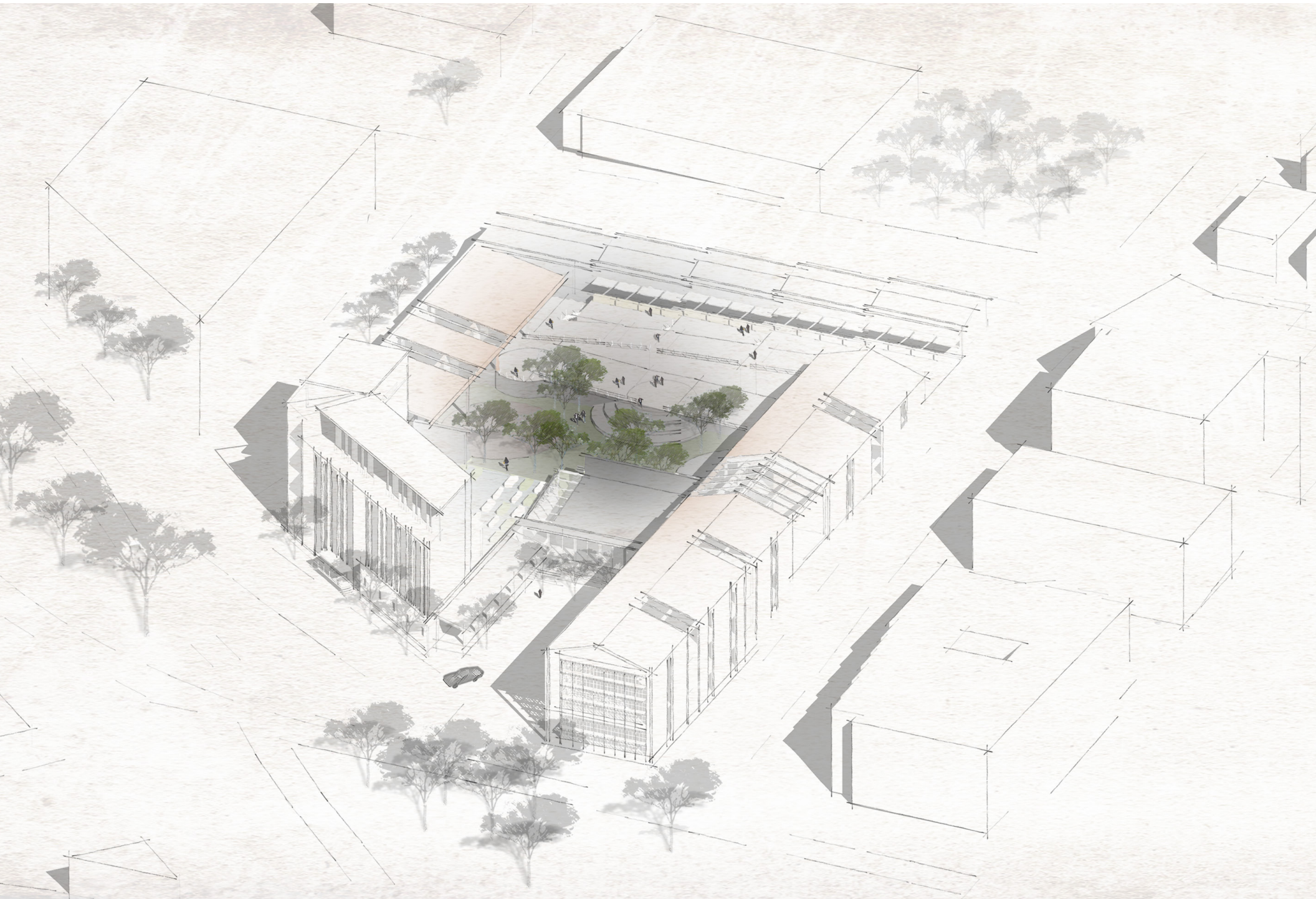
ground in Copenhagen is a collection of closely spaced stumps -- welcome seats for old bodies or challenging stepping stones for young ones.

Unstructured play areas are adaptable to multiple age groups and offer benefits that traditional playgrounds do not.

Unstructured play helps children develop new

NOTES

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DESIGN PROPOSAL

7: DESIGN PROPOSAL

The massing strategy for the complex started with a historical building inventory, the current built context, attachment to existing structures, and balancing open and built space (Figure 63). The fresh foods market will occupy the original north building with seasonal space available on the ramp (Figure 64). The ramp winds down the slope, mitigating the site's 30-foot grade-change, and terminates in the newly constructed Food Preservation Center. The northern end of the Food Preservation Center is set into the hillside and contains the Preserved Foods Marketplace. The southern end holds the preservation kitchens and restaurant and the original portion of the southern building contains spaces for gathering, assembly, and education as well

Figure 62: Chapter Heading: Aerial view of the Wallingford Preservation Center looking northwest.

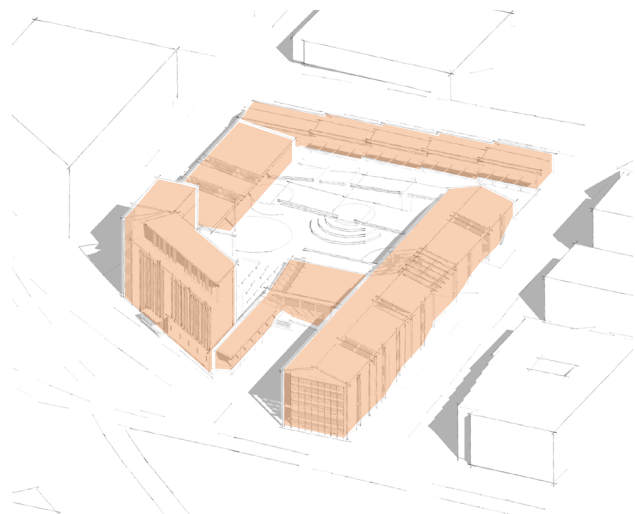


Figure 63: The massing strategy responds to the built context, the existing buildings, and frames the open space.

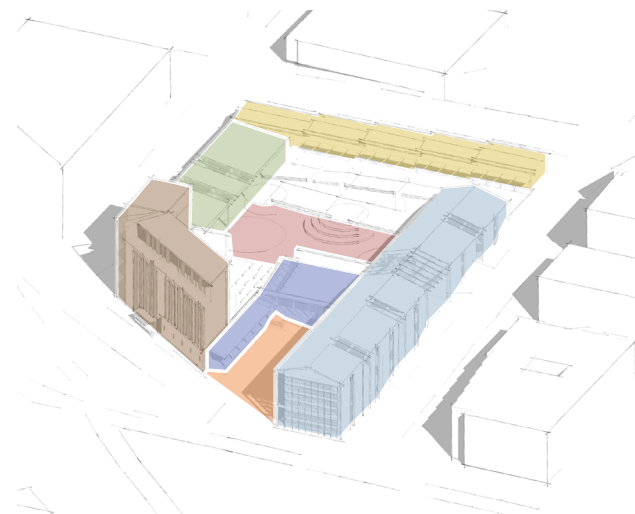


Figure 64: Program diagram

- FRESH FOODS MARKETPLACE
- FOOD PRESERVATION CENTER
- CLASSROOMS + RECIPE ARCHIVES
- RESIDENTIAL TOWER
- DAYCARE + MARKET ADMIN
- CENTRAL COURTYARD
- SOUTHERN PLAZA

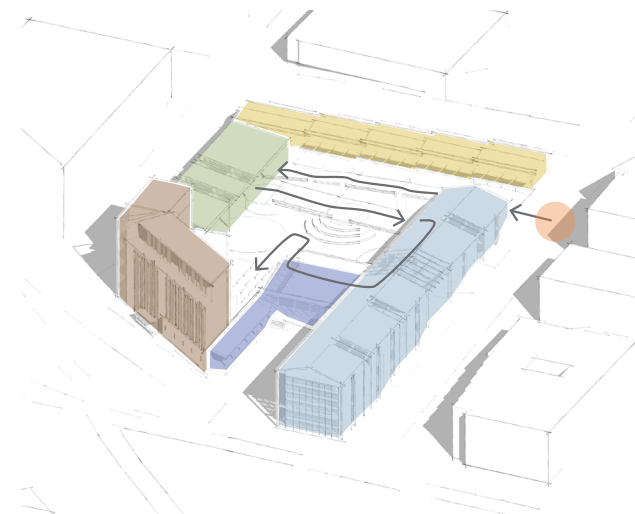


Figure 65: One path through the complex begins at the Fresh Foods Market, the highest point of the site. It then winds down the exterior ramp and into the Food Preservation Center. From here, the path continues down another level to the classrooms and recipe archives. It settles in the central courtyard.

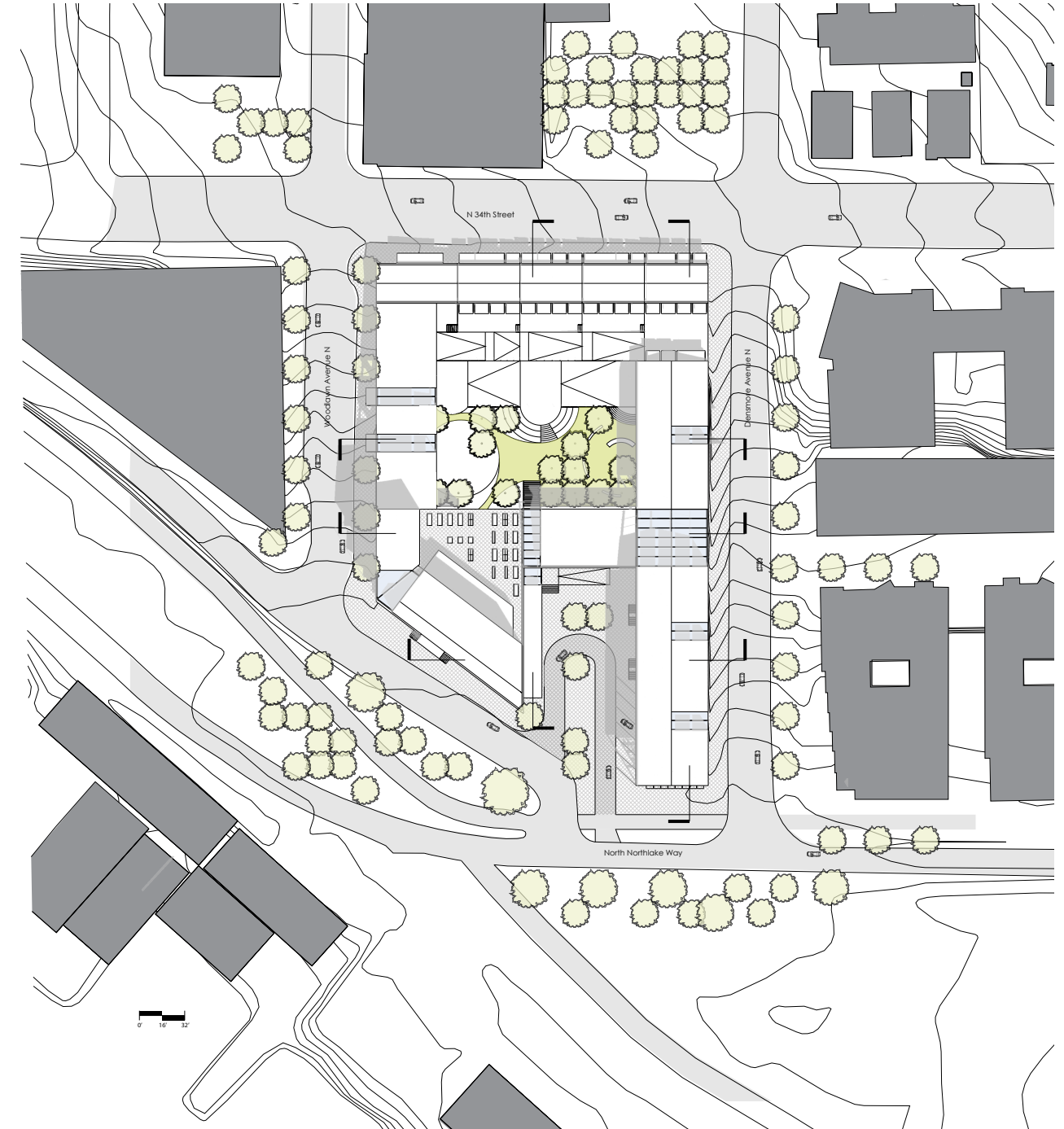


Figure 66: Site plan of the complex showing the open and built space and the central orchard extending back into the community of Wallingford fruit trees.

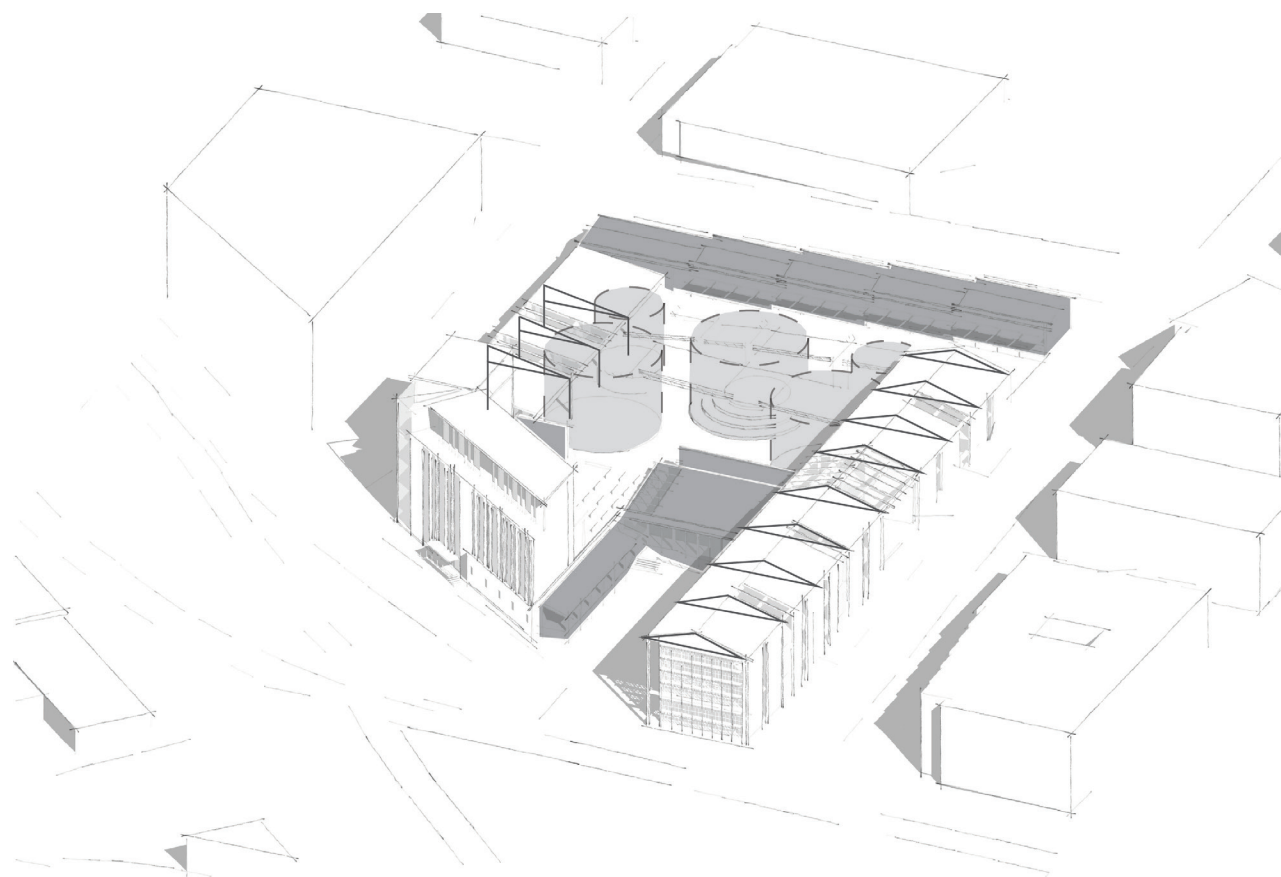


Figure 67: The preserved portions of the original structures. The north building and portions of the south building are preserved while some structure is disassembled and harvested for new buildings. The memories of the tanks are recalled in various ways in the design of the open space.

as the recipe archives. A residential tower occupies the southwest corner of the site with live/work units and a used bike shop comprising the ground floor. The residential tower is 65-feet and positioned at the lowest point of the site to retain access to sunlight and views for neighboring properties to the north. Market administration and a daycare facility is located in the addition on the west edge.

The buildings frame two outdoor spaces-- the central courtyard and southern plaza (Figure 62 and Figure 66). The central courtyard is pedestrian-focused and used for overflow on busy market days. A fruit tree orchard is planted in this space and stretches out from the center of the complex to connect with the network of Wallingford community fruit trees. The southern plaza

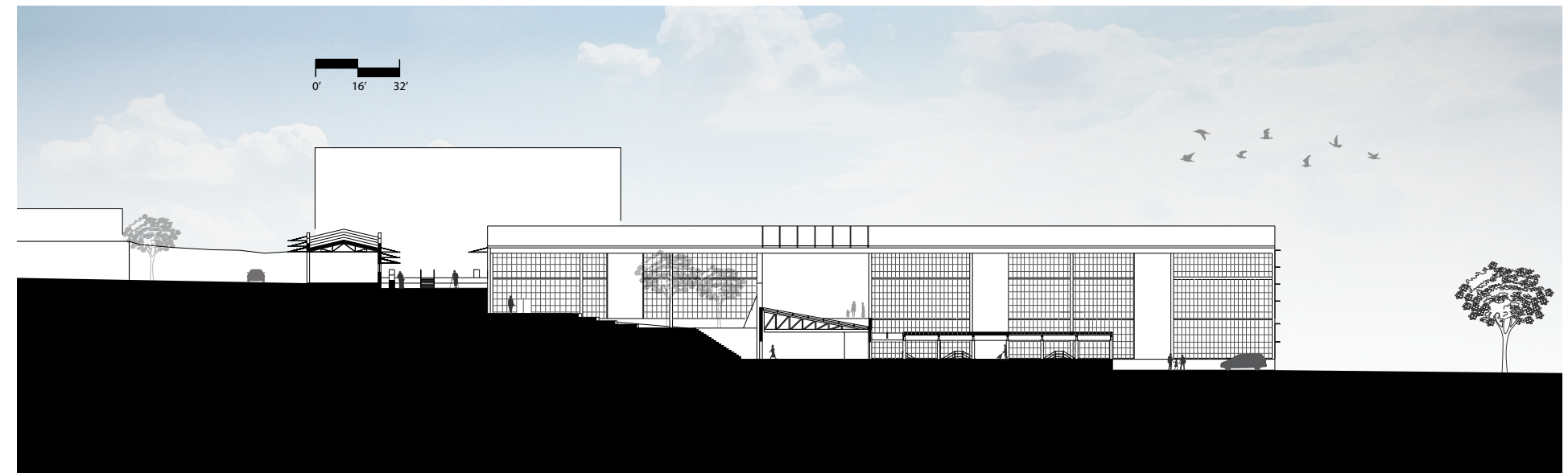


Figure 68: Section through the complex cutting through the Fresh Foods Market on the left, the orchard in the central courtyard, the stairs to the south building, and the covered porch off the southern plaza.

is a shared space much like Pike Place Market in Seattle, Washington or Granville Island in Vancouver, BC. It is a working plaza but also a pleasant one where pedestrians mix with fresh food deliveries.

There are multiple paths through the complex depending upon point of entry. One path begins

at the Fresh Foods Market, at the highest point of the site. It then winds down the exterior ramp to the Food Preservation Center. From there, the path continues down another level to



Figure 69: Approach from N. 34th Street and Densmore Avenue N.. Stalls selling fresh produce, flowers, meats, and eggs open onto N. 34th Street. The break in the buildings is the entrance to the ramp and central courtyard. The Food Preservation Center can be seen on the left.

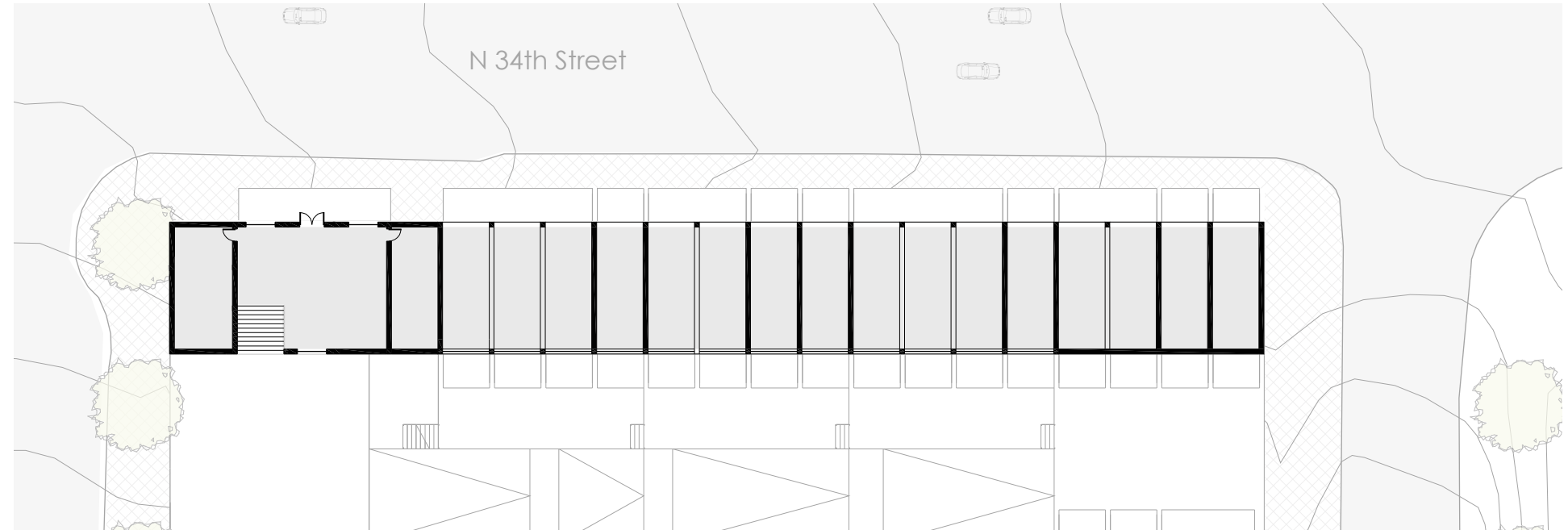
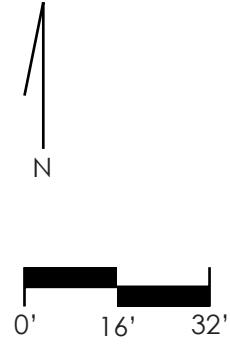


Figure 70: The Fresh Foods Market is a series of stalls opening onto N. 34th Street. The interior walls are flexible to accommodate different vendor sizes and needs. Restrooms and an entrance to market administration is located on the west end of the building.

the classrooms and recipe archives. It settles in the central courtyard (Figure 65).

The concept is to create lineage by simultane-

ously addressing past incarnations, designing for today's needs, and respecting future adaptations. The design mixes the existing structures with new insertions but respects the history of

the site and leaves room for future changes. The current condition of the north building is largely preserved as well as portions of the south building, the covered porch, and the containment



Figure 71: Vendors selling fresh and preserved foods spill out onto the ramp leading to the central courtyard and orchard. Visitors stop to admire the view of Lake Union and downtown Seattle.



Figure 72: Section through the Preserved Foods Market in the Food Preservation Center, the orchard, and the daycare with the residential tower beyond. The containment wall with buttresses frames the south side while the orchard nestles into the central space.

wall (Figure 67). The portions of the south building that are not preserved are disassembled and repurposed on site for the structures of the Food Preservation Center, the daycare, and market

administration spaces. The void of the central courtyard, leftover from the removal of the tanks, is utilized for its open space and the tank forms are recalled in various ways in the design.

FRESH FOODS MARKET

The Fresh Foods Market, located in the north building, follows the slope of N. 34th Street (Fig-



Figure 73: The ramp leads from the Fresh Foods Market to the Food Preservation Center and central orchard. Stepped seating at the location of one of the original oil storage tanks can be seen beyond. Other tanks are recalled as a playground, patio with seating, and raised lookout platform.

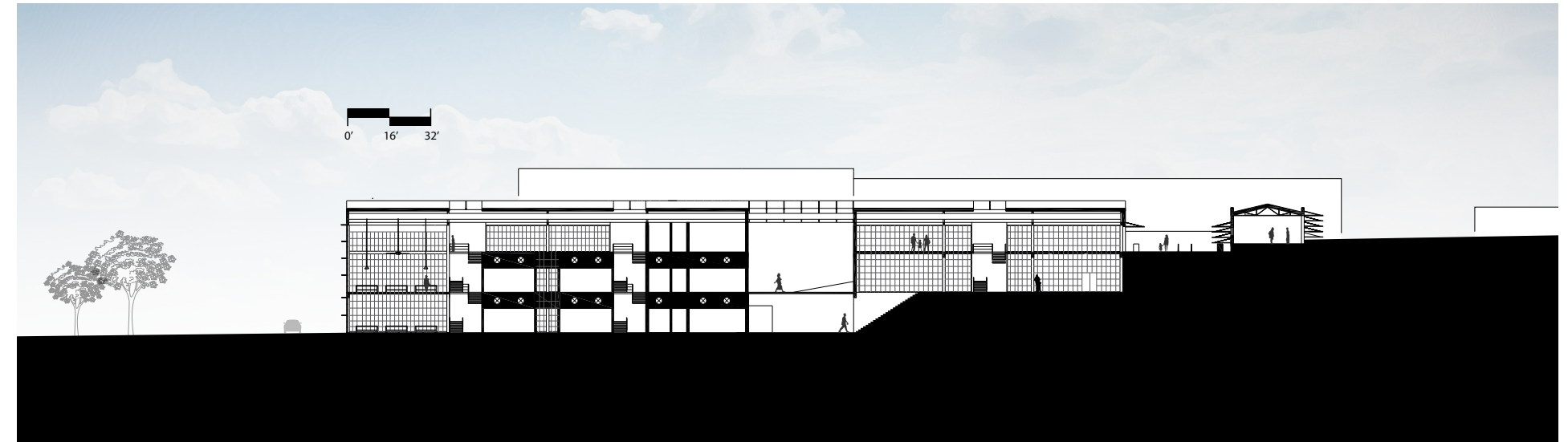


Figure 74: Section through the Food Preservation Center showing the Fresh Foods Market and Preserved Foods Market on the right, the covered breezeway in the middle, the enclosed spaces of the kitchens, and the double-height space to the south. The top floor restaurant has views to Lake Union and downtown Seattle as well as the kitchens below.

ure 69). It is divided into stalls based on the existing structural grid (Figure 70). These stalls open to the sidewalk, their entries protected by large awnings. The spaces are flexible with interior partitions able to be added or removed based on individual business needs. In warmer seasons

vendors may set up stands on the ramp, allowing customers to shop while overlooking the central courtyard, orchard, and residential tower (Figure 71).

CENTRAL COURTYARD

Proceeding down the ramp, the memories of the original tanks have taken on new forms, with each having a different character (Figure 66 and Figure 73). The tanks are reimagined as stepped seating mediating between the ramp and the orchard, an unstructured playground outside

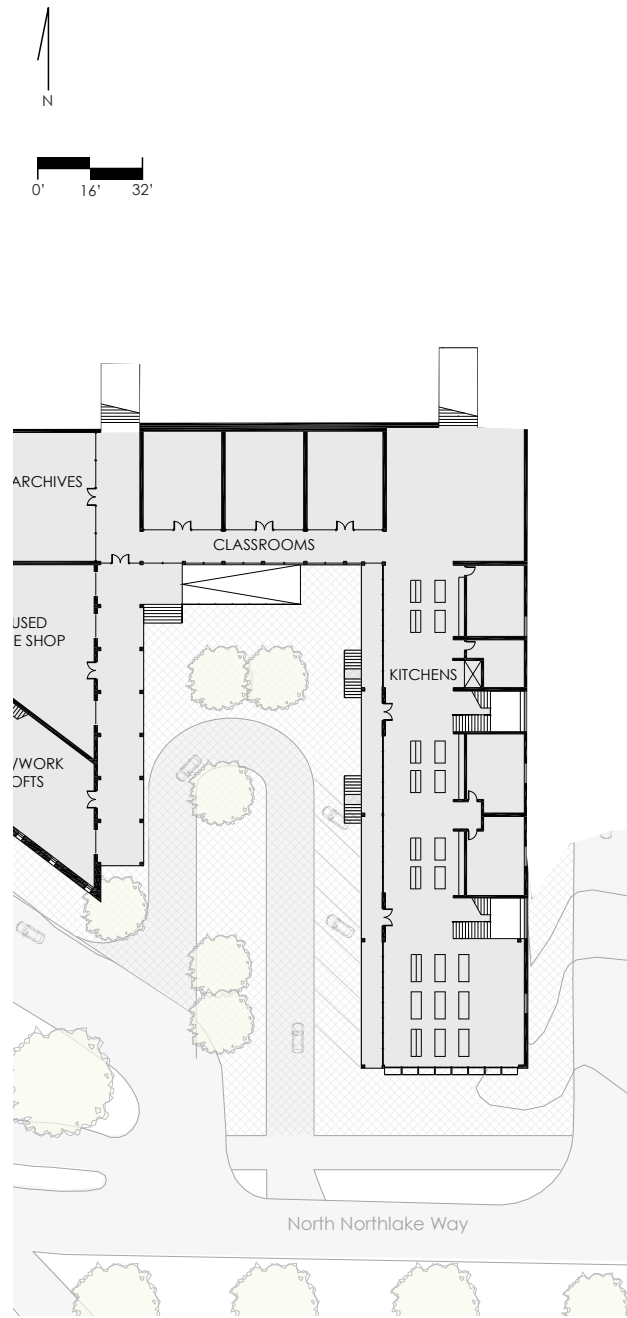


Figure 75: 1st Floor, Food Preservation Center

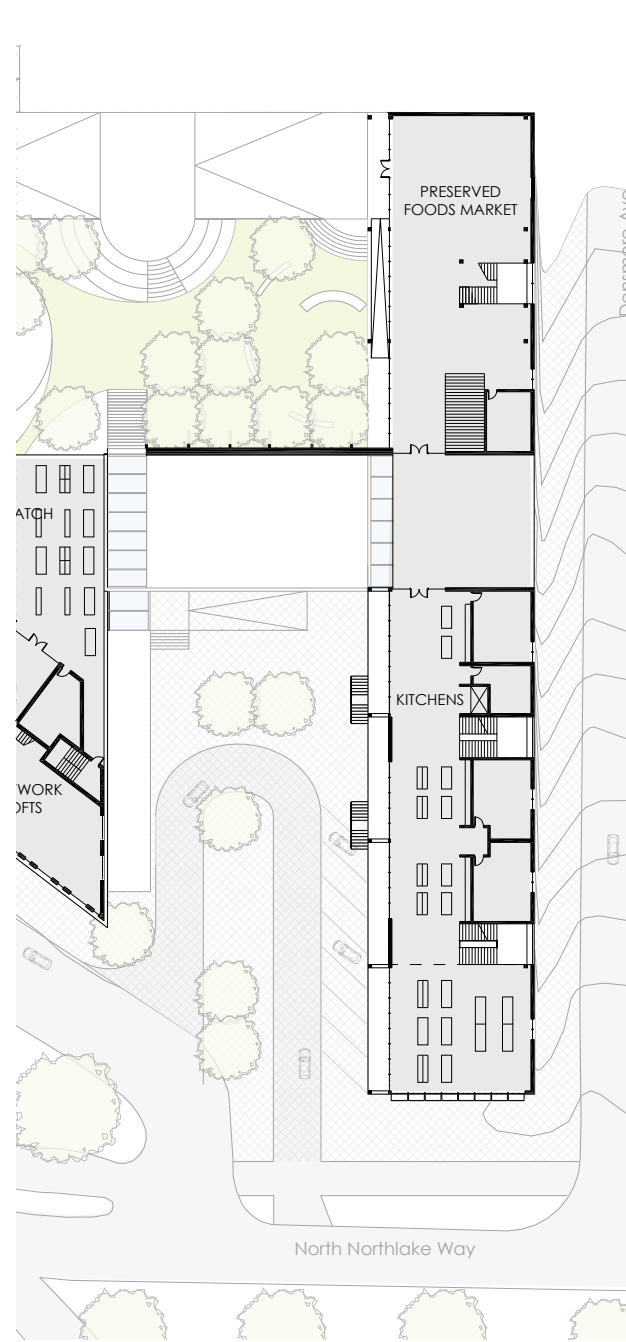


Figure 76: 2nd Floor, Food Preservation Center

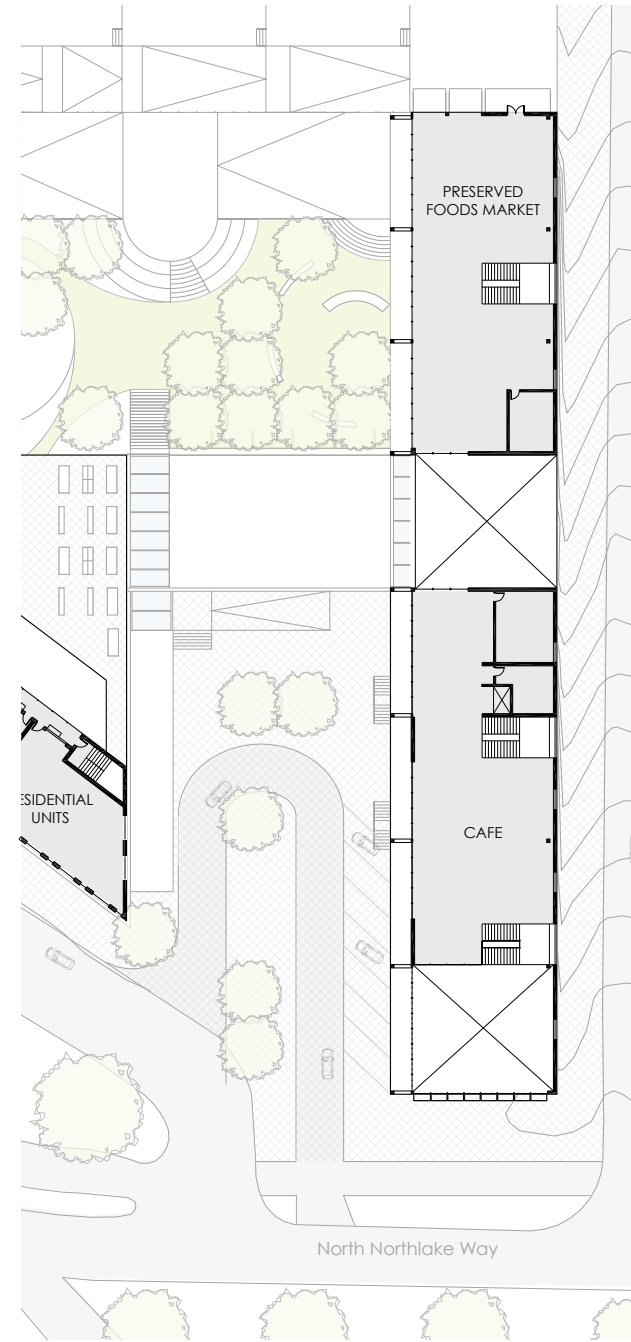


Figure 77: 3rd Floor, Food Preservation Center

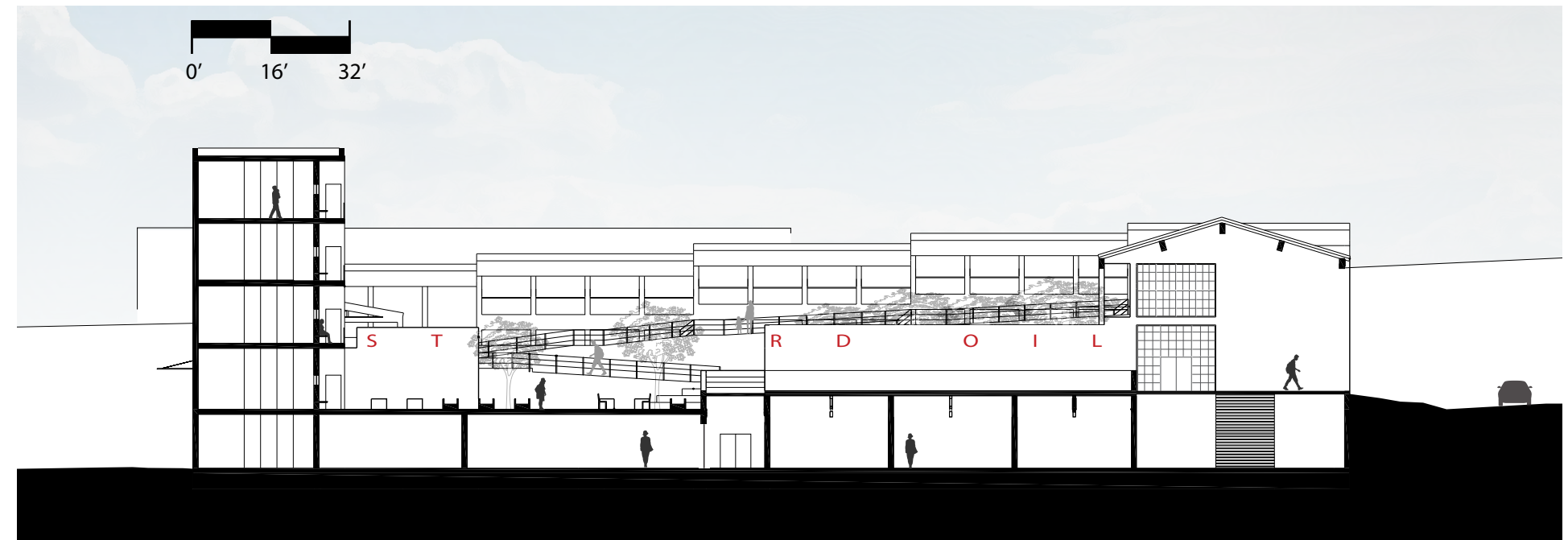


Figure 78: Section through the Food Preservation Center breezeway, the 1st-level classrooms, and the raised bed P-patch of the Residential Tower. The original "Standard Oil" sign on the containment wall can be seen beyond.

the daycare and under the covered roof, a patio with benches and a water feature outside the Preserved Foods Market, and a lookout from

the ramp. A path winds its way between the fruit orchard of the central courtyard, connecting the raised-bed P-patch garden, the daycare,

the Preserved Foods Market, and classrooms in the original south building (Figure 66).

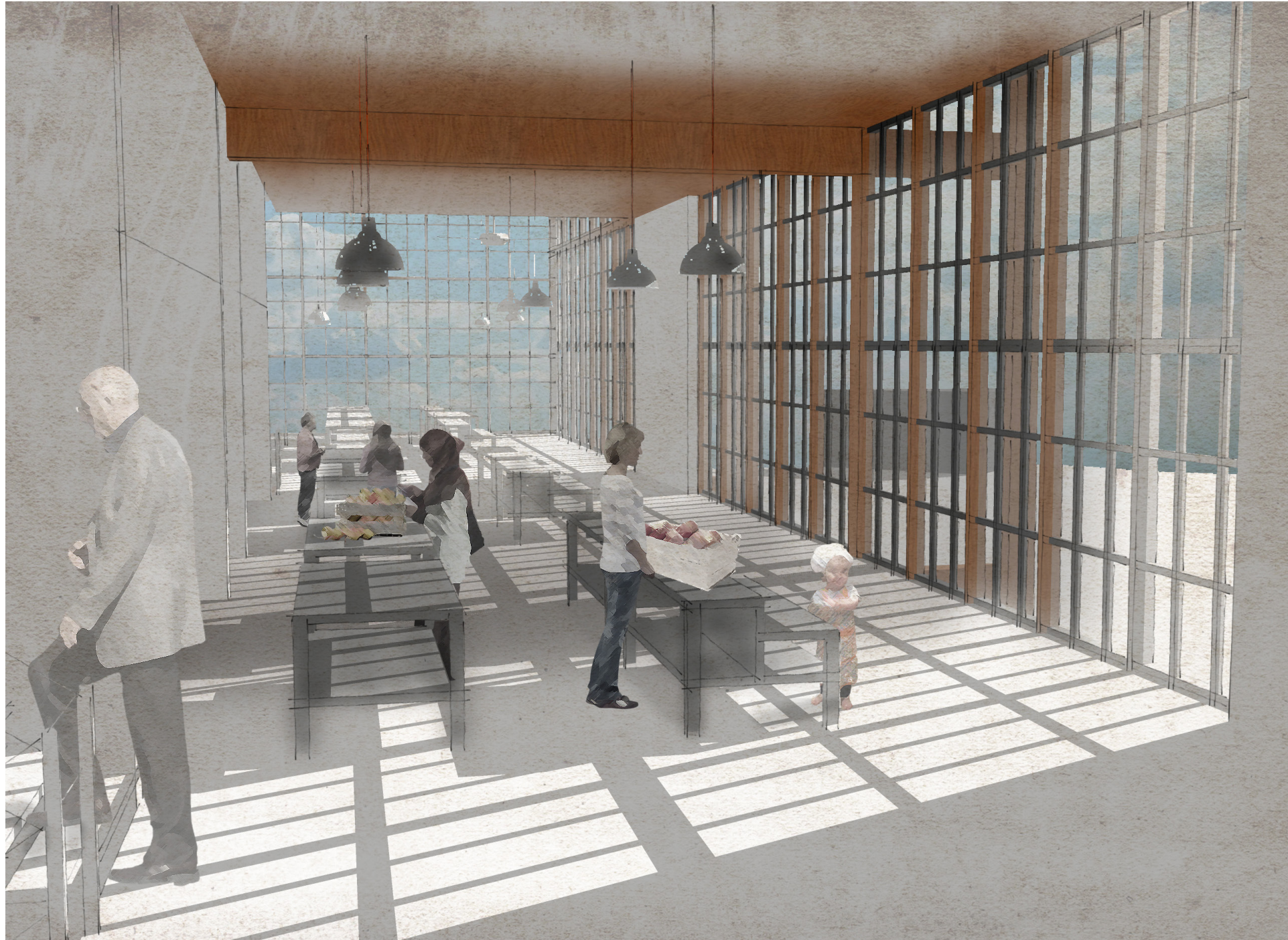


Figure 79: Workstations in the preservation kitchens accommodate different ages.

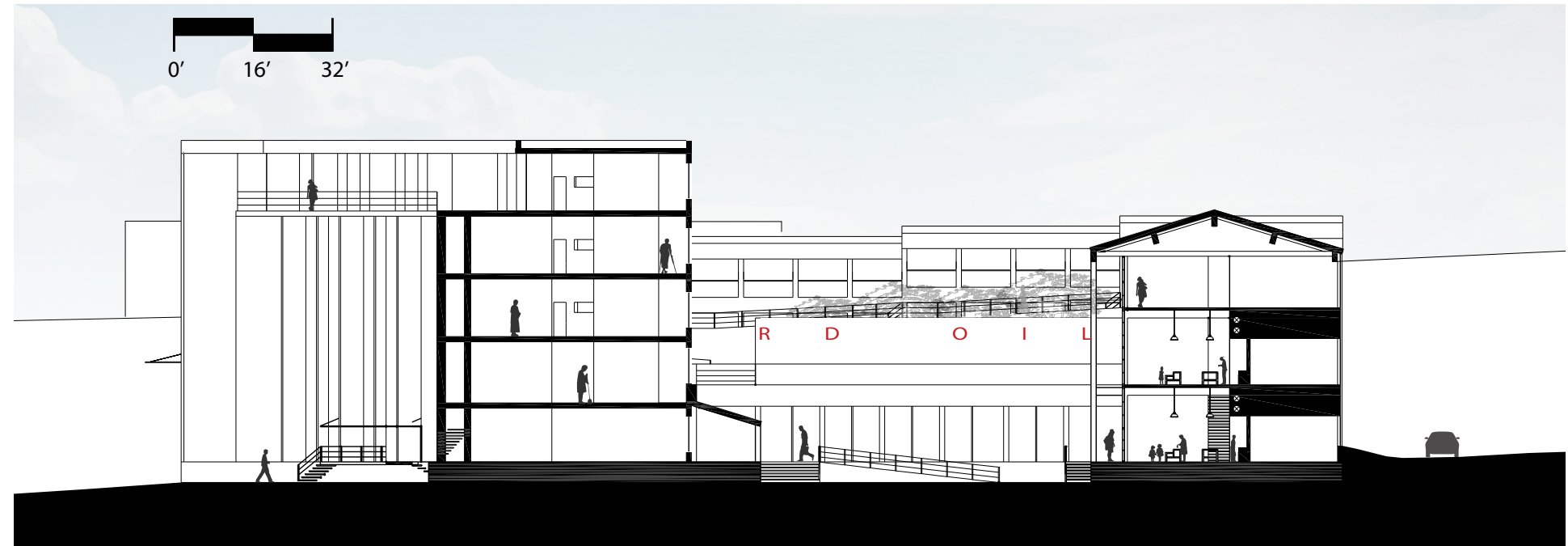


Figure 80: Section through the south plaza showing the datum of the loading dock and the relationship between the work and enclosed areas of the kitchens. The work areas will be used for prep and cooking while the enclosed spaces will be used for storage, fermenting, and dehydrating needs. The dropped ceiling accommodates ventilation for the stovetops.

FOOD PRESERVATION CENTER

The entrance to the Preserved Foods Market, located on the north side of the Food Preserva-

tion Center, is at the bottom of the ramp (Figure 73) directly across the orchard from the daycare (Figure 72). The two-story marketplace is con-

nected to the preservation kitchens by a covered breezeway (Figure 74).

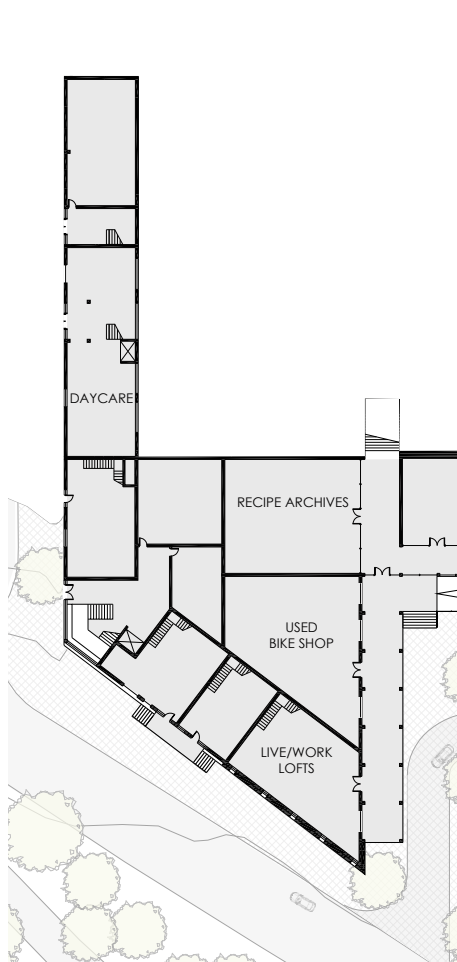
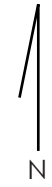


Figure 81: 1st Level

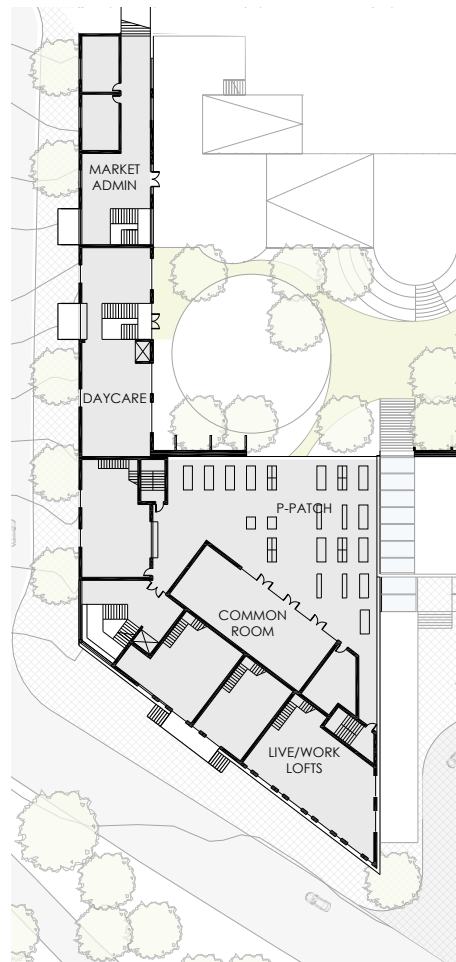


Figure 82: 2nd Level

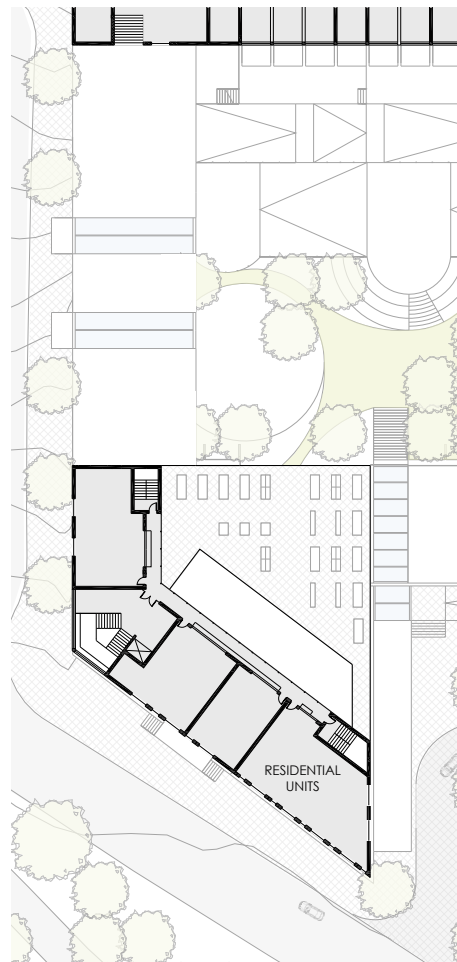


Figure 83: 3rd Level

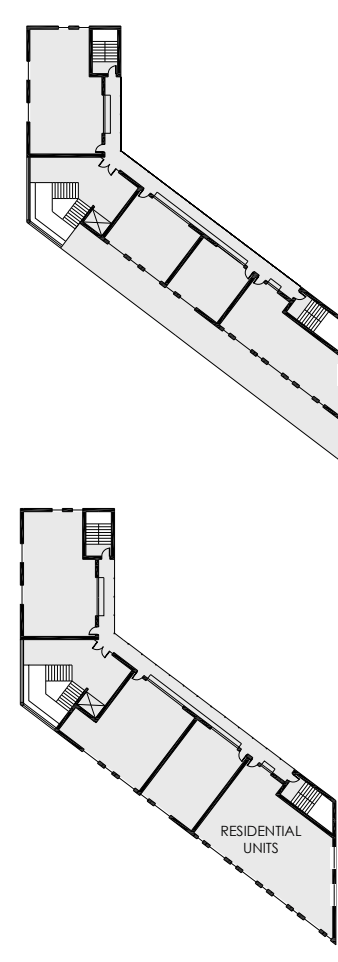


Figure 84: 4th + 5th Levels

On the south side, the Food Preservation Center stands three stories (Figure 75, Figure 76, and Figure 77). The first and second floors are preservation kitchens dedicated to canning, pickling, fermenting, and dehydrating. The kitchens have a series of open work pods with ranges, sinks, and food preparation tables as well as more enclosed spaces for fermentation and storage needs (Figure 80). The enclosed areas have dropped ceilings for ventilation ducts for the work area stovetops. The kitchens' work stations are designed to accommodate different ages with work surfaces at different heights (Figure 79).

The top floor houses a restaurant with views of the food preparation area, Lake Union and downtown Seattle. The lowest floor extends

into the original portion of the south building for classrooms and the recipe archives (Figure 78). On this floor the datum of the historic loading dock is recalled for fresh produce delivery to the preservation kitchens (Figure 80).

The buildings were designed to meet today's needs as well as allow adaptability in the future. The regular geometric form of the Food Preservation Center will allow for the repurpose of the structures in the future. Further, although the roof structure is comprised of steel trusses reclaimed from the demolished portion of the south building, the new structural members are wood. Like MIT's Building 20, a wood structure is the most versatile for purposes of future adaptation. In addition, the floorplates are narrow to maximize daylight throughout the year, the services are

exposed in many parts of the building, and the windows are operable. Like the industrial character that once defined the Wallingford neighborhood, the exterior glazing recalls the paned windows of industrial structures and warehouses. This window system's vernacular form is practical for daylighting, natural ventilation, and repairability. To design for the future, the architecture of the Food Preservation Center looks to the past.

RESIDENTIAL TOWER

The residential tower occupies the southwest corner of the site. It is five stories with the top floor set back from the street (Figure 81, Figure 82, Figure 83, and Figure 84). The first and second floors have live/work lofts to transition between the residential and commercial zones of the neigh-

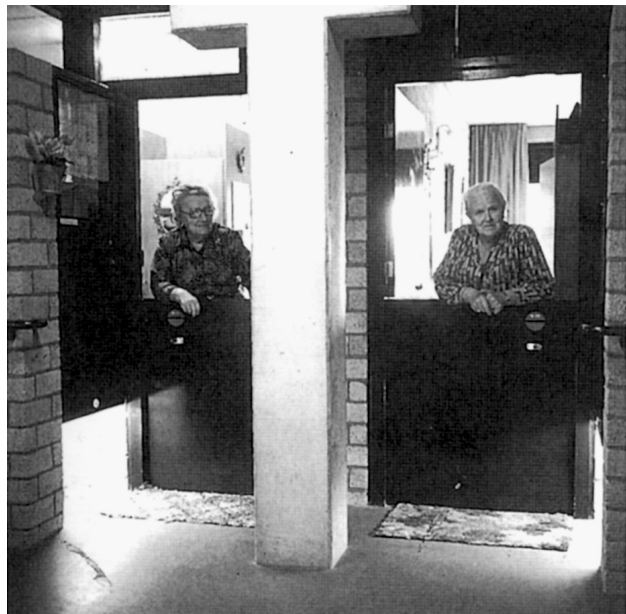


Figure 85: Herman Hertzberger's De Drie Hoven senior housing complex in Amsterdam includes intermediary space to allow residents to have interaction with neighbors. Dutch doors and large entry vestibules create a zone of semi-public/semi-private space. Image: http://philosophiesresarc.files.wordpress.com/2013/03/hertzberger_3-hoven.jpg

boring properties. The first floor also contains a used bike shop. The second floor opens to the north for a raised-bed P-patch for use by the residents and the daycare but accessible to the public. Raised beds make the P-patch accessible to small children and wheelchair users alike. A common room looks out onto the space.

The main entry to the residential tower and vertical circulation is on the corner of Woodlawn Avenue N. and N. Northlake Place. Horizontal circulation is on the north side of the exterior, providing residents with semi-private space with benches and a view towards the markets and central orchard. Herman Hertzberger's Senior Housing project in Amsterdam served as inspiration for the unit vestibules (Figure 85). Dutch doors will give residents privacy but allow them

to remain social with their neighbors. On the south side the units look over Lake Union and downtown Seattle.

The daycare and Market Administration offices are located just north of the residential tower. The entrance to the daycare is located off of Woodlawn Avenue N. with direct access to the covered playground in the central courtyard. Market Administration is next door with storage below and offices accessed from the bend in the ramp.

OPEN SPACE FLEXIBILITY

The open spaces are designed to be flexible with capacity changing based on season, time of day, and weather. On a typical weekday, activity in the south plaza may consist mostly

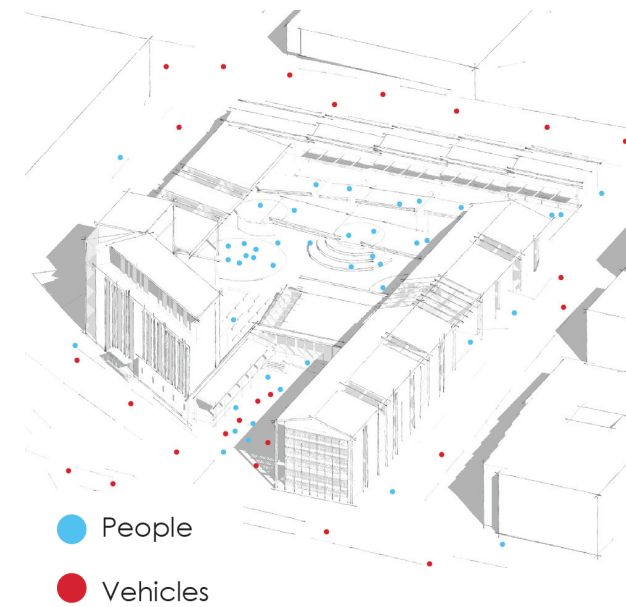


Figure 86: The open spaces provide flexible occupancy based on season and time of day. On weekdays the southern plaza will be a mixture of vehicles and pedestrians.

of vehicle deliveries, with the central courtyard filled with children from the daycare playing on the playground and workers eating lunch (Figure 86). But on warm weekend days the same

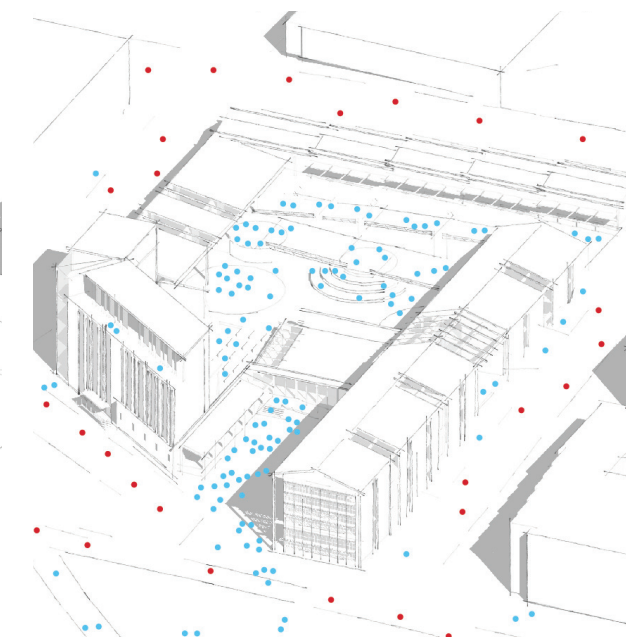


Figure 87: On the weekend the southern plaza will fill with pedestrians as the farmer's market expands.

spaces may bustle with pedestrian activity (Figure 87). On holidays such as the 4th of July or the Fremont Solstice Parade these open spaces will be filled to capacity as the entire complex be-

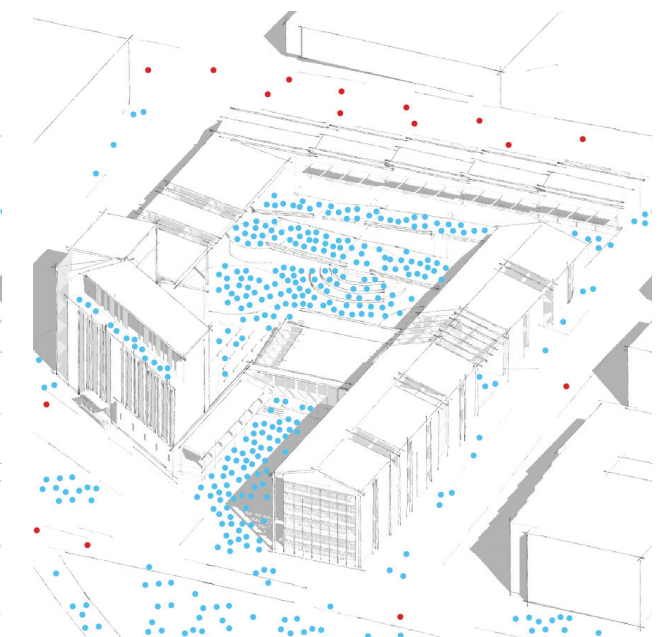


Figure 88: During holidays such as the Fremont Solstice Parade or the 4th of July the Wallingford Preservation Center will become a magnet for the entire neighborhood.

comes a magnet for neighborhood gatherings (Figure 88).



JUST THE BEGINNING

8: JUST THE BEGINNING

Just as this thesis began with the end, it concludes at the beginning. MIT's Building 20 was a well-loved, slightly abused building just at the beginning of its lineage. Its generational adaptability emanated from its low-road structure, regular geometric shape, flexible structural materials, and exposed services making it ideal for not only its original intended use as a WWII research facility but also for future needs by MIT faculty and students.

Like Building 20, the Standard Oil Company buildings should not be viewed as old buildings at the end of their lives, but only at the beginning. The buildings were chosen for their invisibil-

ity and the interventions proposed will serve today's social and cultural needs and allow future adaptability. The design learns from Building 20, using regular geometries, flexible materials, and adaptable spaces and services to set a foundation for lineage.

Figure 89: Chapter Heading: View of the South Plaza overlaying a historic photo of the original standard oil facility.



Figure 90: The fabric of the urban environment can be harnessed for the needs of the future. Images: <https://libraries.mit.edu/archives/mithistory/building20/> (Building 20), www.worn-through.com (quilt), www.providencelodge.blogspot (grandmother and granddaughter)

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