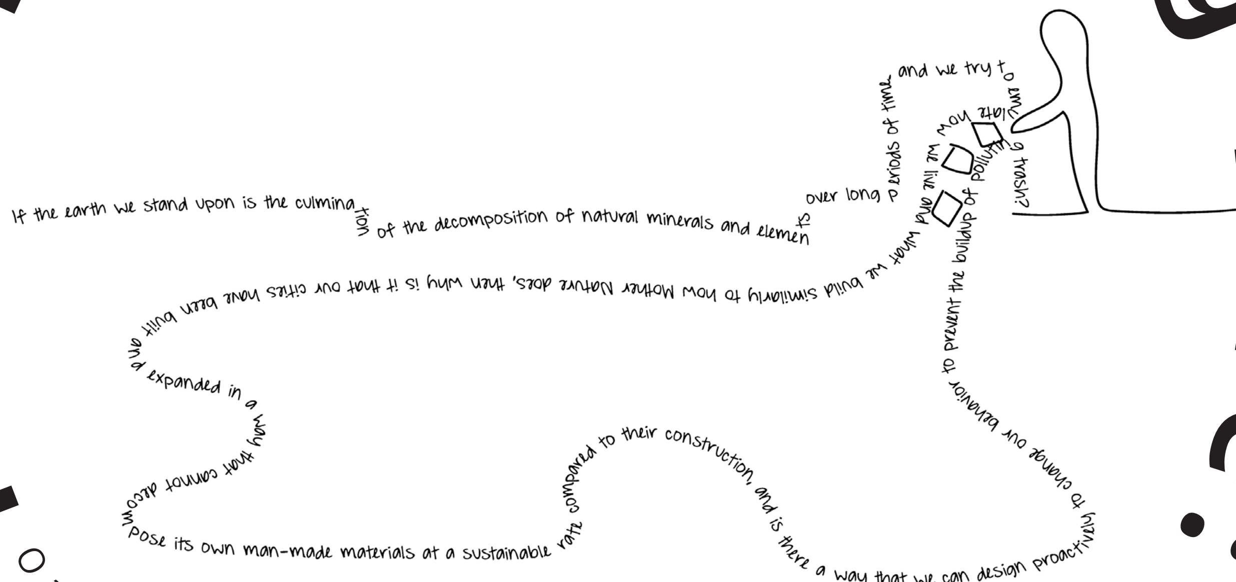
The Circle of Building Life: A Rubbish Revival

by Adele M. Gedeo



THE CIRCLE OF BUILDING LIFE: A RUBBISH REVIVAL

ADELE M. GEDEO

Thesis submitted to the Faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

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in
Architecture

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ABSTRACT

Too often buildings around the world are completely demolished or gutted only for another building to take its place less than thirty years later, despite the strength of its original design intent. This human fascination with replacing the old with the new has assisted majorly to a disastrous climatic situation. According to the EPA, in 2018 more than 90 percent of total Construction and Demolition debris generation in the U.S. alone came from demolition, and around 145 million tons of it was sent to landfills. Building design and redesign decisions must become even more conscientious when it comes to planning for the future, not only in the materials that are chosen, but how they are connected. Designers must plan on how projects not only get built, but also how they will inevitably be taken apart.

THE CIRCLE OF BUILDING LIFE: A RUBBISH REVIVAL

ADELE M. GEDEO

GENERAL AUDIENCE ABSTRACT

Too often buildings around the world are completely demolished or gutted only for another building to take its place less than thirty years later, despite construction standards in place to ensure buildings may withstand a hundred years of use. This human fascination with replacing the old with the new has assisted majorly to a disastrous climatic situation. According to the Environmental Protection Agency, in 2018 more than 90 percent of total Construction and Demolition debris generation in the U.S. alone came from demolition, and around 145 million tons of it was sent to landfills. There is only so much land left to bury more trash, and most of it is poisoning the planet's resources, especially thanks to the exorbitant amount of plastic that is continuously created and discarded. This thesis seeks to study an underutilized building within a city, and discover ways to redesign it in a conscientious way that will offer future occupants opportunities to remodel or upgrade the structure with as little waste as possible. This idea of deconstruction is utilized in not only the materials that are chosen, but how they are connected, as well as in how the existing components are discarded or repurposed.

Dedication

This thesis is dedicated to:

All the dreamers. If we all take one step forward, we can move the world.

Sagba, for supporting me unconditionally, and allowing me to ramble about all the ideas churning in my head.

My parents, for always knowing I can achieve my goals before I even think about them.

Acknowledgements

Thank you, Professor Paul Kelsch for inspiring me to think of the big picture. I've enjoyed every lecture and conversation through the years.

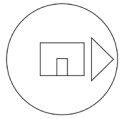
Thank you, Professor Susan Piedmont-Palladino for always pushing my creative limits. I admire your thoughts and views of the world.

Thank you, Professor Paul Emmons for patiently guiding me through the daunting challenge that I chose to confront. You made studying history and theory intriguing.

Thank you, Kennard for encouraging me through the many laughs and tears, through screens and masks, near and far.

Thank you, Libby for motivating me to reach for my dreams.

The Circle of Building Life



CONTENTS

PHOTOS

PHONEMES

abbreviations & definitions

- **C&D** construction and demolition
- **DfD** design for deconstruction
- **EOL** end-of-life
- **EPA** environmental Protection Agency
- **kWh** kilowatt-hours, a unit of energy
- **MEP** mechanical, electrical, plumbing
- **S** south
- **St** street
- **W** watt, a unit of power
- **WAAC** Washington-Alexandria Architecture Center

- **embodied energy* (noun):** the amount of energy consumed to produce a product, in this case building materials. This includes the energy needed to mine or harvest natural resources and raw materials, and manufacture and transport finished materials.
- **life-cycle* (noun):** consecutive and inter-linked stages of a product system, from raw material acquisition or generation of natural resources to the final disposal.
- **perpetuity (per·pe·tu·i·ty) /pərpəˈtōōədē/ (noun):** the state or quality of lasting forever.
- **précis (pré·cis) /prāˈsē,ˈprāsē/ (noun):** a summary or abstract of a text or speech.
- **raze /rāz/ (verb):** completely destroy (a building, town, or other site).

(Oxford English Dictionary, 2022, online;*Environmental Protection Agency, 2022, online)

01

PERPETUITY

It is common for designers to try to ensure buildings will withstand decades of use and weathering from their meticulous decisions on how spaces should be put together, but because technologies and occupants change often during the life of a structure, many buildings are renovated sooner than originally intended. Our cities are burdened with a neverending retrieve and leave mindset. Too many raw materials are extracted from depleting sources to make brand new building interiors and exteriors. Shortly after something breaks, after a material is out of date or after a space is no longer useful, we tear it down and throw it away for brand new materials to take its place (Figure 01).

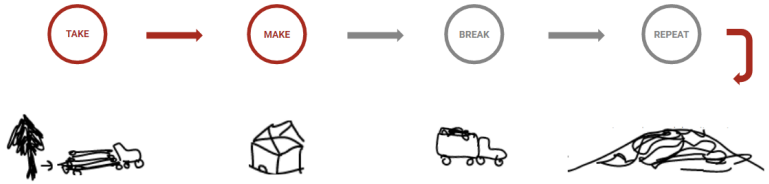
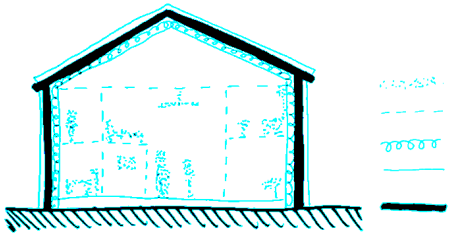


Figure 01

Of course, not all things are created equally. Some parts of a building, more often the interiors, may need to be tossed once its own lifetime has come to a natural end, similar to how our skin cells are naturally replaced over time (Figure 02). Therefore, if we want to prevent creating exorbitant amounts of unnecessary building waste, thorough consideration of material choices from the beginning phases of design and construction should be made. Proactive design will increase the chances of everything lasting as long as predicted, if not longer, despite any amount of reuse.

After a building is constructed, maintaining the quality of building components and systems within is also extremely important in continuing a circular building life. Designers should ensure that access to all parts of a building that make it run is simple and accessible.



LAYER	EXPECTED LIFETIME	POSSIBLE UPGRADE
STUFF	DAILY - 1 YR	DESIGN SPACE FOR COLLECTION
SPACES/ PLANS	3 - 30 YRS	REPURPOSE MATERIALS
SERVICES	7 - 15 YRS	PURPOSEFUL SELECTION & MAINTENANCE
SKIN	20+ YRS	SUSTAINABILITY/NATURAL CHOICES
STRUCTURE	30 - 300 YRS	MAINTAIN/MANAGE AGAINST DETERIORATION

Figure 02[1]

1. Salama.

What is *rubbish*?

rubbish
noun: waste material; refuse or litter.
verb: criticize severely and reject as worthless.
adjective: very bad; worthless or useless.
- Oxford English Dictionary, 2022: online

"In Western society,
people have graves,
and so do products."
- McDonough, Cradle to Cradle, p. 102

Figure 03, trash scattered along beach of Atlantic Ocean
Monrovia, Liberia

Despite what our definitions of the word "rubbish" connotes, waste is supposed to be an important part of our life cycle. "The Earth's major nutrients - carbon, hydrogen, oxygen, nitrogen - are cycled and recycled. Waste equals food."[2] As historian and recycling guru Benjamin Miller mentions in an interview with Medium, "garbage is not a pile of something you see on the street. It is something that moves."[3] It is all around us, and maybe even inside of us. Trash can be found anywhere you look in the world, land or sea. This would not be a problem, however, if we never learned how to create new materials through the use of discovered chemistry. The man-made wonder that is plastic has posed a huge risk to life as we currently know it. When tossed or littered it does not decompose, it instead fragments into smaller and smaller pieces until it is invisible to the human eye, called microplastics, and then into even smaller nanoplastics, which end up in our lands and waterways, eventually invading every food chain.[4]

"Nanoplastics that can hardly be measured are capable of penetrating the body, right into the brain and other organs... Nobody can guarantee that there are no nanoplastics in purified drinking water, for instance. In one study of microplastics in drinking water on various continents, larger pieces of microplastic were found in over 80 percent of the samples."[5]

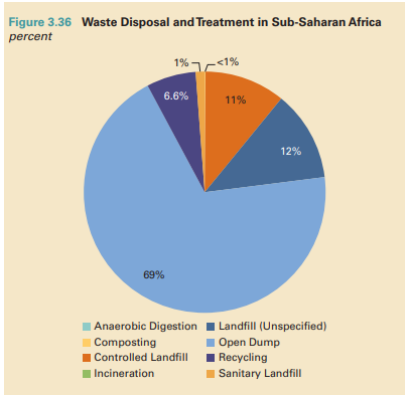
Most people think of single-use water bottles when it comes to plastic pollution. However, we practically live in plastic boxes. Not only do building materials get transported within plastic packaging, but flooring, wall coverings, paints, roofing, plumbing, insulation, windows, doors, fasteners, and wiring are typically all made with or from some type of plastic. Our cities are constantly being improved by new and fresh buildings, but at what cost? All of the different types of plastics are getting tossed together just to be replaced by similar products made of the same plastics. And where exactly does all of that wasted material really go?

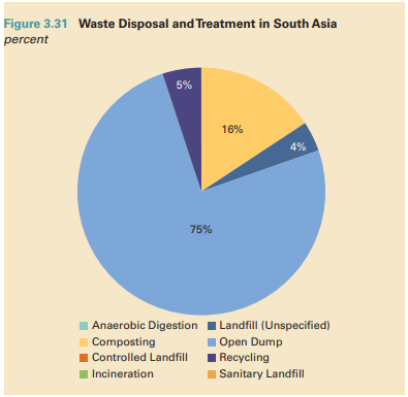
2. McDonough, 92.
3. Quirk.
4. Abbing, 35.
5. Ibid., 61.

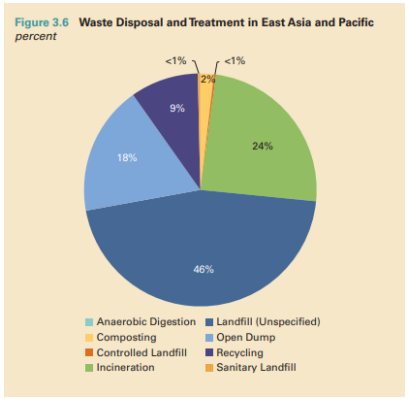
Where is *away*?

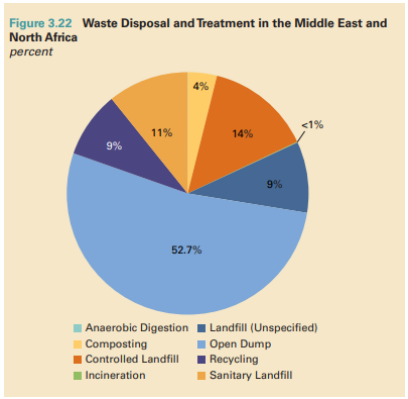
If a removed building material is not repurposed or recycled, it is usually sent to a landfill. As shown in Figure 04, the majority of waste is disposed of in either an open dump, landfill, or sanitary landfill all over the world. In New York City alone, 75 percent of waste ultimately ends up in a landfill (Figure 05). So much material is thrown out from Construction & Demolition alone that some industrial waste landfills are dedicated for the disposal of building components. According to the EPA, in 2018 more than 90 percent of total Construction & Demolition debris generation in the U.S. alone came from demolition, and around 145 million tons of it was sent to landfills (Figure 06).[6] These landfills can only hold so much before they are considered closed, and most grow taller than the cities and towns they serve. Because of the high amount of plastics and other non-biodegradable materials tossed from buildings these landfills must be managed for many years to come despite any closures.[7] Figure 07 shows a diagram of the layers of a properly closed landfill, which is similar to a giant trash bag because of the buried plastic lining that is used in an effort to keep toxic chemicals from leaking into the ground as the weight from all layers above settles over time.

Dr. Bryan Staley, president and CEO of the Environmental Research & Education Foundation (EREF) estimates that the U.S. has about 62 years of combined landfill capacity remaining in its current facilities. There used to be over 7,600 landfills in the 1980s. Now, there are only twenty-two states with available landfill space for decades to come.[8] Some U.S. recycling companies export their plastic to foreign countries for less stringent policies, but those countries are losing ground with their own trash needs, as well. Their policies have begun to change because of it, slowing the recycling process altogether.[9]









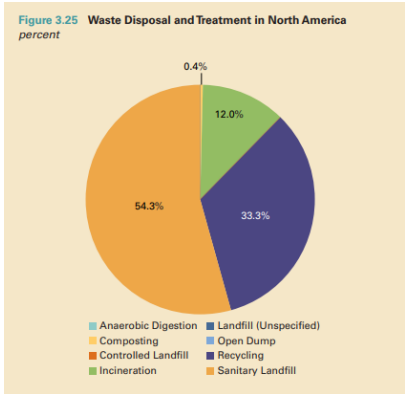
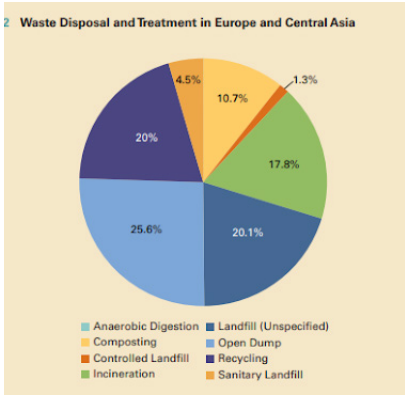
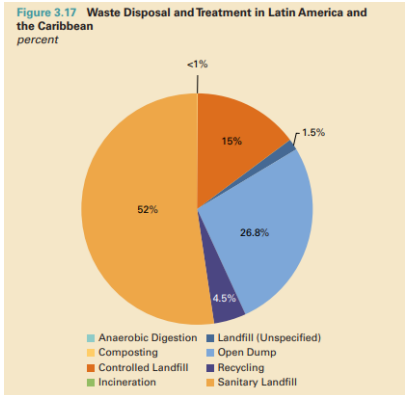


Figure 04





6. "Advancing".
7. Ozbay.
8. Zimlich.
9. Deer.

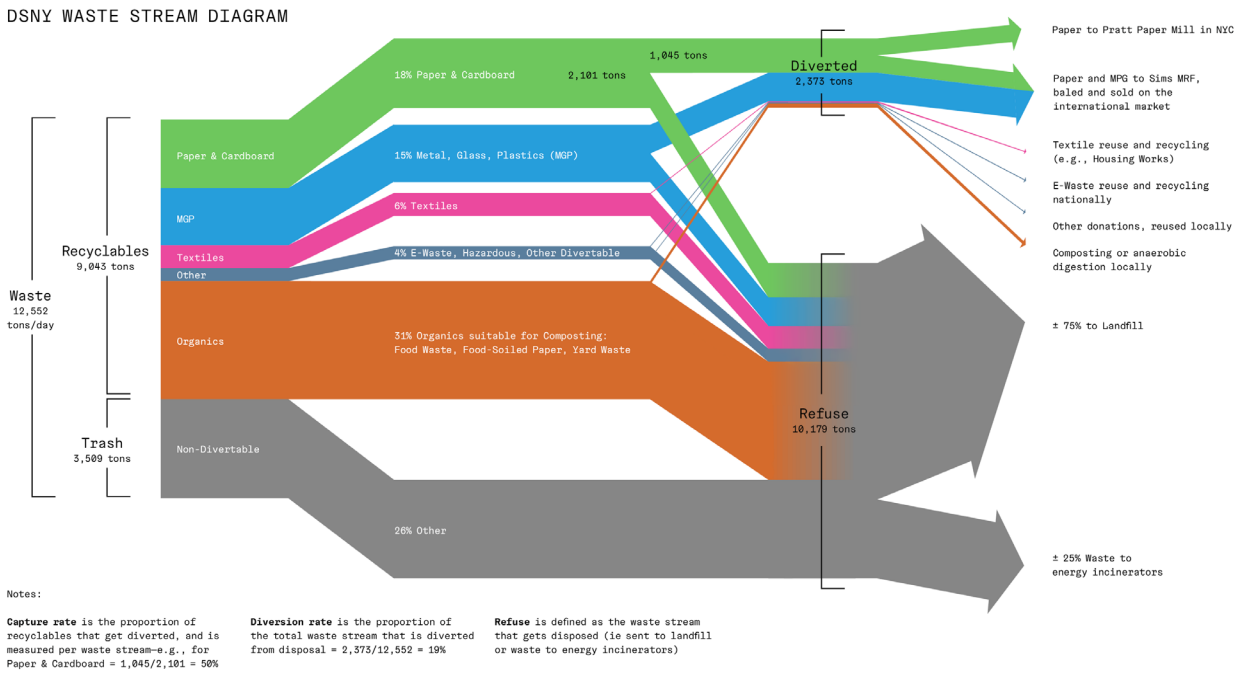


Figure 05

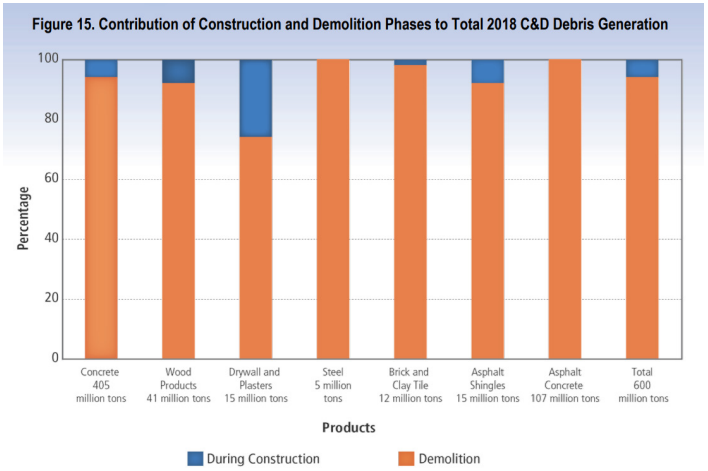


Figure 06

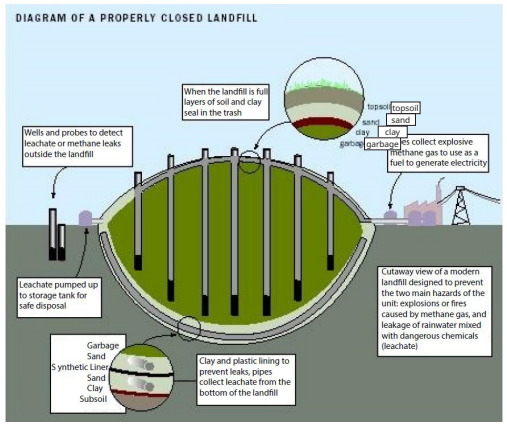


Figure 07

Why a *revival*?

revival
noun: an improvement in the condition or strength of something.
noun: an instance of something becoming popular, active, or important again.
- Oxford English Dictionary, 2022: online

"What would have happened... if the Industrial Revolution had taken place in societies that emphasize the community over the individual, and where people believed not in a cradle-to-grave life cycle but in reincarnation?"
- McDonough, Cradle to Cradle, p. 103

How did the word raze come to mean the complete demolishment of a building? According to Oxford Language, the origin of the word came from Middle English, French and Latin words meaning to scrape or shave or incise, which is quite a different connotation than to destroy. Instead of razing a building, we need to raise it up to a new chapter of its life, like that of raising a child. We can graze what it is made of to revive its life and nurture its character into something more profound and useful to society.

"Nature teaches us that there is no such thing as waste. A dead tree provides nutrients for a subsequent tree, allowing it to grow. We, therefore, have to move towards what is known as a circular economy in which all the cycles are closed loops."[10]

- If we reclaim more existing material during renovations and demolitions, it will help reduce our use of scarce resources from the earth.
- If we design with intent to deconstruct in the future, it will help reduce the amount of components that are wasted.
- If we repurpose materials that lose strength after their removal, it will help revive the spirit of the material and the building by making it important again.

Figure 08 shows these three ideas as a TAKE - MAKE - UPDATE cycle to mimic the sustainability mnemonic device REDUCE - REUSE - RECYCLE as another tool in a designer's belt.

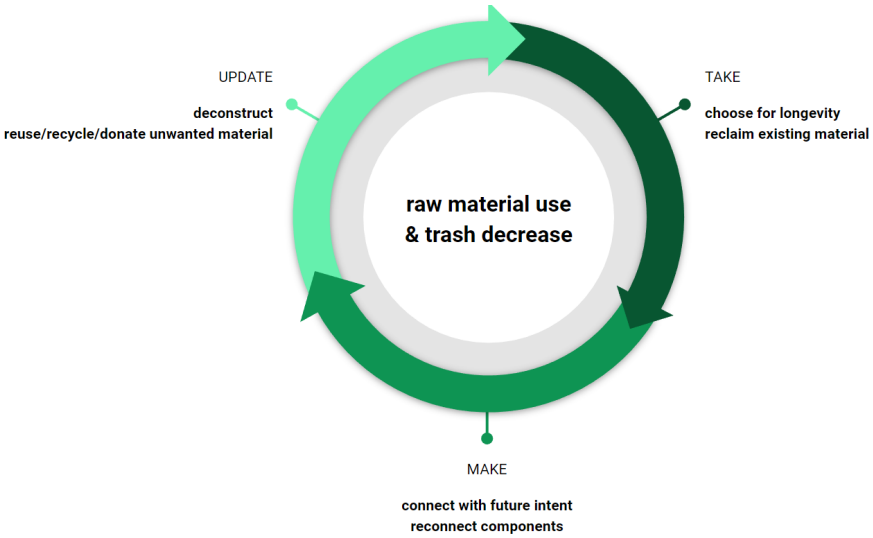


Figure 08

10. Abbing, 82.

Figure 09

Figure 10

Figure 11

Figure 12

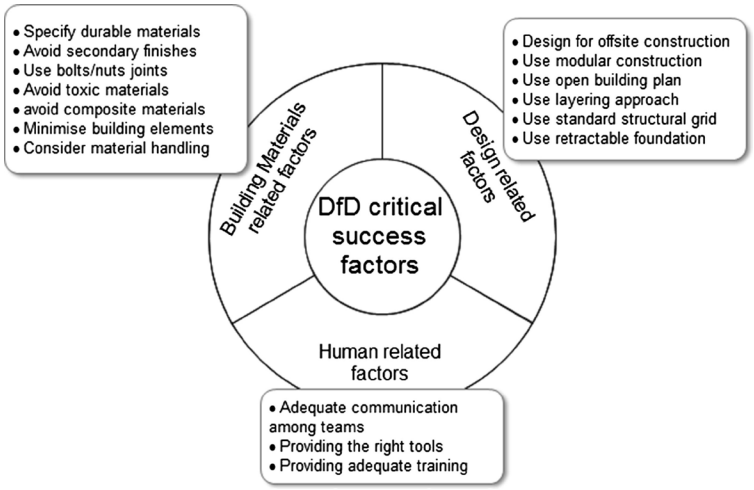


Figure 13

If structures that had simple and removable connections are still standing centuries later, then why not continue that practice today? The Notre-Dame de Paris Truss Project is an example of using historic practices to join materials without the use of glues or nails, and the truss has been disassembled and reassembled multiple times throughout the U.S. without needing to replace any of the major components (Figure 09). I have personally attempted to design furniture for deconstruction. With the use of barrel nuts, bolts, grooves, and careful design, I was able to display the product on location, disassemble it to carry in the trunk of my car, and reassemble at home with no issues (Figures 10-12).

Designing for deconstruction (DfD) instead of demolishment will improve the building's life-cycle embodied energy impact on the environment. "The longer a building remains in service, the smaller the embodied impact are per year of service."[11]

To ensure the success of a DfD, the main focus should be within the plans and connection details. Plans should include information on how materials are to be reused, recycled or reclaimed. Once built, the connections between components should be visible for better understanding of how they may be taken apart. If they are joined via chemicals, like sealers, glues or welding, then it may be more difficult to reclaim or recycle later due to the toxicity of the chemical or the permanence of the connection. Therefore, toxicity, durability, and recycling potential should be considered when selecting materials for even the smallest connections. The less composites, the less waste. As technologies advance, so do our building systems improve. Designing for ways the building can expand or contract for new devices will help maintain them for longevity.[12]

According to a study conducted by a team in Nigeria and the United Kingdom, there are five groups of Critical Success Factors to ensure the effectiveness of recovering materials through DfD, including "stringent legislation and policy, deconstruction design process and competencies, design for material recovery, design for material reuse, and design for building flexibility.[13] Figure 13 shows the breakdown of all factors involved in a successful DfD.

Of course, there are always legal limitations. Deconstruction mandates are already in place, but not in all locations, and not all are written the same. Therefore, time and money are a huge factor when deciding between deconstruction and demolition. As technology improves and design decisions become popular, prices and legalities will continue to fluctuate in the right direction towards longer building life cycles. There have already been many studies on the structural capabilities of more sustainable composite building systems in terms of deconstruction. For example, in 2018 a new floor system had been tested with some success using a mixture of concrete and steel parts connected with clamps instead of fusing them together permanently.[14] It is a step towards a better future, but more work is to be done before DfD becomes the average option.

"And when our designs end up as litter or landfill, how prudent have we been?"
- Hosey, The Shape of Green, p. 7

11. Kestner.
12. Cutieru.
13. Akinade.
14. Hajjar.

02

PRESENT

To truly study designing for deconstruction it would be best to choose an existing building to renovate or to design its adaptive reuse. This would test my theories on how to revive a building's character through DfD principles. It seems to be more common for civil or historical buildings to be adapted into new uses compared to a typical building in a city. Therefore, I decided to search for a residential or commercial building within the Washington Metropolitan region. The better choice is to find a building that is fairly unused, as well as accessible to meticulously study in person.

Which building?

Ultimately, the perfect contender was right under my nose. The Washington-Alexandria Architecture Center (WAAC) at 1001 Prince Street focuses on an interdisciplinary way of learning where students intermingle and collaborate, but the campus' newest-claimed neighboring building at 1021 Prince Street hinders that collaboration in its design, and is currently underutilized because of it.[15]

A walk around the building displays some obvious exterior characteristics that are in need of improvement, including:

- The underground parking garage is always vacant, and its access door needs replacement;
- Grand steps lead to a main door off Prince St, but it is used as a window instead; and
- The only doors on the busiest street and longest elevation are fire doors. There is no entry on the western side (Figure 14, top).

There are some positive characteristics, however, which make it an interesting building choice, including:

- A quaint, brick plaza sits between the two WAAC buildings.
- One block south from the bustling King Street, it is in a very walkable area despite the heavy vehicular traffic;
- The building is accessible from alley parking, and its floors are accessible from an interior elevator;
- A wood and metal workshop on the first floor is already frequently used by students; and
- There is a possibility for a future parking garage within a new residential building to be constructed on the northern neighboring lot (Figure 14, bottom). A proposal has already been submitted for permit to the City of Alexandria in 2020.

Figure 14

15. "Washington"

How is it now?

Originally built as an office building, 1021 Prince Street sits on the vehicularly busy corner of Prince St and S Henry St (Richmond Hwy/Rte 1 South) (Figure 15). It has two main axes which give the impression it is two separate buildings joined together; a southern rectangular end, and a northern square end. It is three stories tall with a basement for parking.

A walk within the building shows some obvious interior characteristics that are in need of improvement, including:

- There are quite a number of partitions separating offices along the exterior walls, which creates many dark corridors in an interior space that is already pretty small.
- Two fire stairwells within about twenty feet of each other along the building's central axis practically sandwich the elevator.
- The risers of the stairs are too high for building codes and comfort.
- The eastern stairwell provides access to neither the basement parking nor the roof.
- Roof access is within the western stair via a ladder.

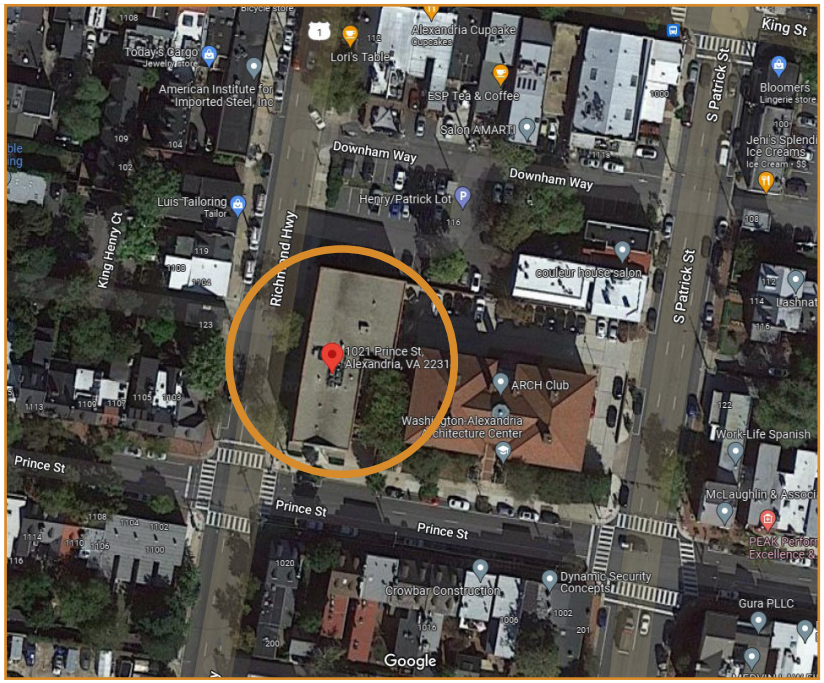


Figure 15

1021 Prince Street, Alexandria VA 22314

Lot Size (Sq. Ft.): 9,553
Zoning: CD
Building Description
Year Built: 1983
Construction Quality: GOOD PLUS
Building Condition: GOOD
HVAC: COMPLETE HVAC
Building Type: COLLEGE - CLASSROOMS
Gross Building Area (Sq. Ft.): 22,500
Source: Real Estate Assessment Search, City of Alexandria Virginia

Current spaces

Basement	parking garage
1st floor	exterior courtyard
	wood shop
	metal shop
	conference room
	two single-person restrooms
	music/studio space
	office suite
2nd floor	office suites on either end
3rd floor	meeting rooms
	offices
	reading room
	small kitchen

03

PROGRAM

Who will use it?

As an architecture school, the building should be used by students, professors, and other visitors who may attend exhibits or special events. With another building already on site at 1001 Prince Street, the program of the building should fulfill the needs of the school that cannot be done within its current building, and possibly improve conditions of 1001 Prince Street, as well.

Current spaces at the WAAC:
- *studios*
- *library*
- *offices*
- *pin-up rooms*
- *meeting rooms*
- *computer lab*
- *photo room/dark room*
- *laser cutter room*
- *wood & metal shop*

What is needed?
- *pin-up areas*
- *kitchen or cafe/eating space*
- *crafting/modeling space*
- *rest areas*
- *study/research areas*
- *auditorium*
- *exhibit space*
- *recycling/reusing storage*
- *storage*
- *access to floors 1 & 3 in 1001*

Chosen program:
- *access to 1001*
- *large courtyard*
- *lecture hall*
- *studios with pin-up area*
- *cafe*
- *photo studio*
- *recycling center*
- *gardens*
- *exterior spaces - terraces & balconies*
- *exhibition spaces*

When will it connect?

- Connection to the existing campus building is most important in creating an accessible and cohesive community. With the second floor as the only accessible floor of 1001 Prince Street, I want to ensure there is access to enter it on the first floor through a new courtyard, as well as on the third floor via some form of a bridge.
- Visitors of 1021 Prince Street should be able to connect with others from other levels visibly throughout the building.
- Circulation into the building should connect from all available exterior routes: Henry Street, Prince Street, and the back alley parking area.
- Structural material connections should be visible wherever possible to be used as a teaching device.

04

PROPOSAL

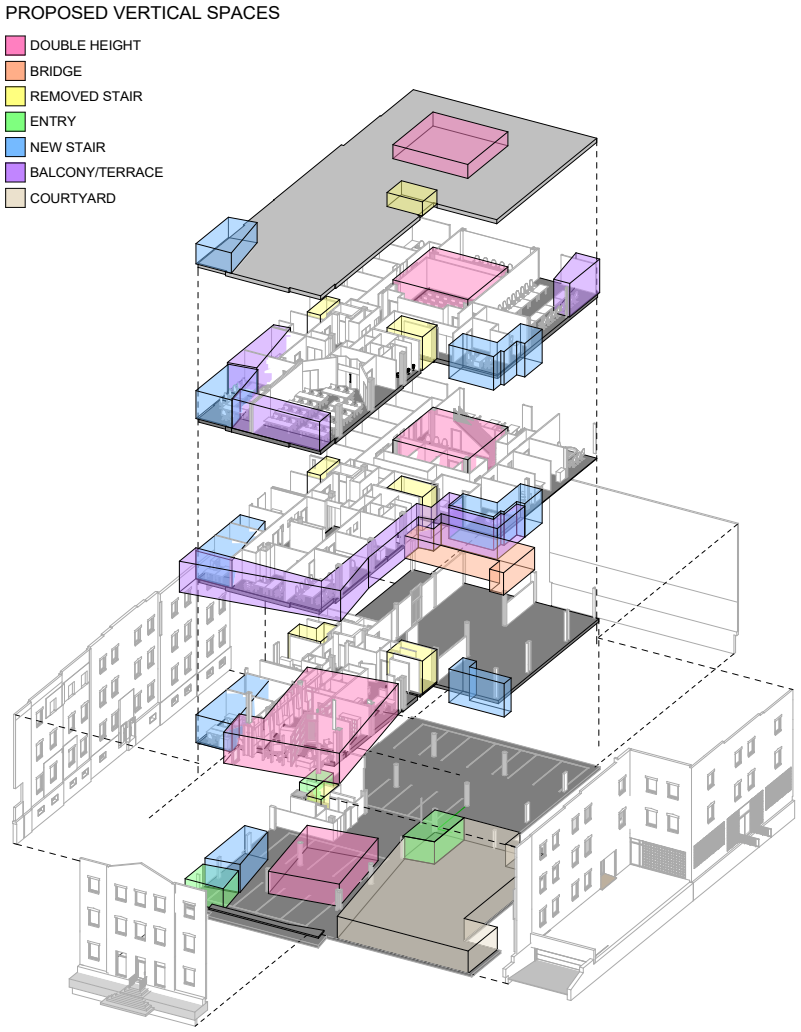


Figure 16

The following proposal drawings and descriptions represent one new cycle of the building's life. It is designed to revive the character of 1021 Prince Street while allowing future cycles to naturally turn.

Goals

My main goal is to give the building more visibility and light by creating vertical spaces throughout the site (Figure 16). This will make the spaces feel more open, improving its natural wayfinding. The current floor plans have so many partitions that it becomes dark and confusing when moving between spaces. Carefully removing the unnecessary walls will improve the building's connection to the overall campus. Figure 17 shows the demolition of walls and floors in orange and the demolition of exterior concrete in red, while Figure 18 shows the newly opened space available for a new design from what remains. I intend for as much of the materials to be reused or repurposed throughout the interior and site.

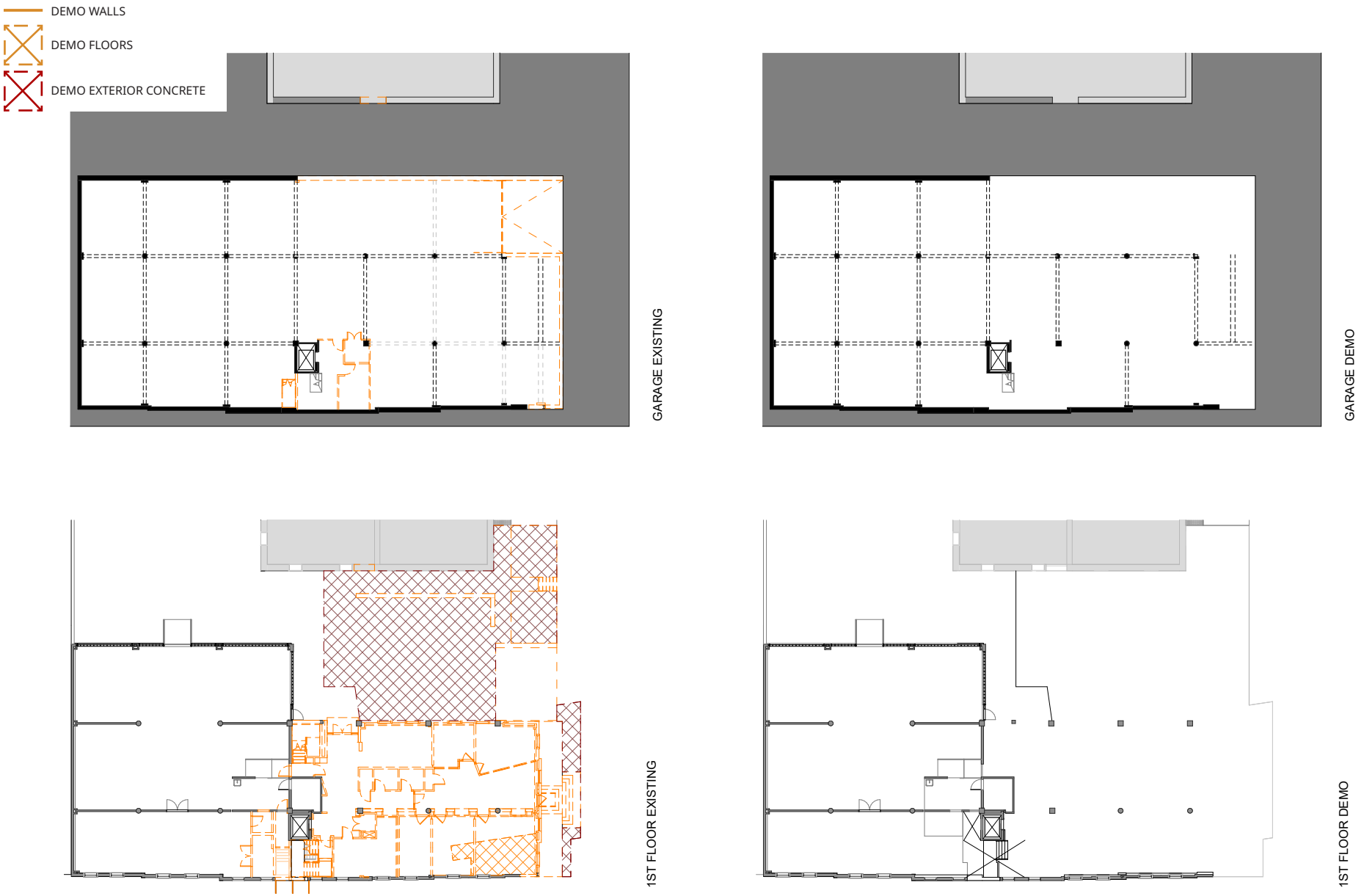
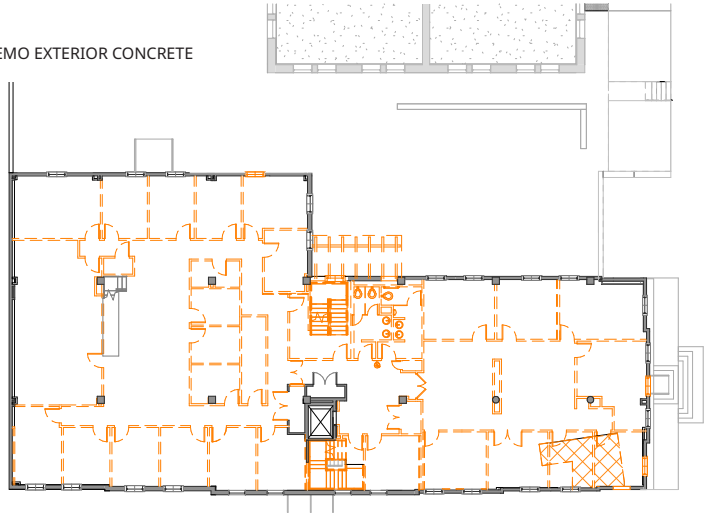

DEMO WALLS
DEMO FLOORS
DEMO EXTERIOR CONCRETE
GARAGE EXISTING
GARAGE DEMO
1ST FLOOR EXISTING
1ST FLOOR DEMO

Figure 17

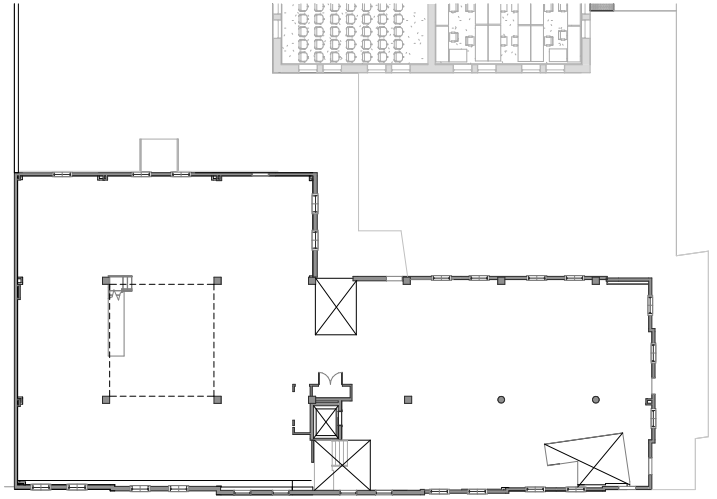
DEMO WALLS

DEMO FLOORS

DEMO EXTERIOR CONCRETE

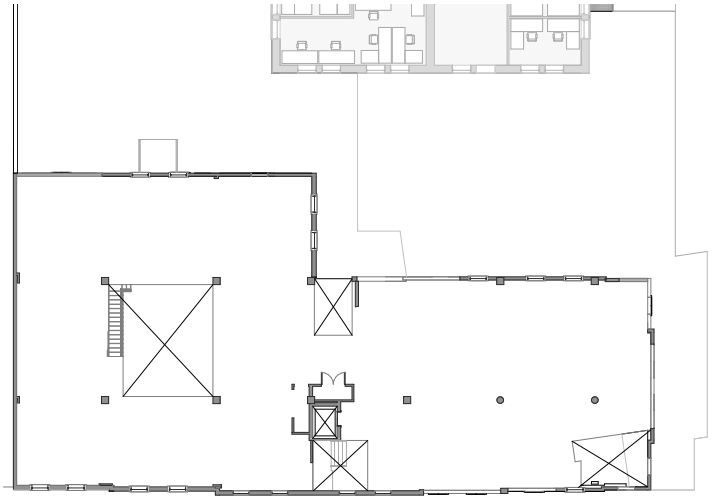


2ND FLOOR EXISTING



2ND FLOOR DEMO

3RD FLOOR EXISTING



3RD FLOOR - DEMO

Figure 18

BEFORE

Figure 19

Figure 19 shows an axon view of the existing school from the southeast corner of its surroundings within the City of Alexandria. The WAAC has two buildings that sit on the northern side of Prince St between S Henry St on the west and S Patrick St on the east. The eastern building with the gabled roof is the older building at 1001 Prince St, and the western building with the flat roof is the building of study for this thesis at 1021 Prince St.

There is plenty of existing parking on this corner. Street parking lines the sidewalks surrounding each city block, and a public pay parking lot is available on the lot immediately north of the school at the street level. Parking directly related to the school is available in an elevated alley behind the older building, which is accessed from S Patrick St. This alley is directly connected to the woodshop doors of 1021 Prince Street on its eastern exterior. The alley also contains stairs with a lift, which is the only accessible route to the second floor of 1001 Prince Street.

A small path from the alley wraps the western façade of 1001 Prince Street to its southern main entrance. This path also connects via steps down to the main sidewalk on Prince St, as well as to a brick paved courtyard between the two school buildings. This hidden and elevated courtyard is the main entry point for 1021 Prince Street.

The courtyard sits above the eastern portion of the underground parking garage for 1021 Prince Street, which would be accessible from Prince St if it was in use. Next to the garage entrance ramp is a concrete podium with steps leading up the southern wall of 1021 Prince Street to another entry door. However, this glass door currently functions only as a window. The grandeur of this entry is a wasted design as I have witnessed the enchantment of climbing its steps take hostage of children walking past as their embarrassed parents drag them away from the possible danger.

The only entry into 1021 Prince Street aligned with the elevation of the sidewalk is at the center of its western perimeter. However, the two doors there are flush with the brick and property line. Therefore, railings block the public path for when they are opened in emergencies because they are only meant for egress, one from the underground garage, and the other from a stairwell.

AFTER

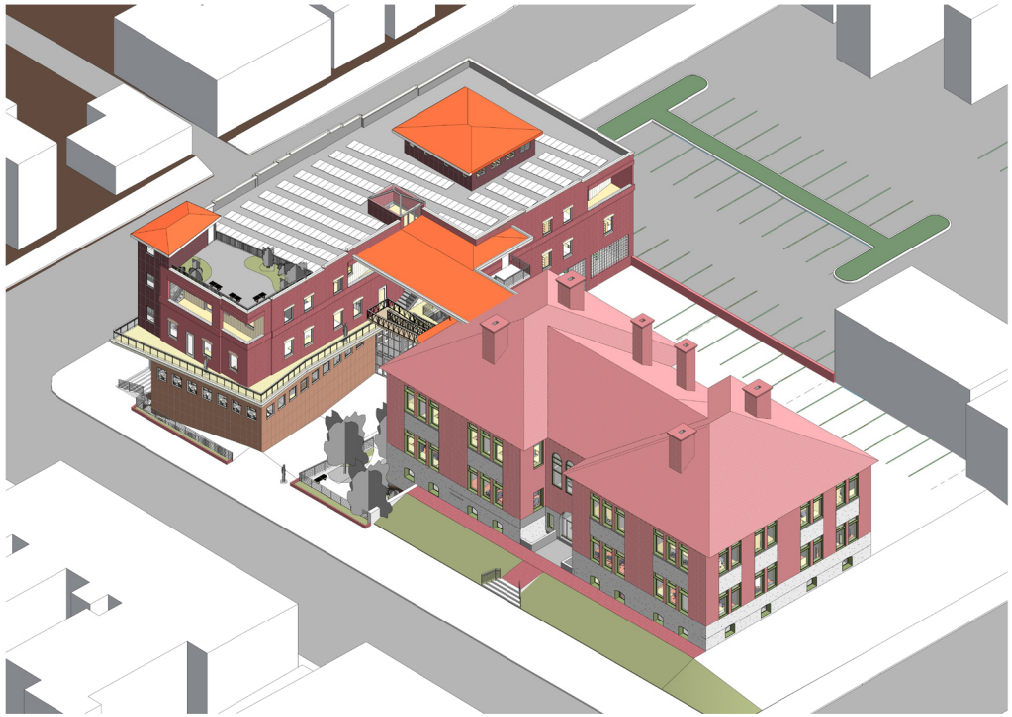


Figure 20

Figure 20 shows an axon view of the proposed campus design from the same angle as Figure 19. Entry into the building is accessible from the three existing routes of S Henry St, Prince St and the alley parking, with the main entrance still within a central courtyard that connects the two school buildings. However, the main entry is on the lower level by removing the existing garage altogether, which adds floor space to the building. The lowered courtyard also creates an opportunity for accessible entry into the first floor of 1001 Prince Street.

Adding a floor below ground makes it possible to create a larger vertical space for a lecture hall, which can also project beyond the existing perimeter to create a terrace, and to replace the southern podium stair entry. New entries at the southwest corner and on the western perimeter changes the horizontal circulation from the street level. Exterior stairs and ramps above the courtyard connect the two buildings, as well as provide an accessible route to the third floor of 1001 Prince Street.

Garden spaces are added to the courtyard and roof. Solar panels are also added to the flat roof, as well as to some of the building veneer. Balconies are added on the third floor by breaking some of the exterior walls. New roofs protrude past the existing roof over important vertical spaces to provide more light.

Interior

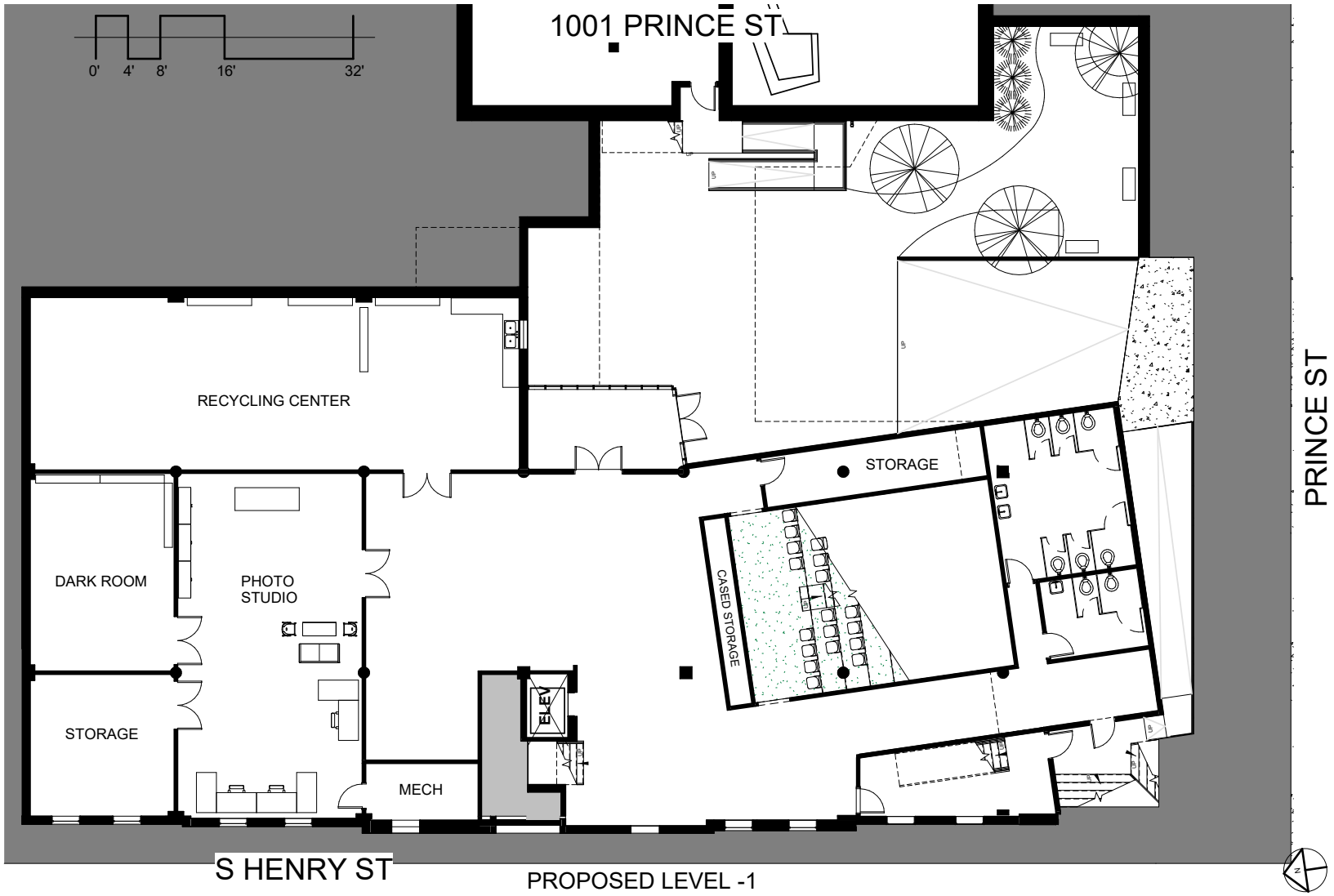


Figure 21

Proposed Plan: Level -1

The underground garage is transformed into usable floor space where a lecture hall rises for two stories on the south end. The lecture hall projects into a new courtyard at an angle to create more seating along its back wall, which lines the south perimeter. Students and other visitors will be able to face direct north while attending lectures, meetings and presentations. The lecture hall has a total of 135 seats, 75 seats on the lower level and 60 seats on the upper level.

The new courtyard can be accessed by descending a wide ramp from the Prince St sidewalk, or by steps from the existing elevated alley parking. The stair connects to a new entry for 1001 Prince Street, which also joins an accessible ramp. A garden with existing trees salvaged from the old courtyard sits between the southwest corner of 1001 Prince Street and the wide ramp to the new courtyard. Below the original main entry sits the new entry within a glass curtain wall vestibule. The door is on the southern wall to make it visible from the sidewalk, as well as to create an unobstructed space covered from above at the north end of the courtyard.

Entering the building through the courtyard leads into an open lobby that can be used as exhibition space. To the north are spaces for private work, including a photo studio suite and a recycling center, where students may reuse materials and supplies, as well as where they may learn about waste management and a material's life cycle.

At the west end of the lobby an existing flight of stairs leads to a new entry from S Henry St, while the hall to the south leads to a new exit onto Prince St. A new fire stair leads out to this corner space, as well. Both entries are covered, and they provide more options for students to enter and exit the building semi-privately as most visitors will enter through the courtyard.

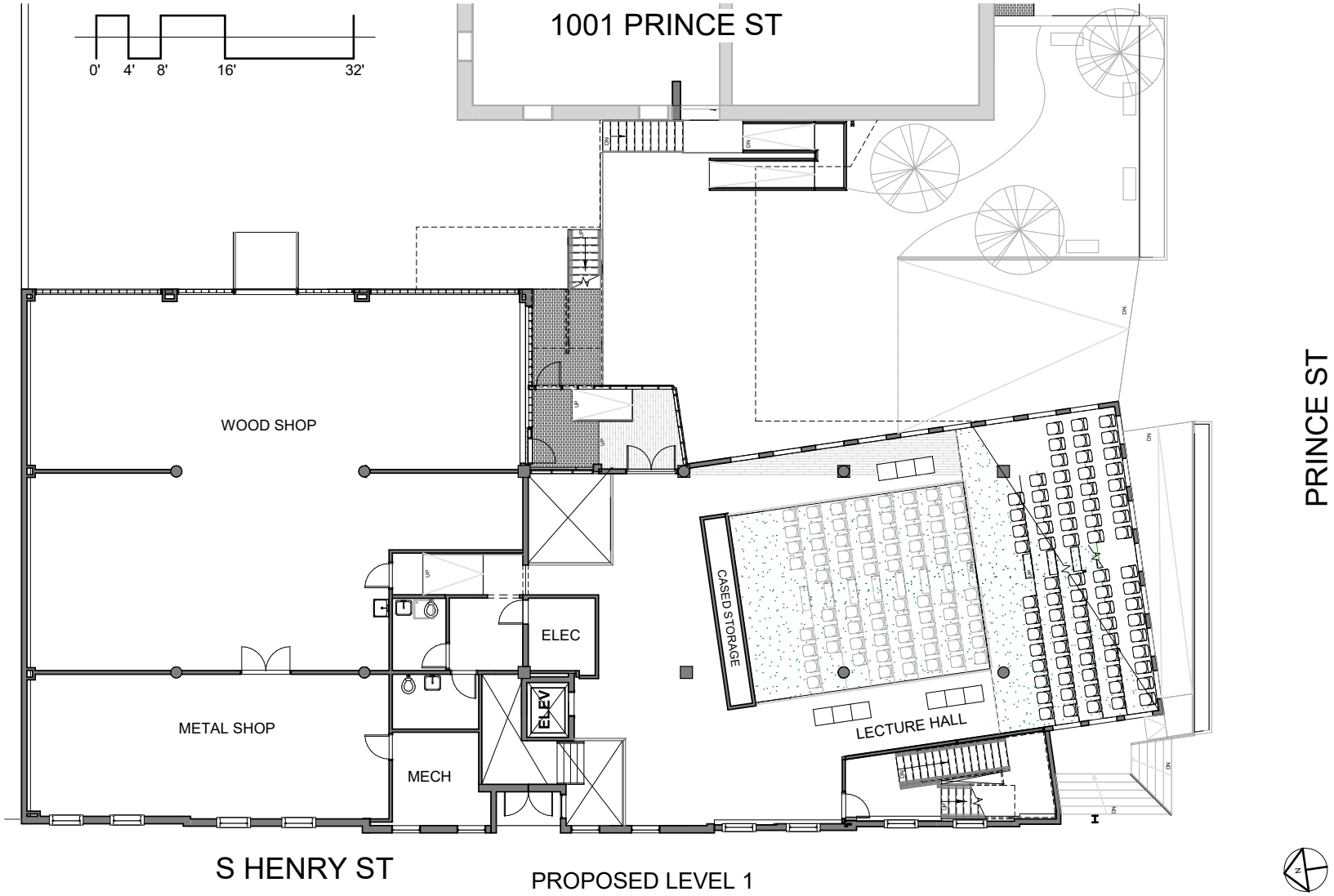

0'
4'
8'
16'
32'
1001 PRINCE ST
WOOD SHOP
METAL SHOP
ELEC
ELEV
MECH
CASED STORAGE
LECTURE HALL
PRINCE ST
S HENRY ST
PROPOSED LEVEL 1

Figure 22

Proposed Plan: Level 1

A majority of the woodshop and metal shop remains the same because of its existing efficiency. The southern exterior door that originally entered onto the courtyard is now within a vestibule similar to the one on Level -1. This vestibule enters into Level 1 of 1021 Prince Street and exits out to the alley parking. Access to an exterior stair is available at the edge of the alley overlooking the courtyard.

Immediately to the north after entering the lobby of Level 1, a guardrail wraps along the floor edge from a removed floor and stair, which opens up the space to all other floors. At the western end of the lobby a similar hole in the floor opens up the view to the new western entry and the floor below it. With the existing stairs removed, the new stairs on the southwest corner and on the exterior create a better means of egress for all floors. The interior walls of the corner stair are glass to improve visibility and wayfinding from floor to floor.

The lecture hall can be accessed from Level 1, as well. Railings line the sides of the space for an open concept to allow people passing through to have a chance to overhear or peek into presentations without fully interrupting.

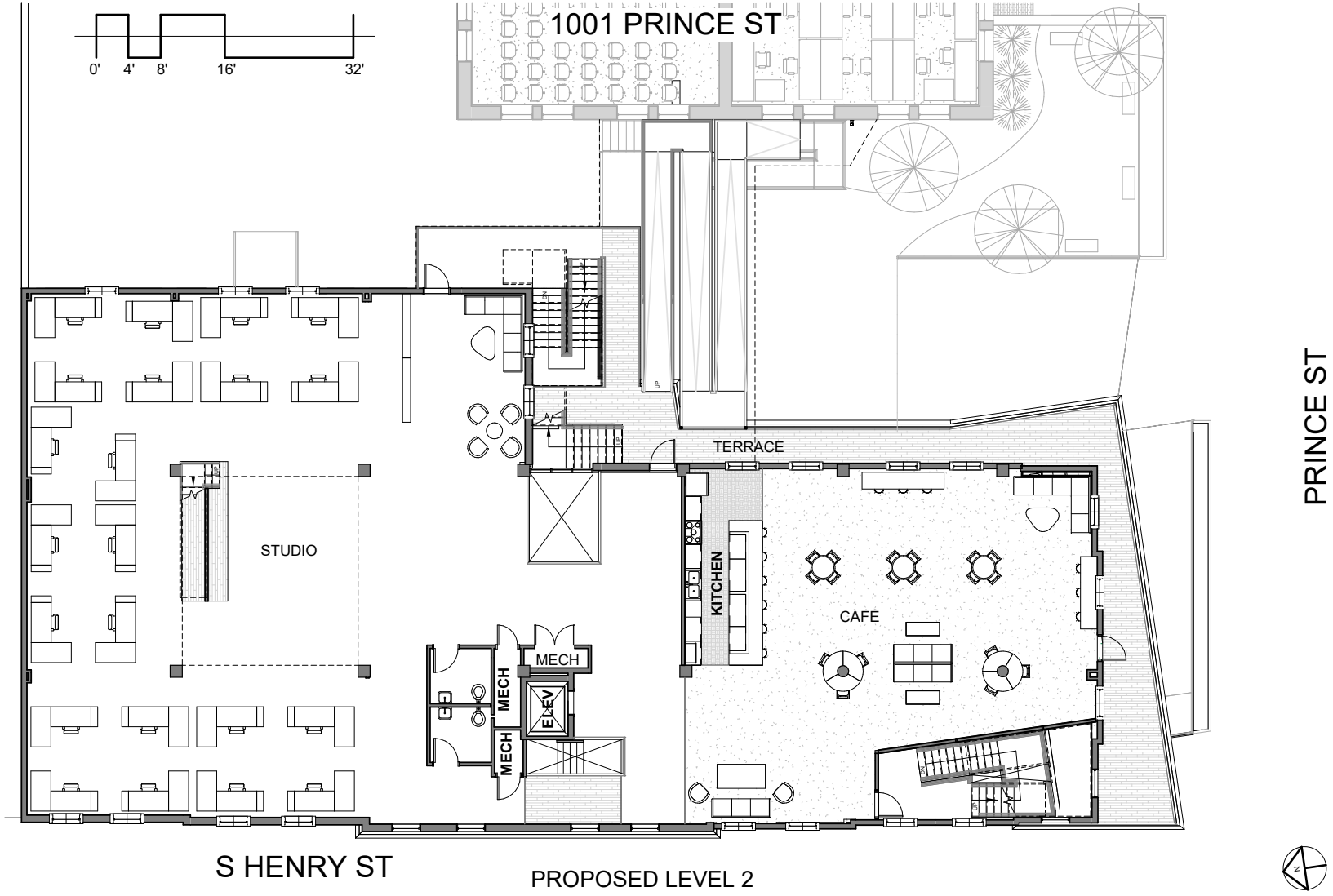

0'
4'
8'
16'
32'
1001 PRINCE ST
TERRACE
STUDIO
KITCHEN
CAFE
MECH
MECH
ELEV
MECH
PRINCE ST
S HENRY ST
PROPOSED LEVEL 2

Figure 23

Proposed Plan: Level 2

Level 2 is the most orchestral in 1021 Prince Street. It is where I imagine people moving about the most, to and from 1001 Prince Street to access their studio desk on the north end or to the cafe for a meal on the south end.

Above the projection of the lecture hall is a terrace that wraps around the south and eastern perimeter of the building. This terrace joins with the exterior stair and a ramp that connects to the third floor of 1001 Prince Street.

An existing stair remains in its place, but a platform is added to its bottom landing. A pin-up wall stands on the platform along the southern railing of the stair.

Where the western stair was removed, wood flooring fills in the void partially to allow more circulation while creating sightlines to other floors. The eastern exterior wall where a stair was removed is changed to a glazed curtain wall up to the roof to provide more natural light into the center of each lobby.

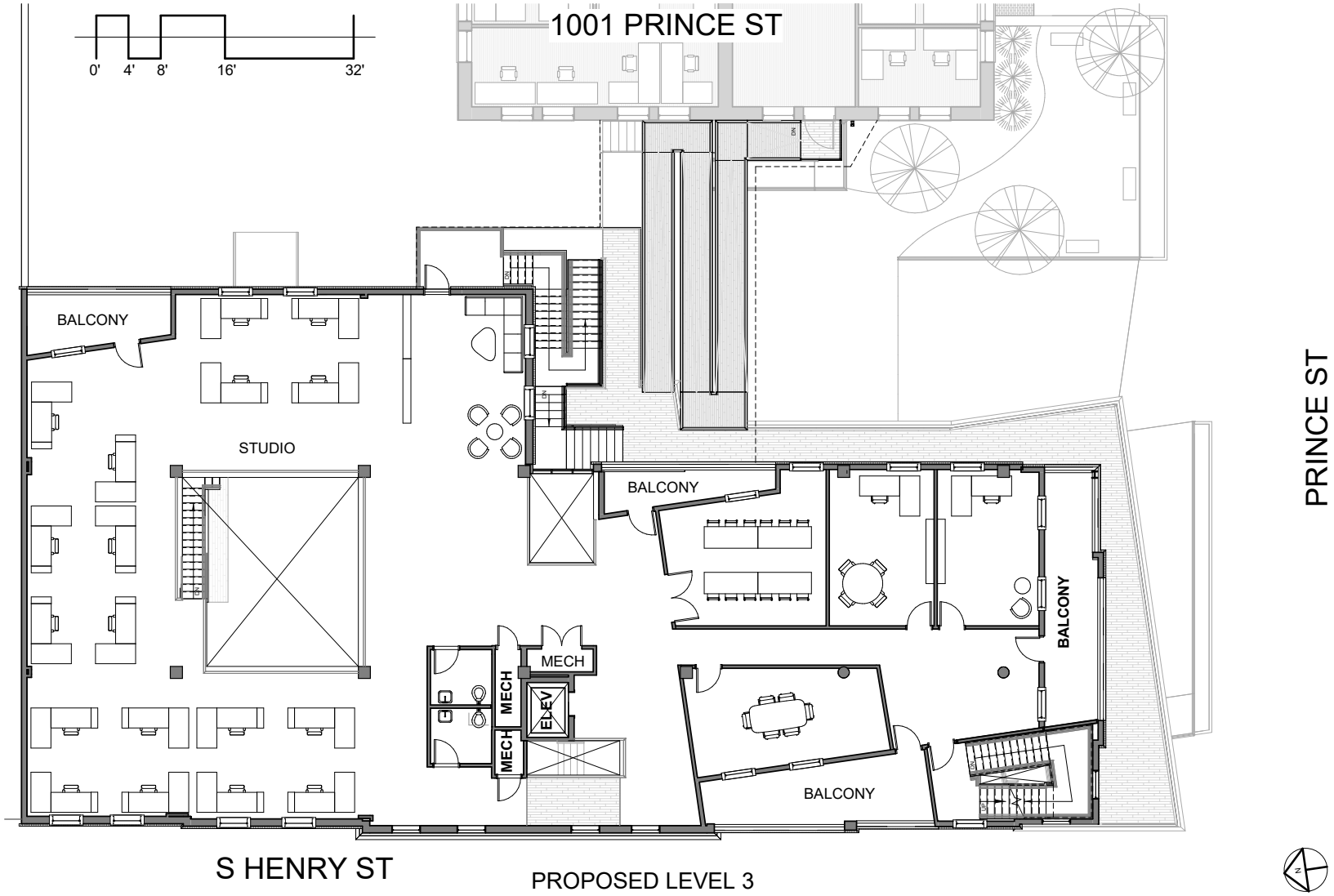

0'
4'
8'
16'
32'
1001 PRINCE ST
BALCONY
STUDIO
BALCONY
MECH
MECH
ELEV
MECH
BALCONY
BALCONY
PRINCE ST
S HENRY ST
PROPOSED LEVEL 3

Figure 24

Proposed Plan: Level 3

Level 3 is meant to be the most private area of the building. It has access to connect with the public sphere on balconies, but meeting spaces are partitioned for privacy. The walls are joined for future deconstruction in order to make it faster, simpler, and less expensive to create different spaces on the southern end of the floor plan.

The floor in the center of the studio opens up both studios for more collaboration and motivation. The roof is protruded above this opening with clerestory windows on each side to allow more natural light into each studio. Existing beams remain in the opening as a way to study connections in structures.

The corner stair provides access to the roof, and the exterior stair provides access to the lower levels, including the ramp to 1001 Prince Street.

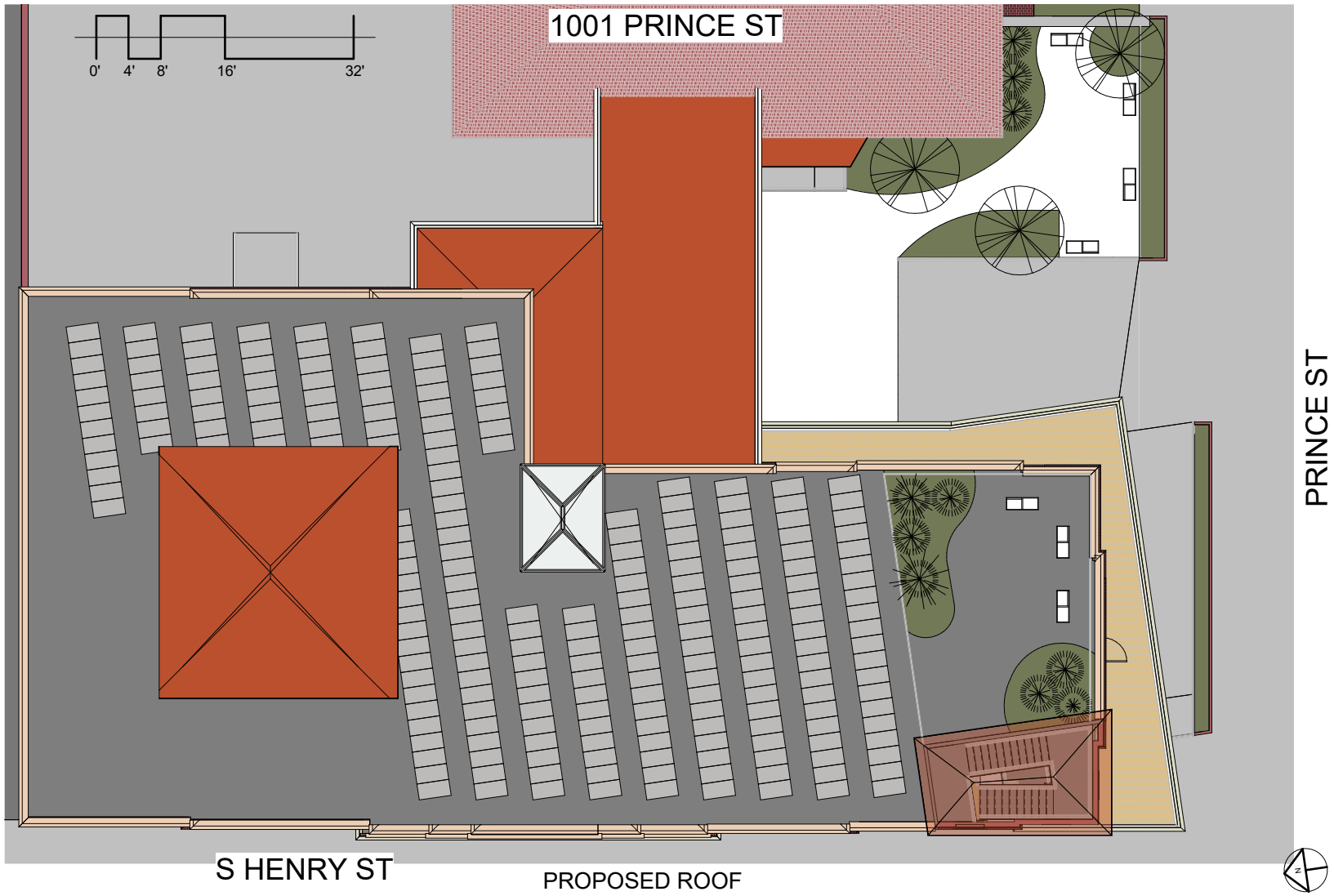


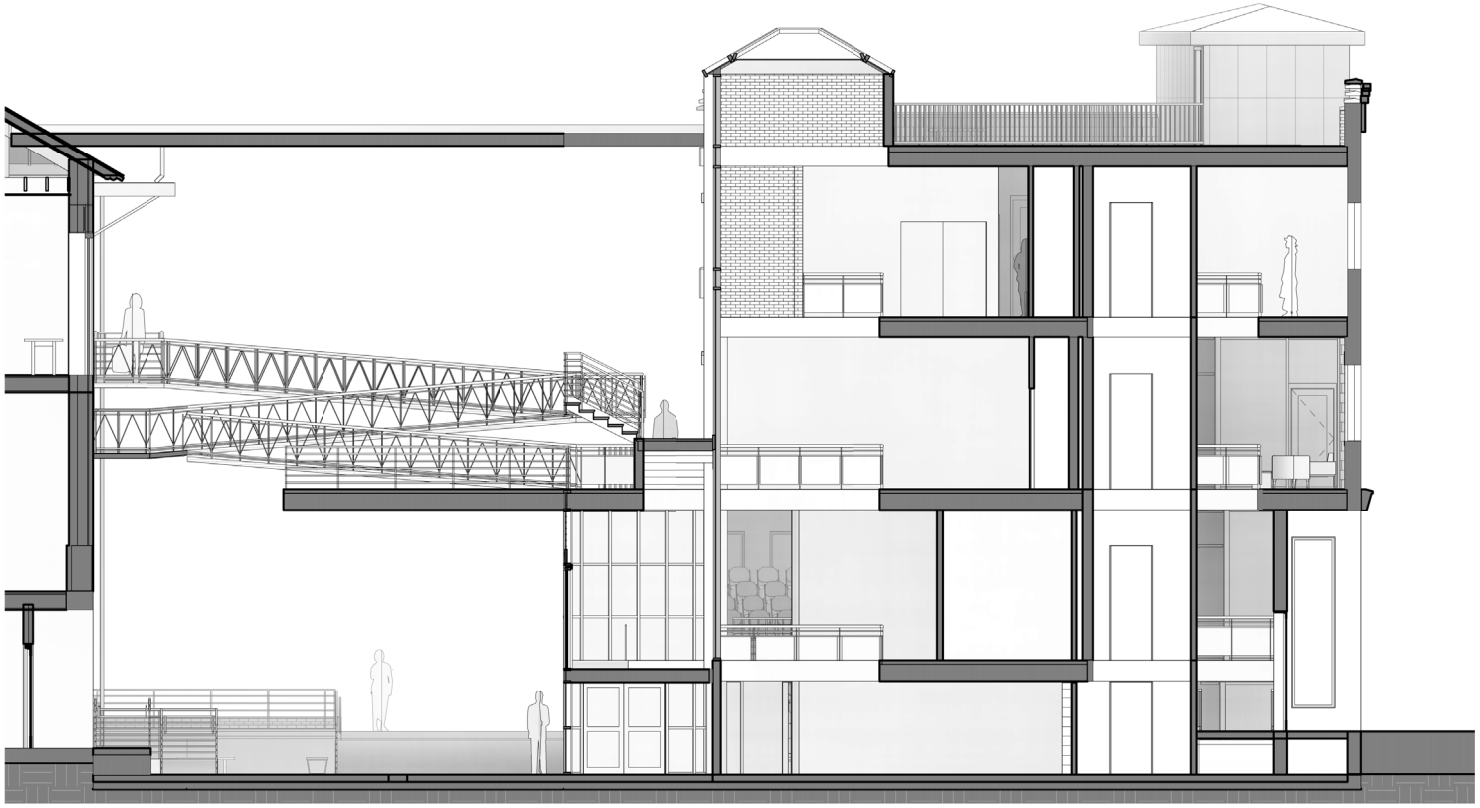
Figure 25

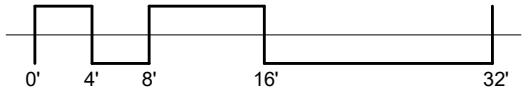
Proposed Plan: Roof

Adding elements to the roof, such as a roof garden, clerestory windows, and solar panels revives the roof by becoming a space for rest, light, and energy. New roofs cover the exterior stairs and ramps. Each new roof is a similar material or color to the roof of 1001 Prince Street, but the one above the main lobby is glass for more natural light.

There are approximately 616 solar panels throughout the project; 387 secured to exterior walls, and 229 on the roof. With a monthly average of 416 kWh used per day, including about 25% cushion for rainy days, these panels should cover about 22% at 150 W minimum per panel. The spacing between the rows on the roof is to allow for maintenance.

Section Through Courtyard





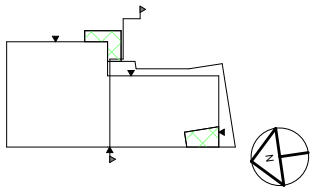
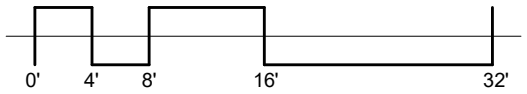


Figure 26 shows an entry cut across the campus to show the new entry points into 1001 Prince Street on Levels -1 and 3, the new entries into 1021 Prince Street from S Henry St and the courtyard, as well as the newly opened vertical spaces that are left where the existing stairs are removed.

Figure 26

Section Through Southwest Corner Stairwell



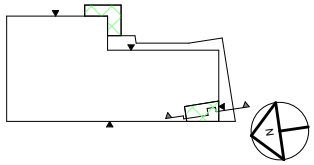
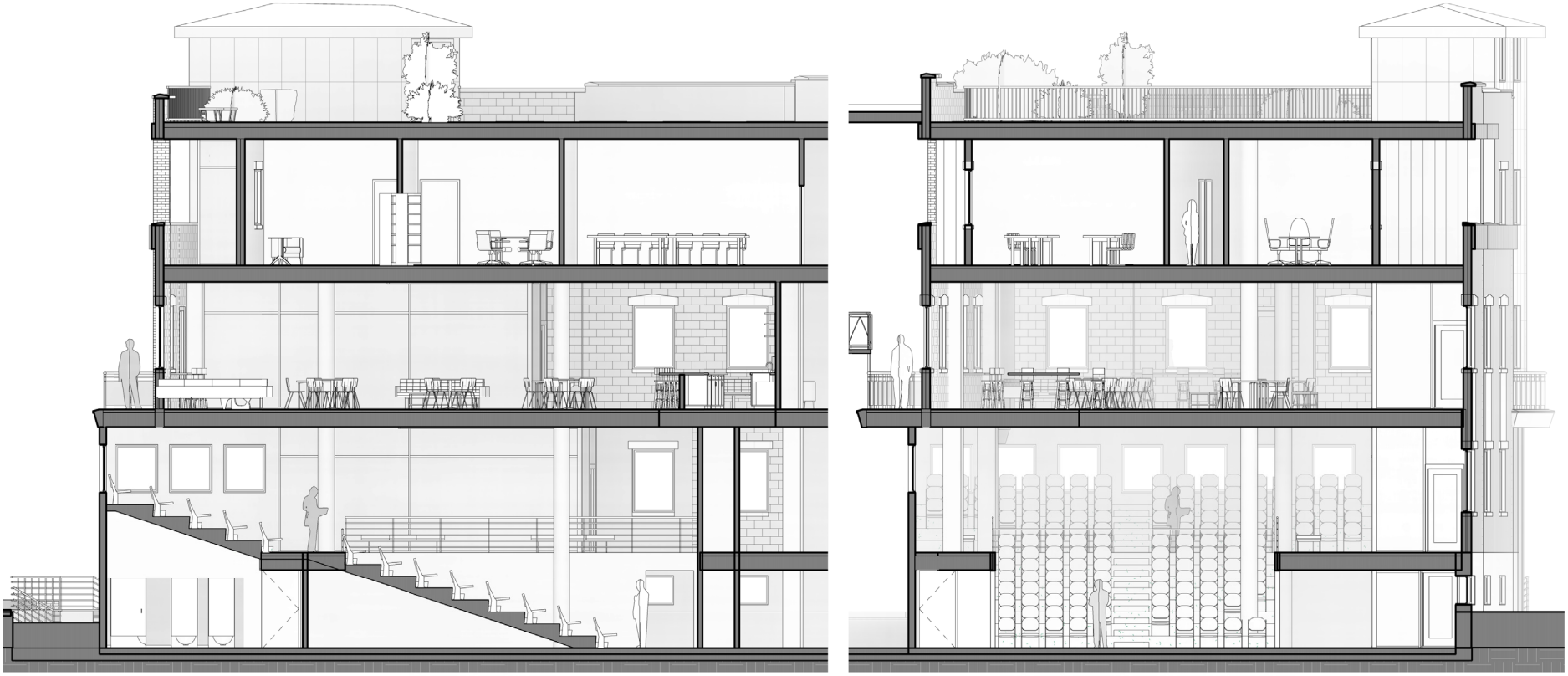
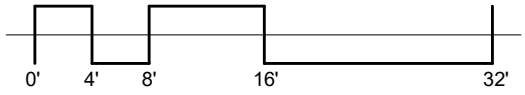


Figure 27 shows a section cut through the new stairwell on the southwest corner of 1021 Prince Street.

Figure 27

Section Through Lecture Hall





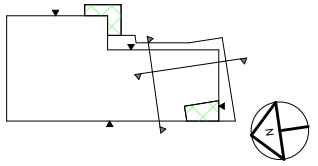
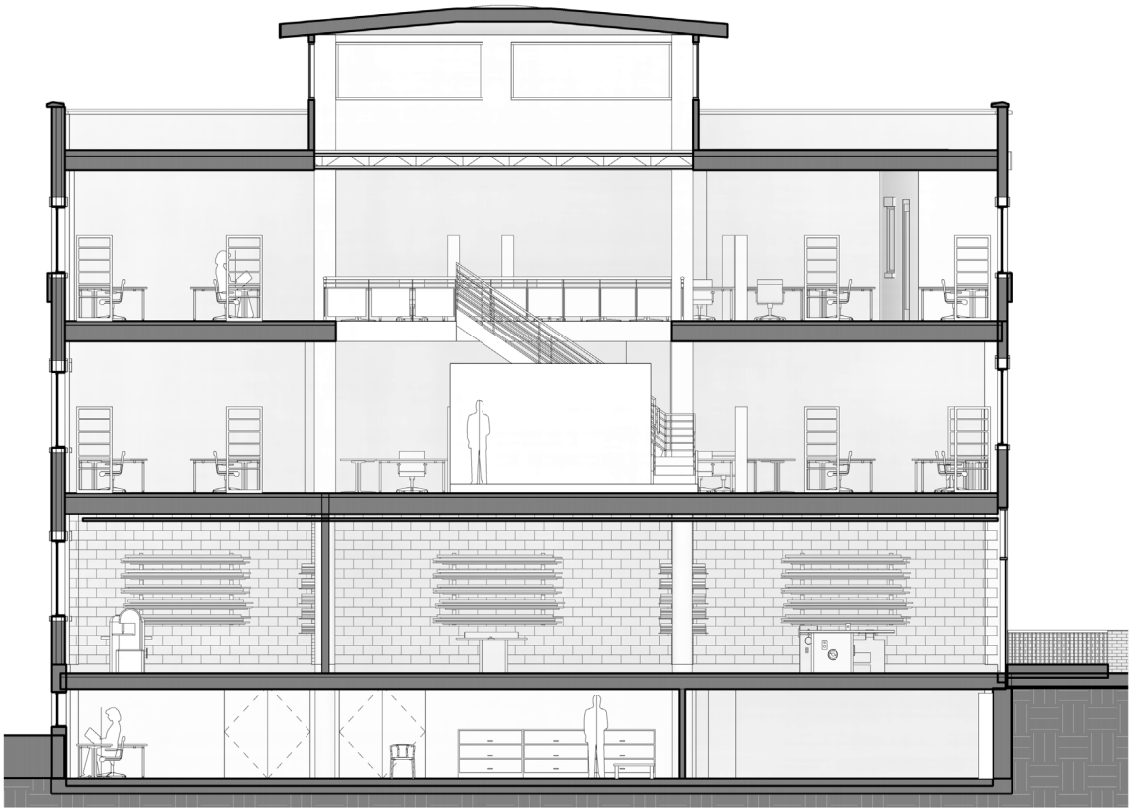
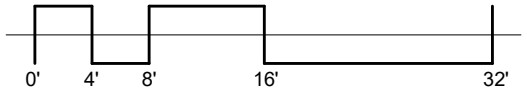


Figure 28 shows section cuts through the lecture hall, cafe, office spaces, and roof garden.

Figure 28

Section Through Studios





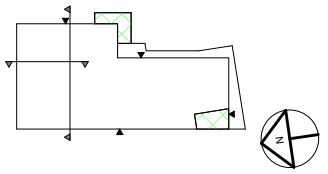
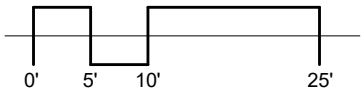


Figure 29 shows section cuts through the studio spaces and shops. A pin-up wall sits atop a platform along the existing stair between Levels 2 and 3. Beams are revealed under the new roof expansion as a learning devise, as well as to allow interesting shadows to paint the space throughout the day.

Figure 29

Exterior



EAST ELEVATION

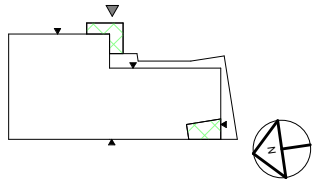


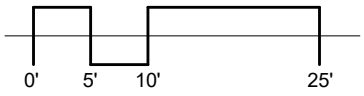
Figure 30

East Elevation

With a new floor in place of the underground garage, the main entry becomes more prominent at the core of the east elevation. The solar panel veneer of the protruding, double-height lecture hall cascades down a ramp into the new courtyard from the sidewalk on Prince St, which leads to a two-level glass vestibule of the main entry. Removing the eastern stair makes it possible to allow more light into the center core of the building with a protruding tower of glazing extending above the entry, which also marks the significance of this corner.

To maintain a connection to the existing alley parking and the woodshop and metal shop on Level 1, the existing exterior wall remains untouched, except for where an exterior stair is attached to provide vertical access to the building, as well as to create shelter for the main doors within the top level of the vestibule.

The extension of the lecture hall past the existing perimeter provides a terrace for circulation between the two school buildings as well as offers vertical routes through 1021 Prince Street. Portions of the exterior walls on the third floor are removed at the corners of the building to provide more exterior spaces for moments of connection with what is happening outside, or for moments of privacy away from meetings inside the building.



SOUTH ELEVATION

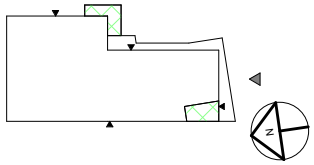


Figure 31

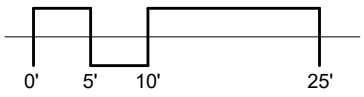
South Elevation

Removing the existing podium stair entry on the south elevation makes it possible to create a more welcoming and useful entry on the southwest corner of the building at the new lower level via a double-height corner stair and a ramp along the southern lecture hall wall.

Adding a stairwell at this corner, which also provides access to the roof, breaks up the rigid box of the existing exterior, especially with the lecture hall protruding away from the perimeter at an angle from below.

The existing façade of the building is very classical and symmetrical. Breaking up the exterior wall with openings, angles and protrusions creates a more interesting elevation, while maintaining a pattern of the doors and windows nods to the classical symmetry of its past and the surrounding buildings.

The ramp spanning above the courtyard not only connects the two buildings on campus, it provides an accessible route to 1001 Prince Street by way of the elevator in 1021 Prince Street, it creates more shelter for the courtyard below it, and it makes the space look more inviting from the street level.



WEST ELEVATION

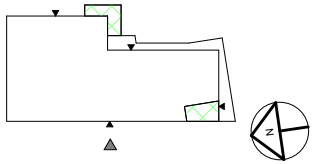


Figure 32

West Elevation

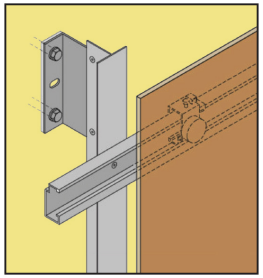


Figure 33

Adding recessed entries at the center of the west elevation and the southwest corner provides better circulation along the street level, as well as clearances on the surrounding sidewalks. The central entry gives direct access to the elevator and steps down to the lobby of Level -1.

Existing garage vent openings are replaced by windows to provide more natural light into the western side of the lower level.

Removing a portion of the exterior wall on the third floor for a balcony, as well as adding solar panels to the veneer helps divide up the long, monotonous wall of brick to a smaller pattern similar to townhomes in the surrounding area. All salvageable bricks removed for the balconies are reused as banding below and above the new openings on Level 3.

Solar panels produced by SolarLab are mounted similar to a rainscreen (Figures 33 & 34). SolarLab panels come in multiple colors, and they are 100% recyclable.[16] Dark red panels are added to highlight the new vertical spaces. Gray panels extend the concrete color within the center of the elevation to create a base of the central "column" over the entry, continuing with the classical treatment of the existing building. Orange panels connect the windows from Levels 1 and 2, as well as line the walls of the lecture hall on the south end. All roof extrusions are clad with the dark red panels, as well.

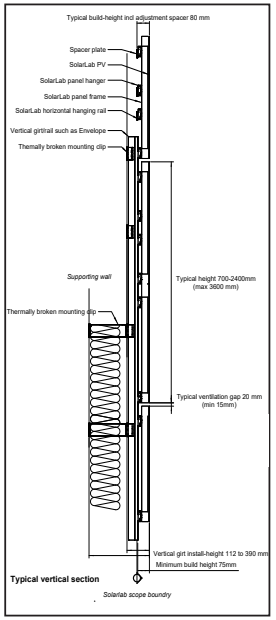


Figure 34

16. "Solar".

Experience

This chapter includes images of 1021 Prince Street in its current state juxtaposed with rendered perspectives from similar angles of the proposed building.

BEFORE

Figures 35 & 36 show views of the southwest corner of the building at the intersection of Prince and Henry Streets.

Figure 35

AFTER

Figure 36

Figures 37 & 38 are images of the existing plaza above the basement garage. Reclaiming the space from the garage creates more opportunities to connect with the surroundings, and makes the gathering space feel larger and more welcoming (Figure 39). Brick taken from the plaza ground and barriers can be reused for new garden beds.

Figure 37

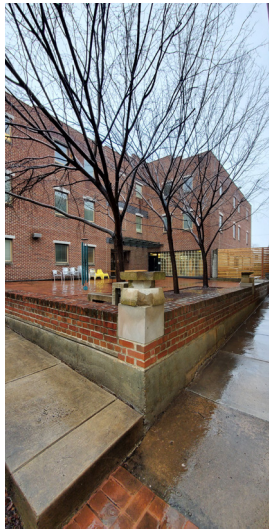


Figure 38

Figure 39

Figure 40

Figure 41

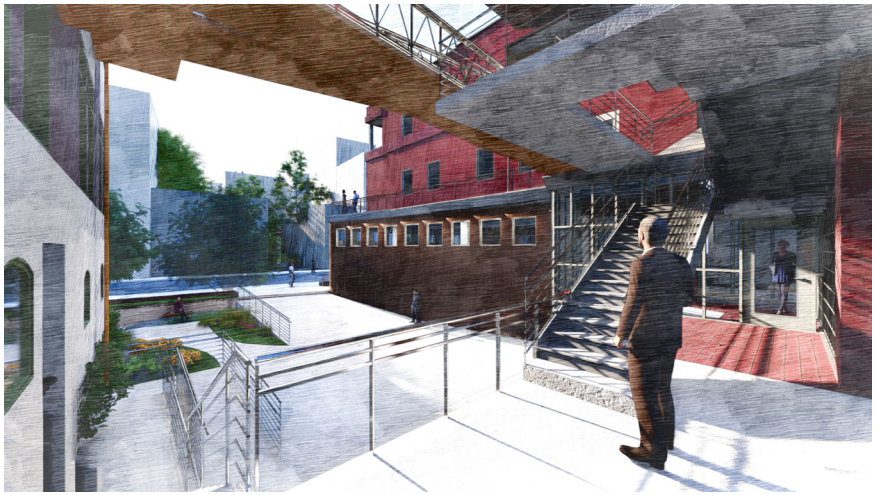


Figure 42

Figures 40 & 41 are images taken from the existing courtyard facing towards Prince Street and towards the existing main entry onto the first floor. Figure 42 shows how much more connected the two buildings are from multiple levels, as well as how visible the path is to the courtyard from the street and sidewalk.

Figure 43

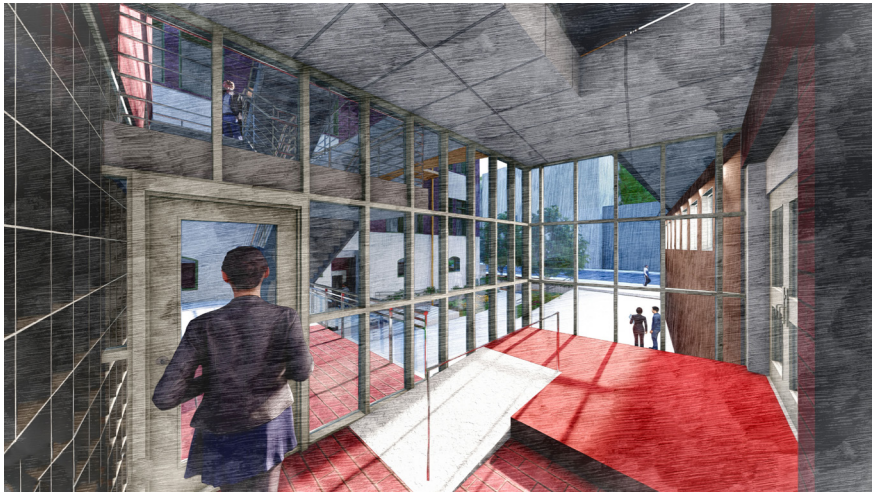


Figure 44

Figure 43 was taken in a corner where the main entry meets a door to the shops, facing 1001 Prince Street's western façade. A new vestibule attached to the original main entry and tucked under a new terrace creates an opportunity to view over the courtyard while providing access to the existing alley parking behind 1001 Prince Street (Figure 44).

Figure 45

Figure 46

The existing access to the basement feels awkward, especially when combined with a vacant garage (Figure 45). Making the main entrance open to the basement level, and containing the building's main MEP stacks central with the existing elevator improves vertical wayfinding (Figure 46).

Figure 47

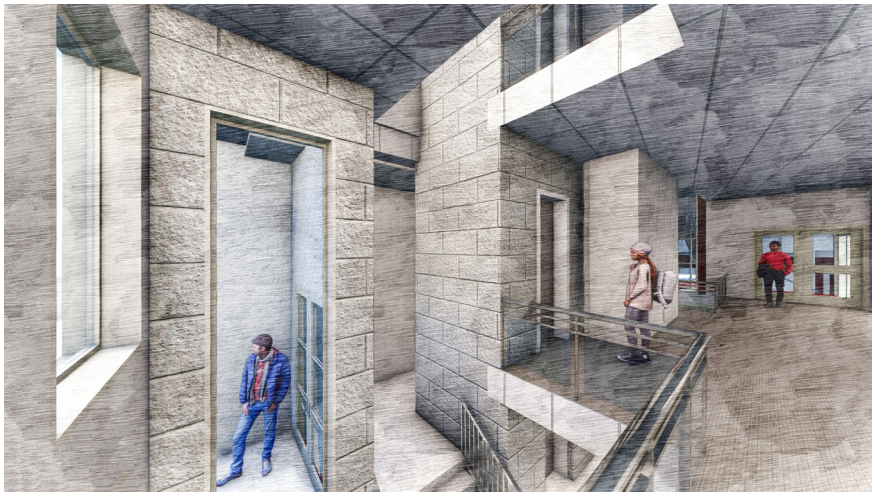


Figure 48

Direct access to the sidewalk level on the western side along Henry Street is currently for egress purposes only (Figure 47). With the full stairwell removed, an opportunity to create better use of exterior doors along the busiest street becomes clear, and the elevator becomes a dominating feature in a more spacious lobby on the first floor (Figure 48).

Figure 49

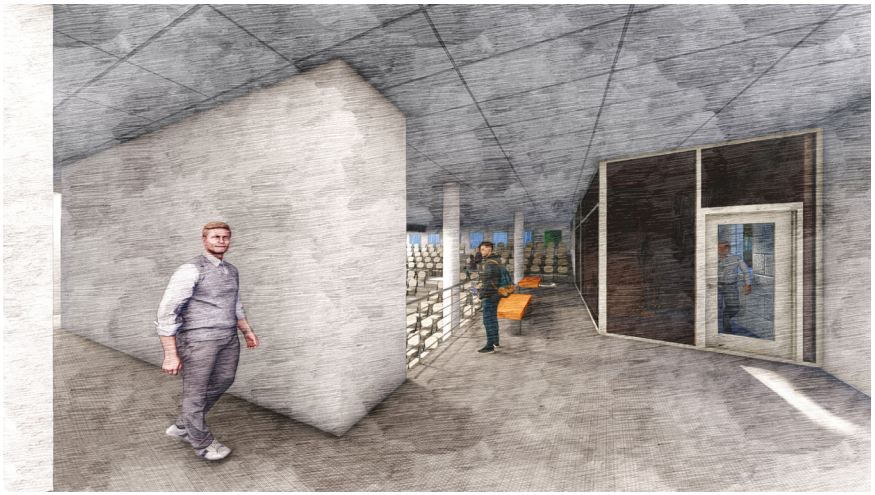


Figure 50

Figure 49 is the existing main lobby on the first level facing away from the elevator and western stairwell. Leaving the lecture hall open on the sides at Level 1 allows students and visitors to stop by for a peek at presentations. I imagine students punching a mixture of holes into the back and/or sides of the wide presentation wall as storage (Figure 50).

Figure 51

Figure 52

Figures 51 is taken from within a meeting room immediately next to the existing main entry with views of the plaza. Further south in the building, Figure 52 is from the last rows of the lecture hall. The presentation wall spans two floors to allow large projections, and the open concept simplifies emergency egress via multiple routes.

Figure 53

Figure 54

The south end of the existing second floor is an suite of office surrounding a meeting space, and it feels very private (Figure 55). I want to maintain this area as a place to meet, but I believe where people gather most is where there is food. Figure 56 shows the cafe from the edge of the kitchen, with a view towards the exit to the southern exit to the exterior terrace.

Figure 55

Figure 56

Figures 57 & 58 are views facing north from the southern end of the second floor. The elevator and stair are visible, and there is more natural light to create a safe and comfortable space to meet or take a break.

Figure 57

Figure 58

The stairwell on the eastern side of the building sits in the corner of its two main axes, but doesn't continue to the basement. Figure 53 shows how the second floor (and third) has an awkward access hallway within it, which seems like a waste of space. When the stair is removed, the lobbies of each floor gain verticality and views of the connections to 1001 Prince (Figure 54).

Figure 59

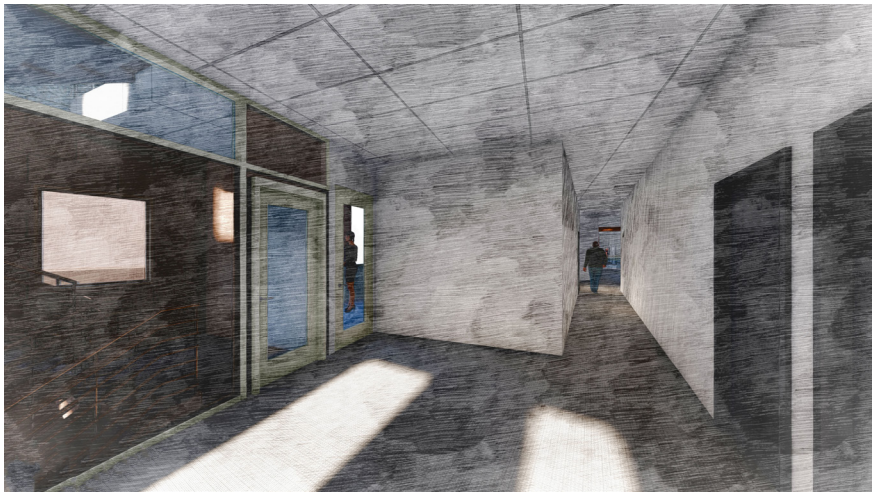


Figure 60

The existing third floor has a couple large spaces that are great for gathering on the southern end (Figure 59). However, I want the top floor of the building to be more private, and to give access to the exterior via balconies. Balconies on the west and south are accessible from the fire stair or a hallway that visibly leads directly to the central core (Figure 60).

Figure 61

Figure 62

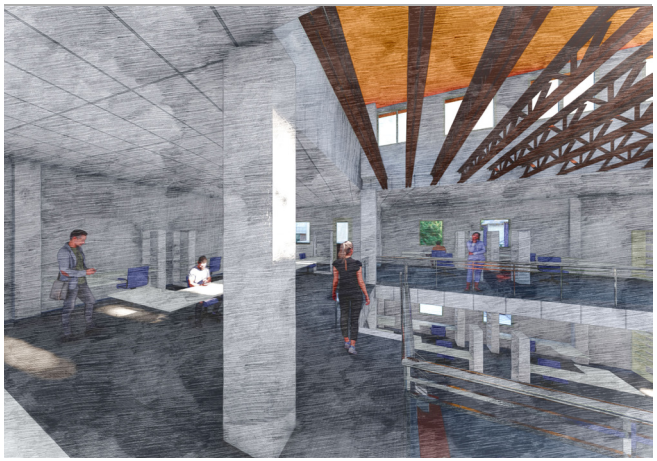


Figure 63

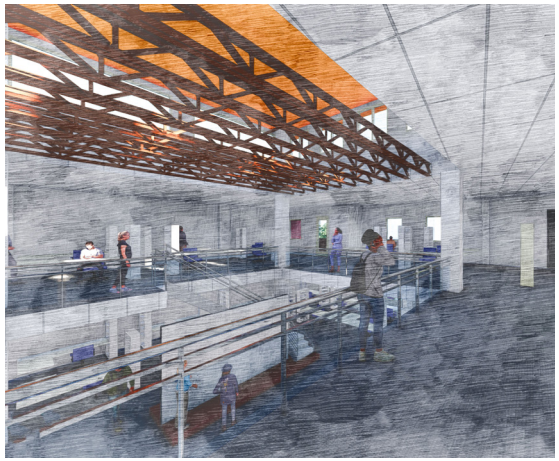


Figure 64

The northern end of the existing third floor was poorly planned. Figure 61 shows a suite of offices on the northern end of the building where large spans of drywall surround two central meeting spaces that have no natural light. To prevent a dead-end corridor, a staircase to the second floor hides behind the back wall of the meeting space (Figure 62). Removing the walls and punching a hole in the floor while keeping the stair creates an opportunity to have a double height space, perfect for studios (Figure 63). It allows students to view presentations from Level 3 without interrupting (Figure 64). Larger gatherings can also function using both levels without the worry of students spilling out of an enclosed room.

Figure 65

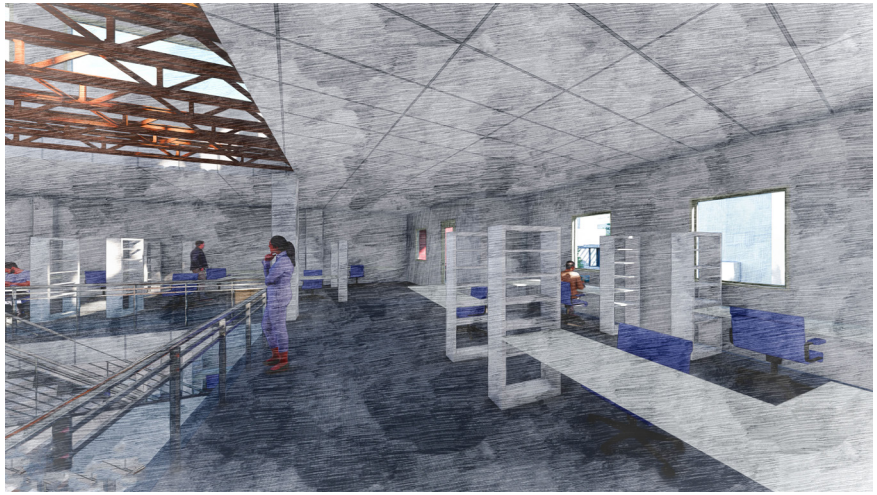


Figure 66

Other than the wood shop on the first floor, the “zoom” room on the northeast side of the third floor was probably the most used room in the building (Figure 65). Creating an open plan and raising the roof for clerestories allows light and collaboration to flow from east to west and between floors (Figure 66).

05

Précis

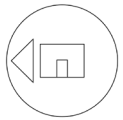
Modern society seems to be infatuated with the idea of “new and improved” buildings. There’s a reason that phrase is an oxymoron. Something can’t be new and improved at the same time. But can it? Can we improve our spaces by using existing materials in new ways? Maybe we can start designing for the future with what we already have because we cannot create new energy. We can only revive the existing energy within our buildings.

In my study of redesigning the underutilized building at 1021 Prince Street I found that opening up floor plans is not only beneficial for increasing access to natural light, but it also makes it possible for spaces to evolve over time. Our buildings should be more fluid as their life-cycle turns.

Creating several routes within a building and on a site results in moments of chance; a chance to meet other people, a chance to see the spaces in different ways, a chance to plan for what’s next.

Trash will be a problem for a long time coming simply because of how much of it is already out there and how much is controlled by laws and affordability, but as designers we should start to put into perspective a rubbish revival to never break the circle of building life.

The Circle of Building Life



06

Postlude

In studying how 1021 Prince Street was put together, I became stuck on the amount of material that was useless in the existing building. I didn't want to get rid of it for fear of being a hypocrit. Changing my perspective from what I can't do to what I can do helped me to focus on the important point: a good design in a bad space will only last so long. I then aimed to improve the spaces within and outside the existing building knowing that they will mostly likely evolve over time as it gets used. However, comparing the amount of material that may be wasted from changing a bad space versus a good space helped because what little material is removed from a good space will most likely be able to be reused or repurposed within that same space. Not so much for the other.

What do we do with the excess material, especially if it's the first round of reviving a building's life? I imagined much of the excess brick, glass and gypsum to be crushed for use as sand, aggregate, or soil for the gardens. I also thought students would be able to reuse large pieces of gypsum wall for pin-up boards, projects or desks. The metal from drop down ceilings and studs could be used for handmade railings throughout the site. The options really are endless, and what better place to have that kind of issue than at an architecture school!

I really wanted to make the design choices visible for students to learn how materials may be used and connected, but I also believed that it's important to show what's new versus old as a way of tracking time, like the strata of rock. This shows in not only materials, but their style, such as the different window headers and sills.

I wanted to relate materiality and connection to the building level names, as well. For clarity purposes, however, I kept them labeled by numbers, but I imagined Level -1 to be called Grass, Level 0 as Pavement, Level 1 as Wood, Level 2 as Bridge, Level 3 as Overlook, and the Roof as Sun. It would be very fitting for the character of the WAAC.

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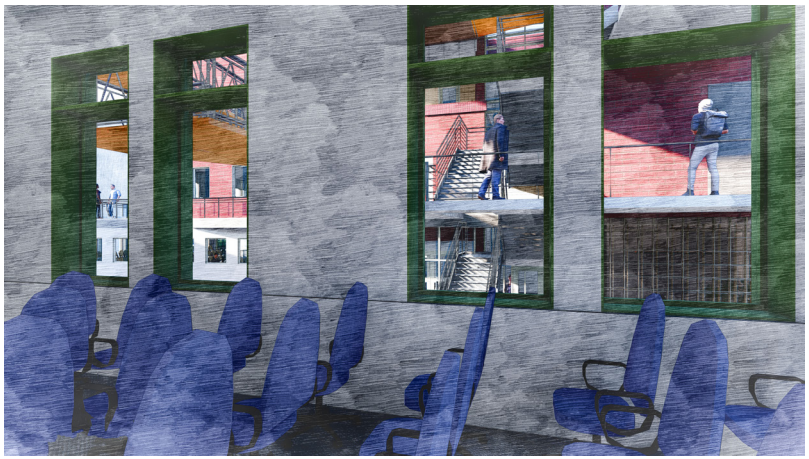

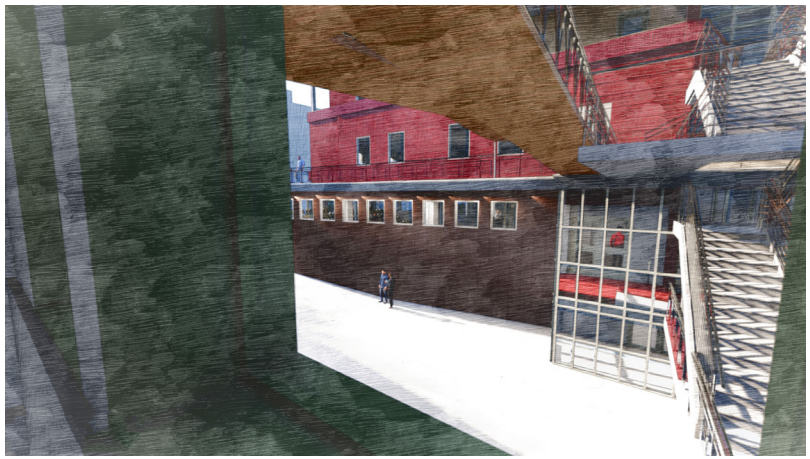

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