

co/evLABS
a habitat for co evolution

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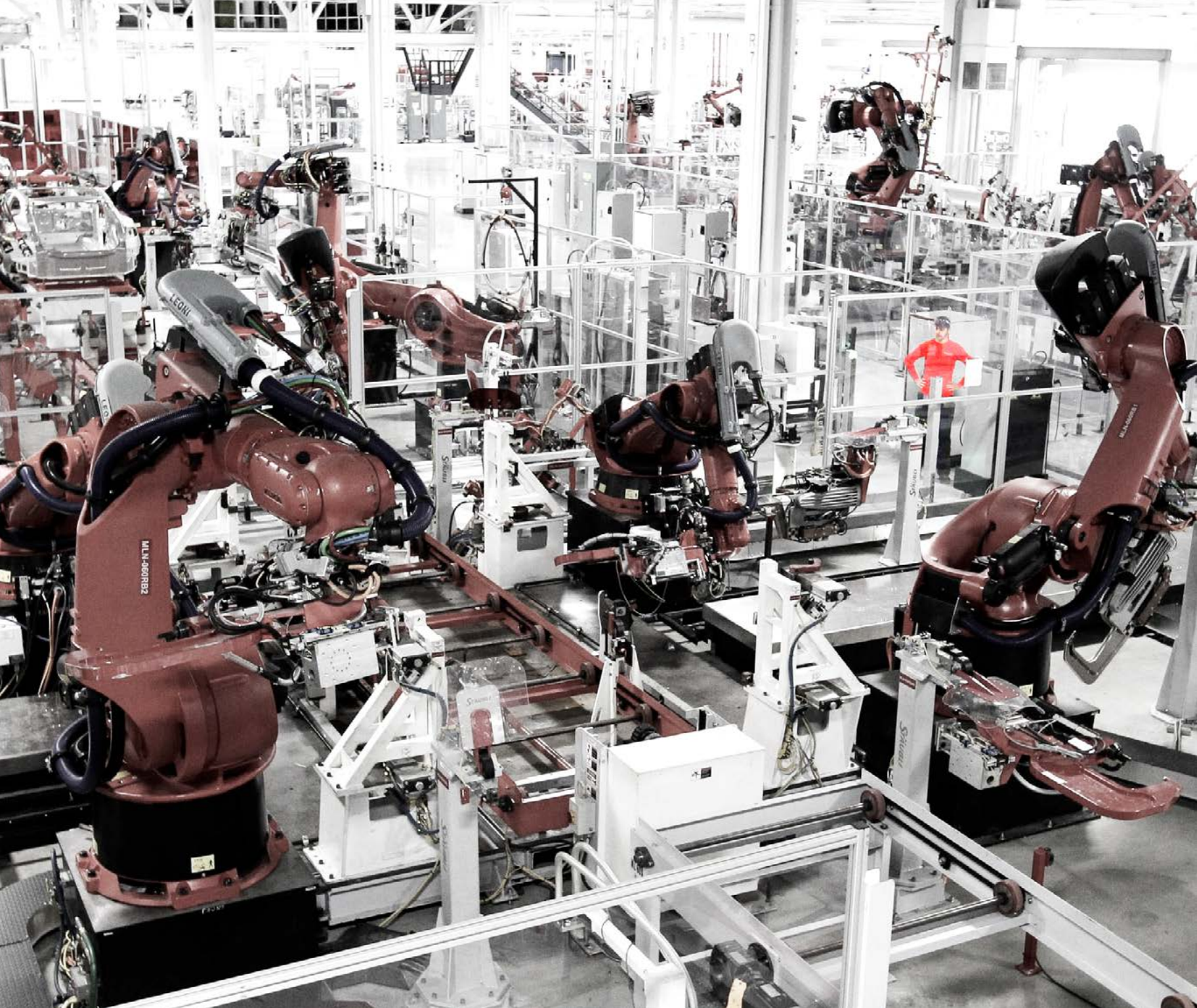
tools of leisure

The human species started as hunter gatherers, where every member of a society was needed in order to sustain the resources necessary for survival. But as tools developed, the species started to evolve into farming based societies, which allowed for a more stable and abundant food source. This allowed some members of these societies to not need to labor for survival, and instead, freed them to develop art.

The tools humanity uses have continued to evolve, which in turn, and created a growing leisure class, which does not need to labor in order to survive.

<http://bloemskunstdebby.nl/2011/wp-content/gallery/farmers-plow-12.j>
<http://www.machines-simon.com/en/our-machines/vegetable-harvester/carrot-harvester---top-lifter/three-point-linkage-harvester/25-harvester-with-cross-conveyor-discharge-elevator.html>

Instead, they have other jobs and tasks that are not critical to sustaining life, but are still critical to the maintenance and advancement of society as a whole. Currently, the machines that maintain the human species' survival are becoming increasingly complex, efficient, and useful in taking the bulk of the labor. This has allowed the modern world to continue its pursuit of art and intellect with almost no bounds.



species of labor

The machine species has evolved to be almost self sufficient. Today, vast factories can produce acutely customized items at a mass scale thanks to the advancement of machine labor.

But there is still room for further evolution.

In the near future, machines will begin to take over every classically laborious industry. Everything from heavy industry to repetitive service work will be spaces for the species to expand into. This will leave many humans without work, and without other industries to turn to, leading to a large portion of the labor force with no labor to do.

Some have suggested the idea of a Universal Base Income as a way to maintain an economically functioning society, which would alleviate the fiscal apprehension that precludes the evolution of machines. But what will people do? Without work many would feel like they do not have a purpose in life, and would slip into a life of monotony and boredom. So how does humanity evolve from species of labor, to a species of leisure?

<http://www.machines-simon.com/en/our-machines/vegetable-harvester/carrot-harvester---top-lifter/three-point-linkage-harvester/25-harvester-with-cross-conveyor-discharge-elevator.html>

how do we work when there's no work left to do?

CO/evLABS

a habitat for co evolution

The institution's objective is to create a future in which humans evolve into leisurely lifestyles focused around creativity and learning, free from the burden of labor. It will focus on acclimating humans to the cohabitation with machines by presenting different environments for inter-species interaction. The building will instil creativity by constantly varying the program location throughout the space, and by changing sectional connections between rooms. This will prepare the human species for a life of active leisure, focused on the creativity that makes us uniquely human.

phase 1

The initial mission is to bring together a diverse group of engineers, mechanics, scientists, and artists in the pursuit of the expansion of machine integration with humans. It will set the groundwork for a future that will be defined by the two species living in harmony, and aims to ensure that the technology expands rapidly while maintaining its focus on enhancing human life, not eclipsing it.

The institution will serve as a lab for experimentation, featuring design and testing areas, as well as simulation rooms. These will both serve to show the public the opportunities that

machines have to revolutionize all aspects of human life, as well as help to prepare humans for a near future where living with machines will be the norm. Living spaces will predominantly be occupied by those working at the facility, as well as a few "learners" which will set a course for future inhabitants. This will be the base of a fundamental change in the human race.





phase 2

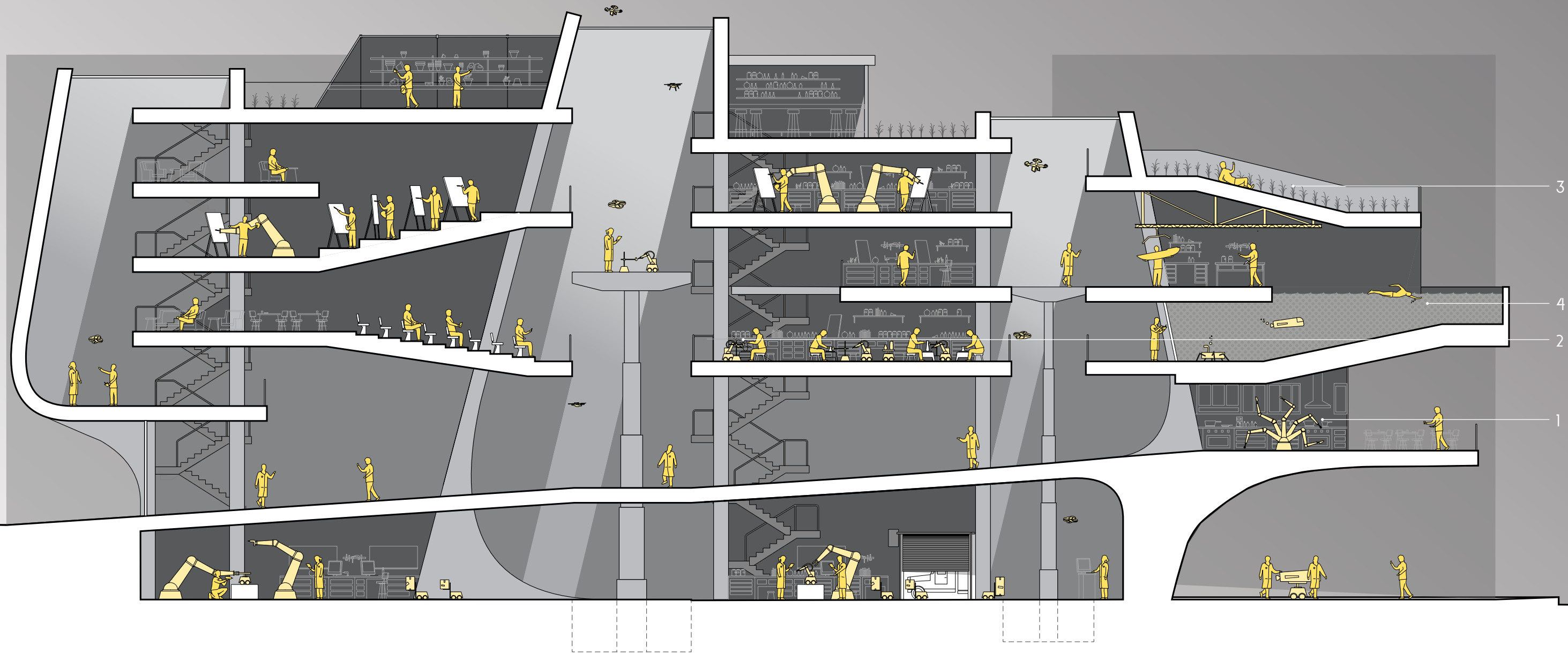
The long term goal is that the facility will transition from a space of constant innovation to a place of inter-species learning. As machines continue to evolve to take on the bulk of the labor, humans, in turn, will evolve to be labor-free, allowing time for self determined study and exploration. The institution will transition to support this new version of humankind by creating a space for inter-species collaboration. Humans will interact with machines to find an area of study, through a range of modes of artistic expression. The machines will not only be a source of labor for every day tasks, but will evolve into partners for collaboration, amplifying human creativity.

The facility will change to cater to this learning centric program. The simulation rooms will transform into spaces of inter-species collaboration, in which both the public and the residents can experience the same creativity. The residents will be dedicated to learning and collaborating with each other, and with the machines, and will expand what they learned as they return to their communities after their residency.



dogpatch, san francisco

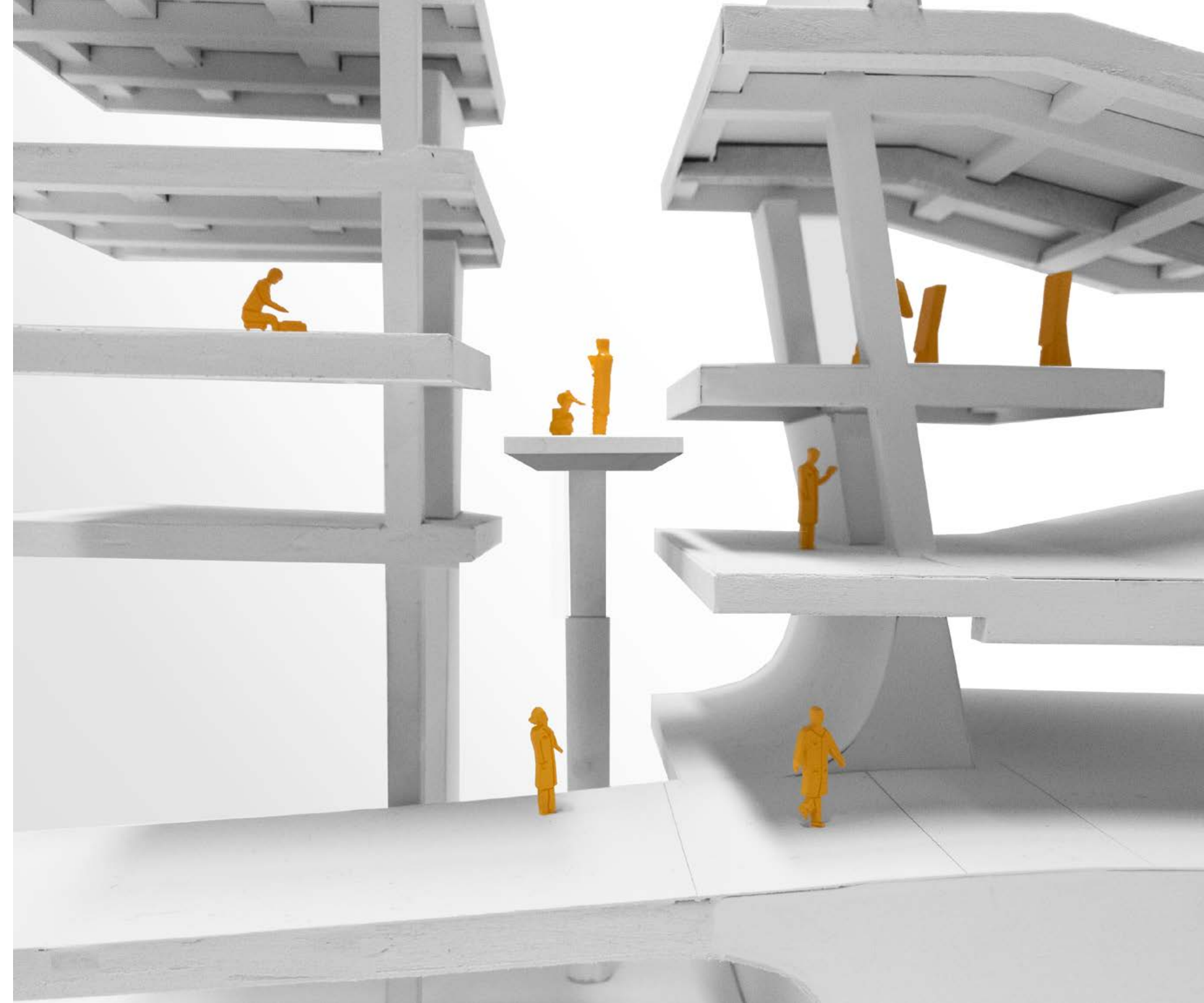
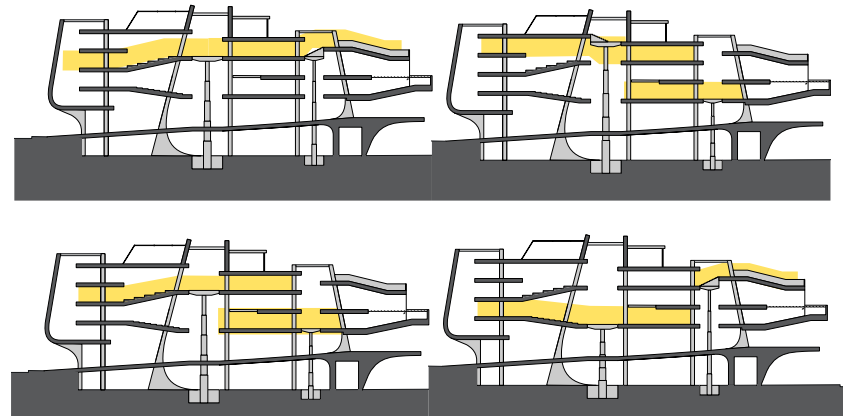
The neighborhood is an old industrial area that is being taken over by artist and makers. Located near the future development of Crane Cove Park, the site will receive lots of foot traffic from the east, and from the muni line to the west.



lifts

Each day, the robots start on the bottom factory floor and then are lifted into the simulation rooms above. The lifts allow for design and maintenance of the machines in spaces that are only visually connected to the public. But their main purpose is to randomly distribute programming throughout the building on each day, which disrupts the monotony that residents might fear in a future without labor.

Wherever the lifts end for the day also creates sectional linkages that both change the spacial make up of the simulation rooms, but also the circulation paths through the building. This changes how residents move through the building each day, and starts to lay the groundwork for a more creative population, as it forces constant critical thinking.





1. display kitchen

The space helps humans get used to a future of interfacing with robots for all services, as well as showcasing the skill the machines can pose to make life easier.

2. demonstration theater

The theater serves as both a space for showcasing new and interesting ways that the residents are working with the machines, and allows for public interaction with the demonstrations, if the lift is linking the seating area to the stage

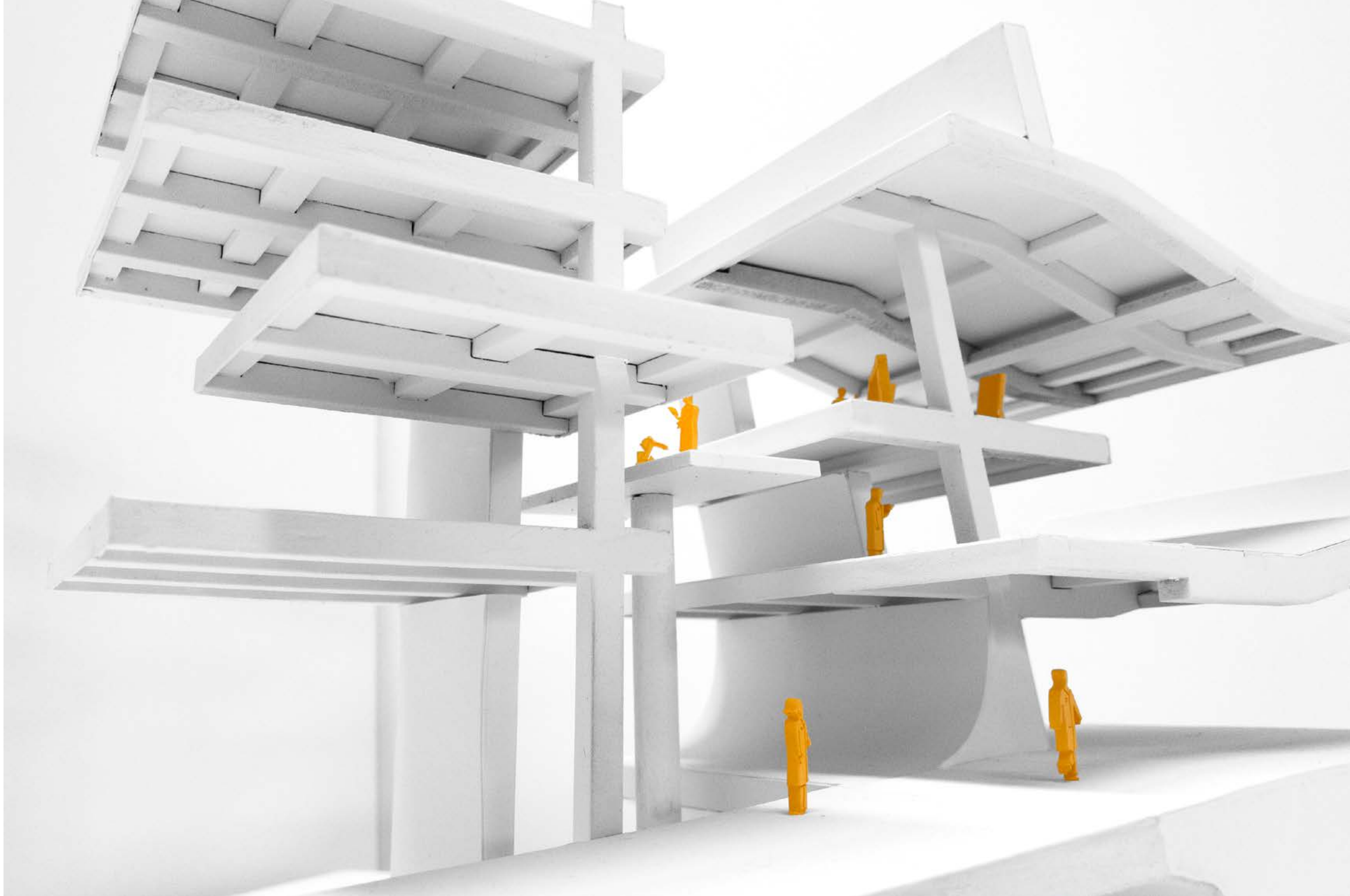
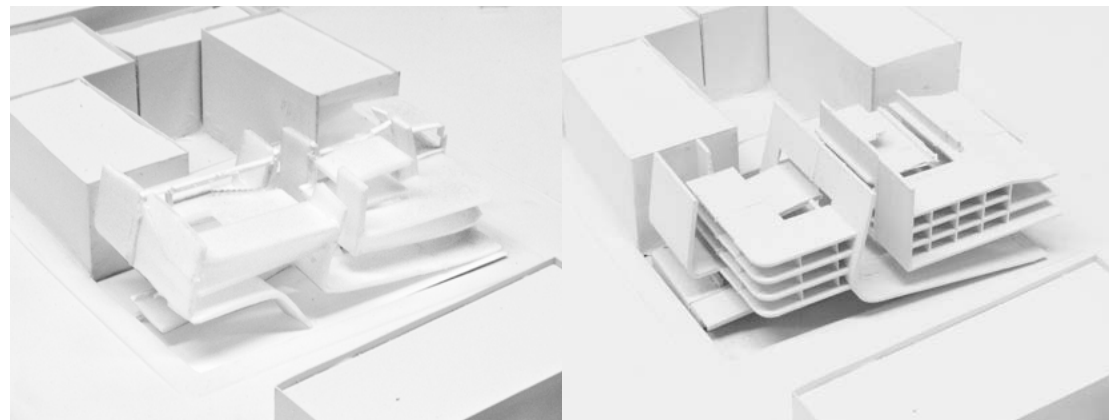
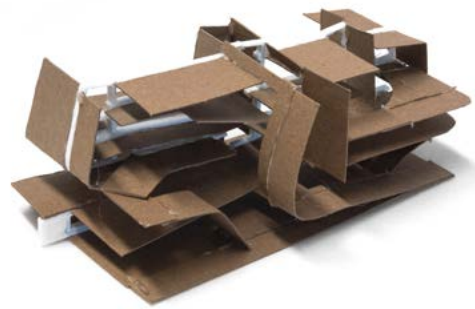


3. rooftop farm

4. inter-species pool

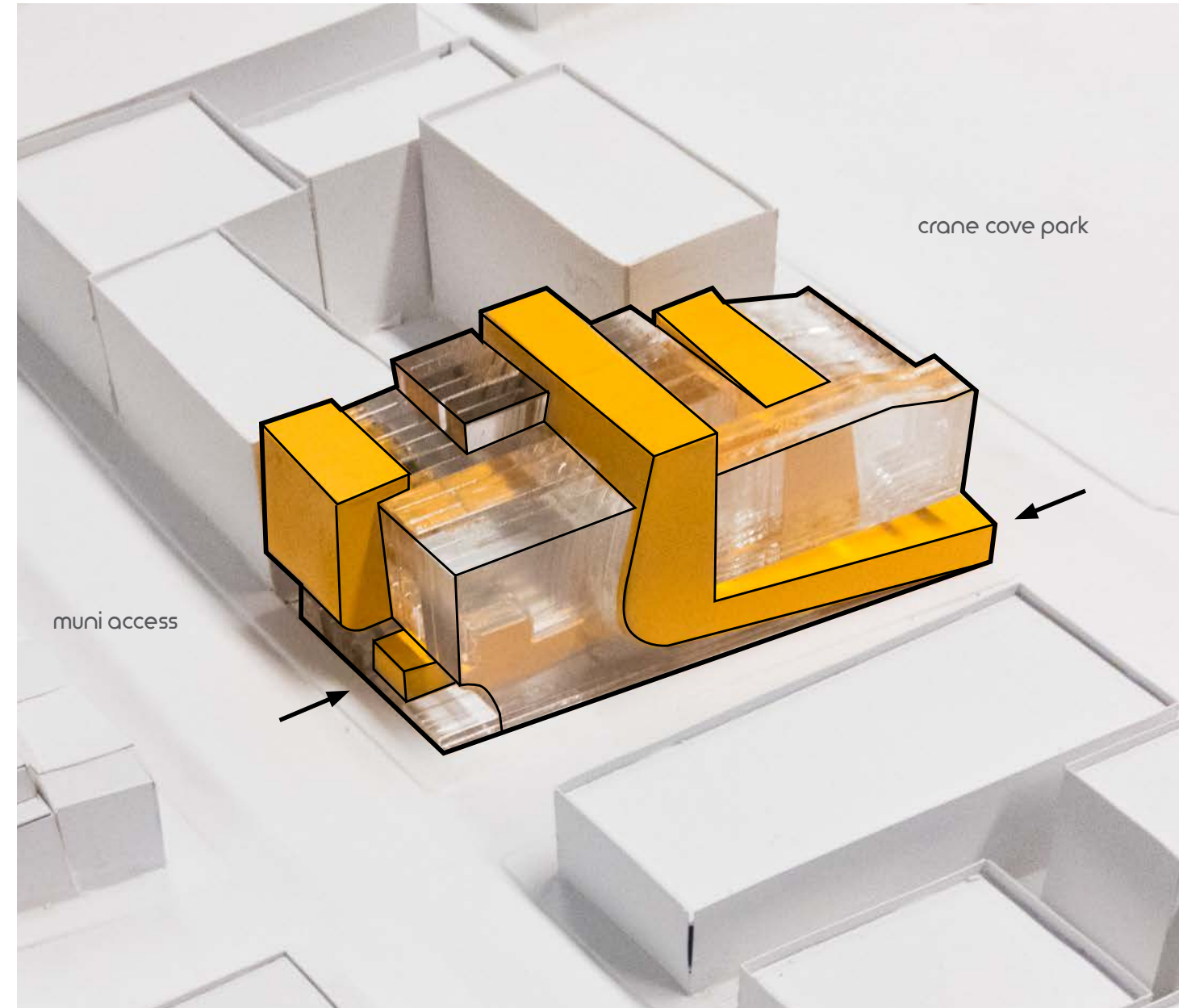
The combination of indoor and outdoor water would be a place of recreation for humans, and clinical testing for machines. It would help to normalize the idea that robots will not solely be on land like humans have already started to accept, but rather interact with humans in a variety of environments.

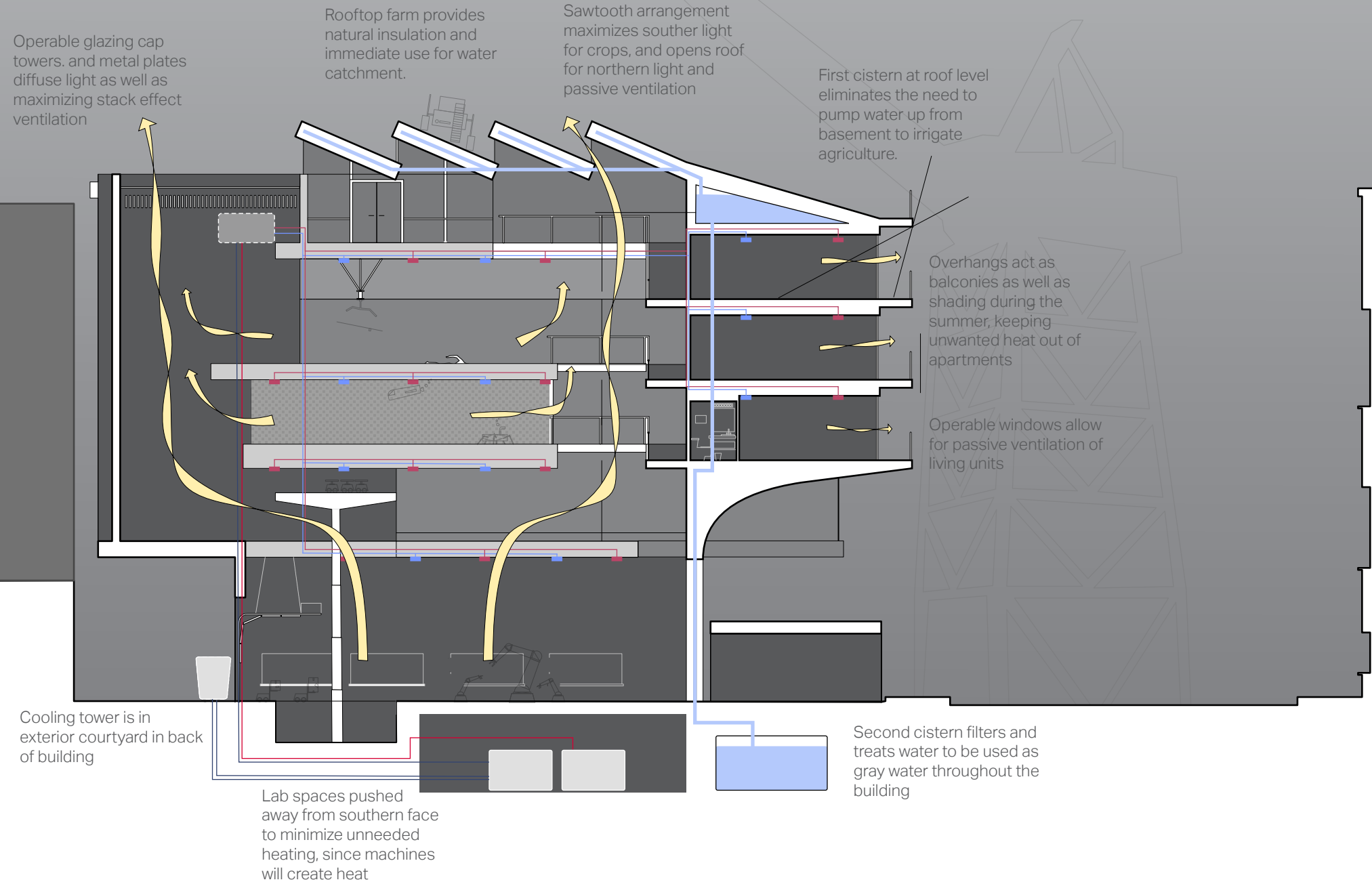




exterior connection

The building opens to the public in two places: one on the west side to access the Muni line, and one on the east to draw people off crane cove park. Both entrances gently raise the walking path allowing visitors to ascend into the building. As they enter the building proper, the space opens up to reveal the lifts and simulation rooms distributed vertically.





systems overview

Rainwater is collected and filtered through the soil on the roof, acting as a preliminary filtration process. It is then stored in a cistern at the top of the building directly under the roof, which can be drawn from in order to irrigate the plants when there is no rainwater. Any excess is stored in the second cistern at the bottom where it is treated for use as gray water, which is used to flush the toilets and for cleaning in the residential units.

The system is air based in order to facilitate constant ventilation, as well as to be able to rapidly change the temperature as the lifts deposit program differently throughout the building. The chiller and boiler are pushed to the basement so they are out of the way

of the factor floor and are accessible for maintenance. The cooling tower is located in the exterior courtyard to the back of the building, minimizing the distance the water must travel. The air handling unit is on the exterior roof, but out of sight for people enjoying the agriculture.

Stack effect ventilation in the towers draws air out of the lab spaces, and the sawtooth roof allows for ventilation of hot air collecting at the ceiling. Living units on the south side of the building have operable windows allowing for passive ventilation as well.

appendix

wanting to reinvent his business by implementing robotics to both work faster and look cooler



auto mechanic

looking to change the world! and gain experience for her resume



mechanical engineering graduate

to design machines that will help people with activities that are limited by their injuries



physical therapist

his previous boss didn't like him experimenting on the machines he was supposed to be fixing



electrical engineer

she wants to design a robot that can blend in with a pod of dolphins fish in order to study them



marine biologist

wonders what he could make if he had the help of a robot with 6 paint brushes



Fine artist

thought he could learn how to paint to keep his senses sharp, and impress his grandchildren

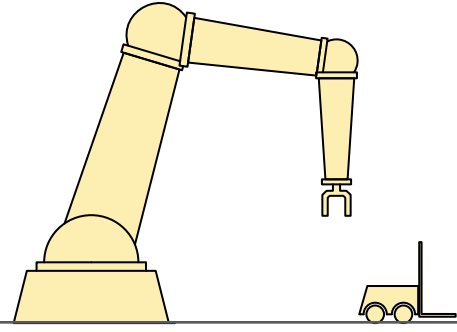


retiree

thought he could try learning a lot of things before he chose one thing to learn a lot about one thing



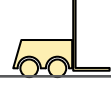
undecided high school graduate



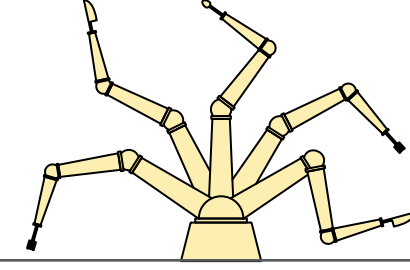
versatile and large, it is the unmodified version that many start designing and also think is a little excessive in size

the big one

small and easy to maneuver, it was designed to carry everything around the facility, and to keep people from making too big of a mess



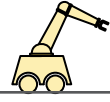
transport



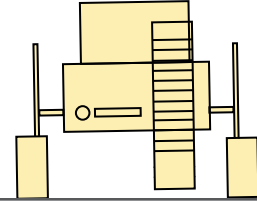
product of the facility, it revolutionizes food prep, and looks scary doing it

the kitchen sink

allows for a smaller scale test of code, on a cutter, less intimidating v scale than the big one



mini



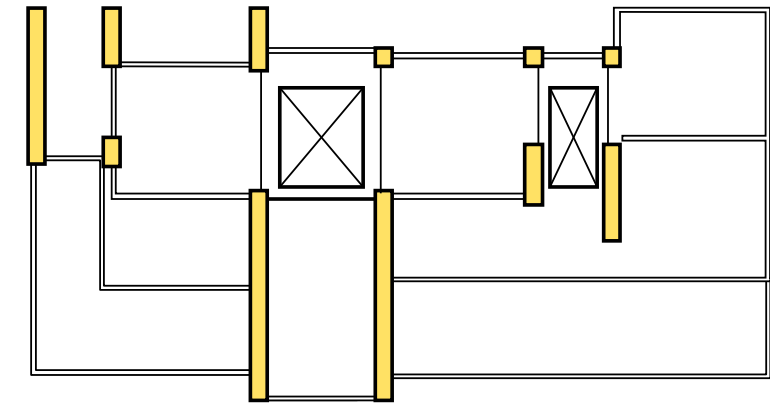
patrols the rooftop farm as a way to maintain the crops and to get people used to machines grazing on crops instead of live stock

ag bot

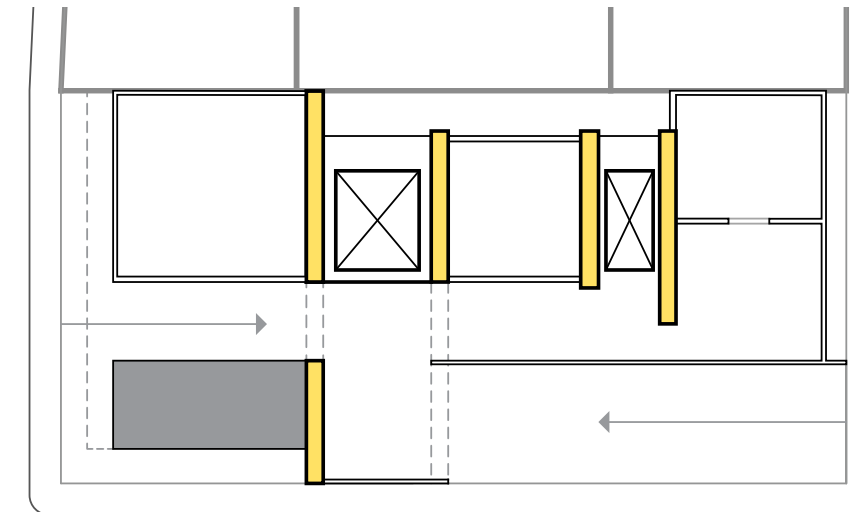
program breakdown

15 10x18 micro units
9 15x18 one bedroom units
10,00 sq ft. circulation space
38,000 sq ft. simulation rooms

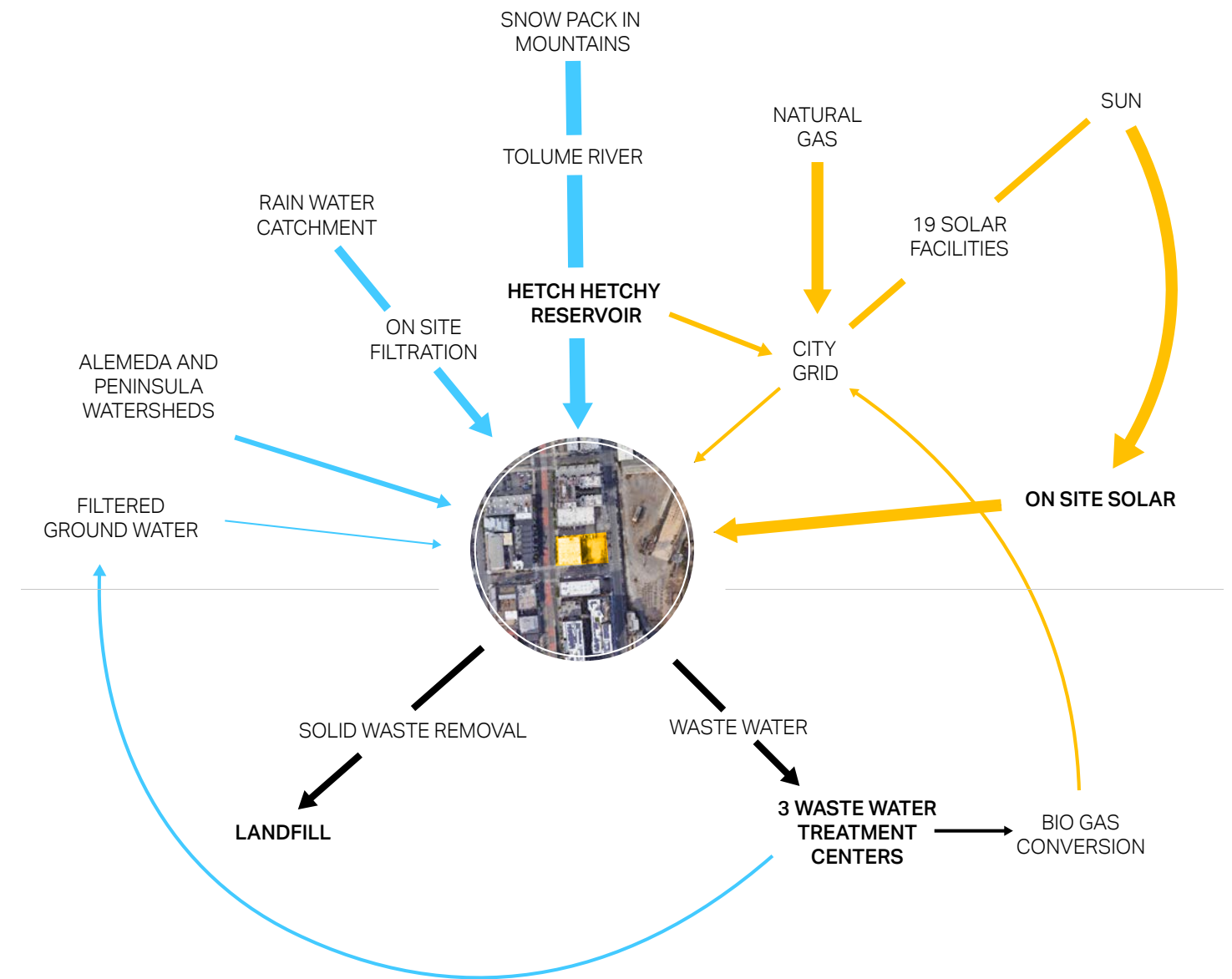
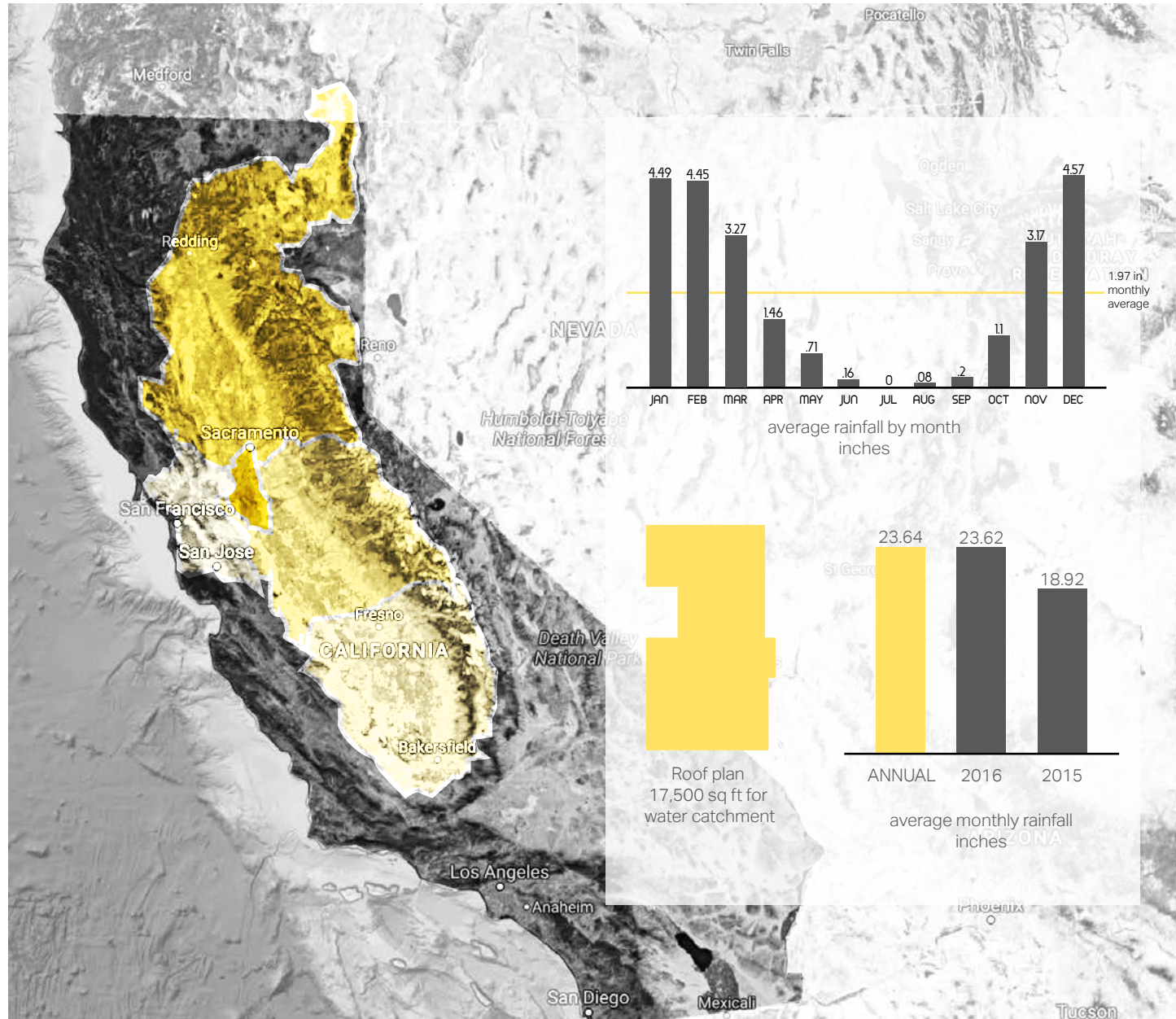
10,000 sq ft. human gathering rooms
6,000 sq ft. factory floor
3,000 sq ft. service spaces
7,000 sq ft. inhabitable rooftop space



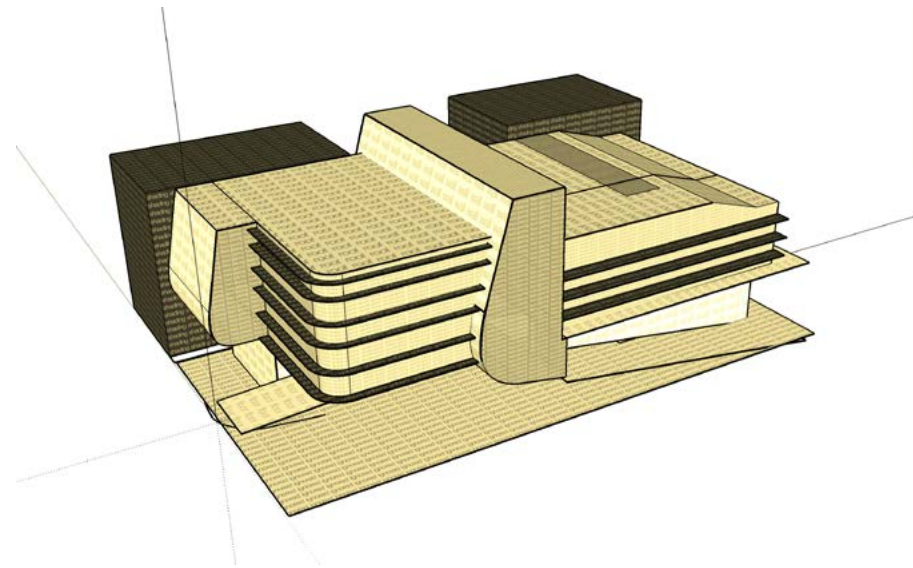
Floor 1



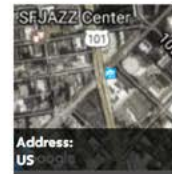
Floor 2



above: site resources map
opposite: san francisco watershed, rainfall data



Co/ev labs Old Architecture



Space Uses

- 65% Labs
- 35% Residential

Tariff

Electricity Peak	0.240 \$/kWh
Electricity Off Peak	0.080 \$/kWh
Heat	8.80 \$/MMBTU
Water	3.79 \$/1000-gal
FIT Elec	0.000 \$/kWh

Resource Mix

Electricity	Top 2
Coal	40 %
Natural Gas	30 %
Heating	Top 2
Natural Gas	100 %
Fuel Oil	0 %

Weather

Current Weather:
San Francisco, CA US (2011)
11mi from site

+ Add Massing

Massing 2

<input type="checkbox"/> Baseline Concept Owner Grant Mattingly	14,988,157kBTU	Ogal	3,366,001lbsCO ₂	5 minutes ago By Grant Mattingly
---------------------------------------------------------------------------	----------------	------	-----------------------------	-------------------------------------



Baseline Concept Old Architecture

Last analysis completed 3 minutes ago.

Run Analysis New Strategy	Annual Energy Consumption kBTU	Annual Energy Use per Gross Internal Area kBTU/ft ²	Annual Utility Cost \$	Annual Space Cooling kBTU	Annual Space Heating kBTU
Baseline Concept	14,988,157	168	526,995	449,399	8,447,118

TIP: Drag strategies from the list above to create bundles.

[Export](#) [Add Result](#)

All changes are automatically saved.

Facade Glazing

Glazing U-Factor: 0.35

Glazing SHGC: 0.25

Glazing Tilt Angle: 0.0

Horizontal Projection: 0.0

Vertical Projection: 0.0

Roof Glazing

Glazing U-Factor: 0.35

Glazing SHGC: 0.25

Glazing Tilt Angle: 0.0

Brise Soleil Turn on

Orientation: Horizontal

Angle: 0.0

Separation: 0.7

Depth: 1.6

Override Facade Glazing

Override Roof Glazing Turn on

Glazing %: 35

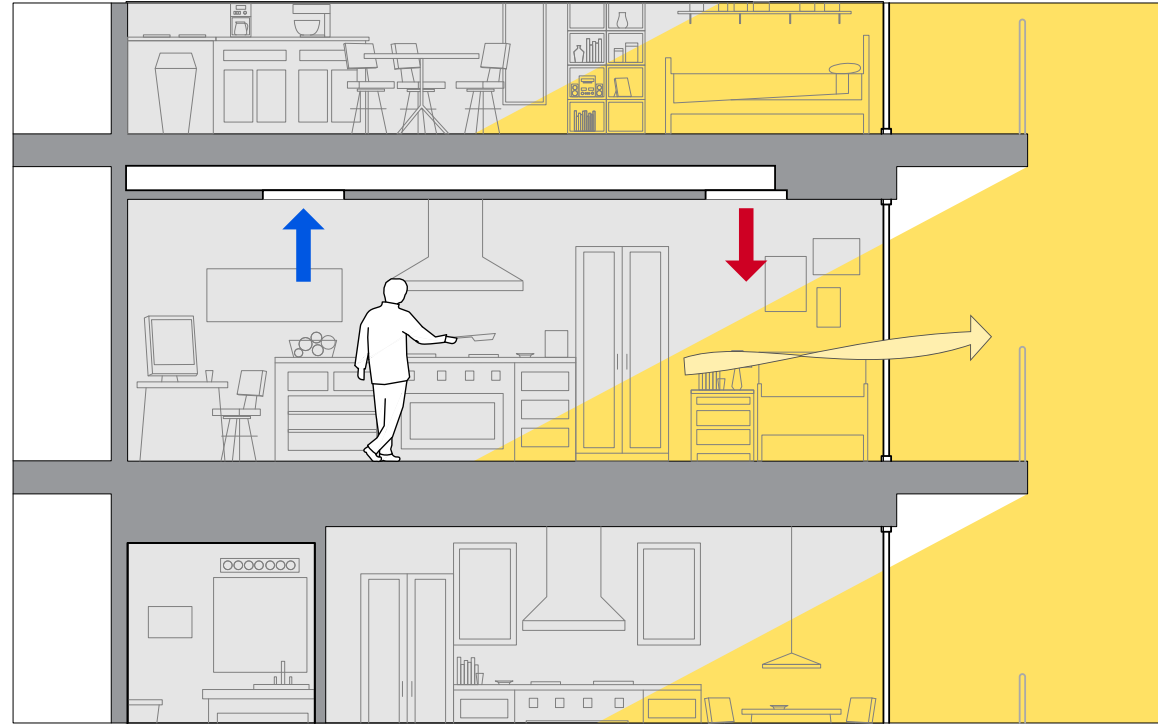
Walls

Assembly Type: Concrete Block

Wall R-Value: 9.62

sefaira analysis

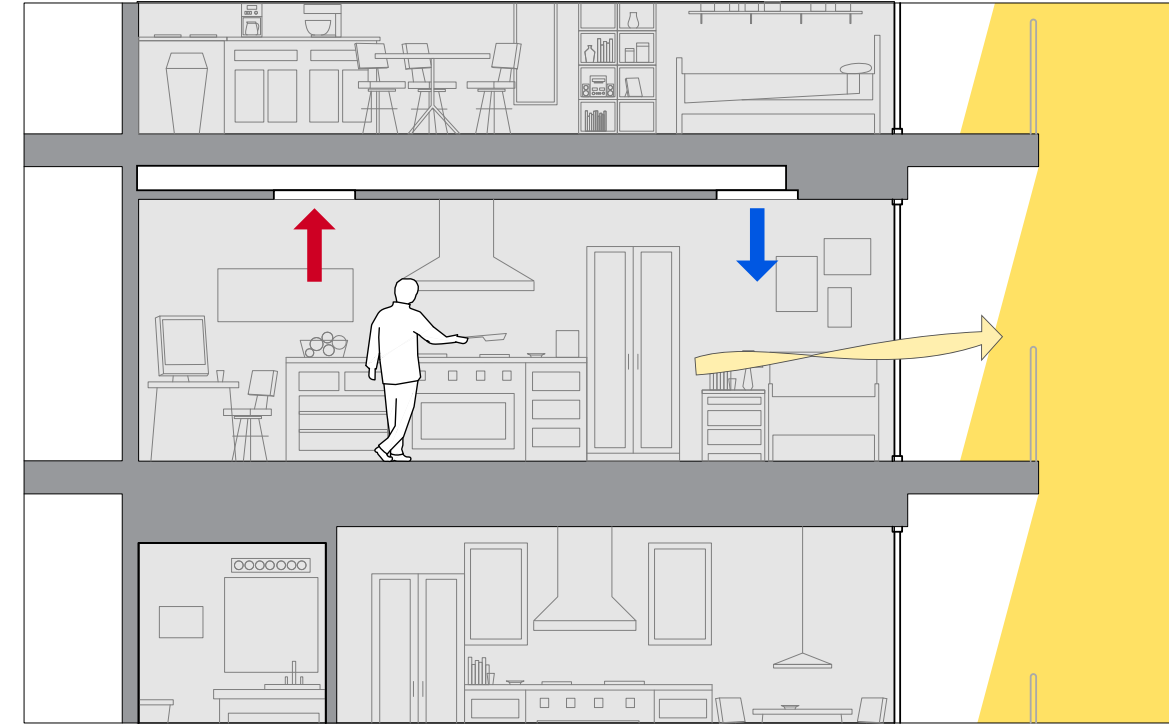
In changing the program distribution in the building to be 65% lab space and 35% residential space (with 40 people occupying the residential), the EUI is lower than the 16 kBTU recommendation, which was found in homework 2.



south facing micro unit: heating

sun: 29°

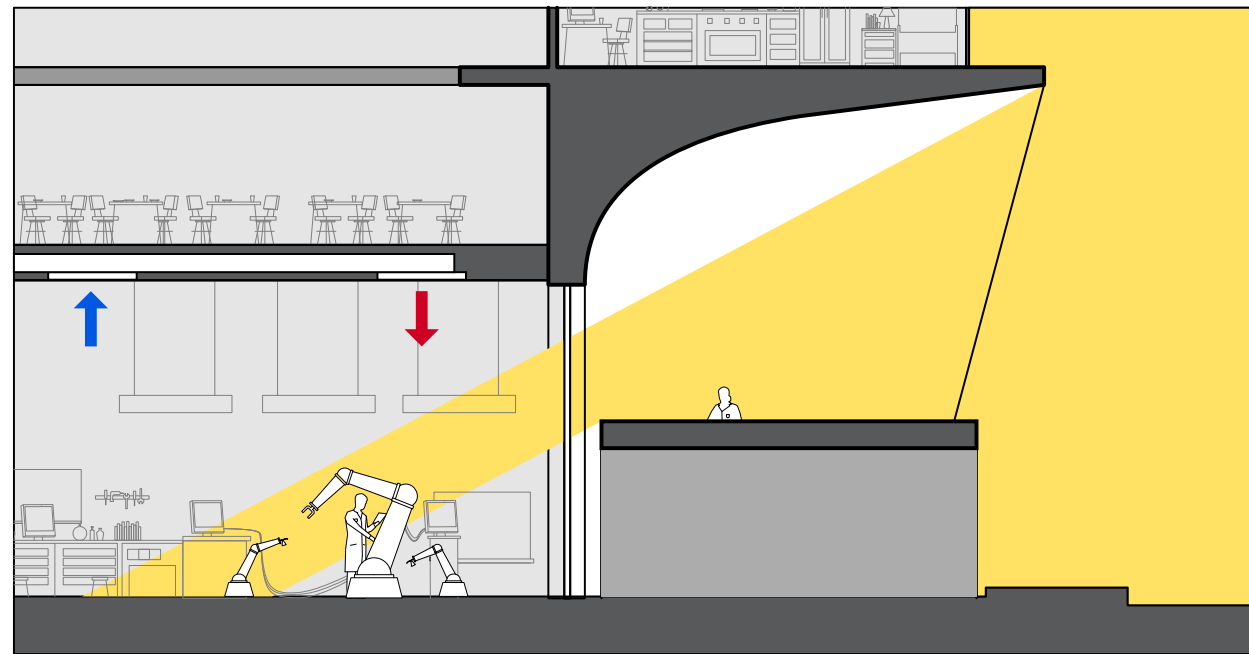
During the winter, the sun is able to enter deep within the space in order to maximize solar gain. Any mechanical heat necessary is first pulled from the machine-intensive areas on the factory floor. A supplemental boiler can also warm air when necessary.



south facing micro unit: cooling

sun: 76°

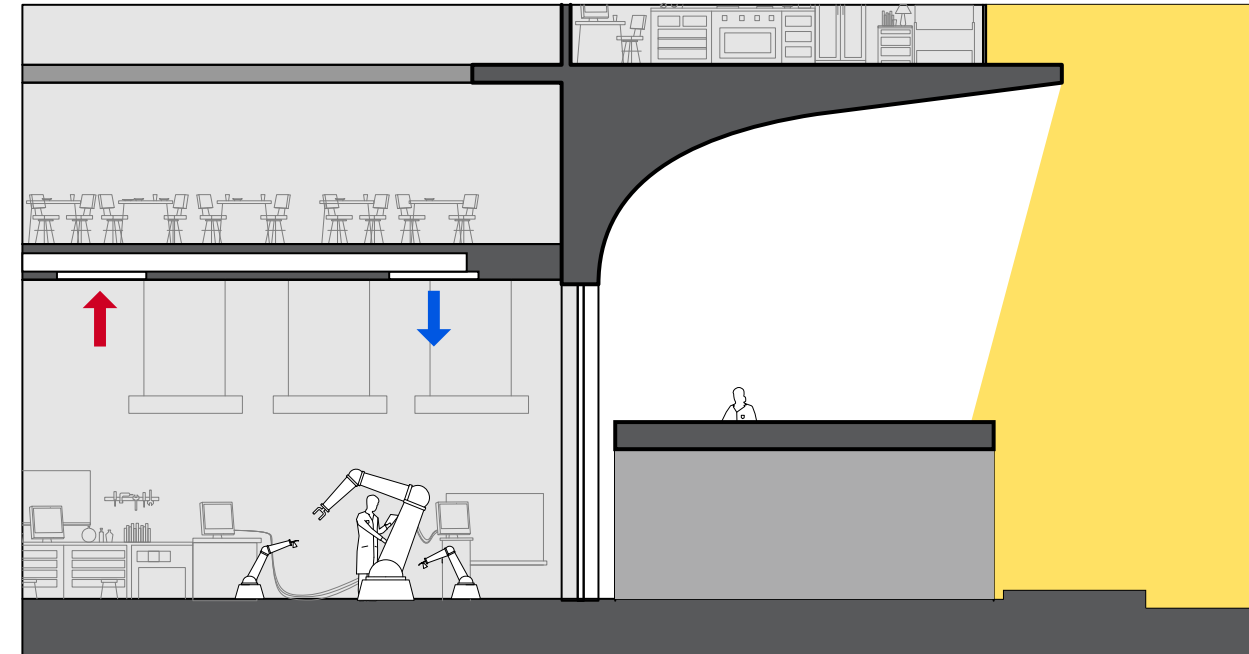
Although the summer in San Francisco does not create a climate that demands lots of mechanical cooling, the overhang between floors on the south side limits the amount of heat during the day. Exhaust is taken through ductwork in the ceiling.



south facing factory floor: heating

sun: 29°

During the winter, the sun is able to help heat the space, but the overhand ensure that it cannot reach too deeply into the space as to over heat it. The heat generated in the area is removed through the exhaust vents in the ceiling and circulated to other parts of the building, such as the living units, that require mechanical warmth.



south facing factory floor: cooling

sun: 76°

Mechanical cooling will be necessary to remove heat that is created by the heavy machinery in the space. The walkway on the exterior that rises along the site also serves to shade the factory, while the windows maintain a visual connection to the public.