Energy Trust of Oregon: Allies for Efficiency

Chemeketa Community College

Net Zero Agriculture + Horticulture Complex

May 6 2021

FFA Architecture + Interiors

Chemeketa Community College

Net Zero Agriculture + Horticulture Complex

Chemeketa Community College

design team:

FFA Architecture + Interiors

PAE

ACOUSTIC DESIGN STUDIO

lango.hansen LANDSCAPE ARCHITECTS PC

RACI Controls Design RACI-Engineering.com

LUMA

kpff

WE WESTECH ENGINEERING, INC. CONSULTING ENGINEERS & PLANNERS

RLB Rider Levett Bucknall

SWINERTON

EnergyTrust of Oregon

Chemeketa Community College
Net Zero Agriculture + Horticulture Complex

12:45 - 1:00 Presentation

Introduction
Edward Running
FFA Architecture + Interiors, Inc.

Career Tech. Education
Holly Nelson
Chemeketa Community College

System Design + NetZero Strategy
Forest Tanier-Gesner, PE Mechanical
PAE Engineers

Juliette Grummon-Beale
Architecture + Interiors, Inc

Isaac Talley
Chemeketa Community College

Implementation + Commissioning
Alan Wright
RACI - Engineering

Construction Challenges COVID
Elizabeth Litzenberger Van Rossen
Swinerton Builders

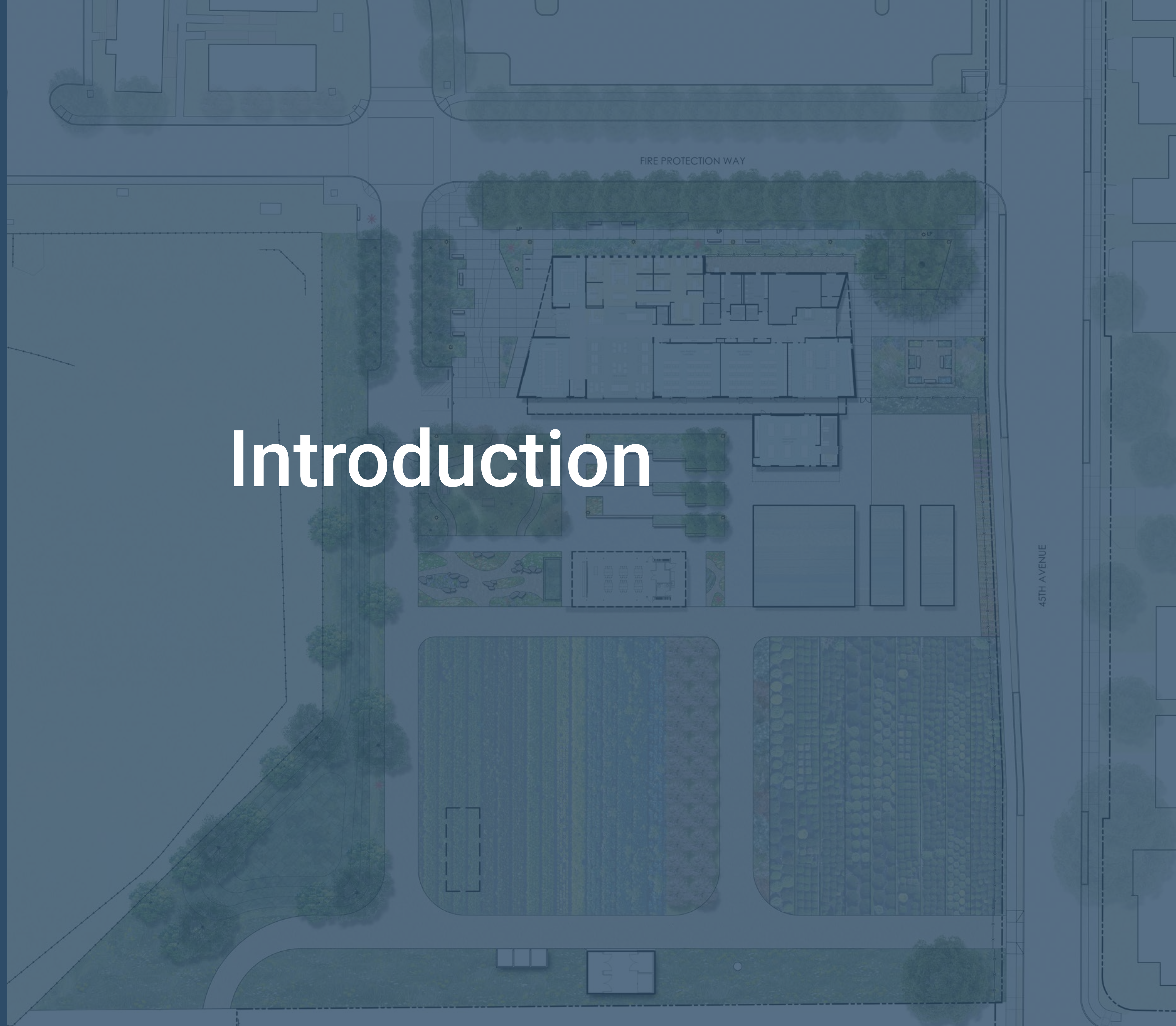
12:45 - 1:00 **Q/A**

1:00 - 1:30 **Virtual Tour of the Building**
Elin Shepard
Eneregy Trust of Oregon, CLEAResult

Rory Alvarez
Chemeketa Community College

Edward Running
FFA Architecture + Interiors, Inc.

Introduction



Chemeketa Community College

Net Zero Agriculture + Horticulture Complex

FFA Architecture & Interiors + Lango Hansen Landscape Architecture + PAE Engineers + KPFF Structural Engineers + Westech Civil Engineering + Luma Lighting Design + Acoustic Design Studio + Swinerton Builders

The **goals** for the Agricultural + Horticultural Complex:

This should be a **welcoming** and **approachable** place, with a feeling of safety for all.

The design will establish a **collaborative** and **inclusive learning environment**.

A **hub** for those throughout the community will be established, centered on **local** and **regional** partners of **Marion, Polk and Yamhill Counties**.

This facility will have a direct connection to **nature** and **daylight.**

Durability and **flexibility** will be key to our success as a place of **innovation.**

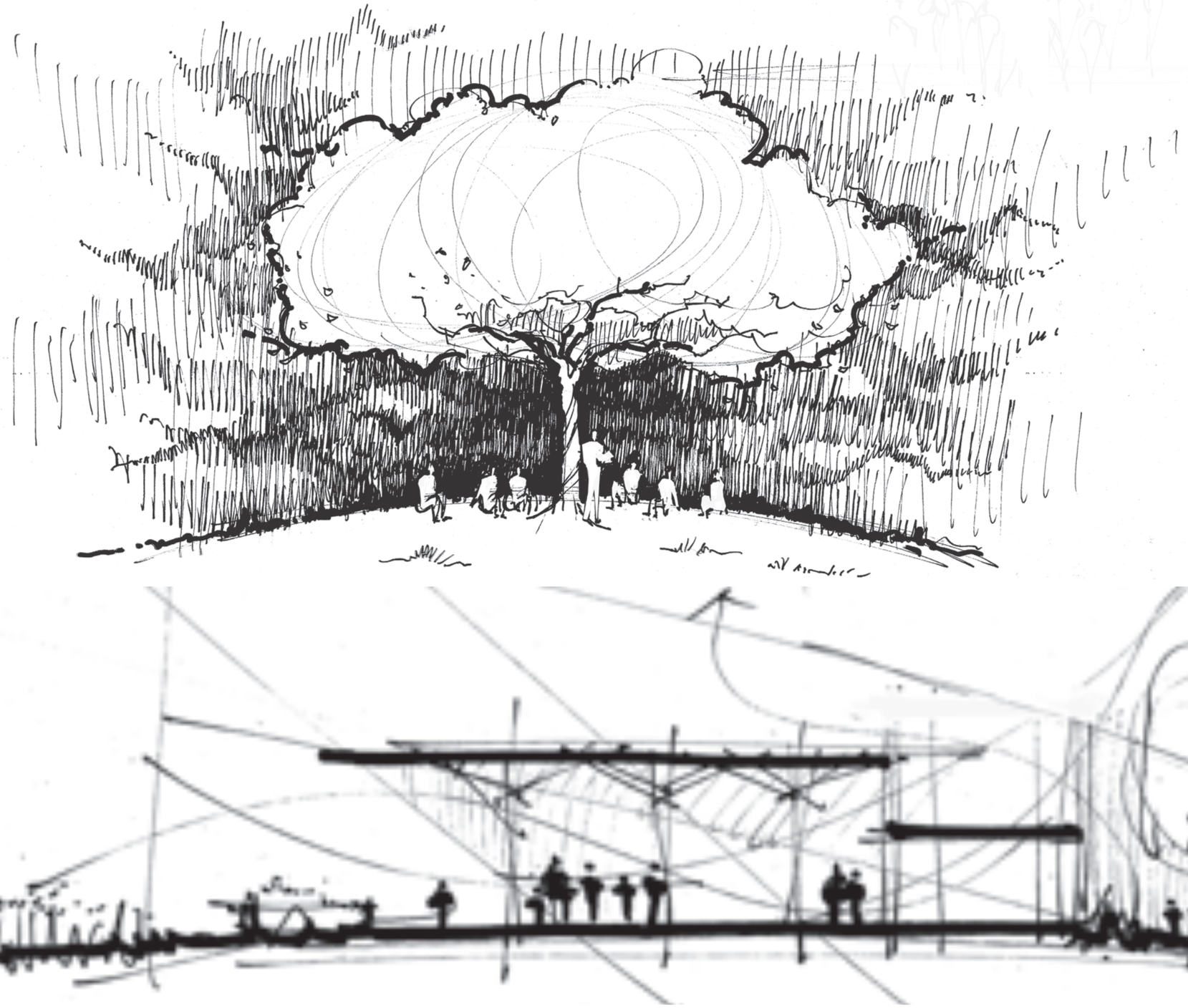
This **community resource** should be an **engaging** and **rewarding environment** that will reflect this **cultural identity.**

RELATIONSHIPS

context of influence

CHARACTER

celebration of agriculture



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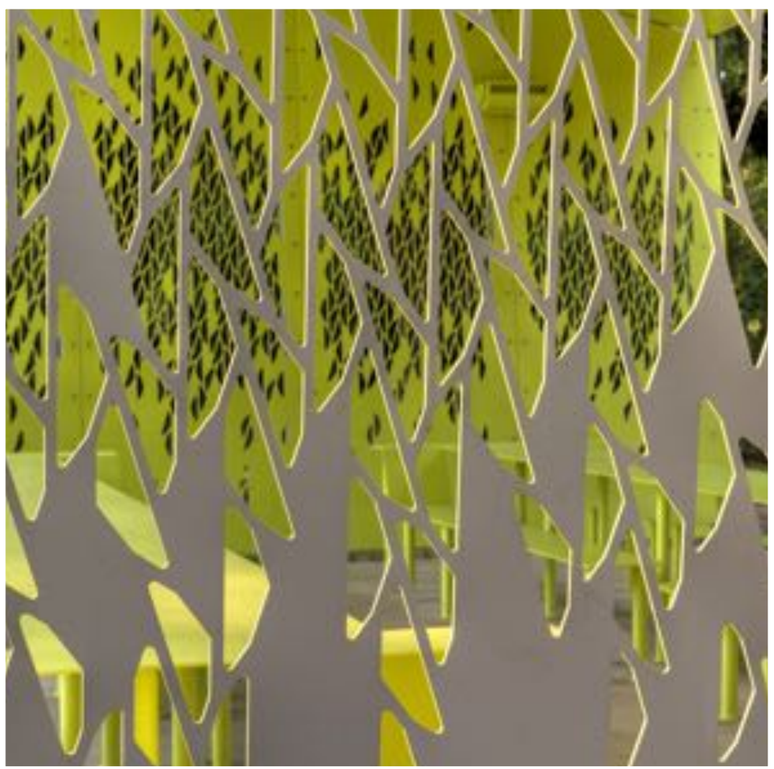
Chemeketa Community College



Net Zero Agriculture + Horticulture Complex

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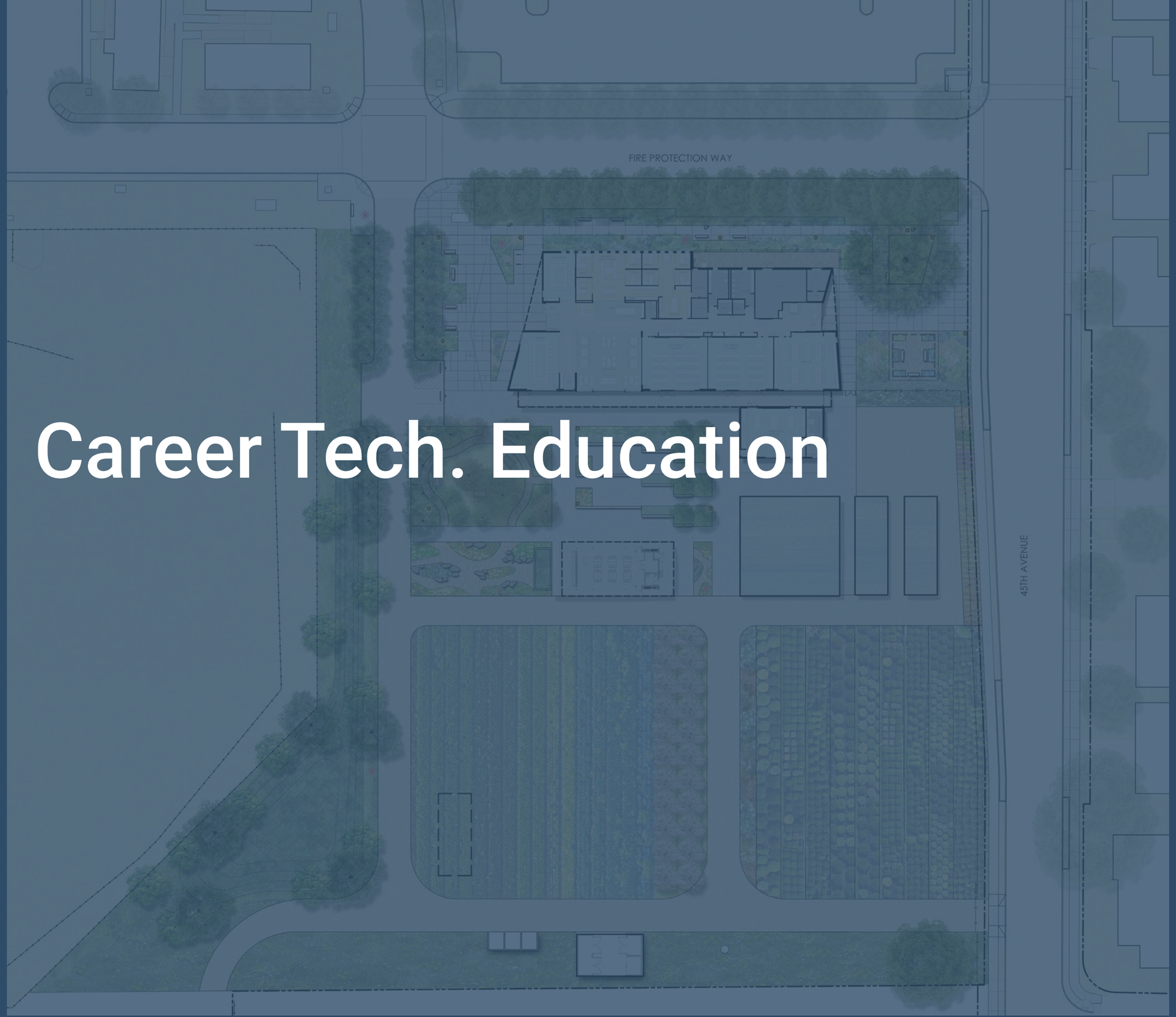
FIRE PROTECTION WAY
4TH AVENUE
LEGEND
1 ENTRY PLAZA
2 MAIN ACADEMIC BUILDING
3 TRELLIS GATHERING SPACE
4 SPECIMEN TREE
5 TREE SPECIMEN GARDEN
6 AMPHITHEATER
7 HEAD HOUSE
8 WORK YARD/LAYDOWN AREA
9 VEGETATED SWALE
10 XERIC GARDEN
11 PAVILION
12 GREENHOUSE
13 HOOP HOUSES
14 ORGANIC GROWING AREA
15 ORCHARD
16 WOODY ORNAMENTAL GROWING AREA
17 STORMWATER GARDEN
18 EQUIPMENT STORAGE

floor plan



Career Tech. Education

AG COMPLEX & HUB

- Career Technical Education programs
  - What is their purpose?
- How workforce training is built into buildings and spaces
- Industry supported/sponsored

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AG COMPLEX & HUB

Programs currently connected in the Ag Complex & Hub

Horticulture
Agribusiness Management
Electronics/Robotics/Automation
Commercial Truck Driving
Non-credit training for workforce training/skill up/continuing education

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AG COMPLEX

Sustainable features from the program perspective

- All organic growing areas (greenhouse, fields, and gardens)
- Integrated Pest Management (use and training)
- Woody Ornamental Learning Lab research plot of 3 growing styles
- Irrigation techniques will utilize technology to create efficiency
- Learning gardens and swell for water run off

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System Design + NetZero Strategy

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Evolution of Building Systems at Chemeketa

Bldg. 8 Health Professions

- Mixed Mode Vent
- Individual ERVs + **ceiling fans**
- **Operable window + turbine**
- Phase change materials
- **Daylighting light wells +** Electrochomatic skylights
- Passice cooling except computer classroom
- **High mass building**
- Very granular energy monitoring in representative classrooms
- Extensive studies of natural ventilation airflow
- **Onsite PV**

completed in 2010

Bldg. 20 Applied Technology

- Mixed Mode Vent
- **Central ERV + ceiling fans**
- **Operable window + turbine**
- **Daylighting light wells + skylights**
- High mass building
- **Radiant heating and cooling (heated slab** with chilled beam)
- Dedicated displacement ventilation for shop spaces
- Moderate studies of natural ventilation airflow
- Passive Approach for 1.5% GET
- **Path to Net Zero**

completed in 2015

Bldg. 60 Ag. Complex

- Mixed Mode Vent
- **Central ERV + ceiling fans**
- **Operable window + turbine**
- **Daylighting + skylights**
- High mass building
- **Radiant heating and cooling**
- **Heat pump DHW (provides mechanical room cooling)**
- **Air to Water Heat Pumps with condensing boiler backup**
- **PV shading structure +**
- **Path to Net Zero**

(Net Zero anticipated)

completed in 2021

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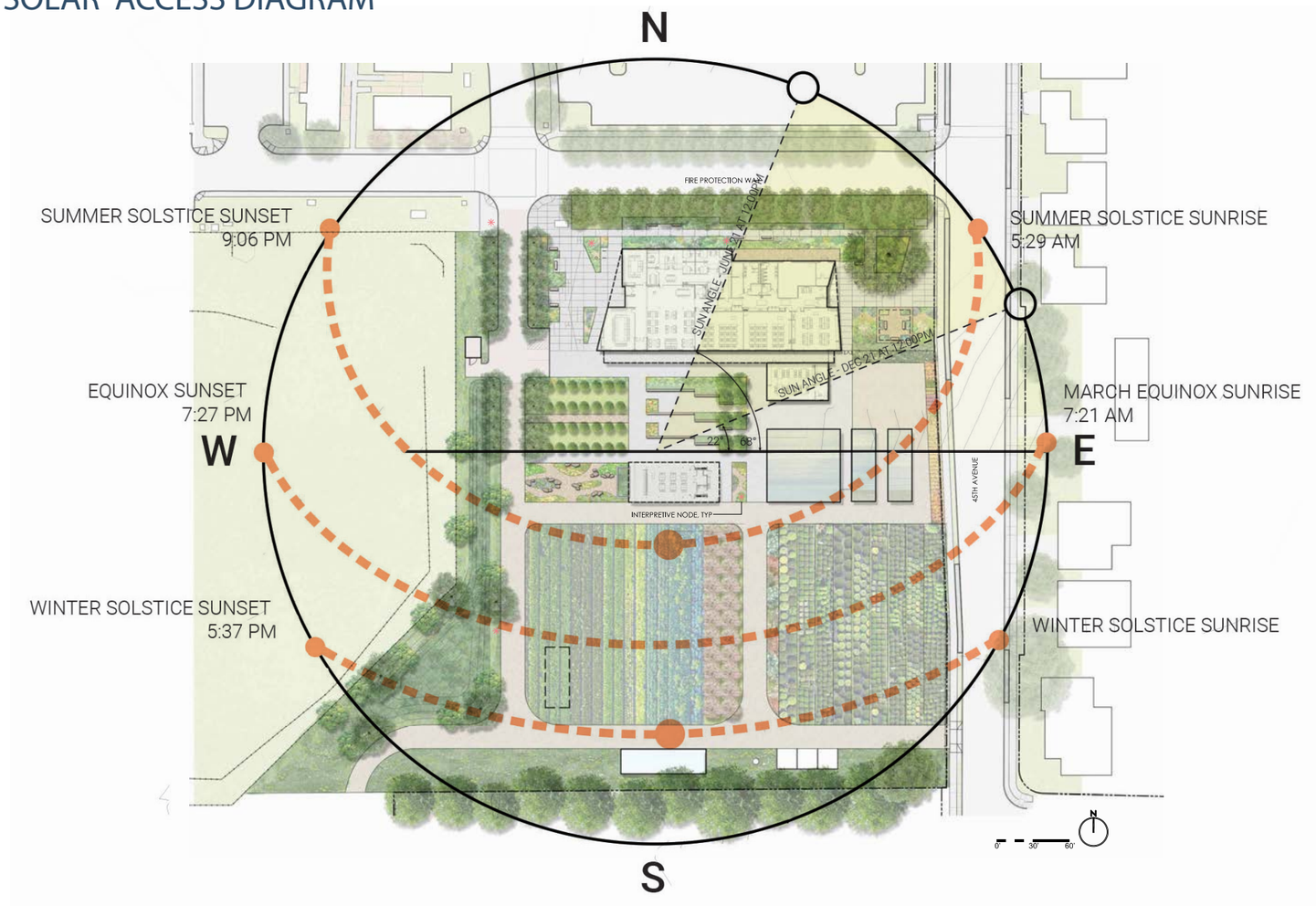
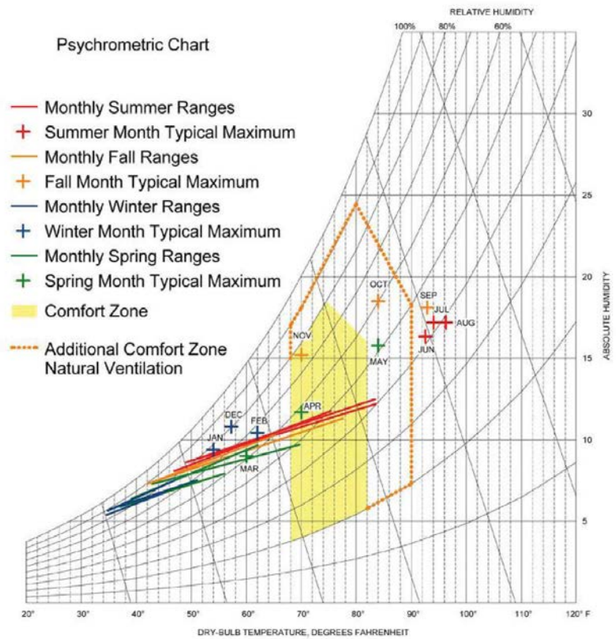
AVERAGE PRECIPITATION

JANUARY	5.9 inches
FEBRUARY	4.5 inches
MARCH	4.3 inches
APRIL	2.4 inches
MAY	1.9 inches
JUNE	1.3 inches
JULY	0.6 inches
AUGUST	0.8 inches
SEPTEMBER	1.6 inches
OCTOBER	3.0 inches
NOVEMBER	6.3 inches
DECEMBER	6.8 inches

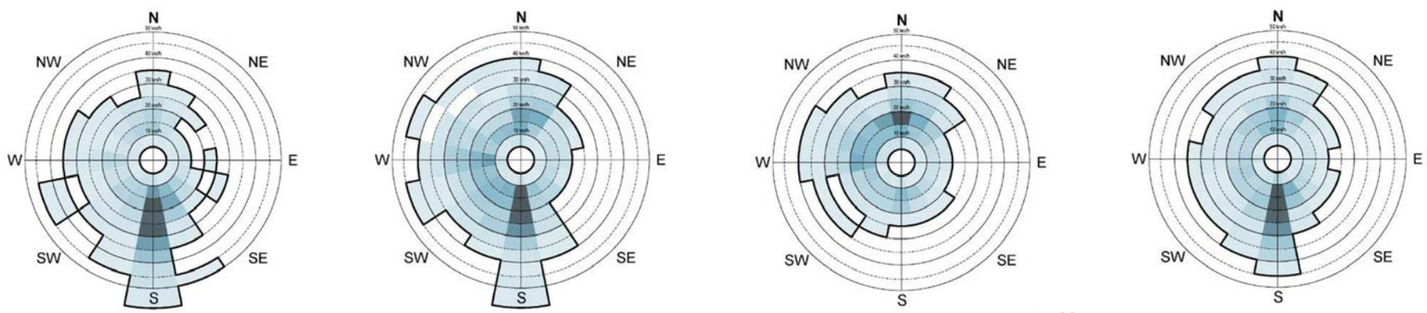
SOLAR ACCESS DIAGRAM



PSYCHROMETRIC CHART



WIND ROSE DIAGRAM



winter spring summer fall

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office area

hub lounge

BUILDING SECTION

office area

hub lounge

BUILDING SECTION | high performance envelope

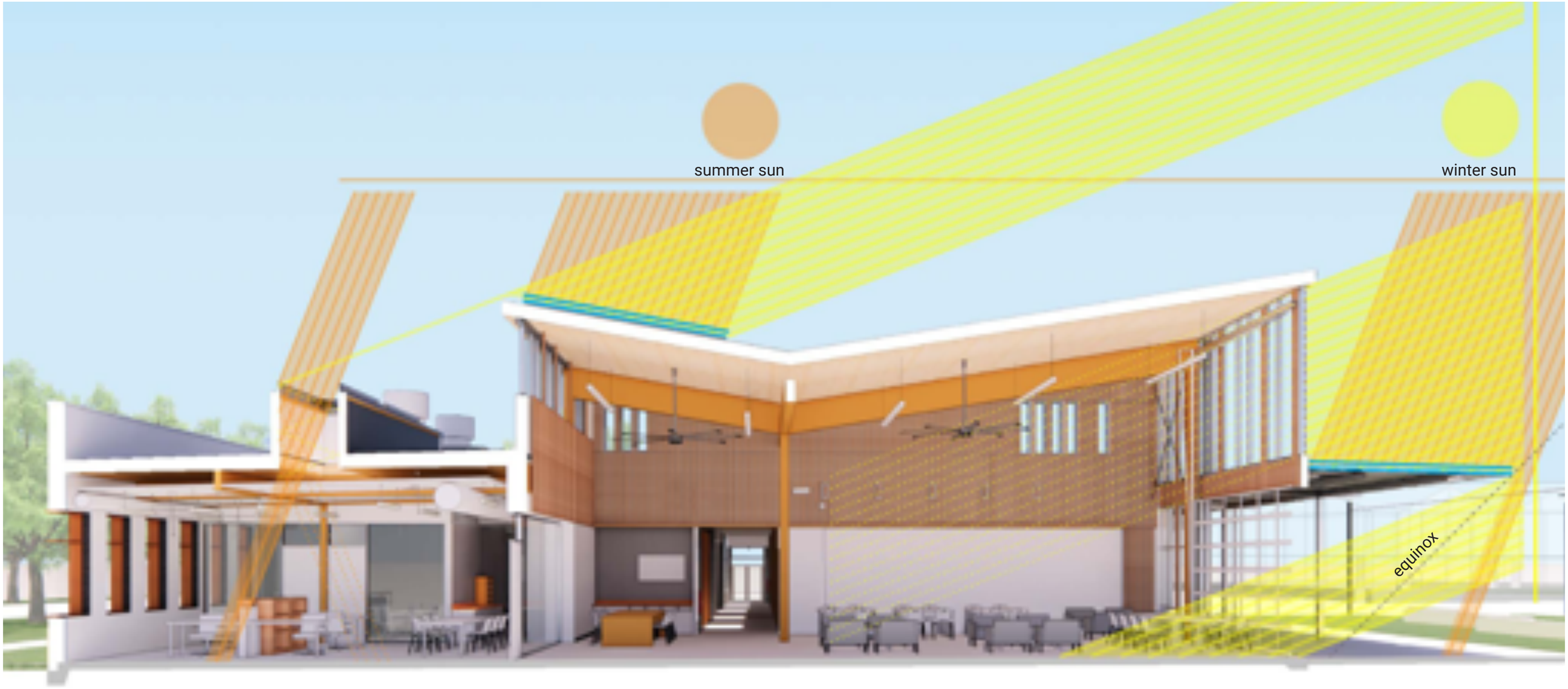
window: U-value: 0.29
SHGC: 0.27
Kawneer Trifab VG 451T
Kawneer Glassvent UT

slab: Fully insulated R-10

exterior Walls: 0.045 design U-value, R-19 batt with R-12.9 ci

roof: R-33, ~6” tapered insulation

skylight: U-value 0.40
SHGC: 0.27
Deamore



office area

hub lounge

BUILDING SECTION | shading and solar harvesting

office area

hub lounge

BUILDING SECTION | daylighting

office area

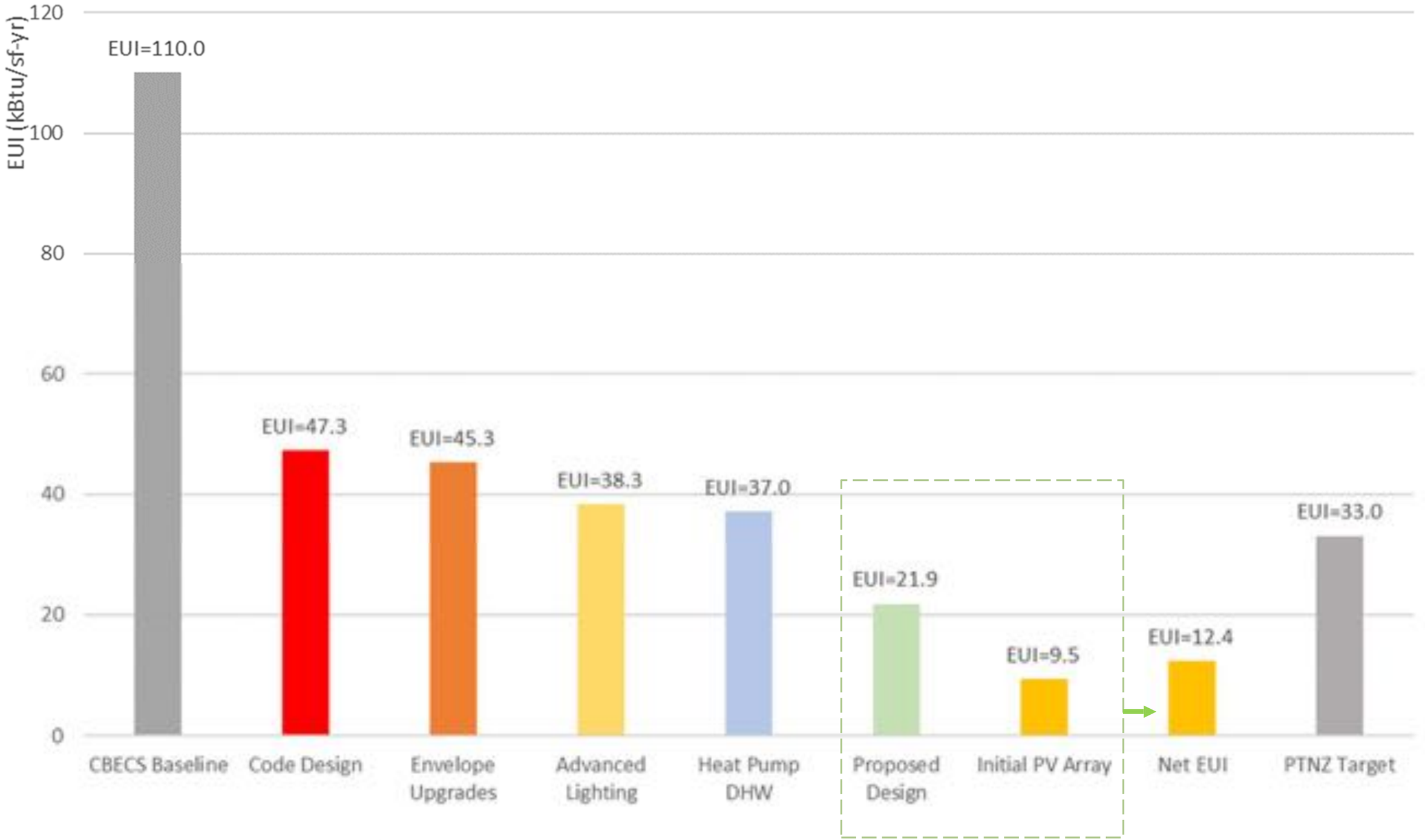
hub lounge

BUILDING SECTION | natural ventilation

System Integration

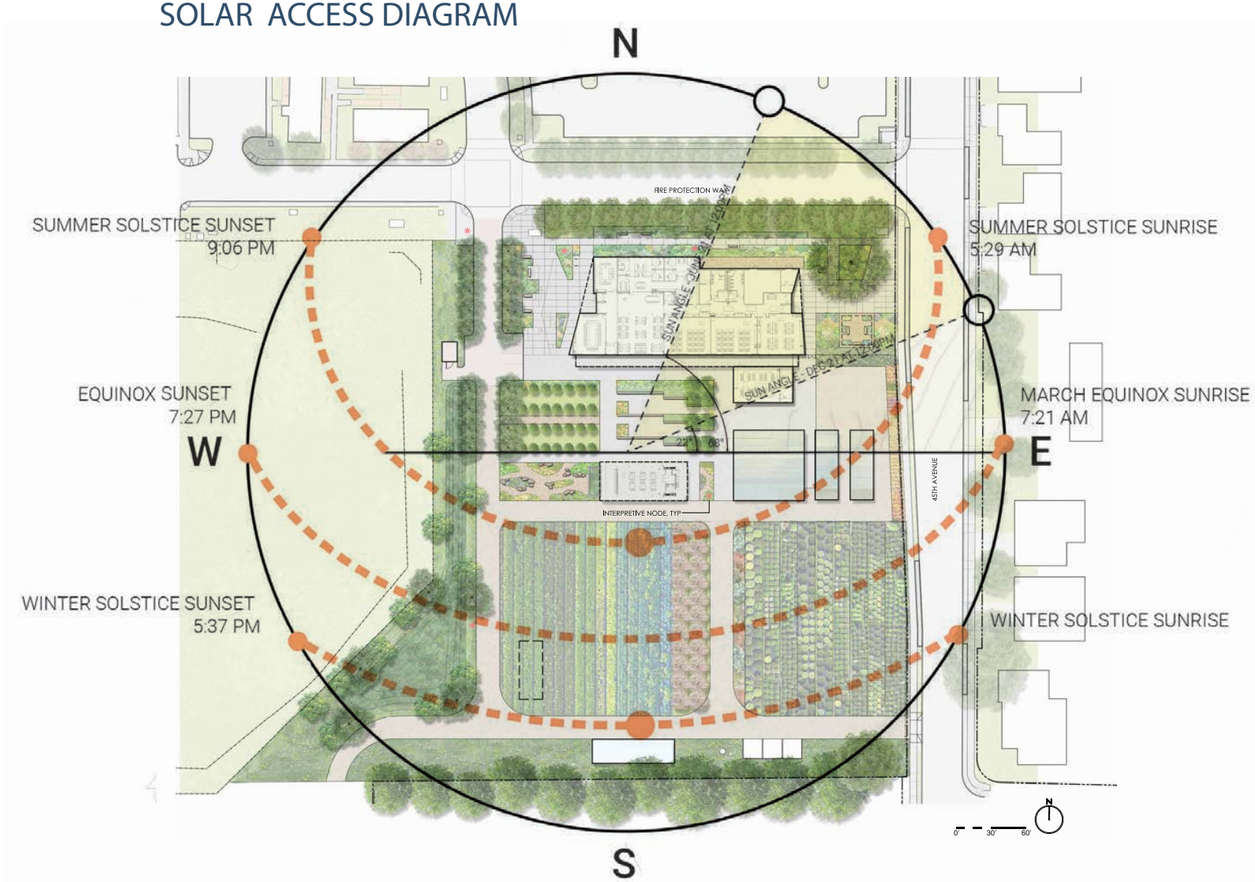
BUILDING AXON DIAGRAM | major system distribution

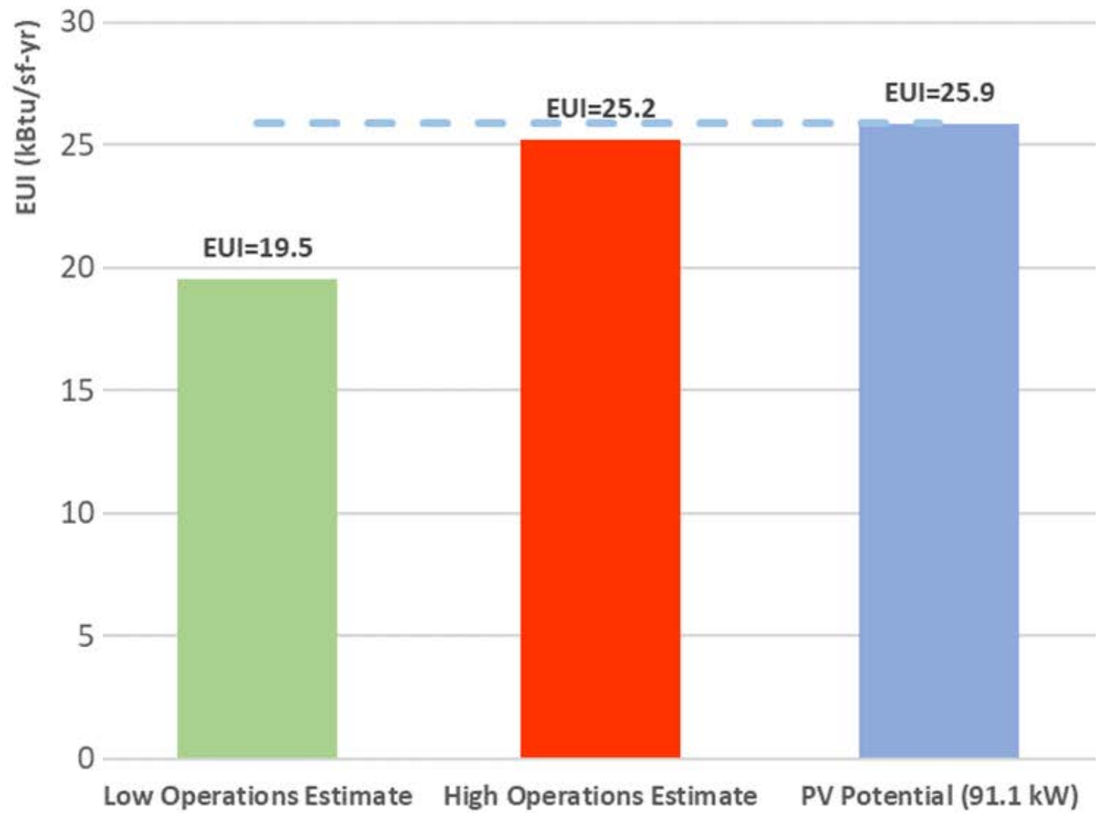
Energy Efficiency Measure Impacts



Dialing in the PV Budget for NZE

SOLAR ACCESS DIAGRAM

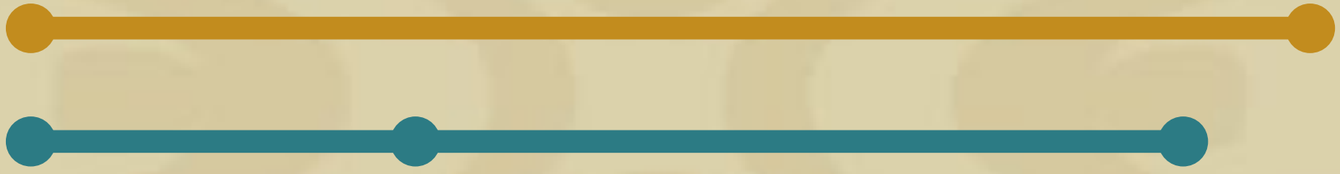




AG COMPLEX

- Why pursue Net Zero
- Fund sources: ETO, PGE
- Grant timeline
- Grant eligible project components

March 2020 - March 2021
Building Project Timeline



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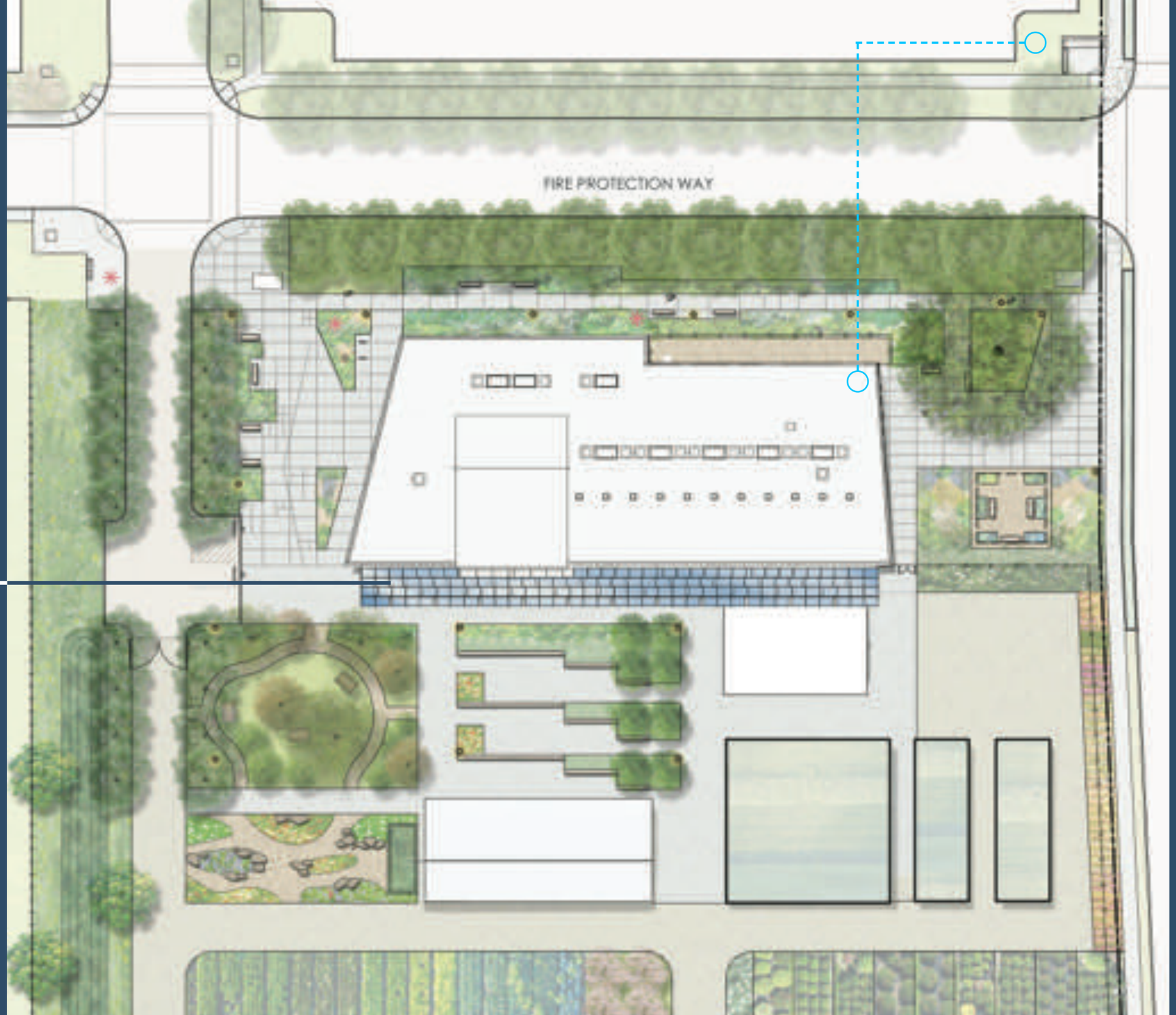
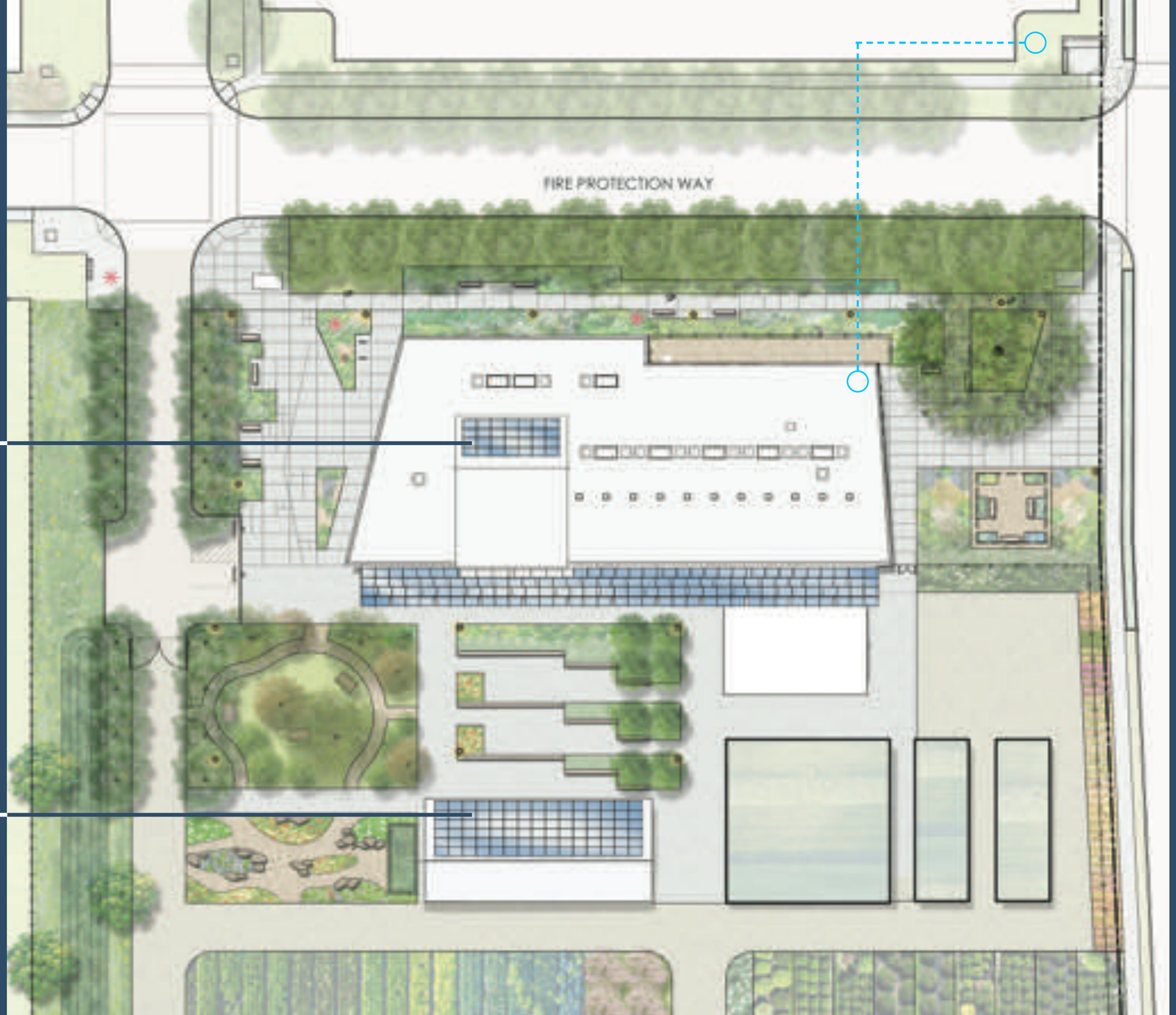
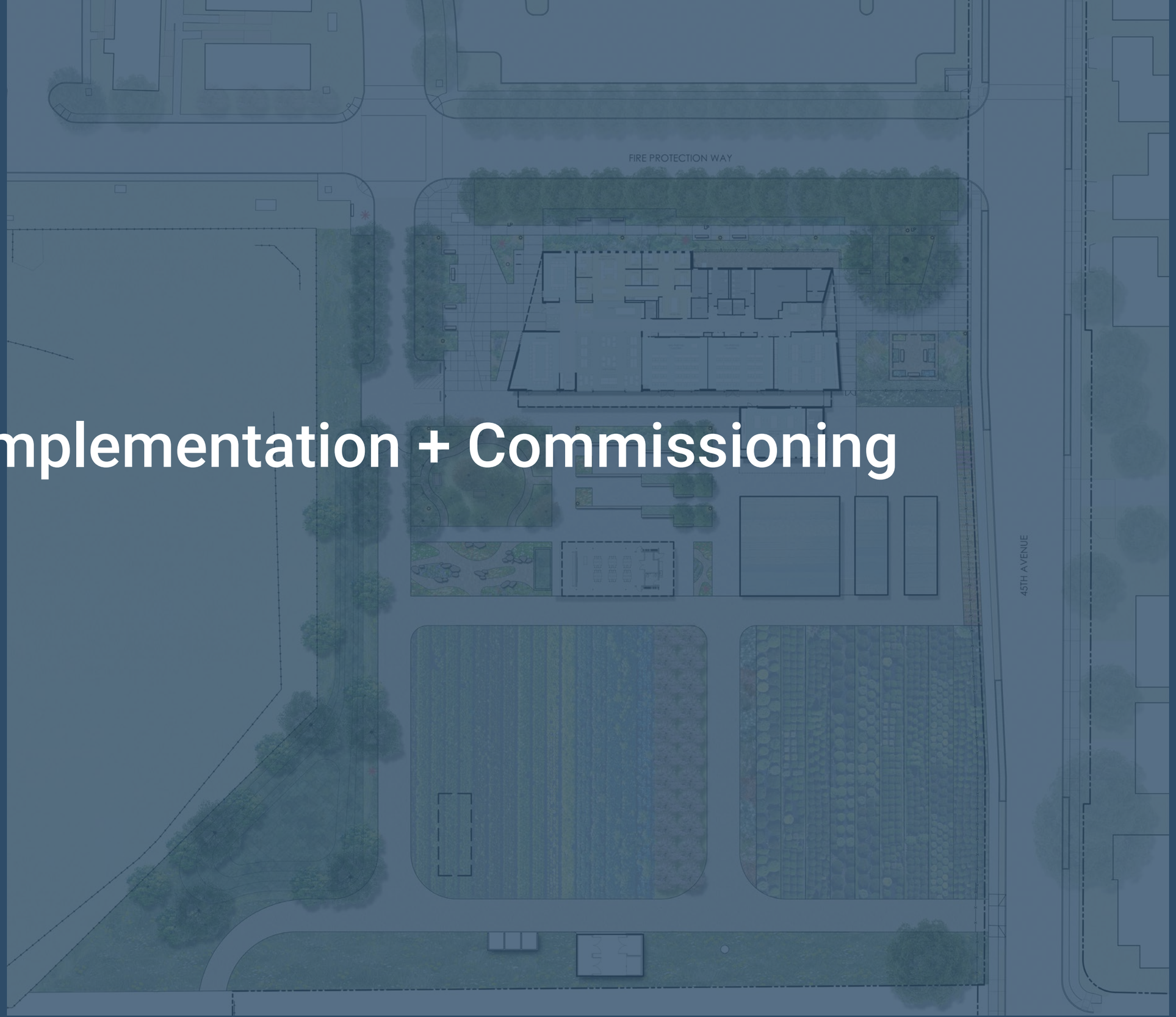
location of the initial solar panels to achieve the 1.5% for renewable energy goal



addtional solar panels funded by the PGE Grant and Chemeketa to reach Net Zero target goal

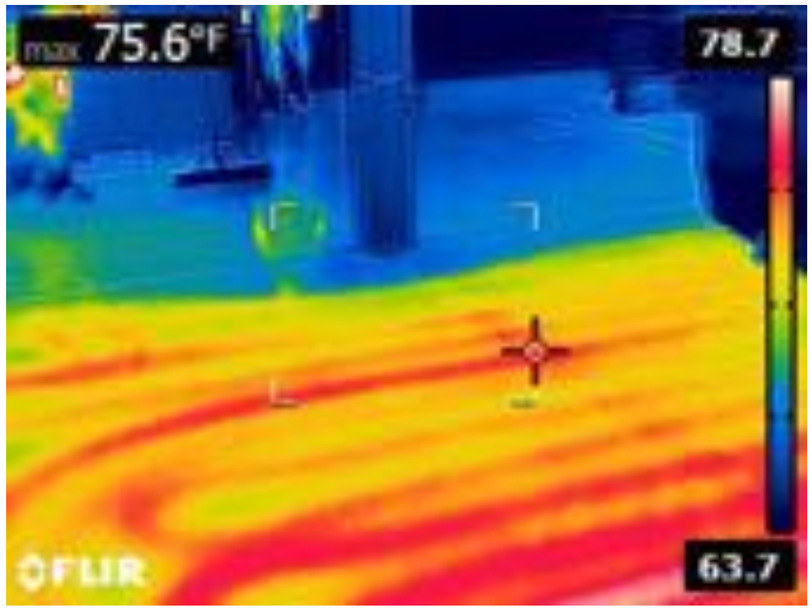


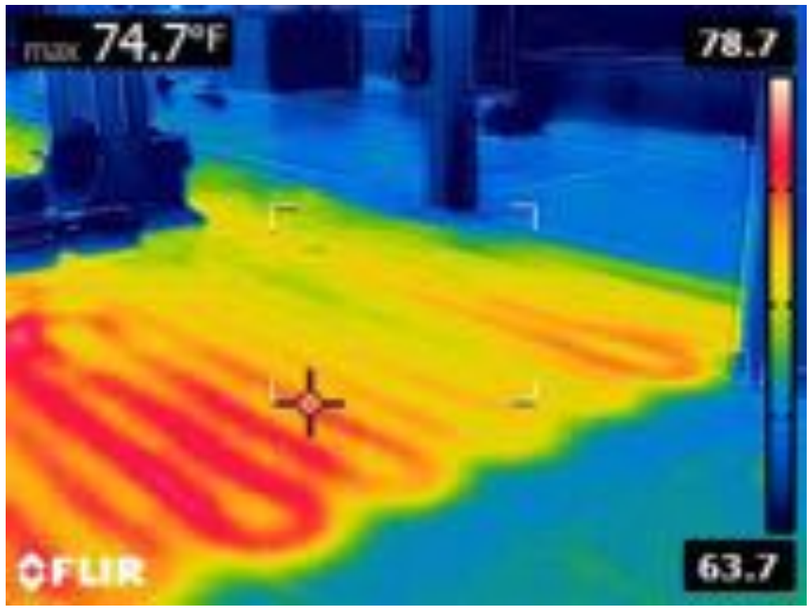


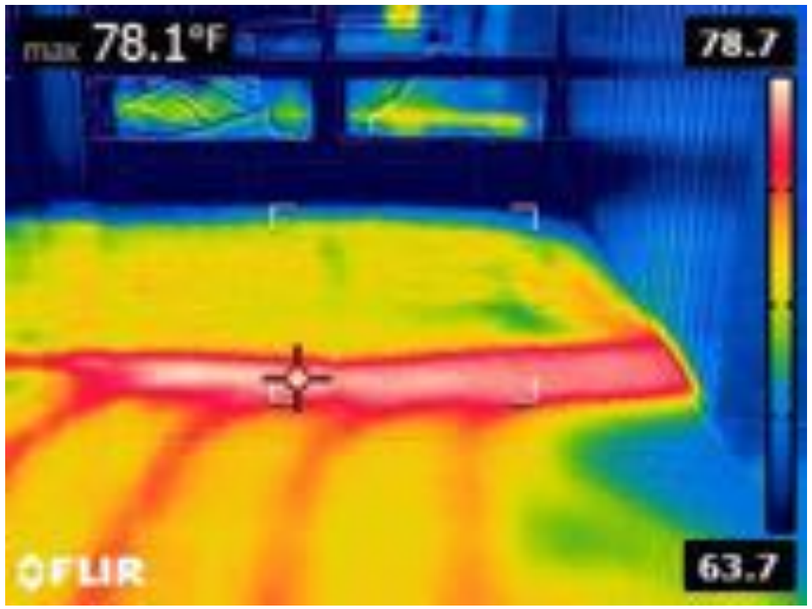
Implementation + Commissioning

Radiant Installation

Radiant Installation







Window Actuator Installation

Construction Challenges COVID, etc.

Construction in COVID

Construction Wildfire Season

Solar Installation

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Q/A

Chemeketa Community College

Net Zero Agriculture + Horticulture Complex

This is the third Path to Net Zero new construction project for the college in Salem.

- heat recovery DOAS mixed mode ventilation
- air to water heat pumps with condensing boiler
- LED lighting and advanced controls
- radiant slab
- solar panels
- mass timber (glulam and MPP)
- passive strategies:
    - high-performance envelope
    - daylighting
    - natural ventilation
    - sunshades
    - turbine ventilators

- $57,8000 in Energy Trust cash incentives*
- 104,700 annual kWh savings*

* numbers do not include solar panels