Paths to Zero Carbon Multifamily Design

Solar response

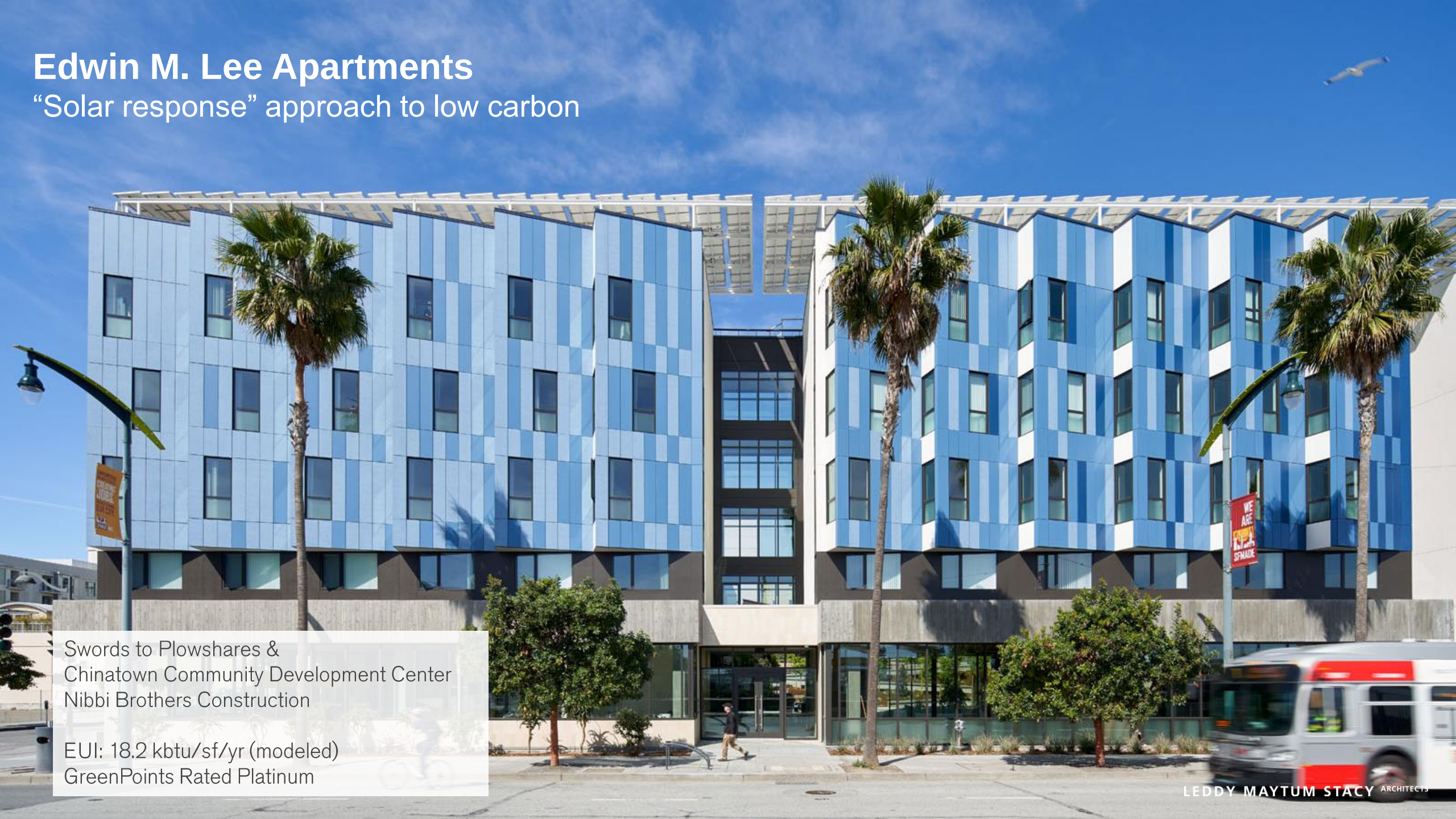
"PassiveHaus Lite"

Modular & resilient design

LMSA

Edwin M. Lee Apartments

“Solar response” approach to low carbon



Swords to Plowshares &
Chinatown Community Development Center
Nibbi Brothers Construction

EUI: 18.2 kbtu/sf/yr (modeled)
GreenPoints Rated Platinum

LEDDY MAYTUM STACY ARCHITECTS

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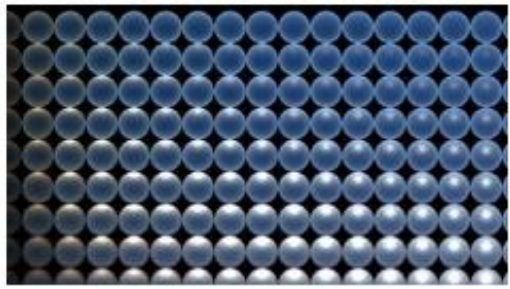
HORACE-BÉNÉDICT DE SAUSSURE
Genevan geologist, meteorologist, physicist, and mountaineer (1740 - 1799).

SAUSSURE'S CYANOMETER
Invented by Saussure to measure the range of color of the sky.



RADIANCE MODEL SKY DOMES
Used in daylight simulation software to simulate sky conditions.

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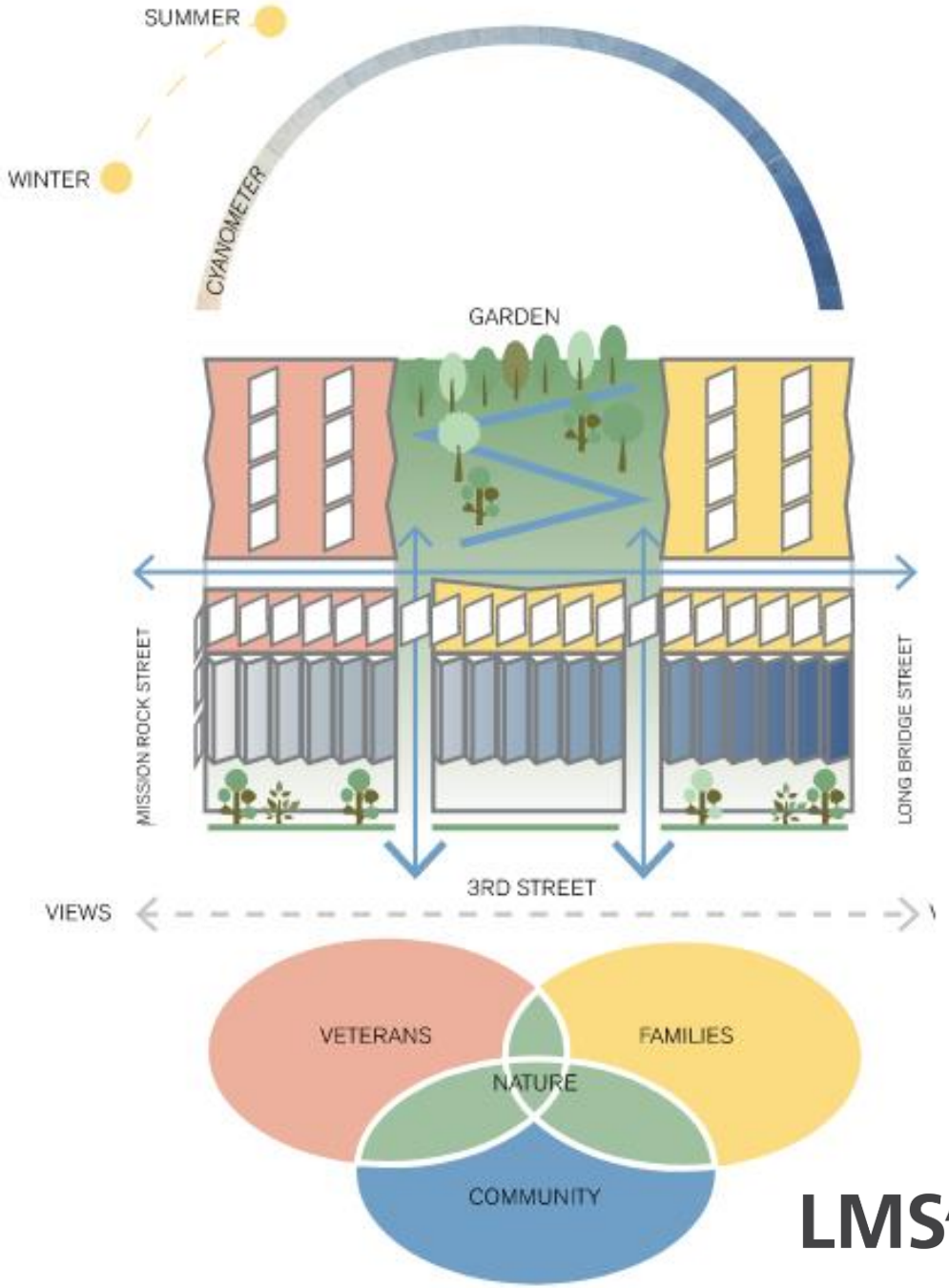
Aerial view of the Mission Bay Neighborhood from Third Street



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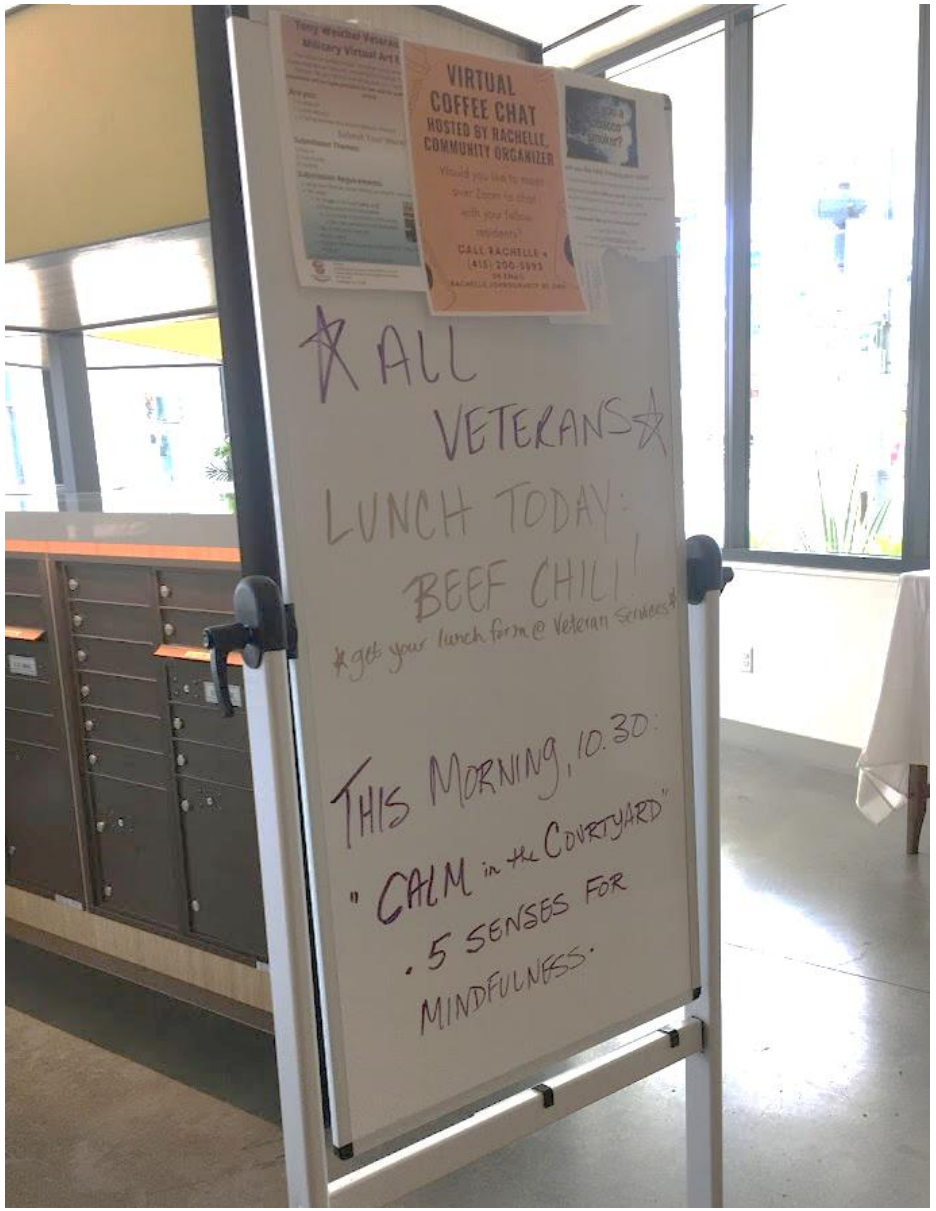

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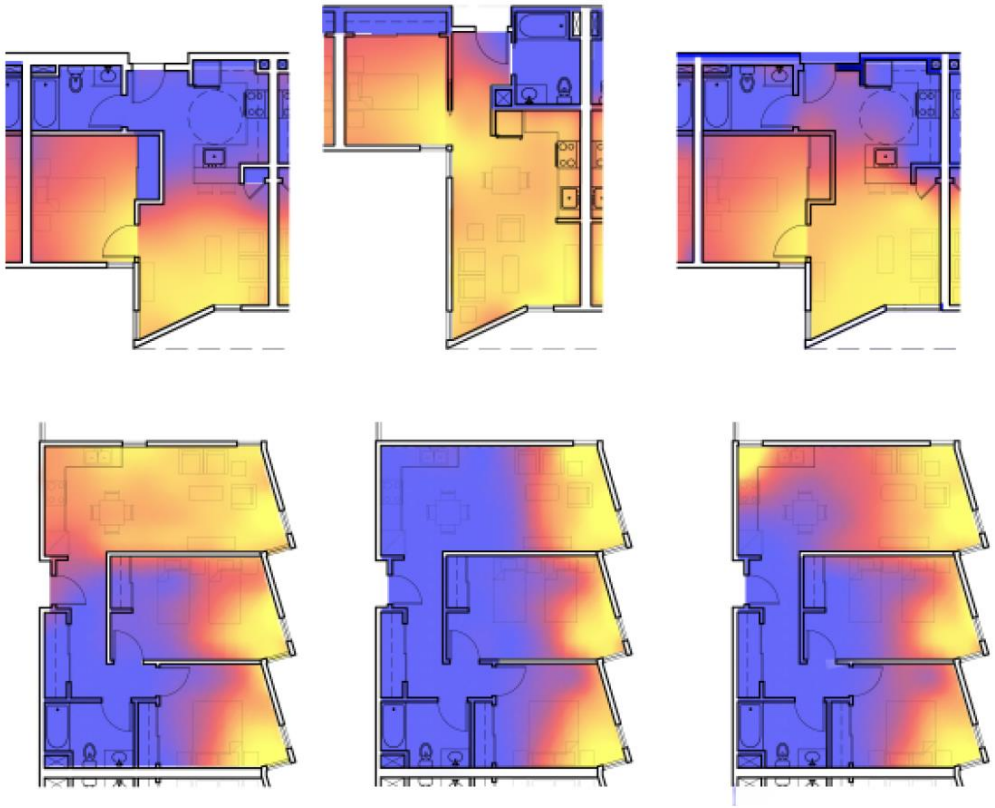

Unit massing & daylighting studies, LMSa

Lessons learned:

- Non-profit clients accustomed to mixed-fuel systems
- Not all MEP designers ready to propose all-electric in 2015-16
- Architects were not ready to advocate for untested* (*low-income housing in the Bay Area) technology

- Fire Dept fickle on PV array overhang guidance, costing the project ~8% of total generation
- Subs not accustomed to insulating hot water pipes beyond the mains
- “Future” flat-roof PV was covered by contingencies at end of the project

- Post-occupancy evaluation (including energy use & survey) to be completed in Fall 2021

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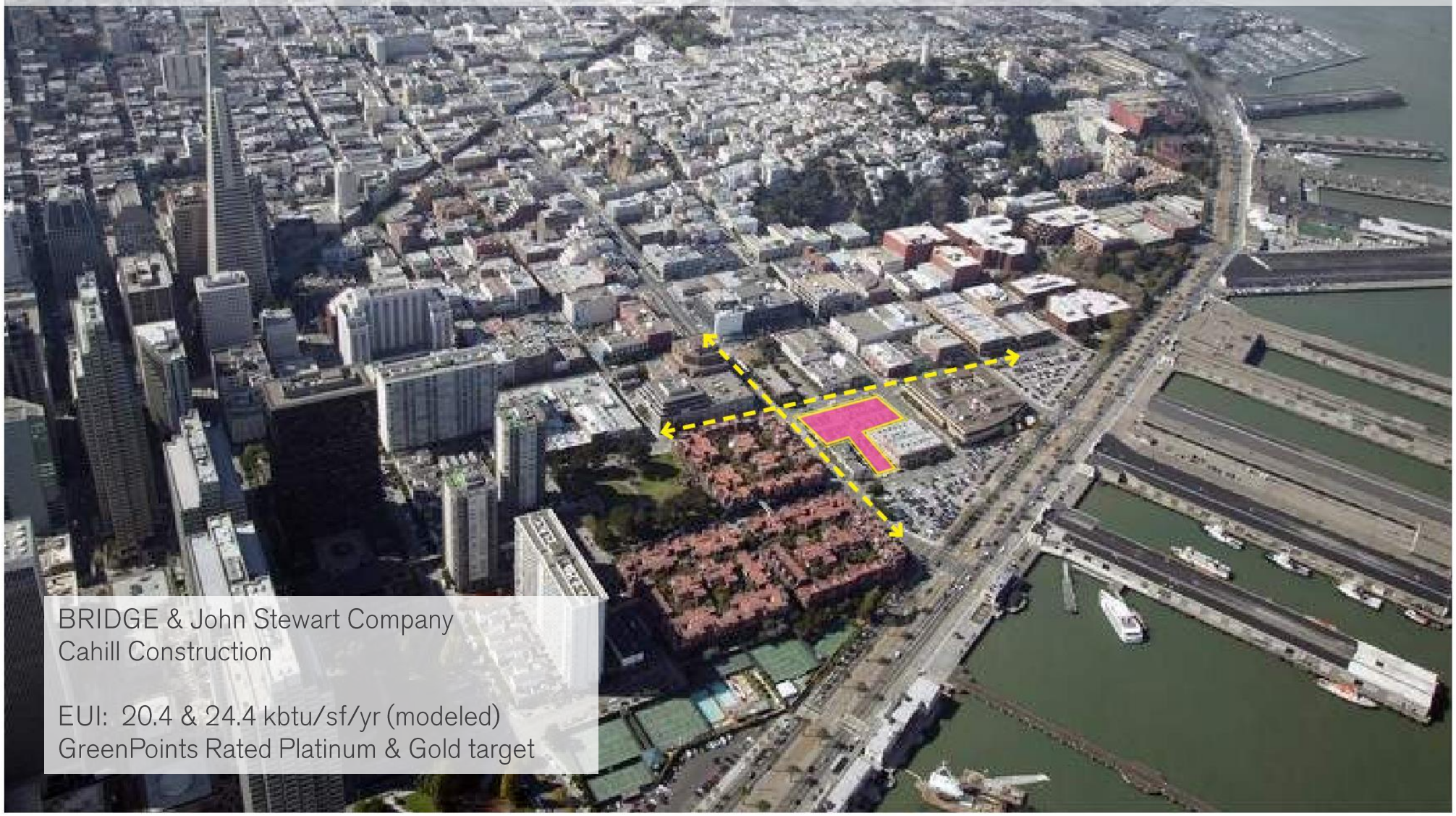
88 Broadway & 735 Davis

“Passive House Lite” approach to low carbon



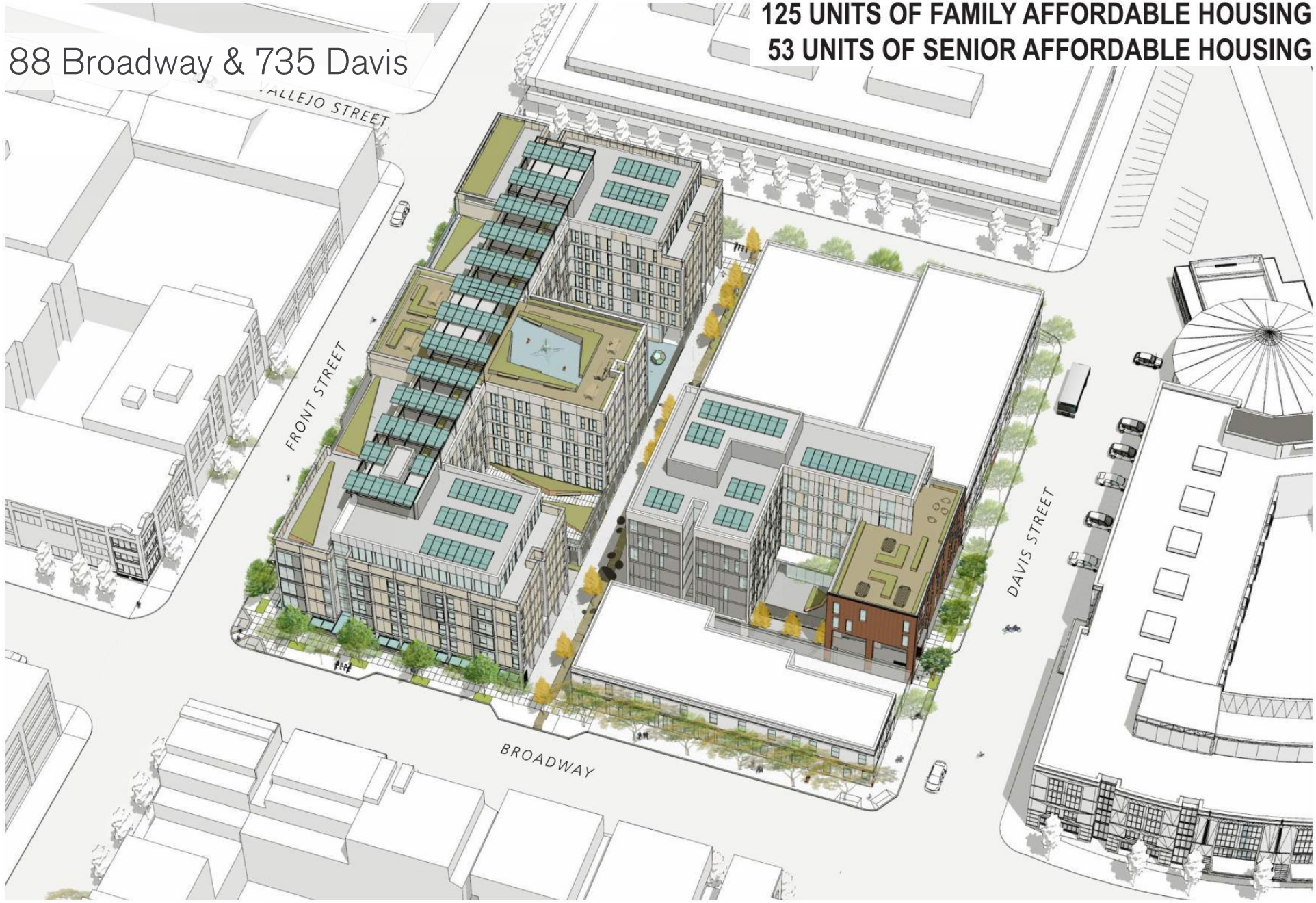
BRIDGE & John Stewart Company
Cahill Construction

EUI: 20.4 & 24.4 kbtu/sf/yr (modeled)
GreenPoints Rated Platinum & Gold target

LMS^A

88 Broadway & 735 Davis

125 UNITS OF FAMILY AFFORDABLE HOUSING
53 UNITS OF SENIOR AFFORDABLE HOUSING



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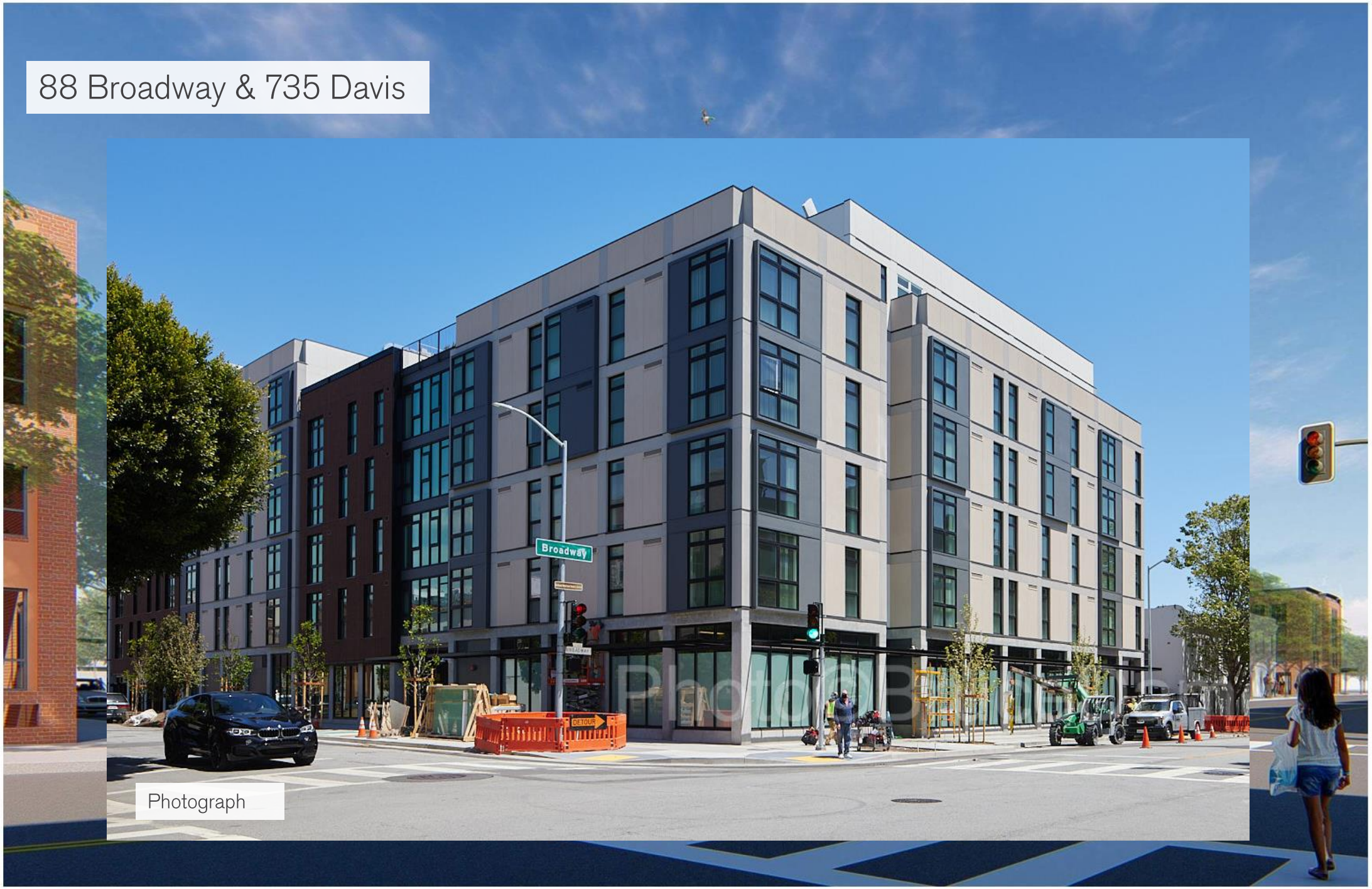
88 Broadway & 735 Davis



Photograph

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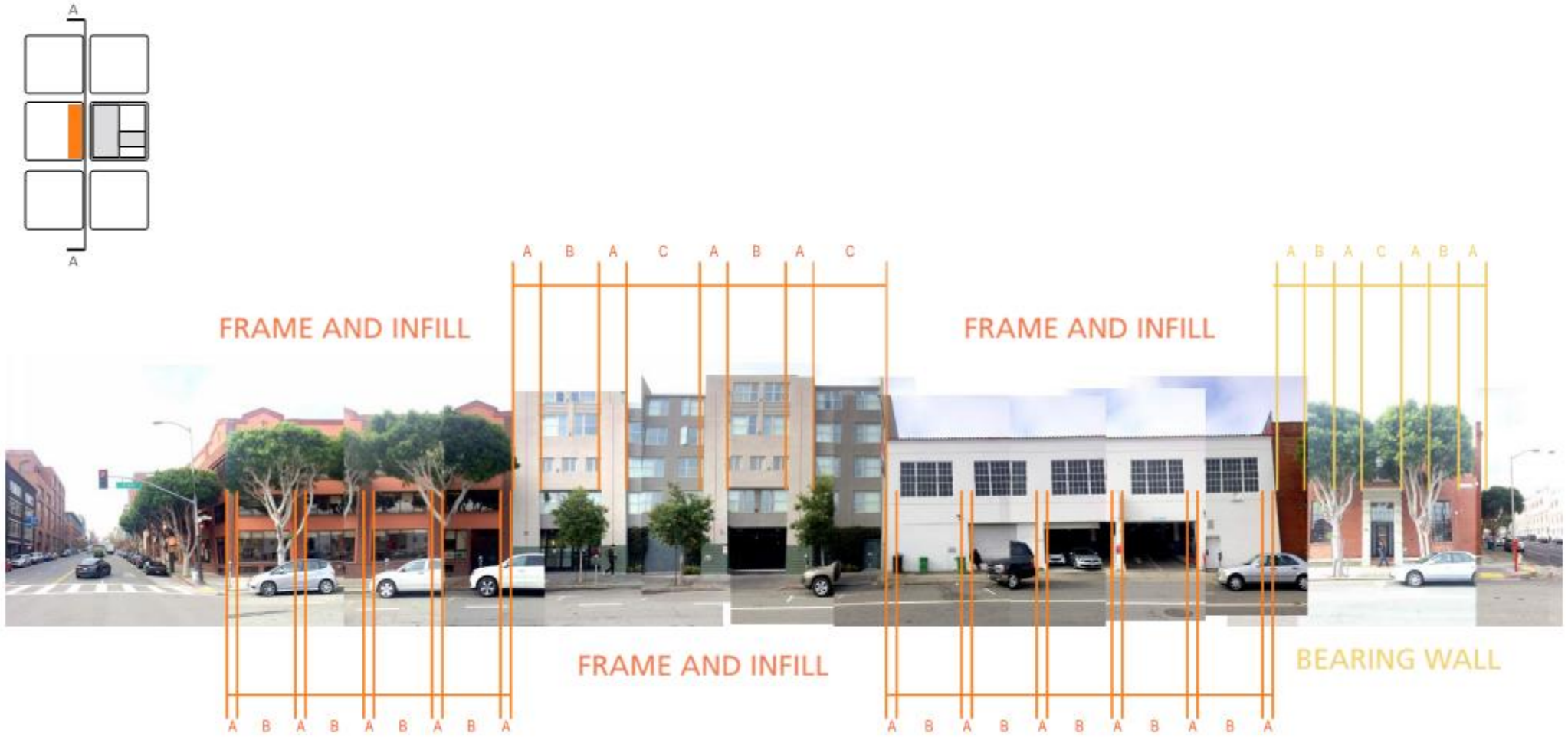
88 Broadway & 735 Davis

FRONT STREET
(PACIFIC THROUGH BROADWAY)



BROADWAY

FRONT STREET AA

VALLEJO

Neighborhood context

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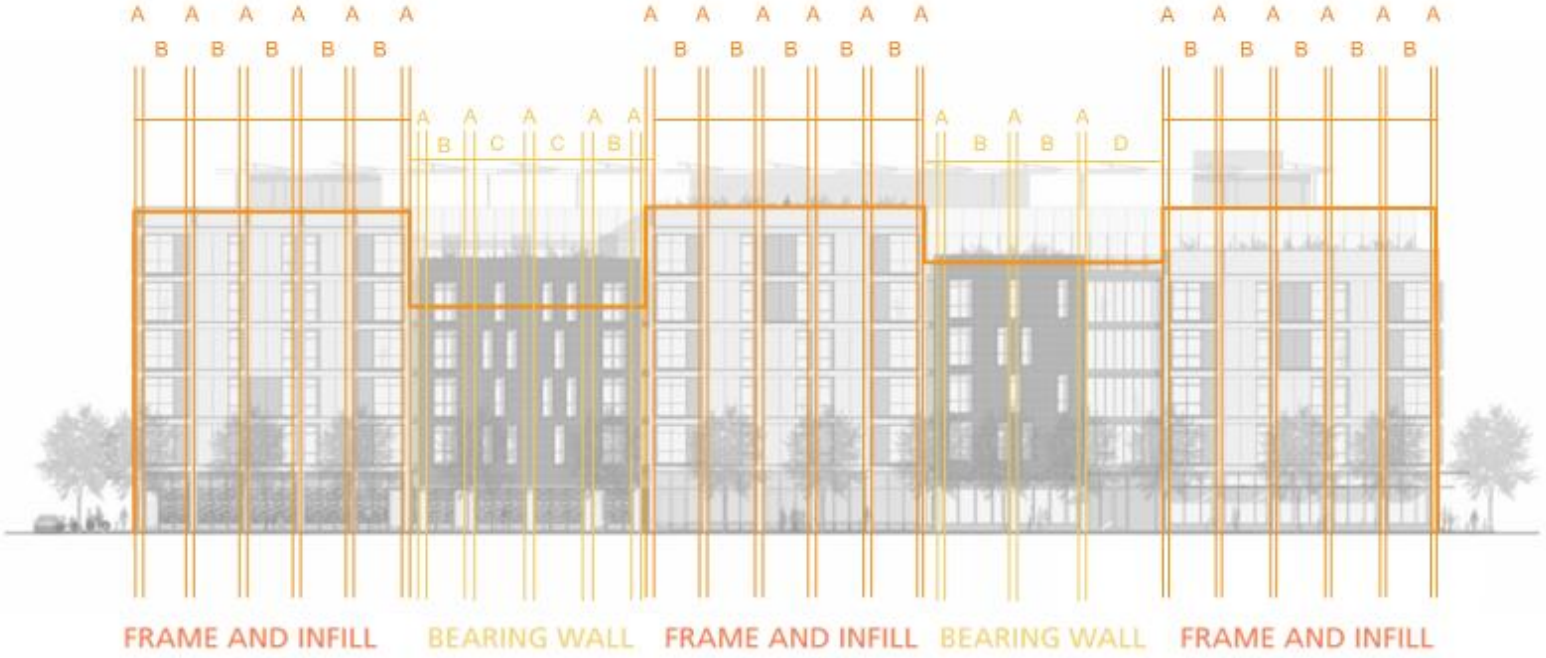
88 Broadway & 735 Davis

BROADWAY STREET ELEVATION - FAMILY BUILDING



FRONT STREET ELEVATION - FAMILY BUILDING

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88 Broadway & 735 Davis

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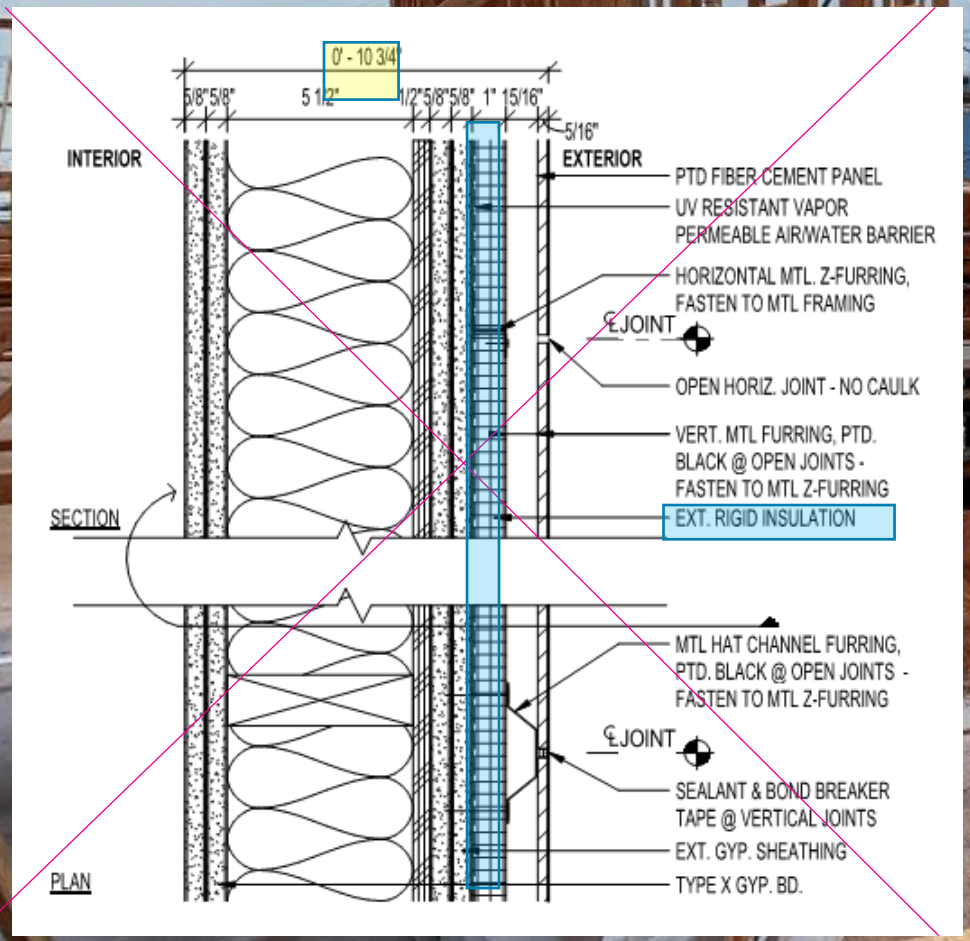
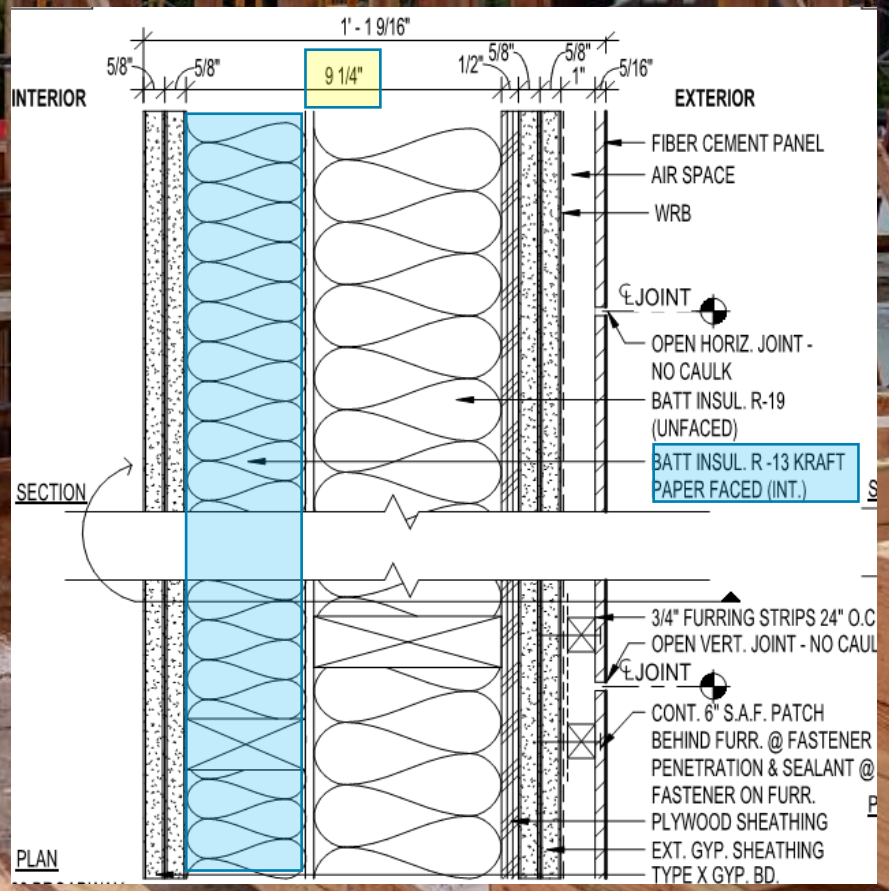
88 Broadway & 735 Davis





100% DD detail

100% CD detail

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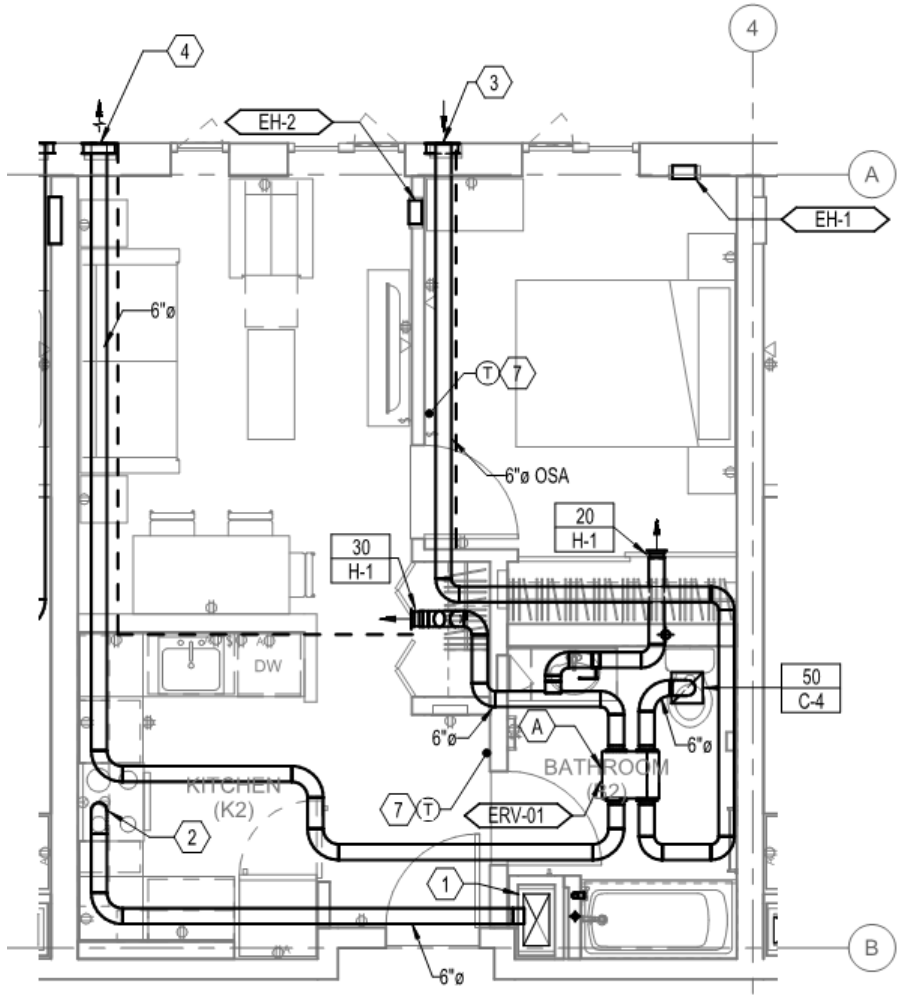
88 Broadway & 735 Davis



S&P TR90

Energy recovery ventilators at each unit route horizontally through facade

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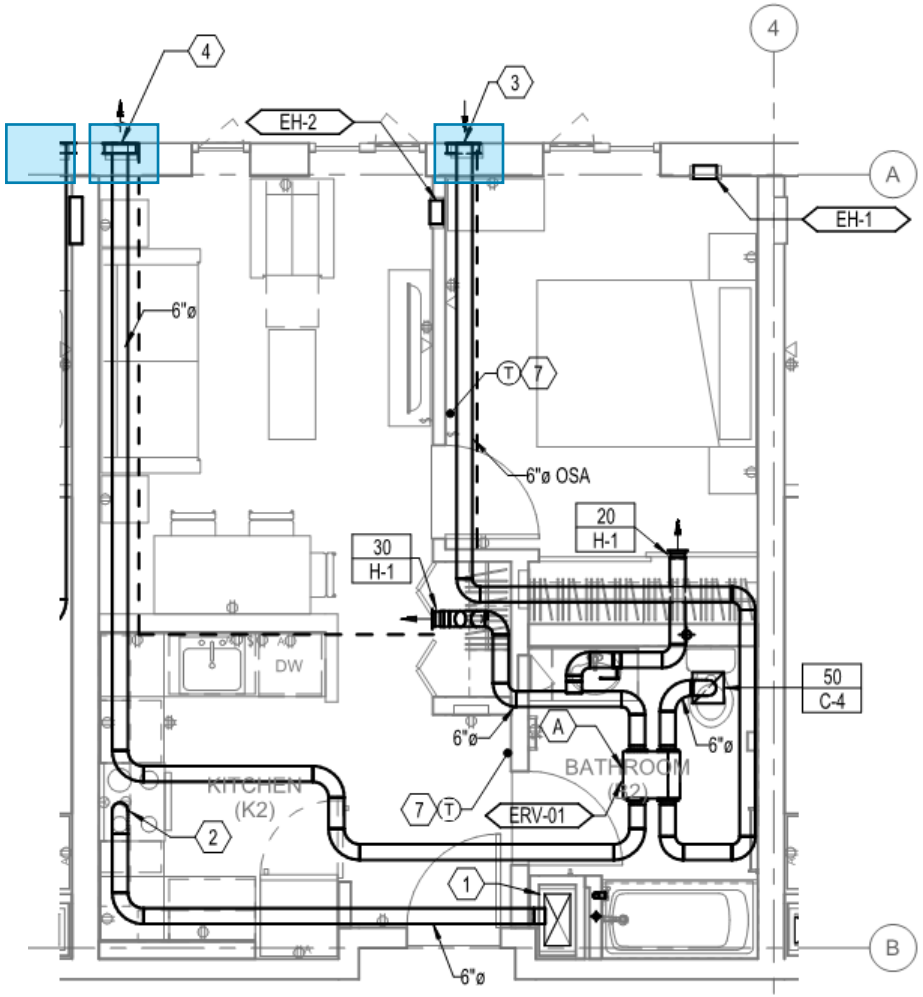
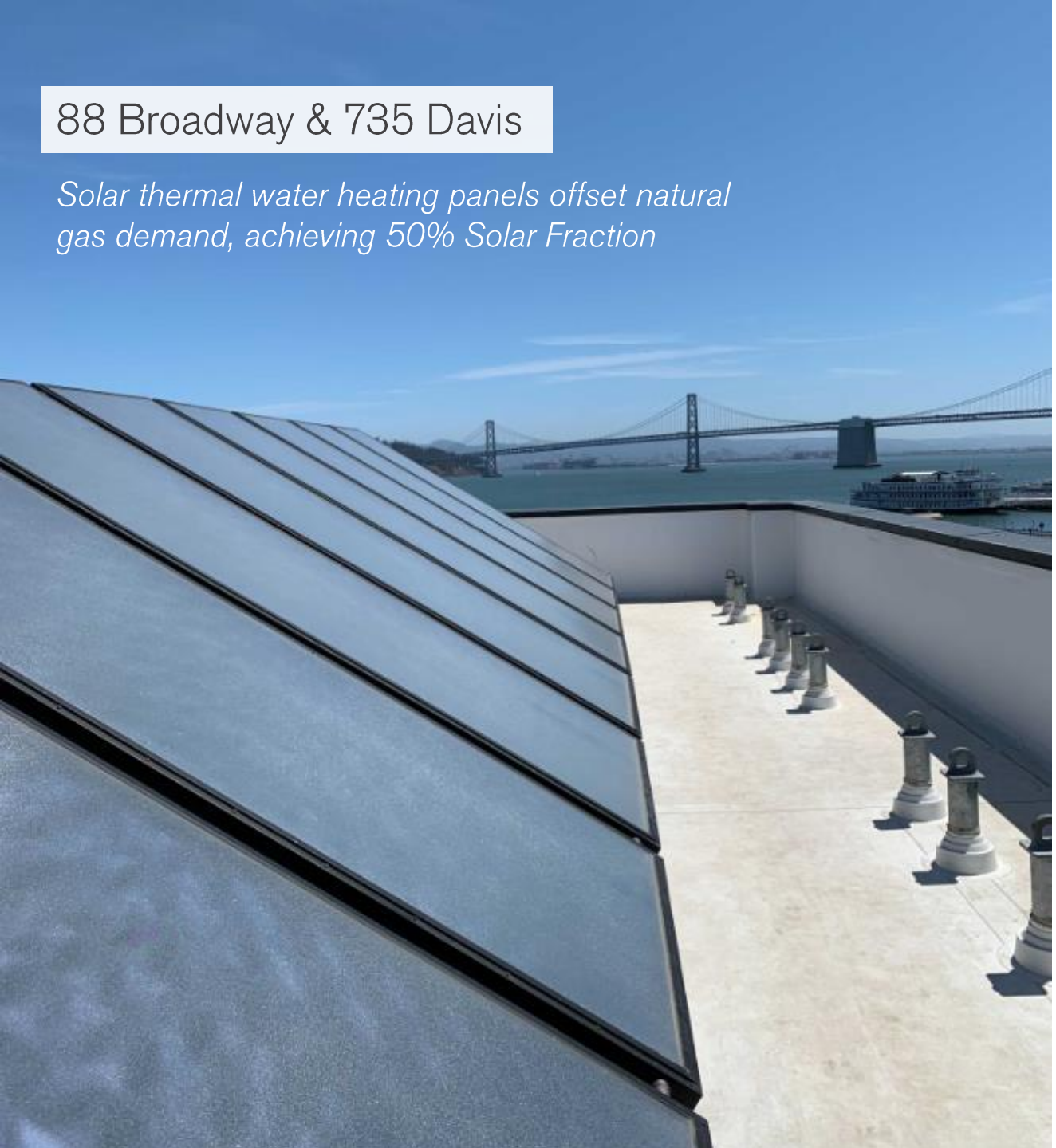
88 Broadway & 735 Davis

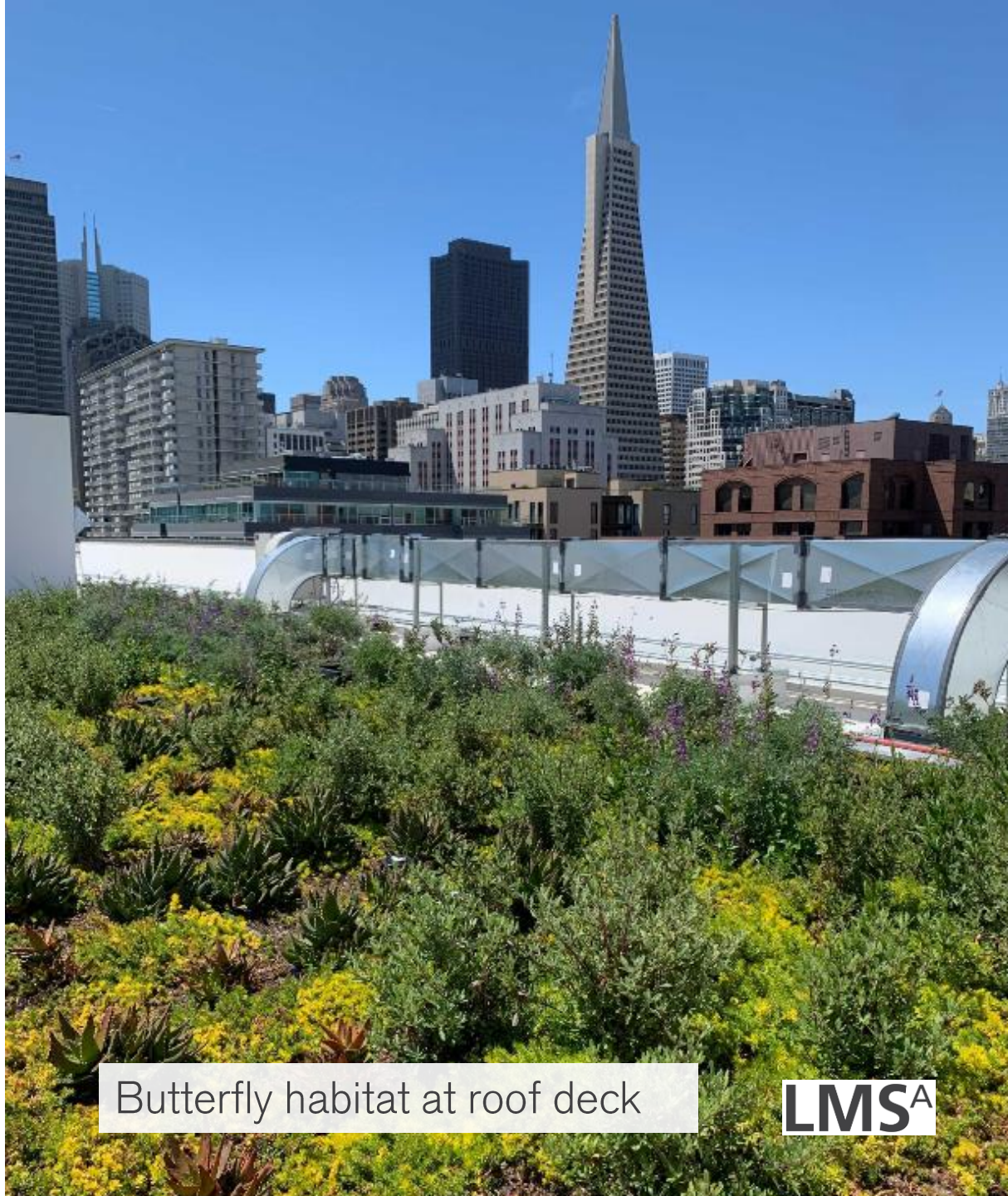


Energy recovery ventilators at each unit route horizontally through facade

88 Broadway & 735 Davis

Solar thermal water heating panels offset natural gas demand, achieving 50% Solar Fraction





Butterfly habitat at roof deck

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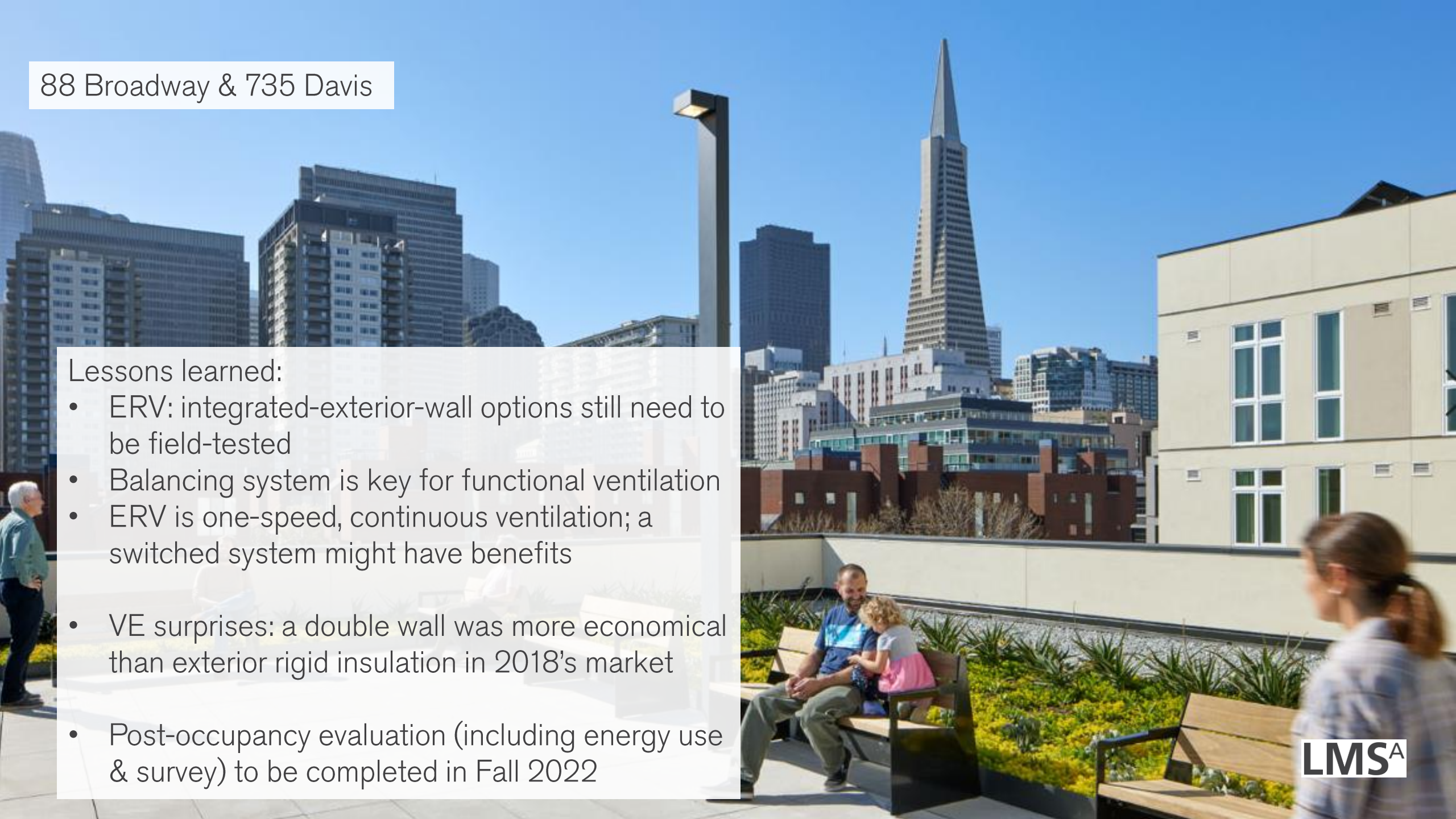

88 Broadway & 735 Davis

Lessons learned:

- ERV: integrated-exterior-wall options still need to be field-tested
- Balancing system is key for functional ventilation
- ERV is one-speed, continuous ventilation; a switched system might have benefits

- VE surprises: a double wall was more economical than exterior rigid insulation in 2018's market

- Post-occupancy evaluation (including energy use & survey) to be completed in Fall 2022

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88 Broadway & 735 Davis

“Modular & resilient” approach to low carbon

Community Housing Partnership + BRIDGE
Cahill Construction & Factory OS

EUI: 26.3 kbtu/sf/yr (modeled)
GreenPoints Rated Platinum target

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Mission Bay South Block 9

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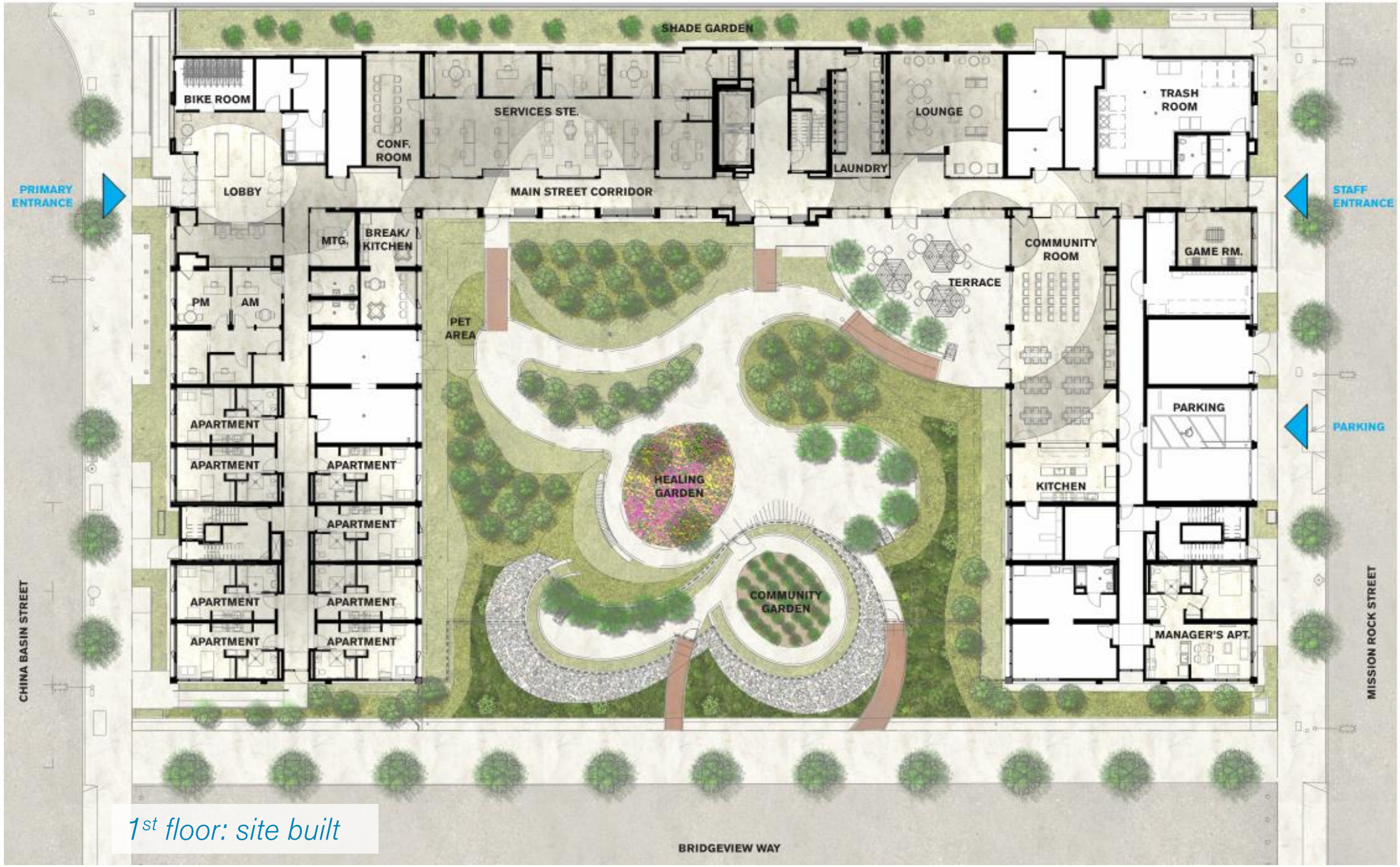

1st floor: site built

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Mission Bay sidewalk subsidence

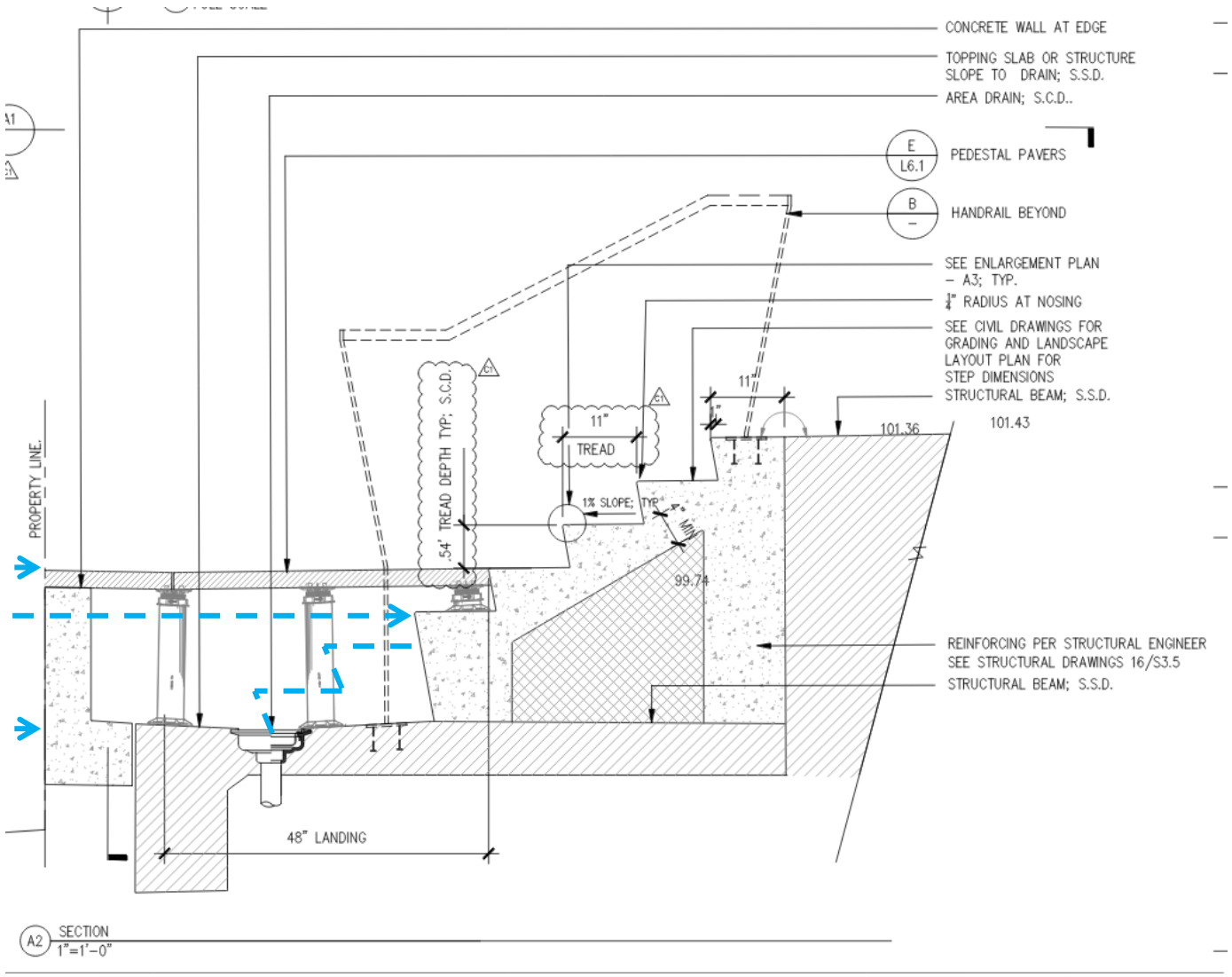
Images: SF Gate

Mission Bay South Block 9

Current sidewalk elevation

Future projected sidewalk elevation

Etc…



Bay fill subsidence: Resilience and accessibility detail at stepped entrance

Mission Bay South Block 9

Under Exploration:

Solar-tied backup power systems for community room receptacle loads + lighting, & limited elevator power

Community room rendering

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Mission Bay South Block 9

Construction progress at factory

Construction progress at site (May 2021)

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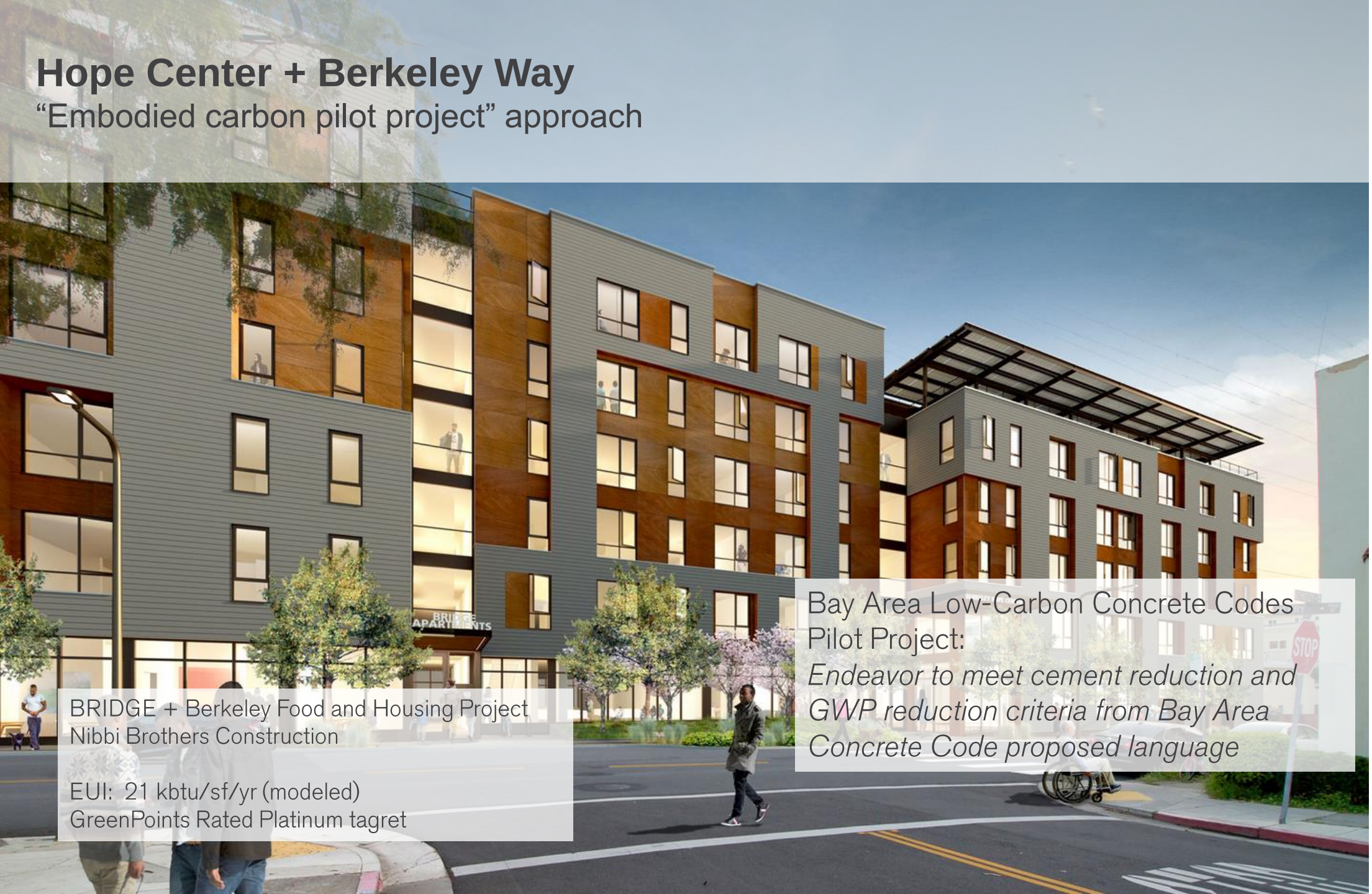
Hope Center + Berkeley Way

“Embodied carbon pilot project” approach



BRIDGE + Berkeley Food and Housing Project
Nibbi Brothers Construction

EUI: 21 kbtu/sf/yr (modeled)
GreenPoints Rated Platinum tagret

Bay Area Low-Carbon Concrete Codes Pilot Project:
Endeavor to meet cement reduction and GWP reduction criteria from Bay Area Concrete Code proposed language

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Hope Center + Berkeley Way

Bay Area Low-Carbon Concrete Codes Pilot Project:

Endeavor to meet cement reduction and GWP reduction criteria from Bay Area Concrete Code proposed language

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Hope Center + Berkeley Way
KEEP
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