BUILDINGENERGY BOSTON

Building as Teacher: Education, Resilience, and Sustainability from the Inside Out

Marvin Loiseau (Franklin Cummings Tech)
Gail Sullivan (Studio G Architects)
Ani Nene (Cosentini Associates)
Carrie Havey (The Green Engineer)

Curated by Frank Stone and Alex Guerrieri (Steven Winter Associates)

Northeast Sustainable Energy Association (NESEA) | March 19, 2024

PANELISTS

Marvin J. Loiseau Ed. D.
Dean of Academics/
Chief Academic Officer
Benjamin Franklin Cummings
Institute of Technology

Gail Sullivan, FAIA
Principal
Studio G Architects

Aniruddha Nene, PE, LEED AP
Vice President
Cosentini Associates

Carrie Havey, LEED Fellow,
SITES AP, Fitwel Amb
Principal, Owner
The Green Engineer

Franklin Cummings Tech

studio g architects
building sustainable communities

Cosentini
A TETRA TECH COMPANY

The Green Engineer
Sustainable Design Consulting

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

ACKNOWLEDGEMENTS + OTHER TEAM MEMBERS

CITY of BOSTON

MASSACHUSETTENSIS. SIGILLUM REIPUBLICÆ

Leggat McCall PROPERTIES

MLJ Insights

goulston & storrs

DELLBROOK ONE WAY

STUDIO ENÉE architects

ground

structural engineers Foley Buhl Roberts & ASSOCIATES INC

Nitsch Engineering

ACENTECH

KALIN ASSOCIATES
ARCHITECTURAL SPECIFICATIONS

B F & A

POINT LINE SPACE

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

AGENDA

- The Why – Franklin Cummings Tech's mission + impact
- The Community – A project embedded in an engaged community
- The Design Solution – How the design responds to the occupants + community
- The Transformation – An institution for the future green economy
- New Energy Code – Revisiting the design to meet the MA Energy Code

THE WHY

Our Mission

Benjamin Franklin Cummings Institute of Technology (Franklin Cummings Tech) delivers transformative technical and trade education that leads to economic advancement.

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

Our Impact

99%

Students receiving financial aid to help pay for tuition, books, and tools

68%

Black & Latinx Students

83%

BFIT grads are employed in their field full-time or continue their education within 6 months

$52K

Annual Median Salary One year after graduation (working full-time, in field)

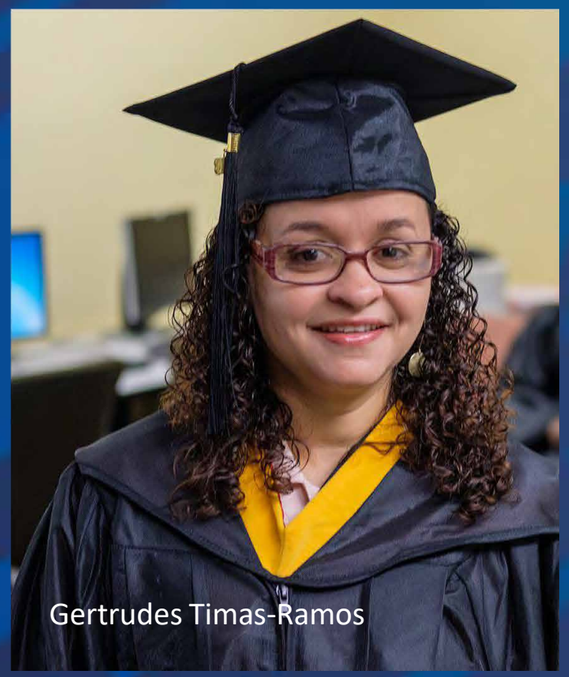
2x

Graduation rate is twice the national 2-year college average and three times the state average

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

Jayvonte Odom


Peter Haubrich


Gertrudes Timas-Ramos

"It's very challenging to work in IT. BFIT's hands-on courses and the support I got as a student really prepared me to be successful."

Gertrudes Timas-Ramos Class of '18
Computer Technology (AS) IT Help Support Specialist
BFIT Roxbury Native

"BFIT was affordable and it's a great environment. The courses are keyed into what's going on now, so you can jump into any role in your field."

Pater Haubrich Class of '16
Health Information Technology (BS) Interface Analyst Optum
Roxbury Native

"I was looking for that sense of community. And right from my first semester, that's what BFIT was."

Jayvonte Odom Class of '21
Construction Management (AS) Project Administrator, Turner Construction Co.
Roxbury Native

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

FRANKLIN CUMMINGS TECH

Center for Energy Efficiency and the Trades

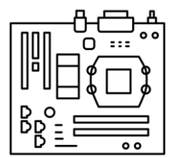
- Early College for BPS High School Students
- Certificate Programs
- Associates & Bachelors Degrees
- Customized Workforce Training for Employers

Automotive Technology (Electric Vehicle Technology Concentration)

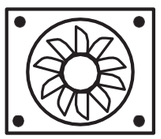
Electrical Engineering and Engineering Technology including Renewable Energy Technology Concentration and Power Engineering

Building Energy Management Concentration

Heat Pumps Training



Computer Technologies



HVAC&R Technology

Practical Electricity

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

A COMMITMENT TO DIVERSITY, EQUITY & INCLUSION

Support a diverse community in all aspects of the new campus

DEVELOPMENT:

- Over 50% of non-construction work contracted to M/WBE firms

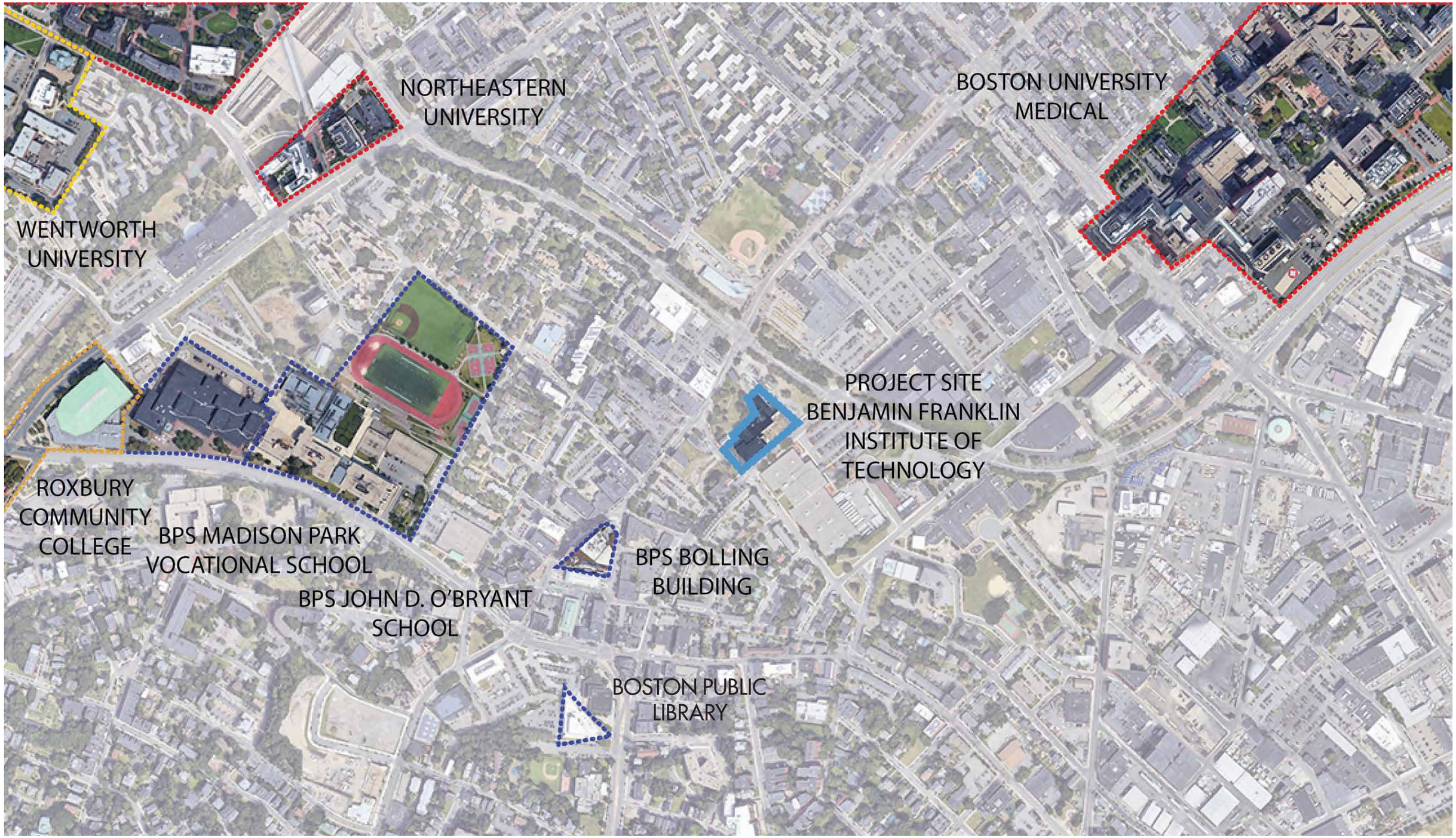
CONSTRUCTION:

- General Contractor – Dellbrook One Way, a joint venture
- Subcontracting Goals:
  - ✓ 35% MBE
  - ✓ 10% WBE
- Workforce Goals:
  - ✓ 51% Boston residents
  - ✓ 51% Minorities
  - ✓ 12% Women

OPERATIONS:

- Use local vendors in Franklin Cummings Tech procurement
- Expand Franklin Cummings Tech's diverse workforce

THE COMMUNITY



BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

TROPICAL FOODS

RESIDENCE INN

TORRENT SIX

NUBA RESIDENCES

NAWN FACTORY BUILDING

NUBIAN ASCENDS

ORCHARD GARDENS SCHOOL

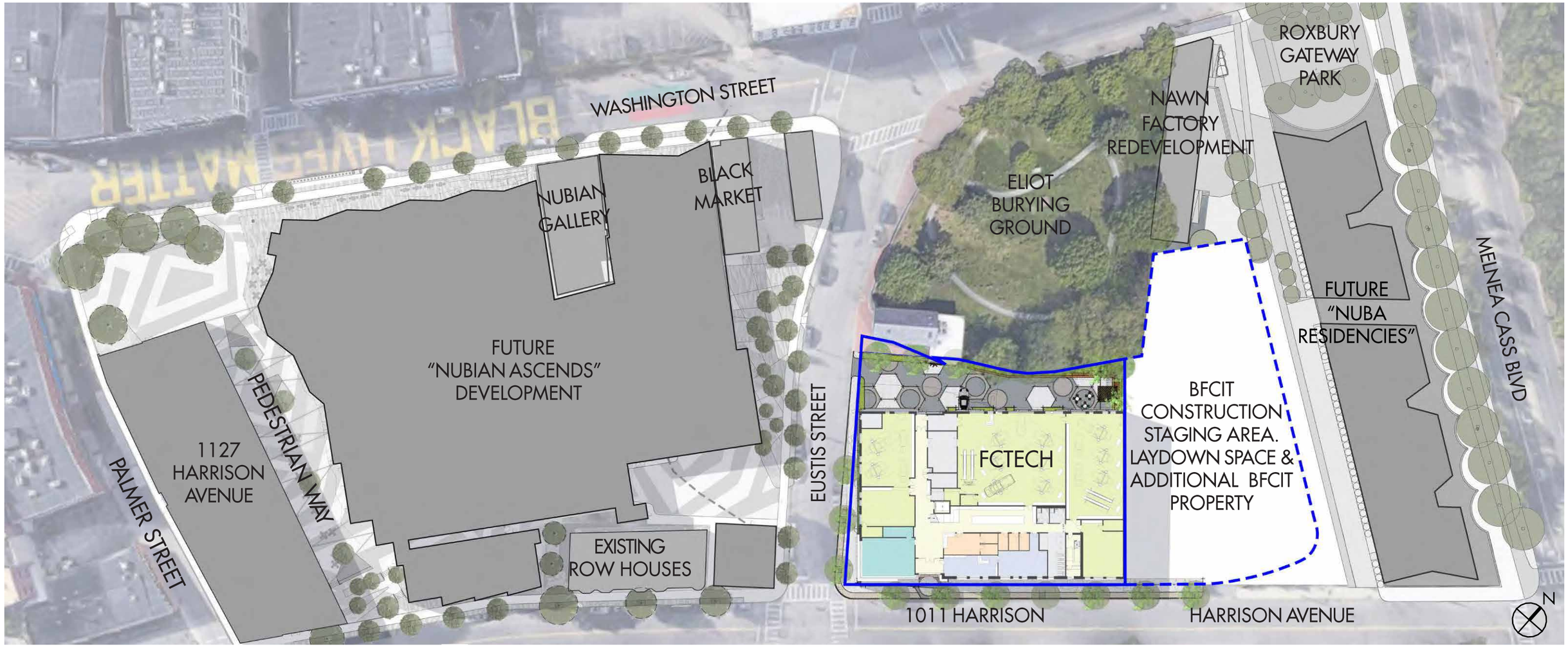
BOLLING MUNICIPAL BUILDING

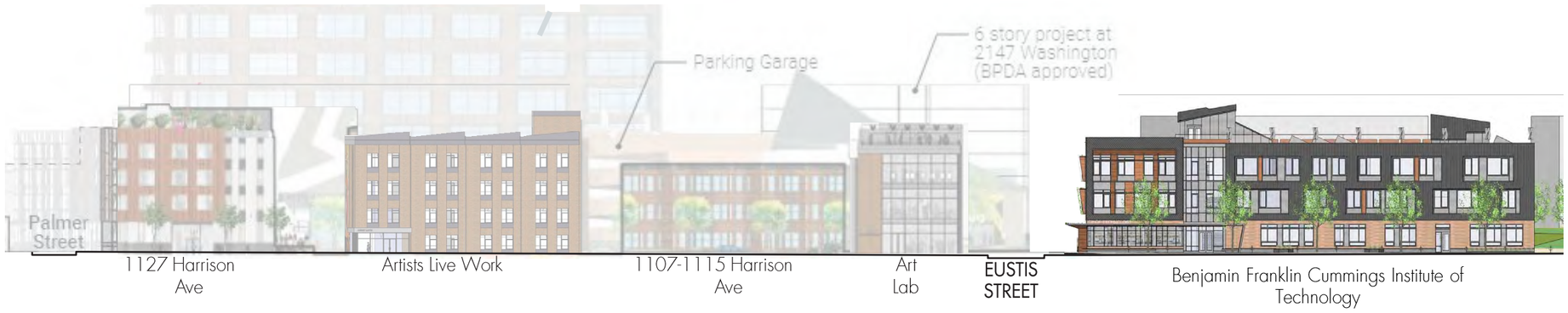
ROW HOUSES

DARTMOUTH HOTEL

PALLADIO HALL

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT





Credit: Stantec, Dream Collaborative, Urbanica, and Monte French Design Studio for Preliminary Designs of neighboring developments

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

What Communiversity means to Franklin Cummings Tech!

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

THE DESIGN SOLUTION

GUIDING PRINCIPLES

- Uphold Franklin Cummings Tech's values of **supporting a diverse community** in all aspects of the project, committing to best practices for contracting with MWBEs and employing a diverse workforce.

- **Optimized the sustainability and flexibility of the building,** allowing it to tread lightly on the environment and evolve to meet future needs.

- Design the building as a **teaching tool for students and visitors.**

- **Design a durable and inspiring building** that conveys Franklin Cummings Tech's mission as an institution of higher learning with a technology focus to the public and students.

- **Find integrated, cost-effective design and construction strategies** to maximize educational value and meet Franklin Cummings Tech's principles and sustainability goals while meeting Franklin Cummings Tech's financial objectives and limited budget.

68,000 SF BUILDING FOR

Students	600
Faculty & Staff	120
Labs	23
Classrooms	7
Flexible Rooms	11
Private Offices	20

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

HARRISON AVENUE - LOOKING WEST

EUSTIS STREET - LOOKING NORTH

HARRISON AVENUE - LOOKING EAST

EUSTIS STREET - LOOKING SOUTH

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

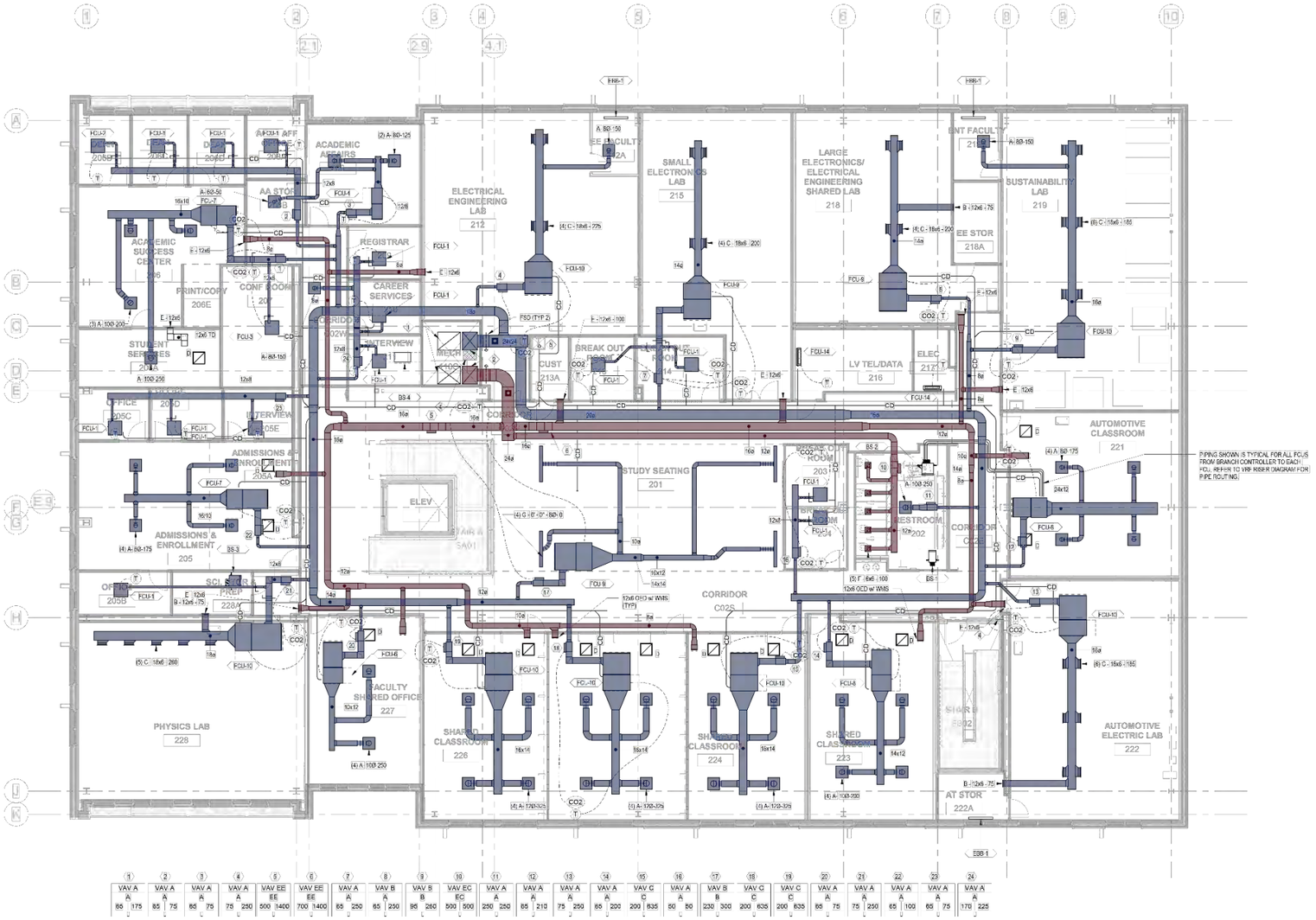
LEED & SUSTAINABILITY ATTRIBUTES

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

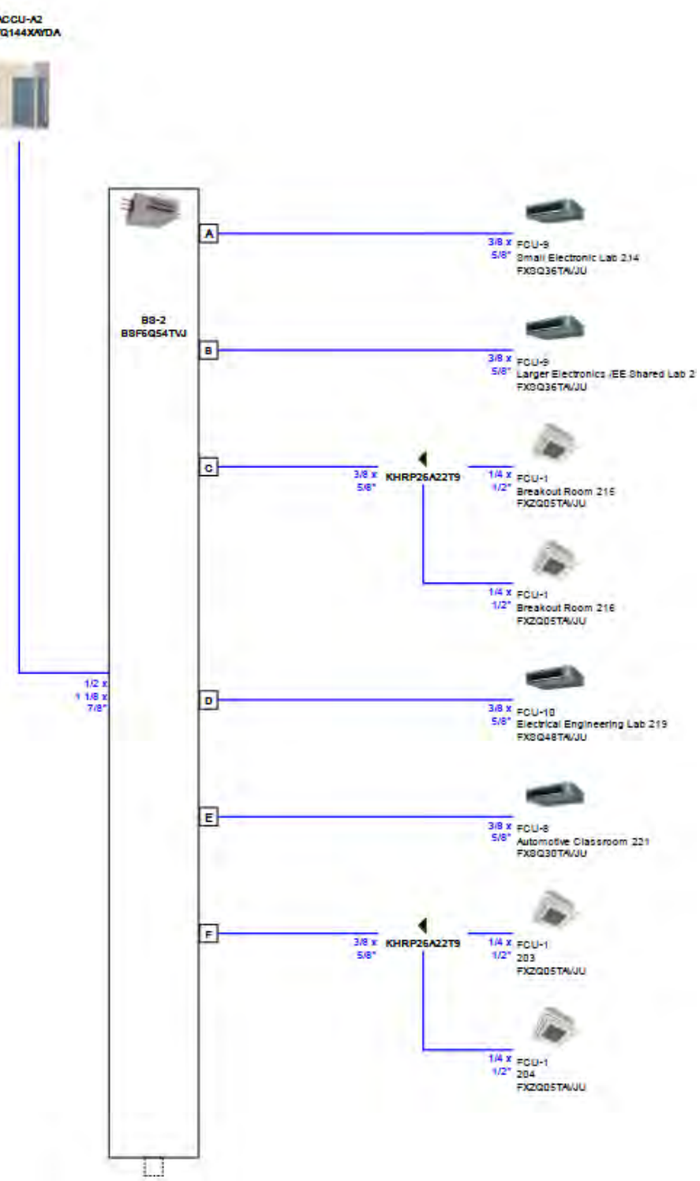
OVERVIEW OF ALL-ELECTRIC MEP SYSTEMS

Design achieves over 40% reduction in CEI at today's emissions rates,
and 100% reduction with a fully renewable grid

OVERVIEW OF ALL-ELECTRIC MEP SYSTEMS



VRF System



VRF System – Piping Layout

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

RENEWABLES

- 4,000 sf rooftop space for Photovoltaics (Estimated to produce approximately 65,000 kWh/year)
- Student learning lab is surrounded by PVs to enable students to interact with the actual technology

LIGHTING & ELECTRICAL POWER

- Lighting – LED fixtures with occupancy sensors and advanced controls
- Initial LPDs were designed aggressive enough to meet the requirements of the new stretch code so no redesign was needed

Space Type	As-Designed	ASHRAE 90.1-2013	New Stretch Code
Classrooms	0.60	1.24	0.71
Laboratory	0.60	1.43	1.11
Office	0.68	1.11	0.74
Restrooms	0.51	0.98	0.63
Lobby	0.37	0.90	0.84

THE TRANSFORMATION

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

STUDIO ENÉE architects

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

REPLICABLE SOLUTIONS

- Adaptability
- Social Equity
- Building as an Education Tool
- LEED
- The site

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

NEW MA ENERGY CODE

CODE COMPLIANCE PATHWAYS

Specialized Opt-In
- TEDI
- Relative Performance

Start Process | Decision | End of Process

Is the project a non-residential building?

Yes →

Is the project's permitted gross conditioned floor area > 20,000 ft²

Yes →

Occupancy Types
- Dormitory
- Fire Station
- Library
- Office
- School
- Police Station
- Post Office
- Town Hall

No →

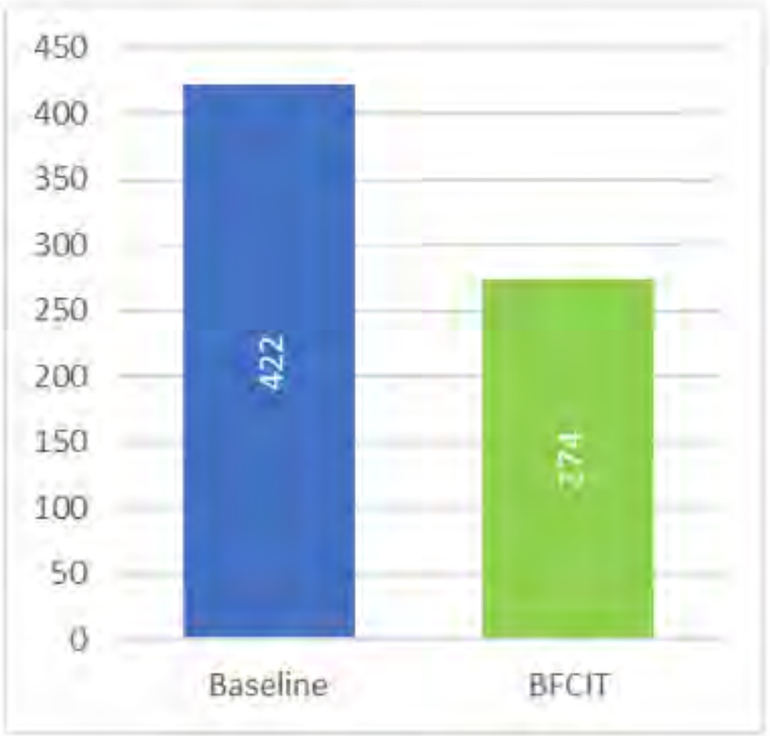
Option to use either Relative Performance or TEDI

Relative Performance

ENERGY AND GREENHOUSE GAS PERFORMANCE

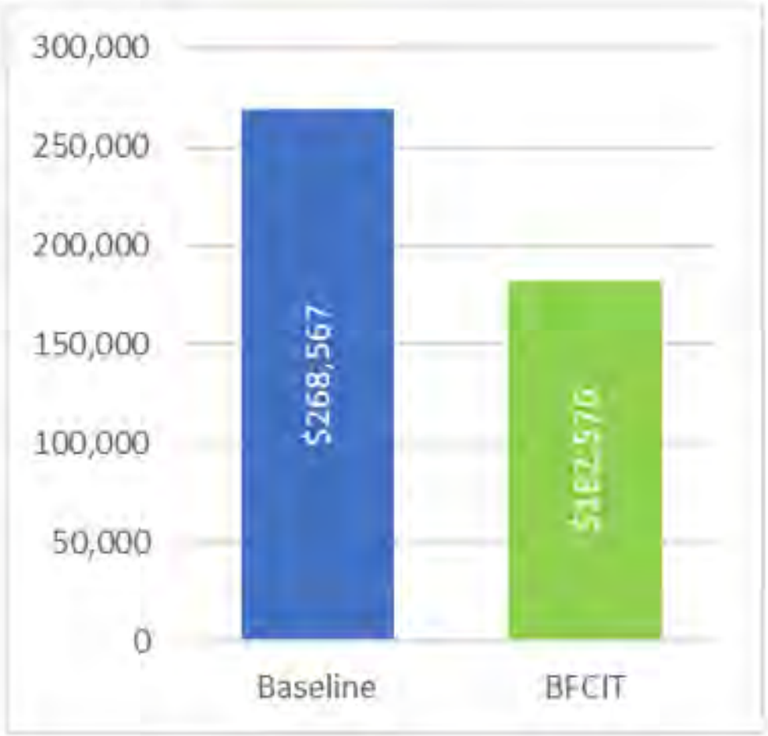
35% Reduction

BFIT is an all electric – GHG reductions will increase overtime



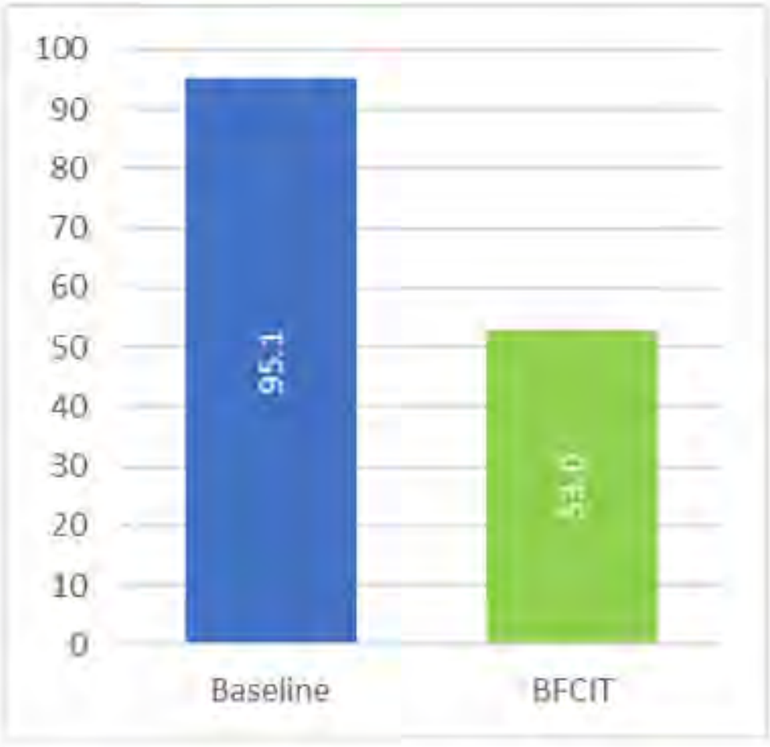
STRETCH CODE GHG EMISSIONS
(ASHRAE 90.1-2019)

32% Reduction



LEED ANNUAL OPERATING COST
(ASHRAE 90.1-2010)

44% Reduction



STRETCH CODE EUI
(ASHRAE 90.1-2019)

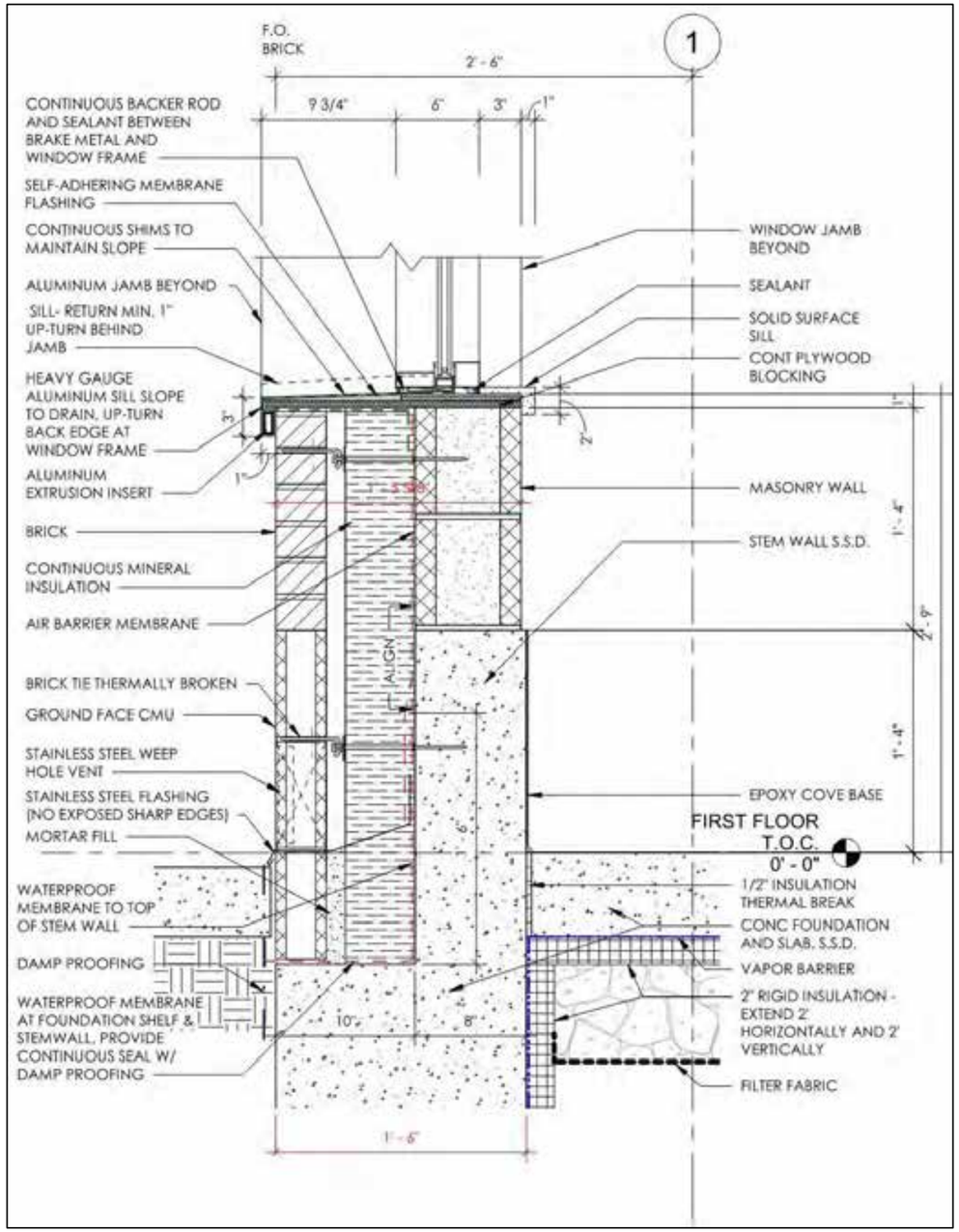
BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

BERDO / CARBON NEUTRAL BUILDING ASSESSMENT

<u>Construction</u> (Passive House wall detailing):

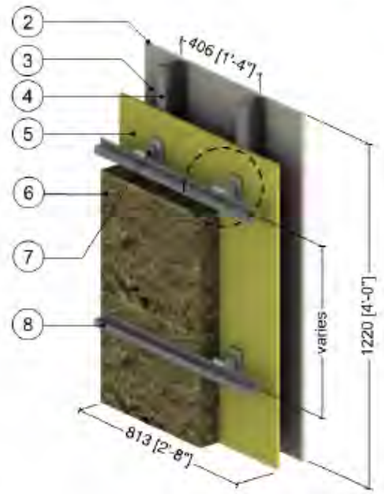
Punched Windows:	U-0.33
Roof (concrete deck):	R-40 continuous
Walls:	R-20 continuous
Projected 2035 emissions:	2.32 to 2.54 kgCO2e/SF/year with and without on-site renewables.
Yearly allowance:	3.8 kgCO2e/SF/year.

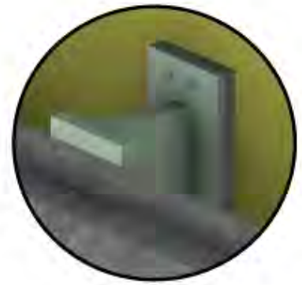
CHANGES TO PROJECT



Detail 5.1.25

Exterior Insulated 3 5/8" x 1/58" Steel Stud (16"o.c.) Wall Assembly with TAC Fiber Reinforced Plastic Girts Supporting Cladding – Clear Wall





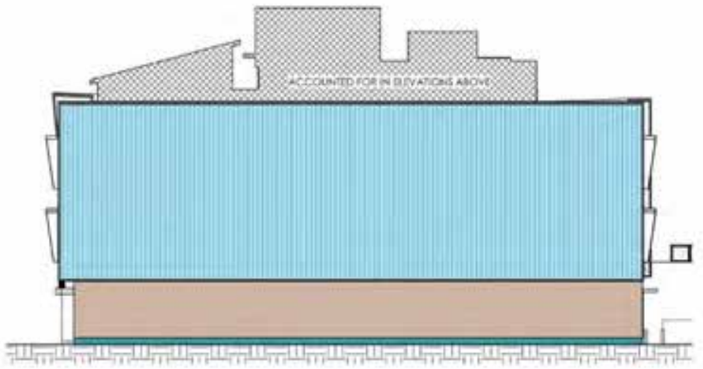
Fiber Reinforced Clip Detail

ID	Component	Thickness Inches (mm)	Conductivity Btu·in / ft²·hr·°F (W/m K)	Nominal Resistance hr·ft²·°F/Btu (m²K/W)	Density lb/ft³ (kg/m³)	Specific Heat Btu/lb·°F (J/kg K)
1	Interior Films[1]	-	-	R-0.7 (0.12 RSI)	-	-
2	Gypsum Board	1/2" (13)	1.1 (0.16)	R-0.5 (0.08 RSI)	50 (800)	0.26 (1090)
3	Air in Stud Cavity	3 5/8" (92)	-	R-0.9 (0.16 RSI)	0.075 (1.2)	0.24 (1000)
4	3 5/8" x 1 5/8" Steel Studs (16"o.c.)	18 Gauge	430 (62)	-	489 (7830)	0.12 (500)
5	Exterior Sheathing	1/2" (13)	1.1 (0.16)	R-0.5 (0.08 RSI)	50 (800)	0.26 (1090)
6	Exterior Insulation	Varies	0.24 (0.034)	R-12.6 to R-25.2 (2.22 to 4.40 RSI)	489 (7830)	0.12 (500)
7	Fiber Reinforced Plastic (FRP) Girts	-	2.4 (0.35)	-	-	-
8	Horizontal Girts	18 Gauge	430 (62)	-	489 (7830)	0.12 (500)
9	Metal Cladding with 1/2" vented airspace incorporated into exterior heat transfer coefficient					
10	Exterior Film[1]	-	-	R-0.7 (0.12 RSI)	-	-

[1] Value selected from table 1, p. 26.1 of 2009 ASHRAE Handbook – Fundamentals depending on surface orientation

- Courtesy of BC Hydro Building Envelope Thermal Bridging Guide v1.6

CHANGES TO PROJECT



⑦ BACKSTOP - NE ELEVATION
1/16" = 1'-0"

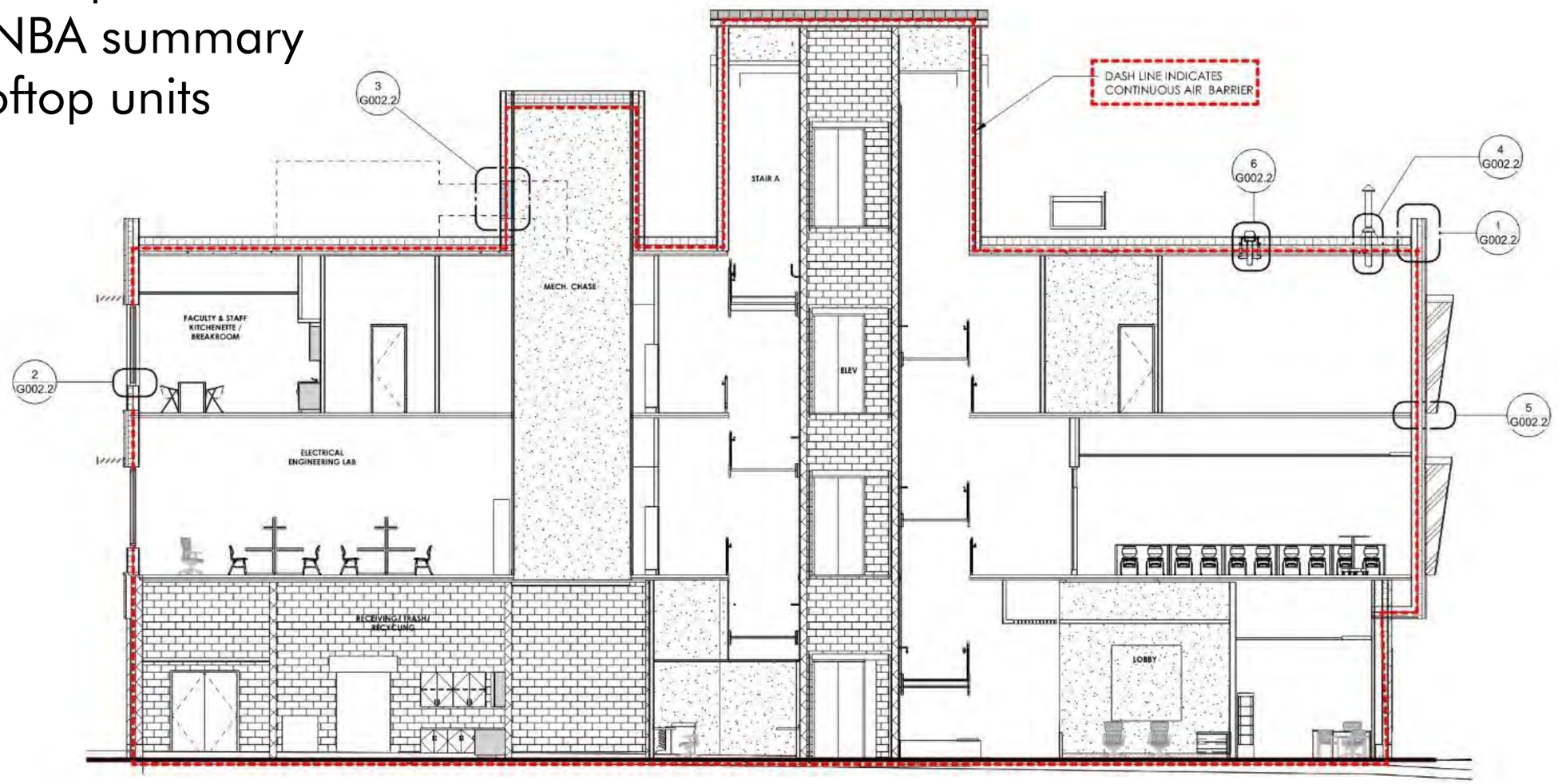
⑤ BACKSTOP - NW ELEVATION
1/16" = 1'-0"

③ BACKSTOP - SW ELEVATION
1/16" = 1'-0"

① BACKSTOP - SE ELEVATION
1/16" = 1'-0"

CHANGES TO PROJECT

- 2 new sheets of drawings comparable to PHIUS projects (matrices and air-sealing details)
- Thermal bridging details
- Energy Model update
- Updated CNBA summary
- Upsized rooftop units



WHAT'S NEXT FOR THE NUBIAN SQUARE CAMPUS?

- Franklin Cummings Tech has all Boston land use approvals for the building
- Construction Documents and bidding is complete!

March 2024:

- Groundbreaking held on March 12th
- Construction started at 1011 Harrison Ave.

July/August 2025

- Construction complete
- Commissioning/moving

Fall Semester 2025

- **Welcome Students to Franklin Cummings Tech's new home**

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT

Q&A

THANK YOU!

Marvin J. Loiseau Ed. D.
Dean of Academics/
Chief Academic Officer
Benjamin Franklin Cummings
Institute of Technology
mloiseau@bfit.edu

Franklin Cummings Tech

Gail Sullivan, FAIA
Principal
Studio G Architects
gails@studiogarchitects.com

studio g architects
building sustainable communities

Aniruddha Nene, PE, LEED AP
Vice President
Cosentini Associates
anene@cosentini.com

Cosentini
A TETRA TECH COMPANY

Carrie Havey, LEED Fellow,
SITES AP, Fitwel Amb
Principal, Owner
The Green Engineer
carrie@greenengineer.com

The Green Engineer
Sustainable Design Consulting

BUILDING AS TEACHER: EDUCATION, RESILIENCE, AND SUSTAINABILITY FROM THE INSIDE OUT