

Campus Energy Plant Tufts University

An aerial photograph of the Tufts University campus. The image shows various academic and administrative buildings, green spaces, and parking lots. A red circle is drawn around a specific building located in the lower-middle part of the image, near a large brick building with a dark roof. The building circled is a smaller, multi-story structure with a light-colored roof and walls.

IDEA CampusEnergy2017
Combined Heat and Power to Provide Energy
Efficiency to Medium Size Campus
February 20-24; 2017

Presentation Overview:

- Campus Introduction
- Project Overview
- Planning, Architecture, and Design
- Construction
- Lessons Learned
- Summary

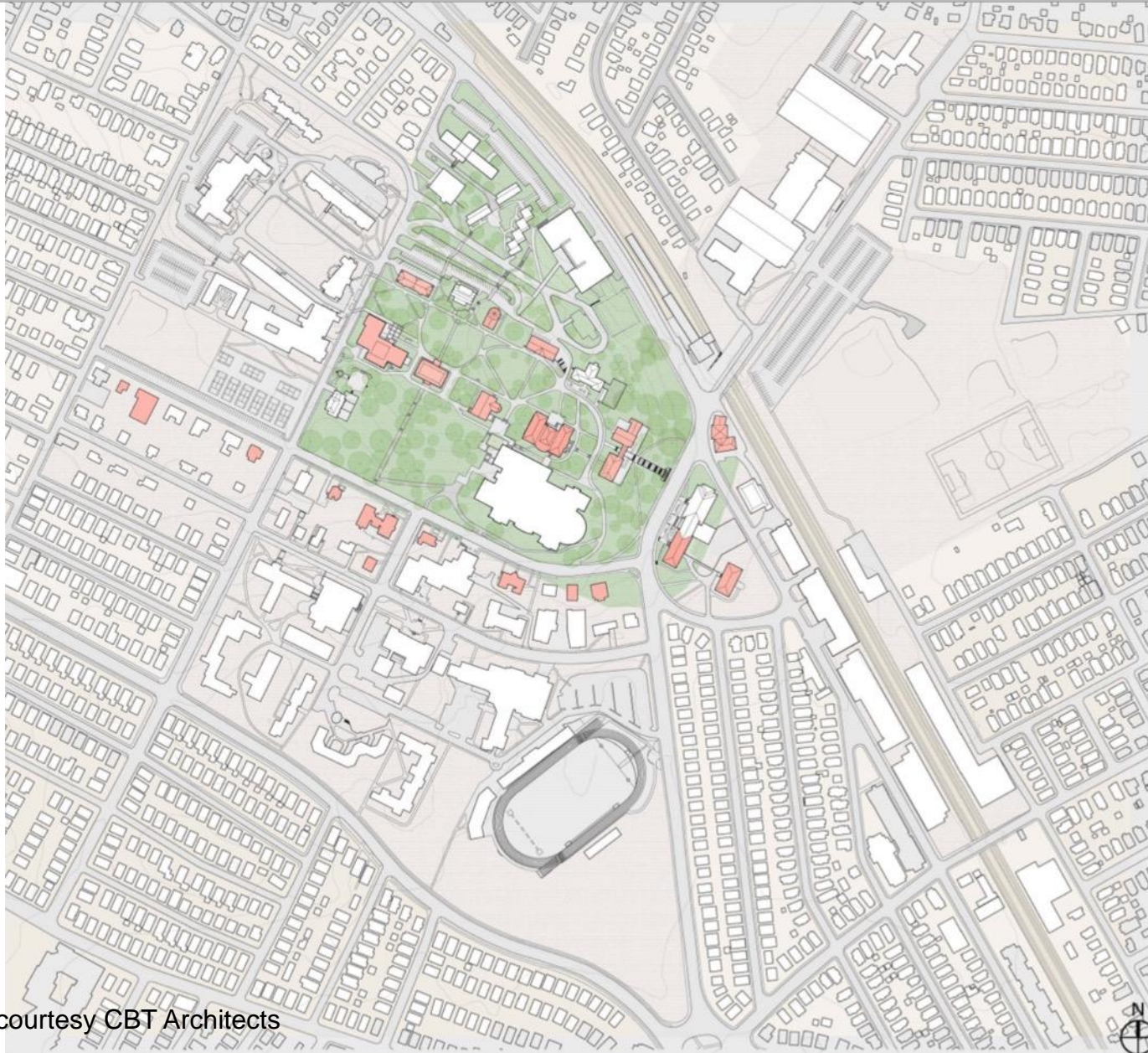
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Traditional Campus Close to City



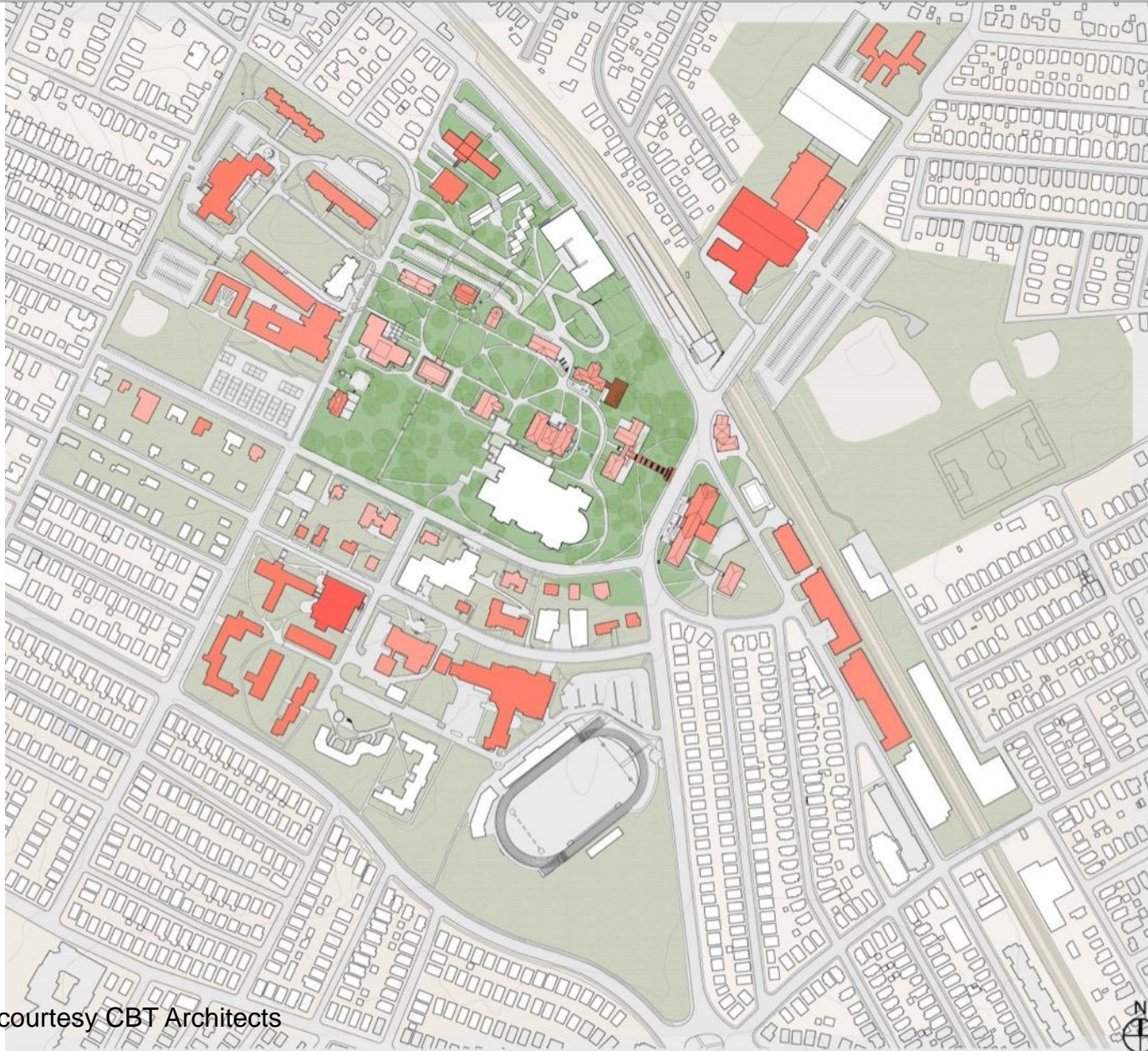
Campus Energy Plant

Evolution of Campus | 1912: Development on the Hill



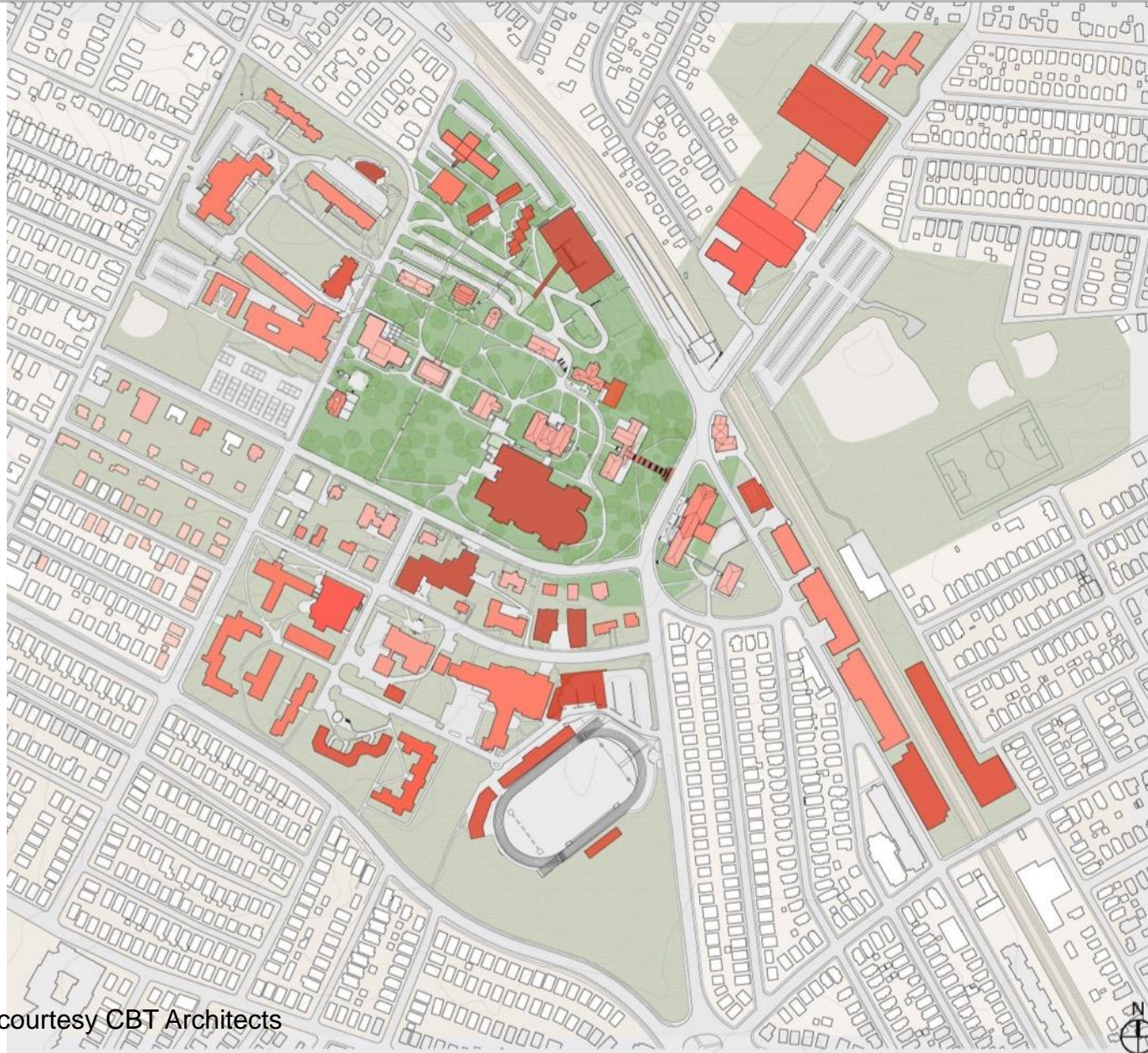
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Evolution of Campus | 1972: Development around the Hill



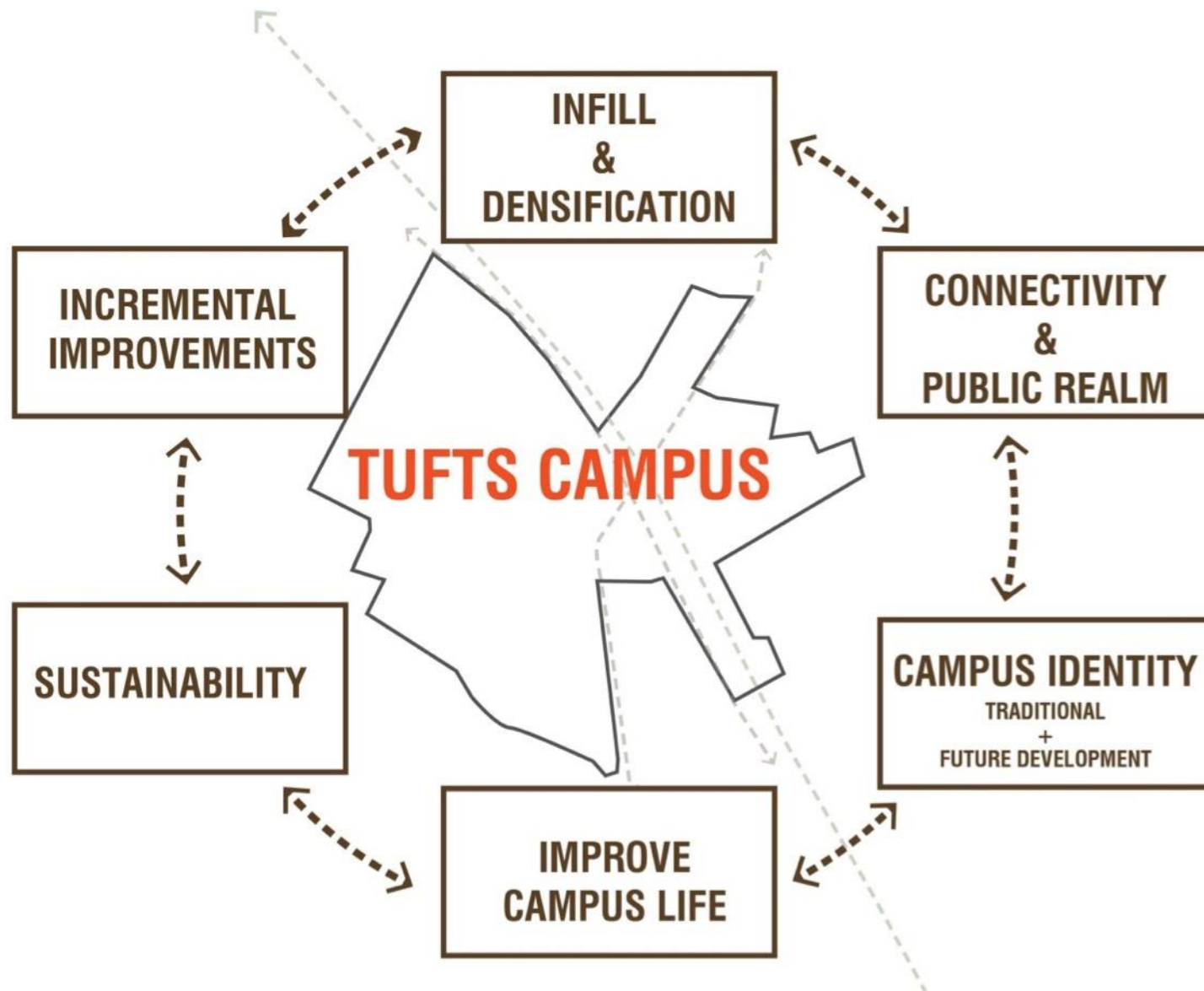
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Evolution of Campus | 2012: Development on the Hill



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A Vision for Future



Campus Energy Plant

Current Precincts and New Gateway



Campus Energy Plant

Currently Planned Projects

CURRENTLY PLANNED PROJECTS



SCIENCE & ENGINEERING COMPLEX 2017



CENTRAL ENERGY PLANT 2016

574 BOSTON AVENUE 2015



CAMPUS PLANNING PRESENTATION

AIR RIGHTS BUILDING 2019/2020



Project Development

- Energy saving opportunities study identified Cogen possibility
- Feasibility study – no fatal flaws
- Established the business case
- Concept design – modify existing plant or new plant?
- Design and Construction Drawing Development
- Construction

Project Operational Highlights:

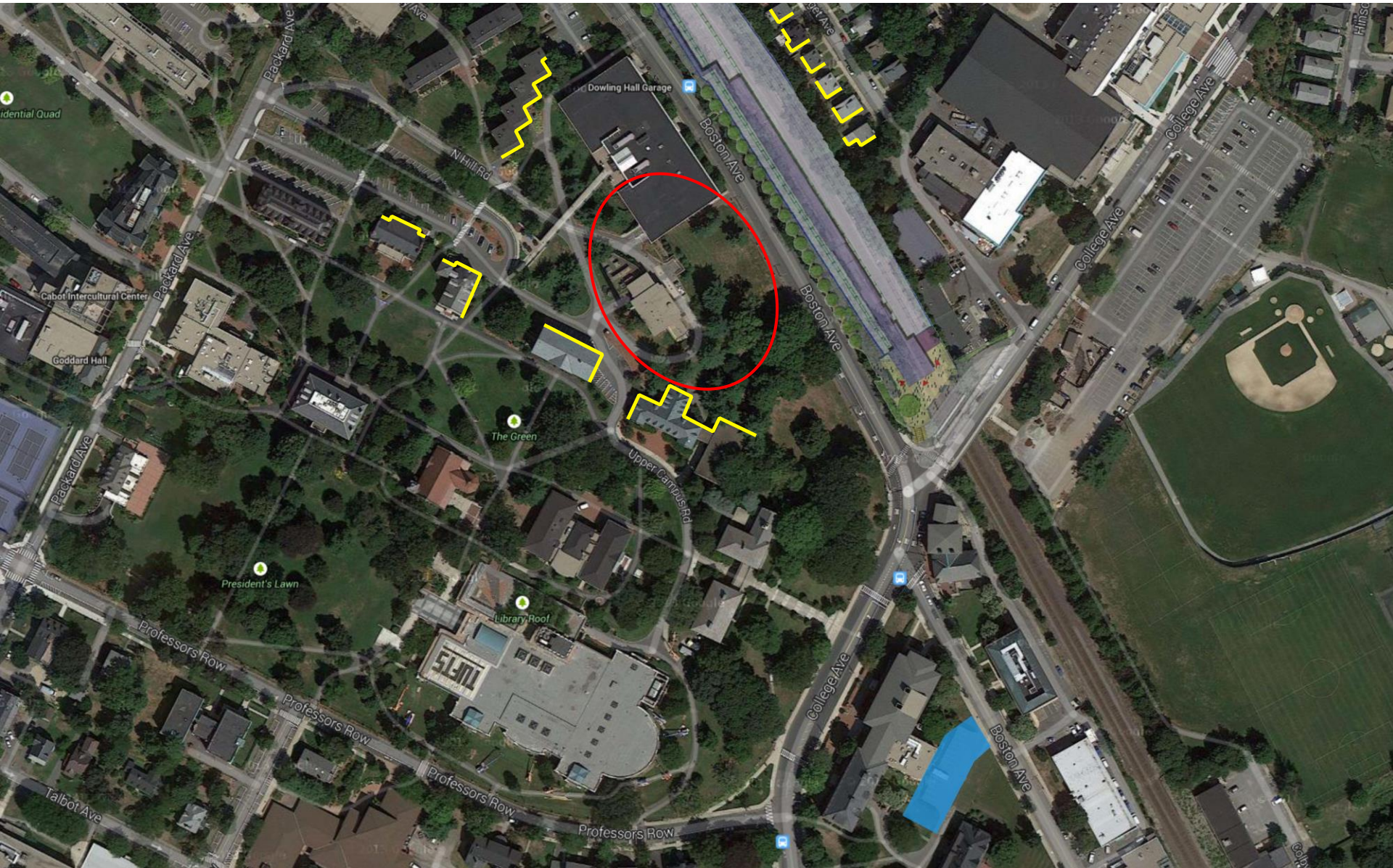
- New Plant includes:
 - On site electrical generation (4MW gas fire reciprocating engine)
 - Supplemental boilers (75 Kpph)
 - Central chilled water system (1,400 tons)
- Enhanced Sustainability
 - Greenhouse gas emissions reduced 14%
 - Significantly more efficient than the existing plant
- Enhanced Resiliency
 - Power continuity even during a long utility outage
- Utility reliability improved

Resiliency Features:

- Cogen can operate in “Island Mode” independent of the local electrical grid
 - Shelter and feed the students and sustain most business operations
- Black start capability
- Major equipment placed out of the “flood plain”
- Boilers are dual fuel

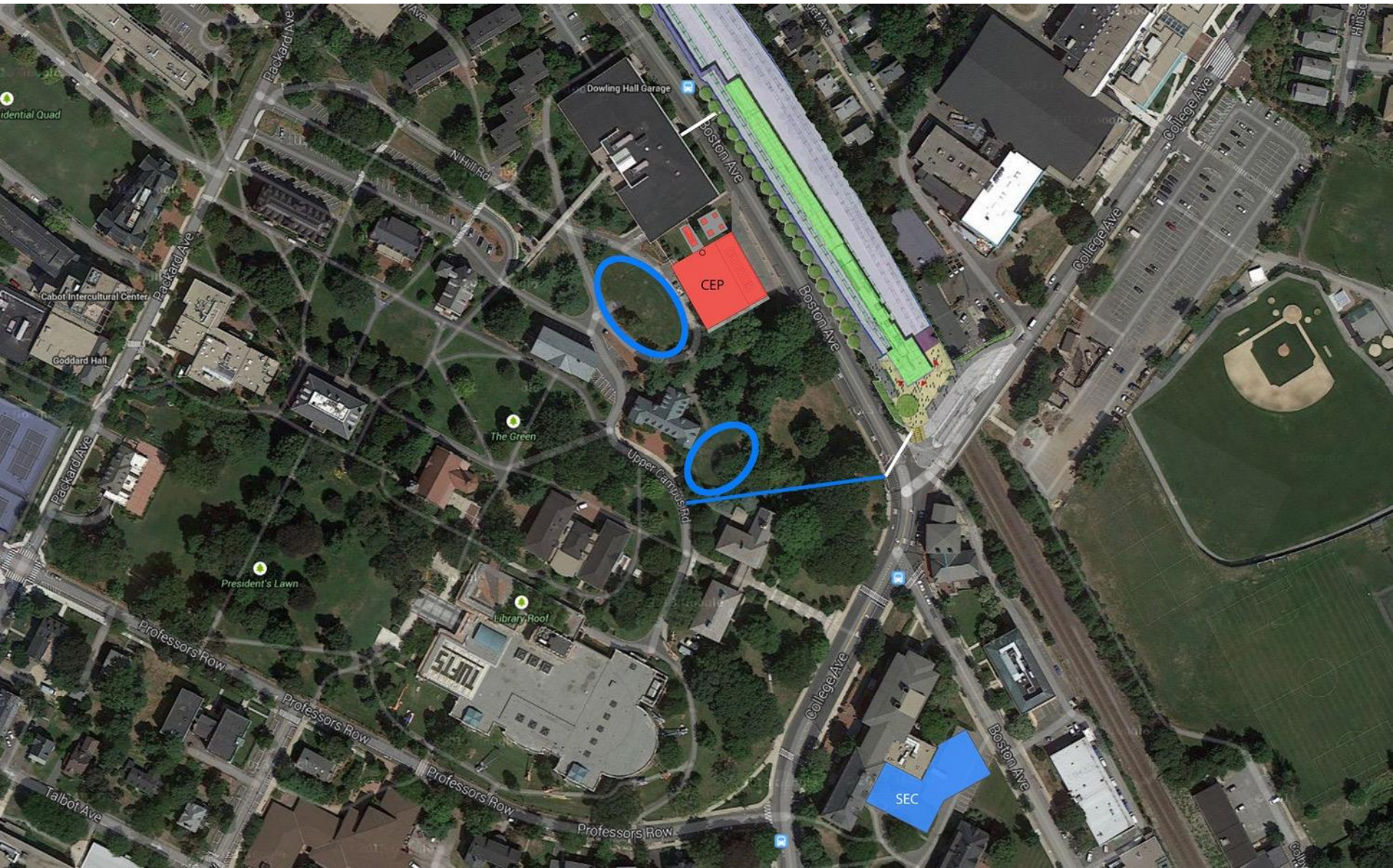
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- Campus Considerations – Acoustical area of influence includes campus and buildings across Boston Ave.
- Stack height influenced by locations of buildings with operable windows



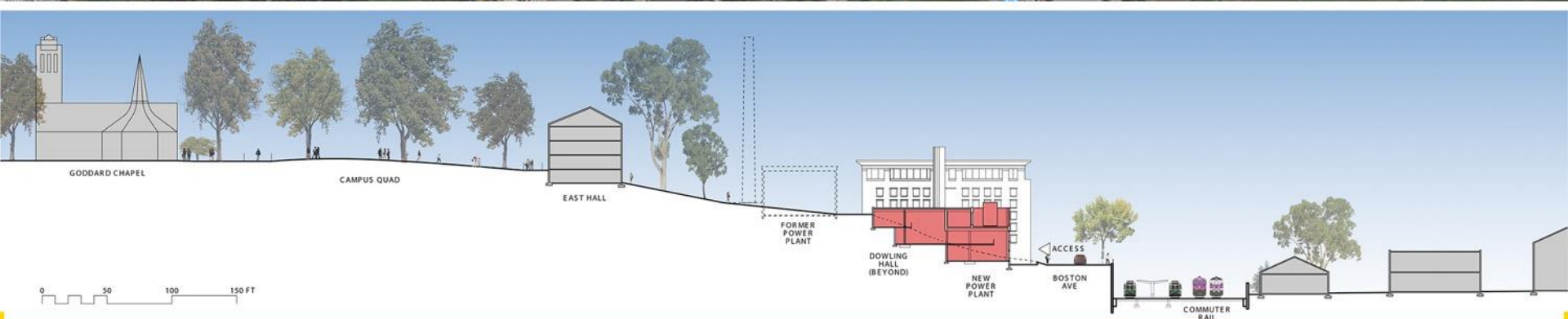
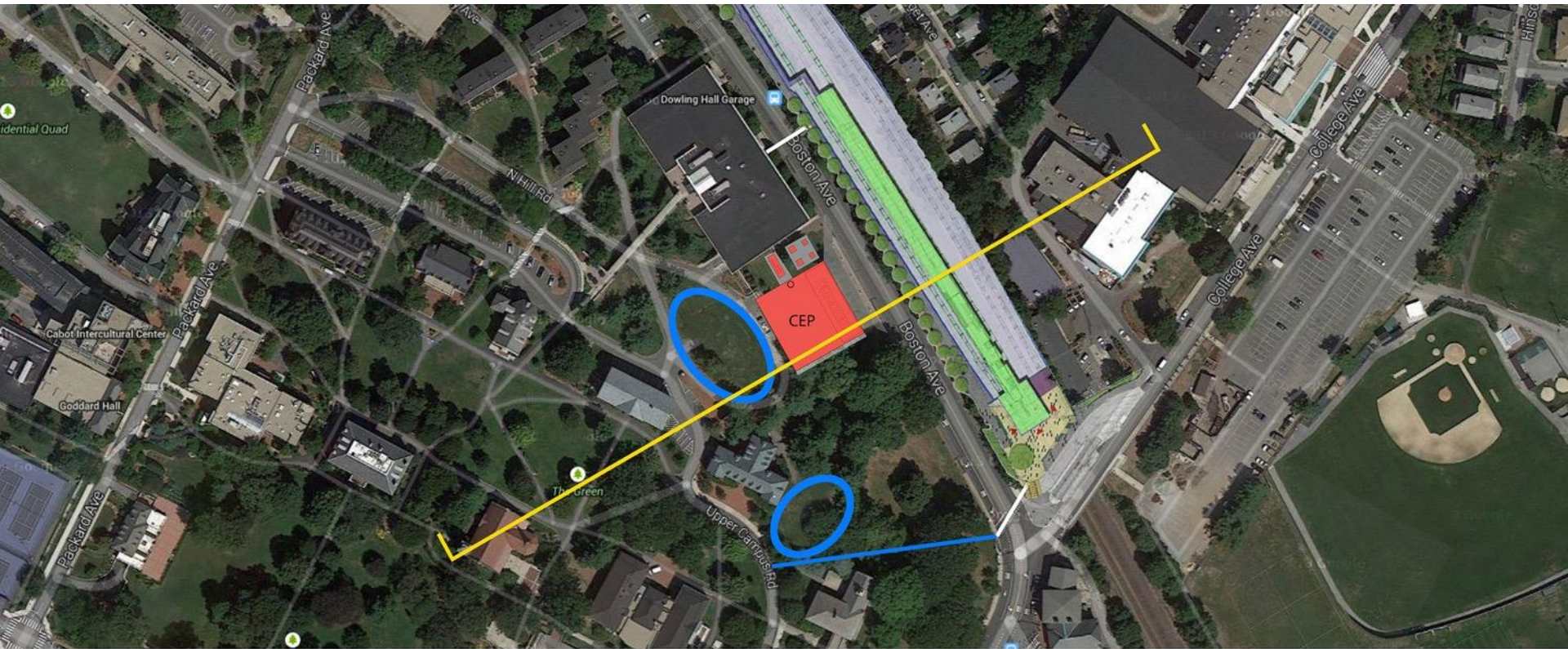
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Campus Master Plan Development – Creates Increased Real Estate Values with new sites and improved views
– Future MBTA Greenline Station at College Avenue, new pedestrian access



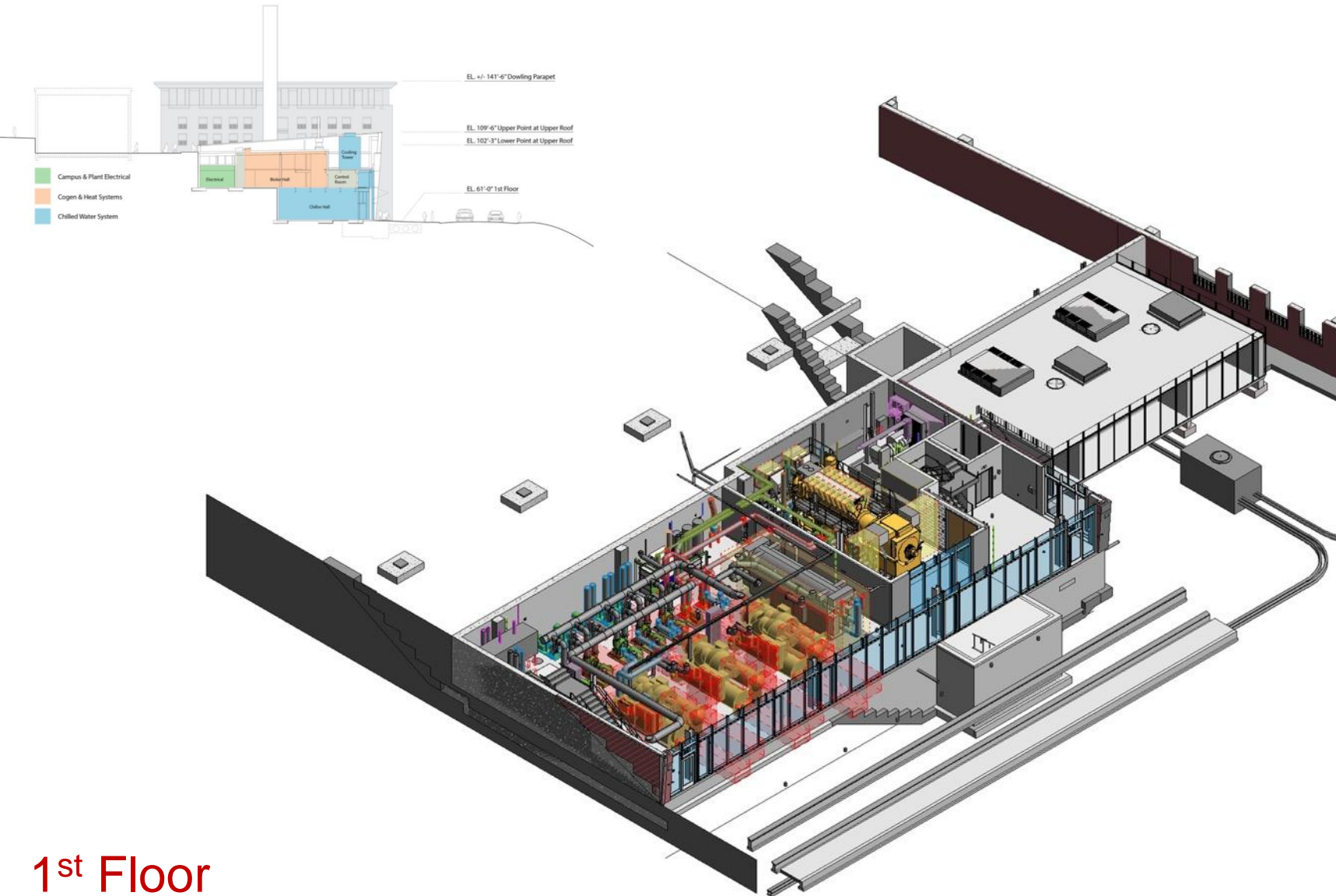
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Campus Site Section – Improved views from Campus Quad and from Dowling Hall Visitors Center,
- Reduced truck traffic on North Hill Road and Loop Road



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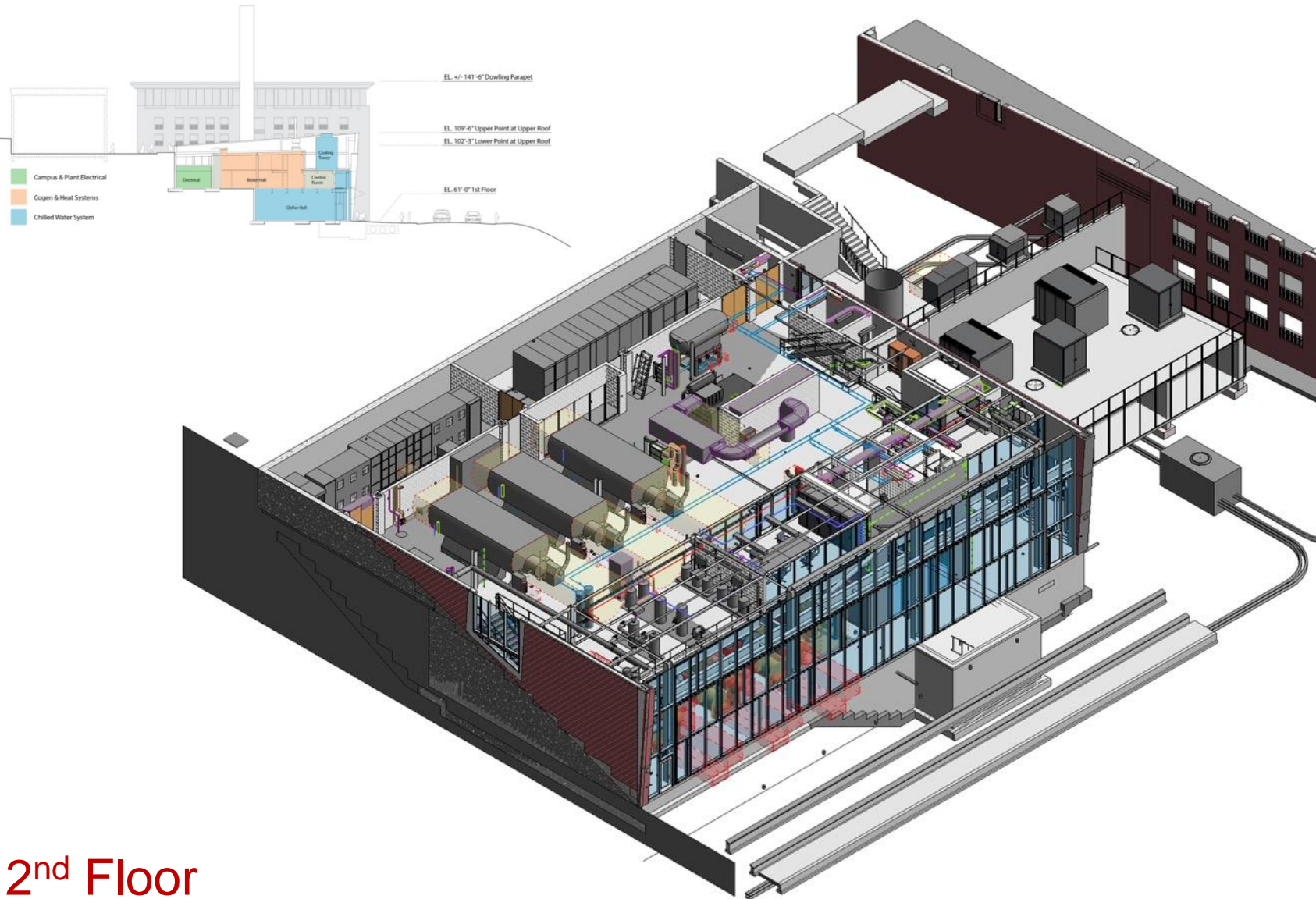
First Floor Chiller Hall and Reciprocating Engine Room
Showing Vehicle Apron and NGRID Transformer Terrace Beyond



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Second Floor with Boilers, HRSG, Plant and Campus Electric Rooms

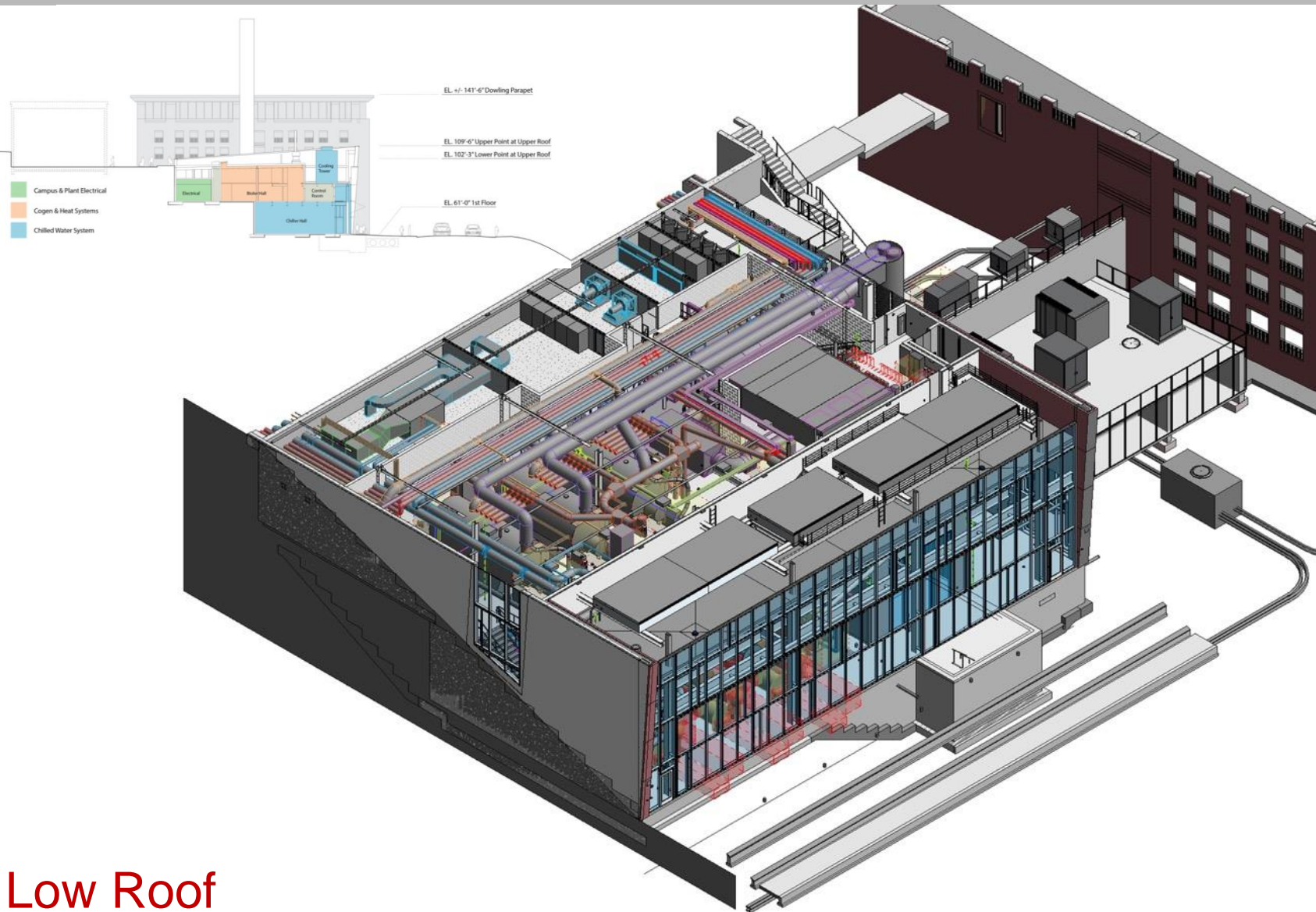
Control Room, Lockers and Restrooms, Meeting Room and NGRID transformers and Meter Cabinets Beyond



2nd Floor

Campus Energy Plant

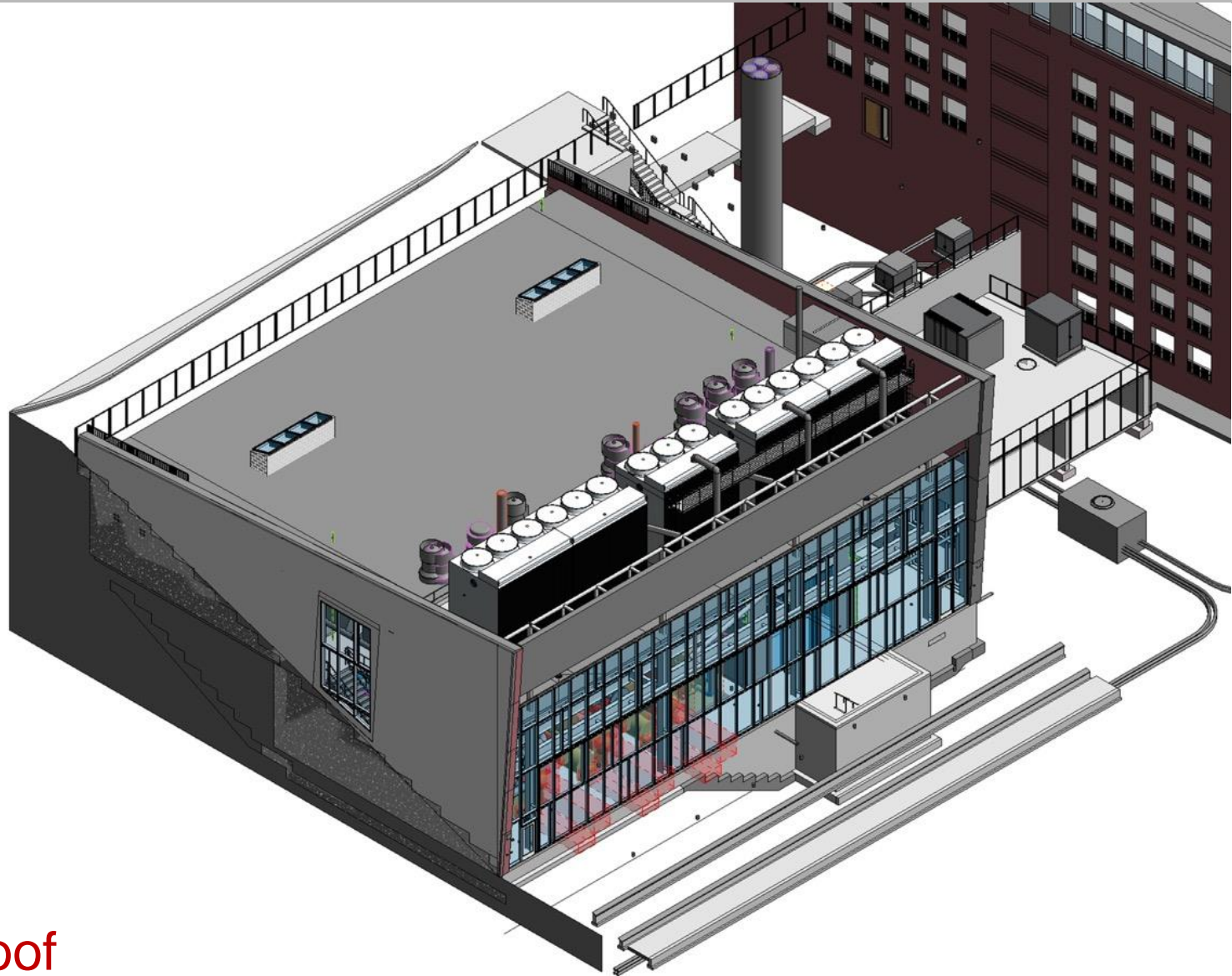
Lower Roof Level with Cooling Tower Basins, Upper Boiler Hall Piping, Air Plenum and Site Utilities Exits



Low Roof

Campus Energy Plant

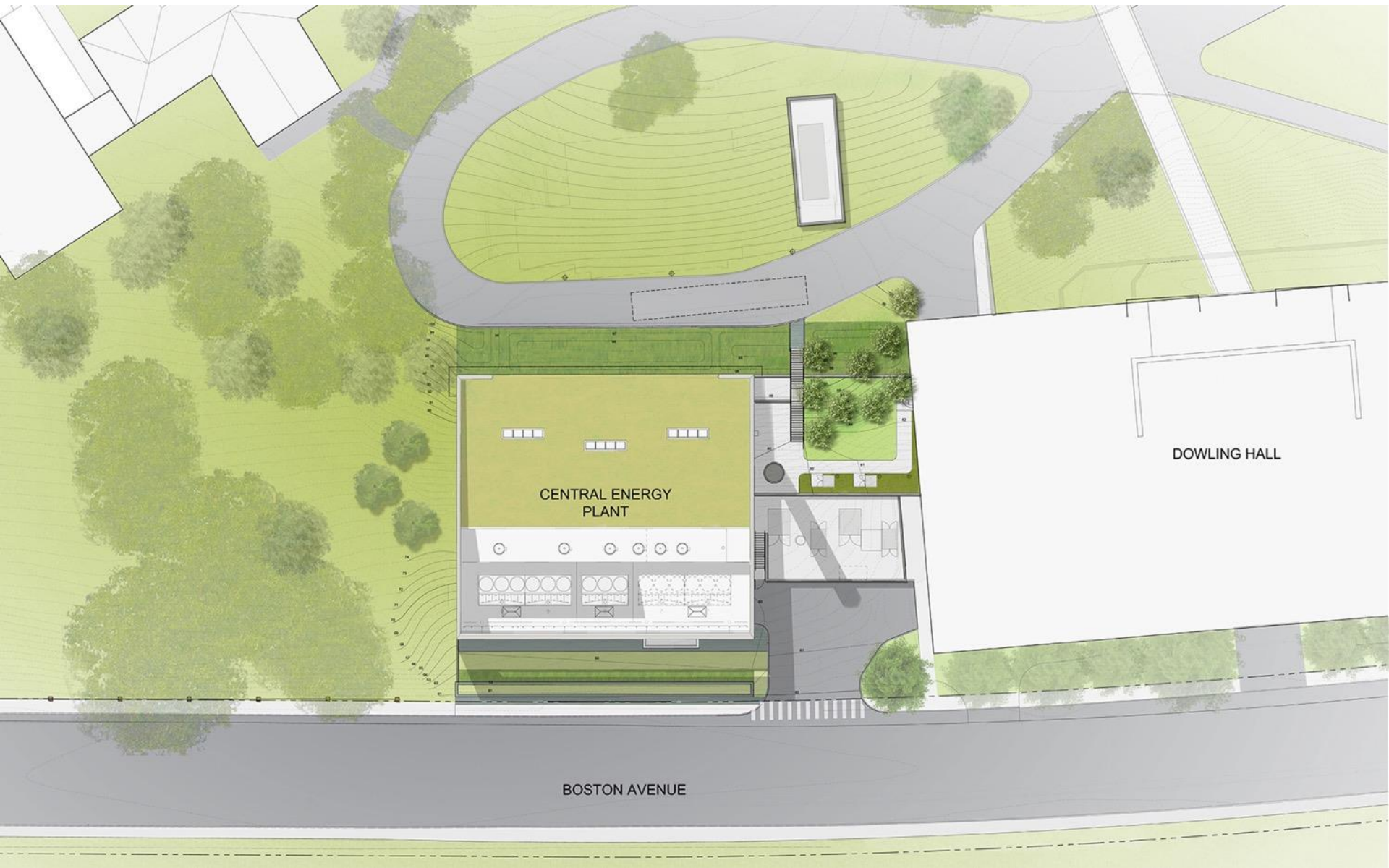
Upper Roof Level with Cooling Tower Full Buildout, Fans and Acoustic Baffle



High Roof

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Site Plan with Green Roof Add Alternate



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View from Boston Ave.



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View from Boston Ave



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Roof Level Pedestrian Bridge View with Acoustic Wall and Green Roof Add Alternates

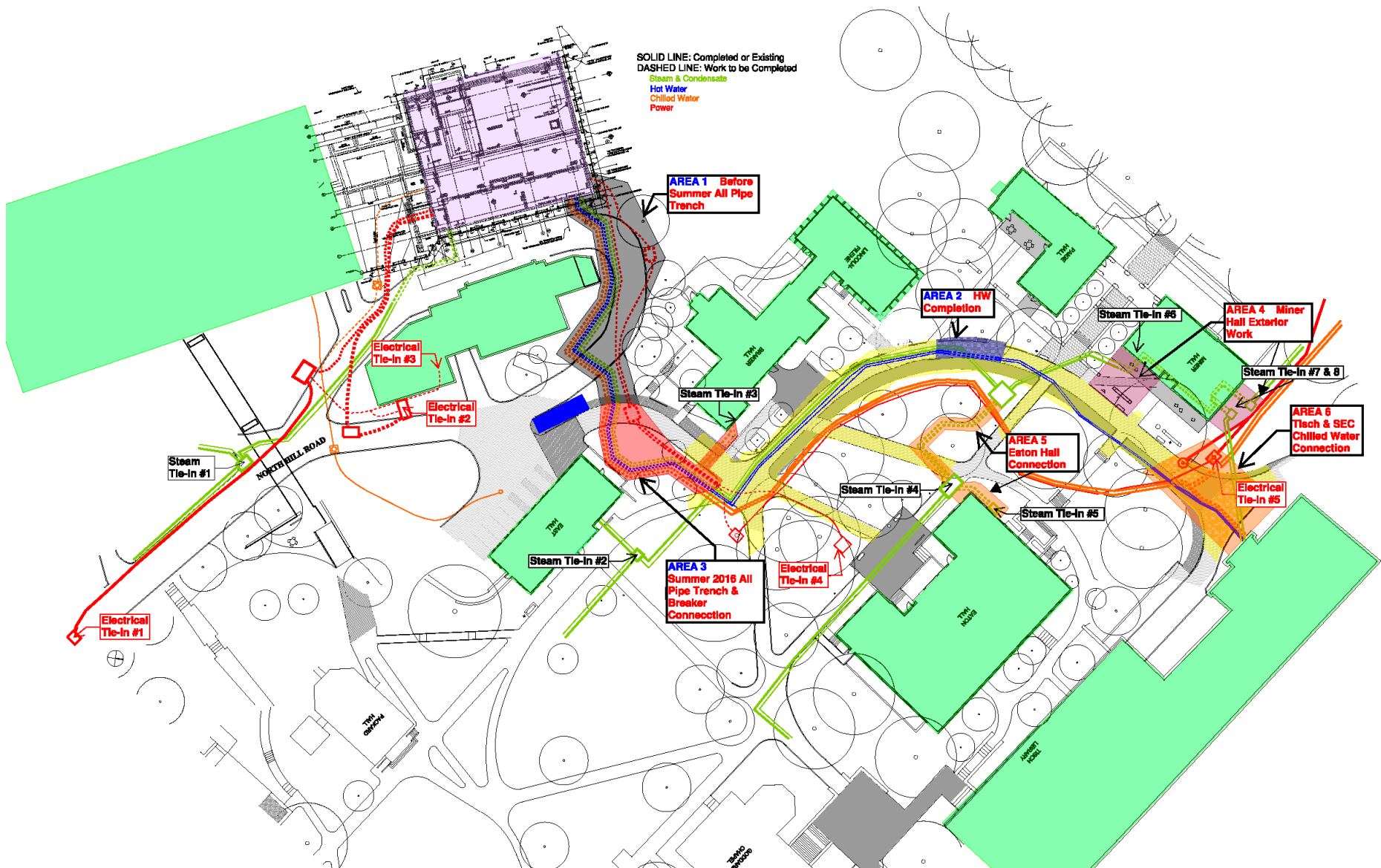


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Site Distribution for Steam, Hot Water, Electrical, and Chilled Water

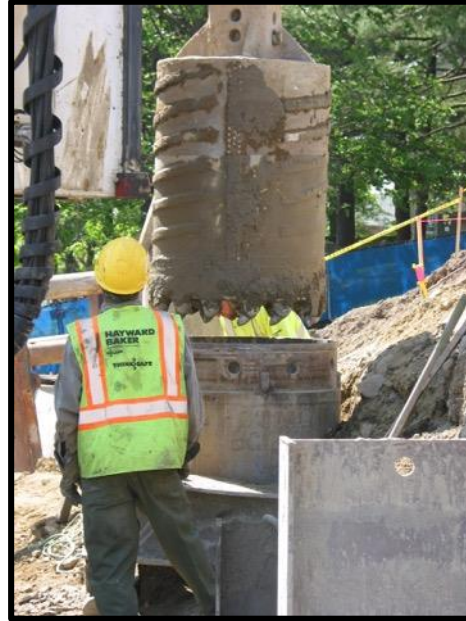


Summer '15 & '16 Distribution Systems Activity



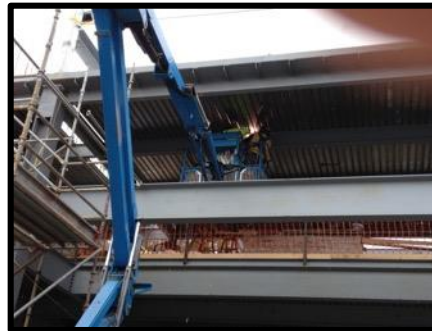
Campus Energy Plant

Construction is underway



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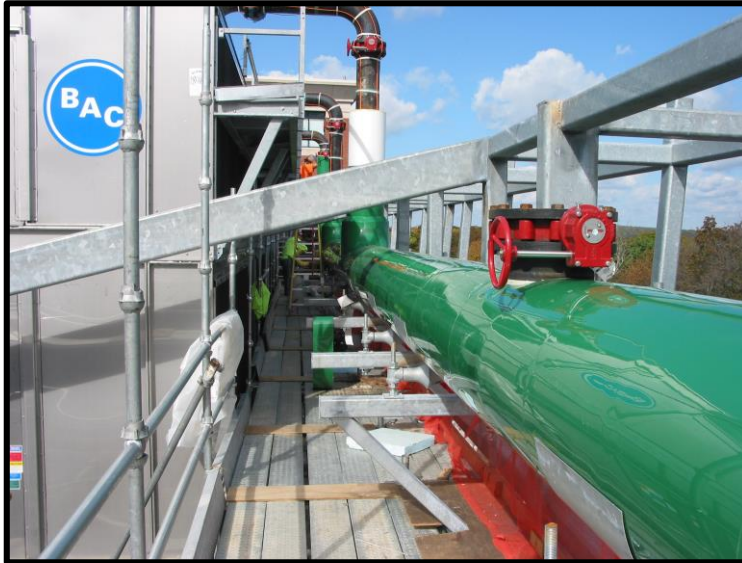
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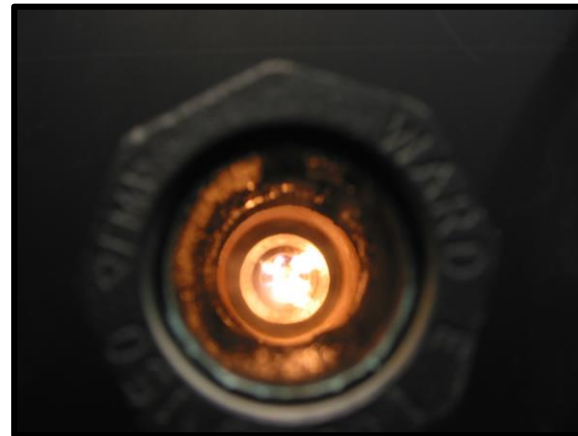
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Project Lessons Learned:

- Selection of Architect, Engineers, Construction Manager, and Owner's Project Manager
- Schedule & commitments to provide services – steam, chilled water, etc.
- Budget and contingency
- Owner purchased equipment
- Value of BIM

Project Operational Highlights:

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