

SAME PROBLEMS.
HIGHER STAKES.
BETTER SOLUTIONS.



NEHES

New England Healthcare Engineers' Society



**BETTER
THINKING**



**INNOVATIVE
PROGRESS**



**OPERATIONAL
RESILIENCE**



**PRACTICAL
SUSTAINABILITY**

PRACTICAL SUSTAINABILITY, POWERED BY INNOVATION

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A Tale of 2 Healthcare Systems: Pushing for Expansion, with Strained MEP Capacity.

Baystate Medical Center and CT Children's

A Tale of 2 Healthcare Systems: Pushing for Expansion, with Strained MEP Capacity.



Baystate Medical Center – Surgical Expansion
Springfield, Massachusetts



Connecticut Children's – NICU Tower Expansion
Hartford, Connecticut



Rich Rybski
Manager of Building
Infrastructure and Construction
Baystate Medical Center



Heath Pramberger
Director of Facilities
Connecticut Children's



Jim Norton
Senior Vice President
Salas O'Brien



Peter Jasinski
Superintendent
DPR Construction

A Tale of 2 Healthcare Systems – pushing for expansion, with strained MEP capacity.

Baystate Medical Center's Scope:

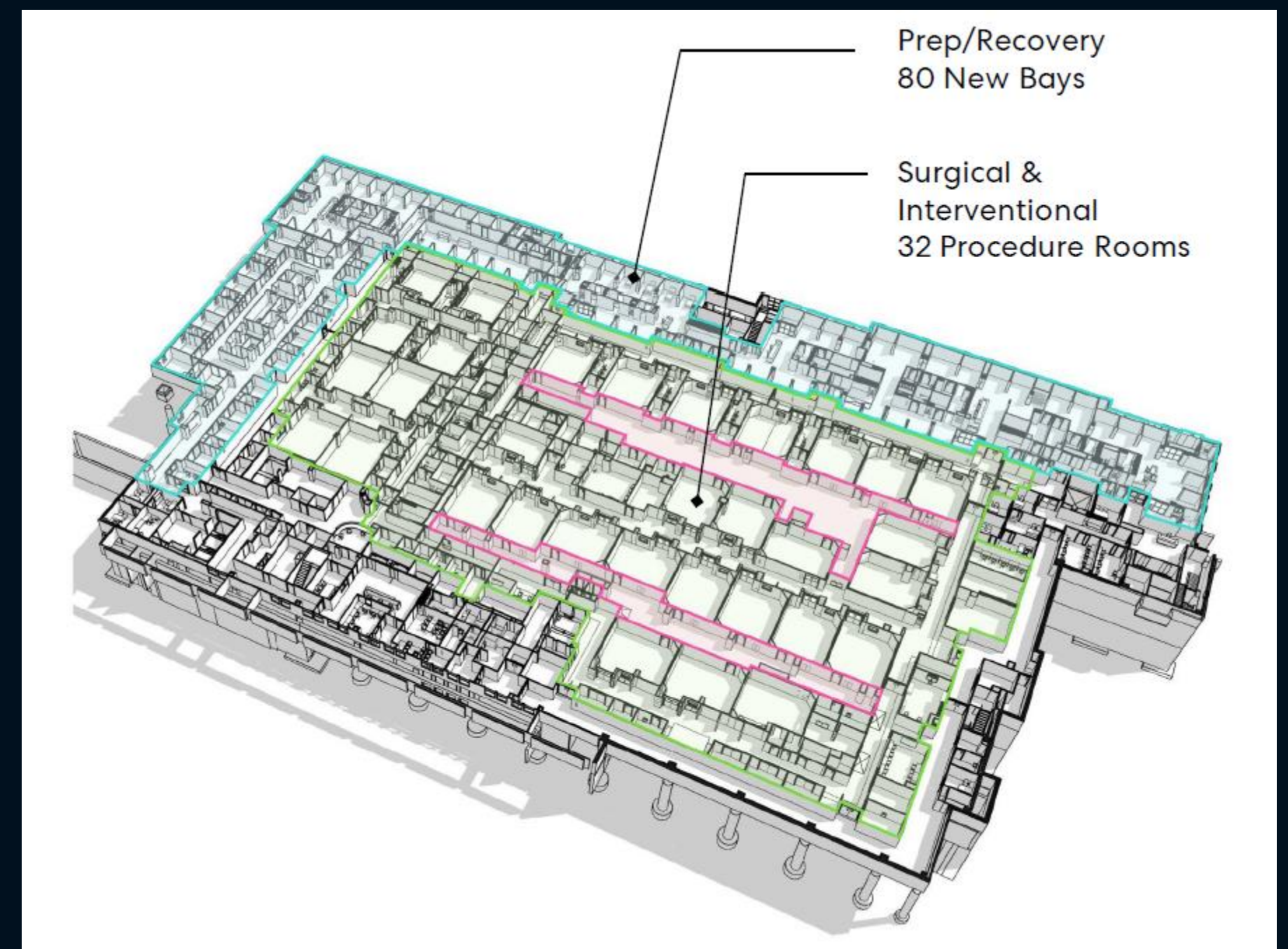
- Surgical Expansion on 2nd floor of the HOF building
 - Above existing Emergency Department
 - Below ICU Floor
 - All new MEP Infrastructure
- Add 20 Operating Rooms
- Add 8 Interventional Radiology Rooms
- Add 70 Pacu Rooms
- Green roof and Bridge above a surgical floor
- Dual Tunnel AHUs
- New Elevators, thru the existing ED
- New Exterior Generators (with belly tanks), connected to existing paralleling switchgear
- 3rd Floor new main entrance for entire hospital

Connecticut Children's Scope:

- New 200,000 SF Tower – in front of, and on top of 2 existing roofs
- 9 Levels of new tower, connecting at all levels of the hospital for horizontal connectivity
- No expansion joints between the existing and new structure. Fixed structural connections for horizontal.
- Existing MEP Infrastructure at capacity
 - 10 new AHUs
 - Cooling Towers
 - Chillers
 - Generators
 - Switchgear
 - Oxygen Tank Farm
 - New Upgraded FA system and relocated command center

Baystate Surgical Expansion: Challenges

- MEP Infrastructure did not have capacity for expansion
- New AHUs, new risers, new electrical loads
- New exhaust fans with risers thru the existing South wing (7 levels of occupied space)
- Cooling Tower expansion of added units, with dunnage tight to each other
- Existing Fire Alarm and Sprinkler on 2nd floor that is 85% under construction
- OR controls ideas (existing vs. new)
- Pressurization issues – build next to an existing operable Surgical unit
- Create a larger elevator shaft in an existing building



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Baystate Surgical Expansion: Solutions and Ideas

- Visual OR controls at Control Desk
- Fanwall redundancy (minimize failures)
- Old Generators (1980s that had caught fire once) removed, and new ones connected to the paralleling switchgear.
- 15 – 20 years ago the idea for 1 large AHU to serve multiple floors is now smaller AHUs (or the dual tunnels)



Baystate Surgical Expansion: Challenges

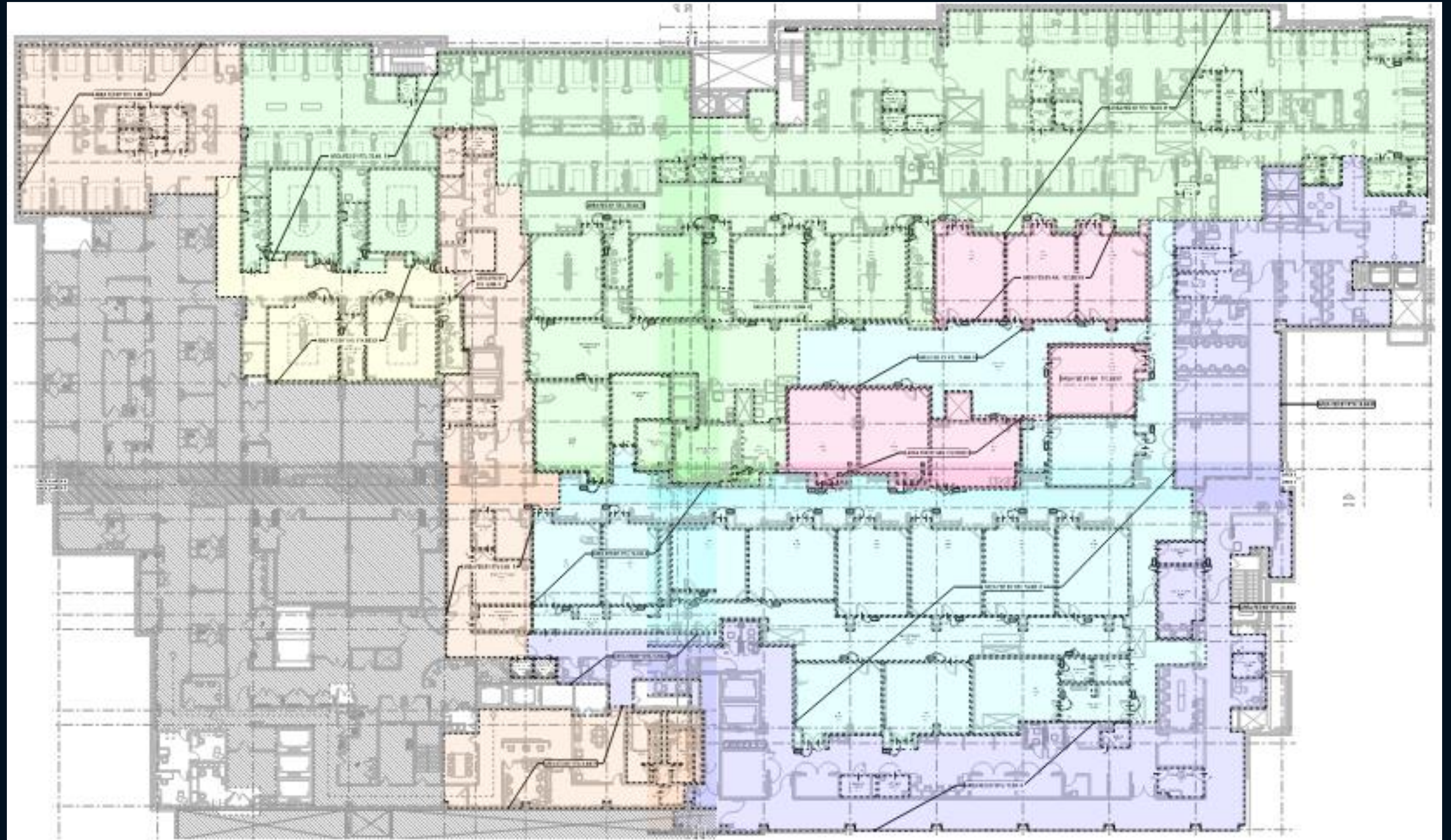
- Planning for abuse in surgical corridors
- Complex phasing to turn over completed suites while maintaining access to existing operating rooms during construction
- Low temperature ORs (<65F) for specialty surgeries/procedures while maintaining under 60% relative humidity
- Detailed rigging plan for low temperature AHU to be delivered thru existing basement



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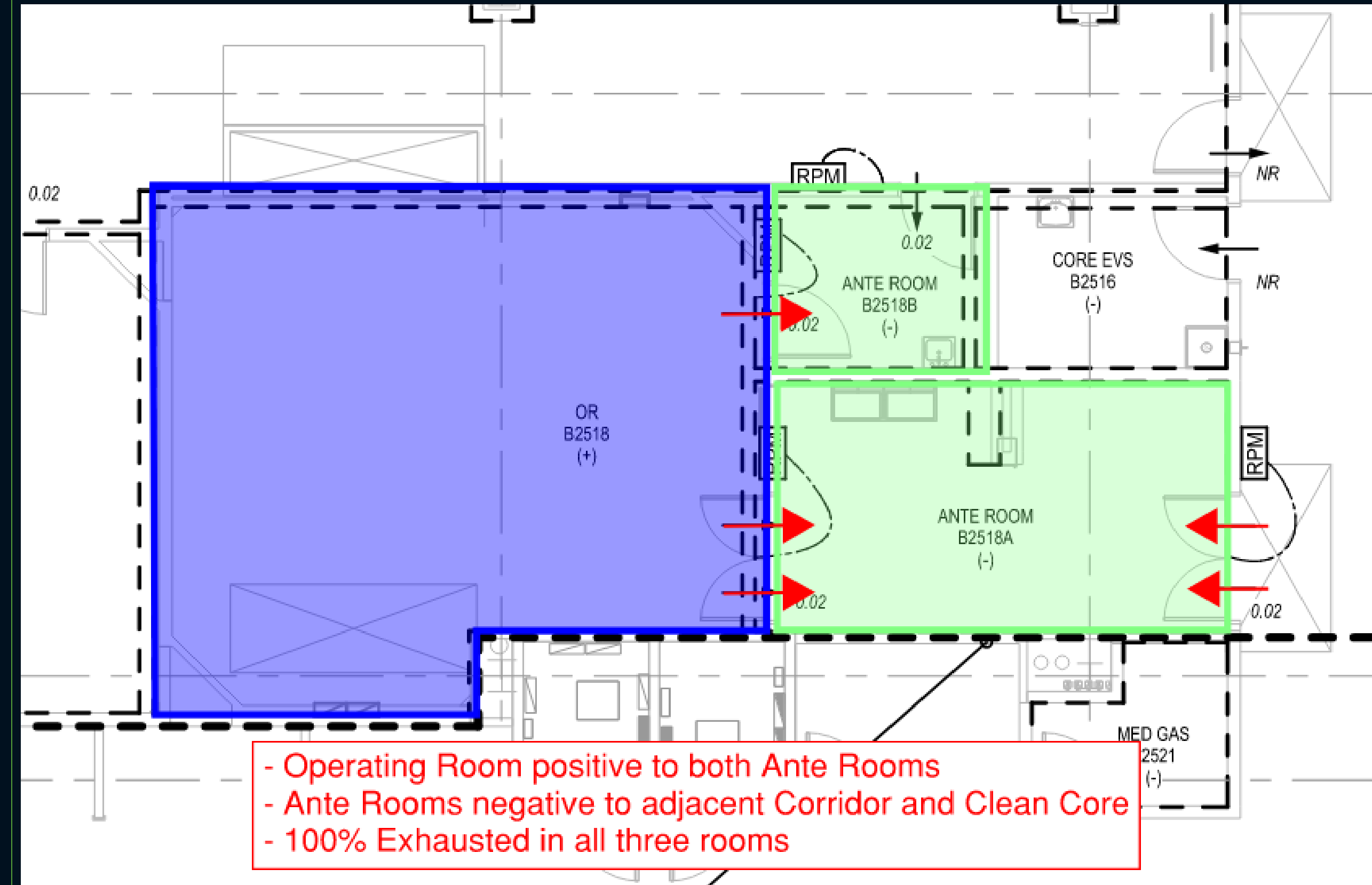
Baystate Surgical Expansion: Solutions and Ideas

- Dual Tunnel AHU with 70% redundancy per tunnel
- Load shed while meeting all minimum airflow requirements
- Night setback to 8 ACH/hr for ORs through BMS (ALC)

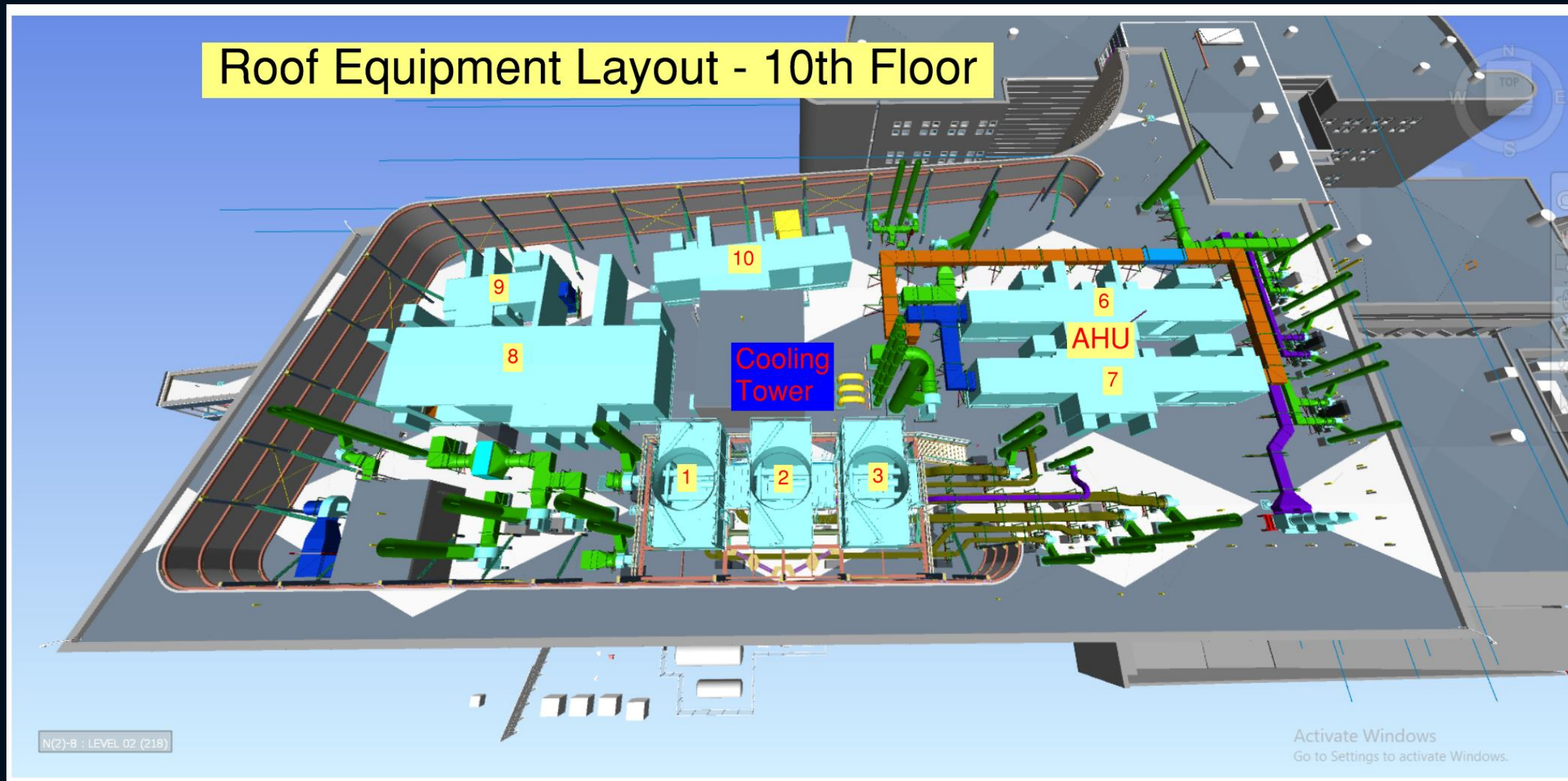
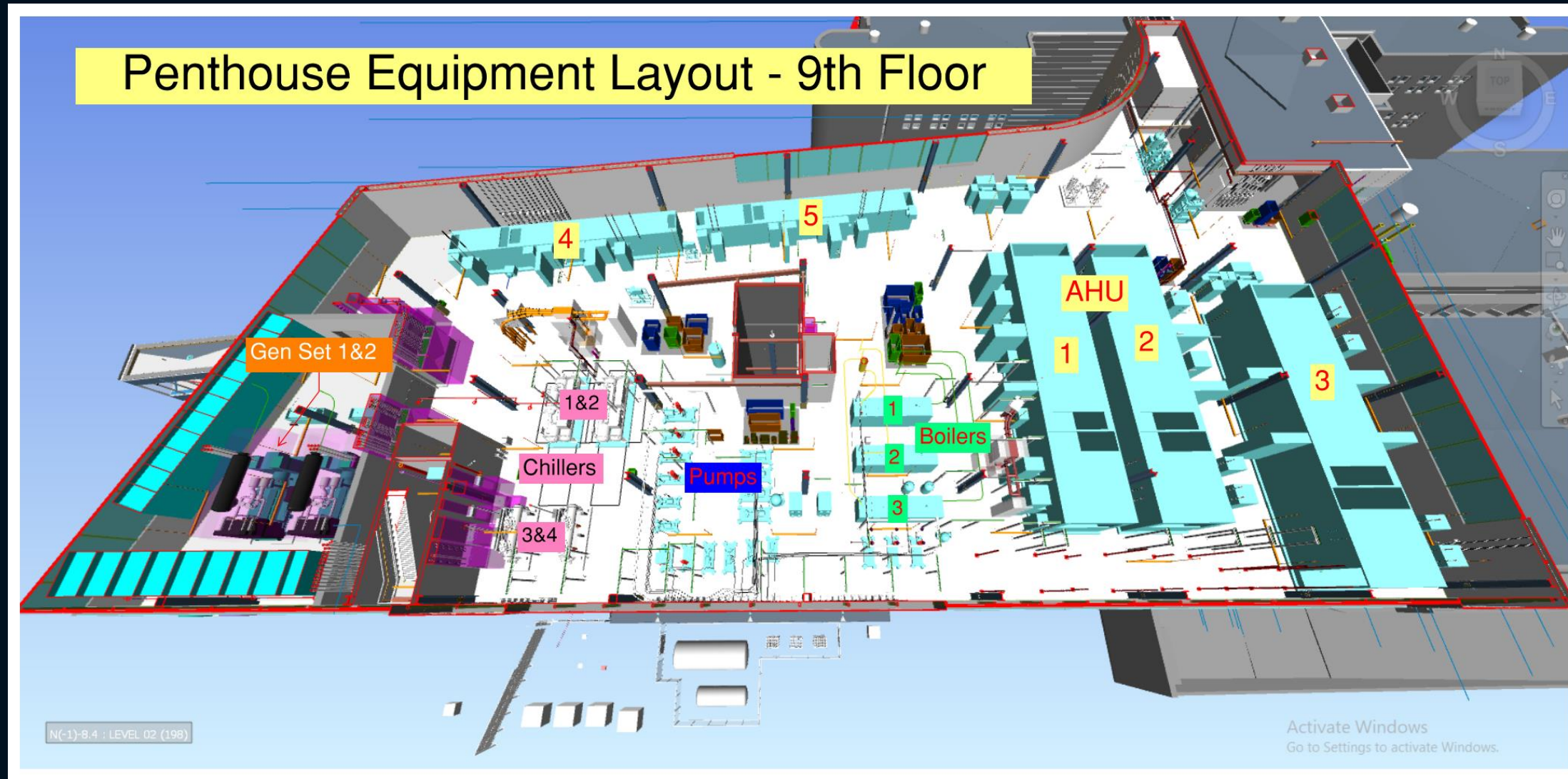


Baystate Surgical Expansion: Solutions and Ideas

- Existing Negative Pressure OR
 - For operations on patients with respiratory illnesses
 - 1980s vintage "Grandfathered in"
- New "Negative Pressure" OR to conform with current ASHRAE 170 requirements
- OR and Ante Rooms fully exhausted
- OR maintains minimum 0.01" WC positive pressure at all times



Connecticut Children's: Challenges

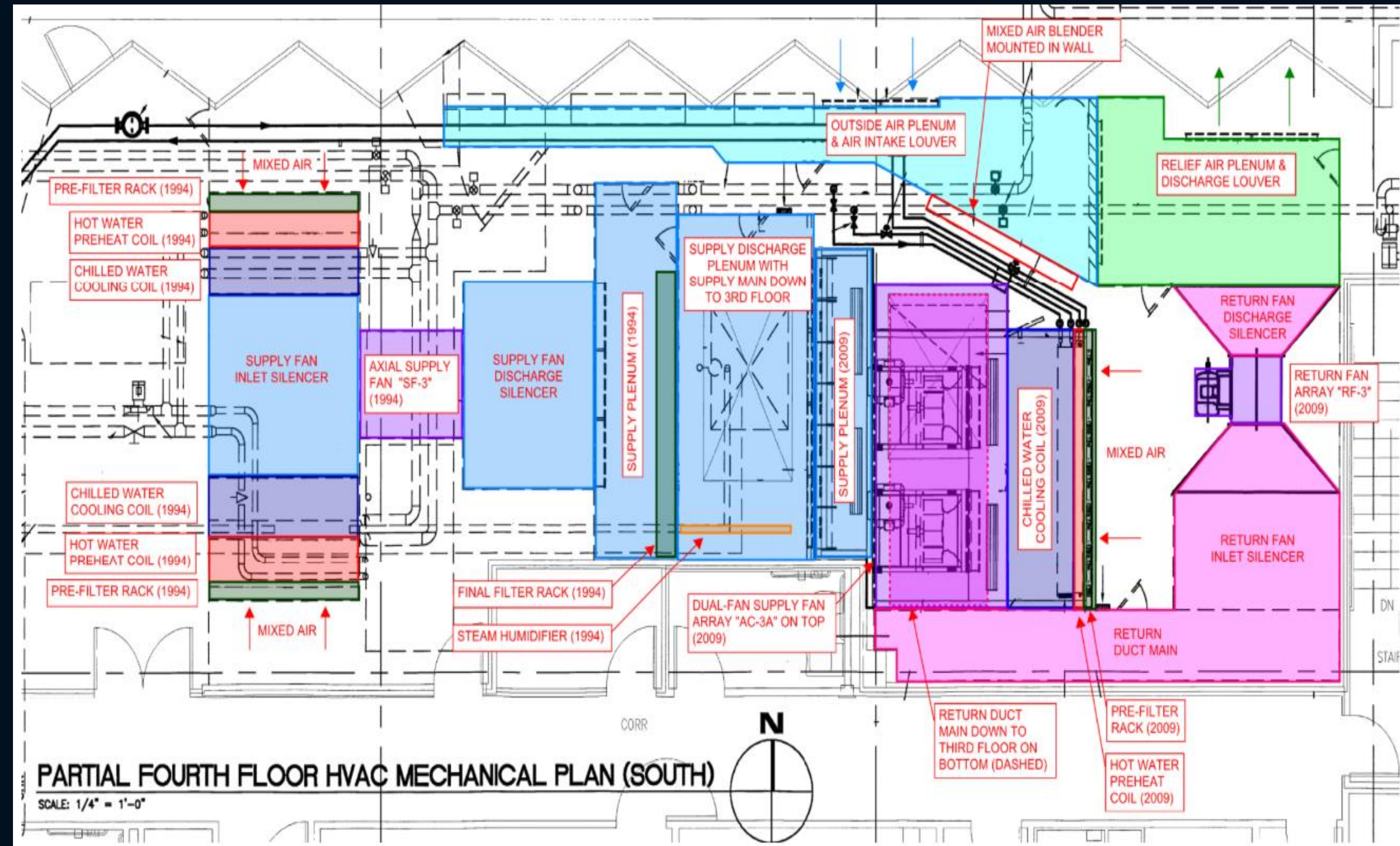


- Oxygen Tank Farm/location
- Electrical load at capacity
- Fire Alarm Integration
- Pressurization Issues (existing over pressurized strategy)
- MEP deficiencies, and gaps of existing systems (AC #1, #2, and #3)
 - AC#1 relief with the Tower
 - AC#3 General Pharmacy decanted
 - Fan Array future projects
- Releasing equipment post COVID
- Utility Company installing a different size transformer (two 2,000kVa, switched to one 1,500kVa and one 2,500 kVa)

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Connecticut Children's: Challenges

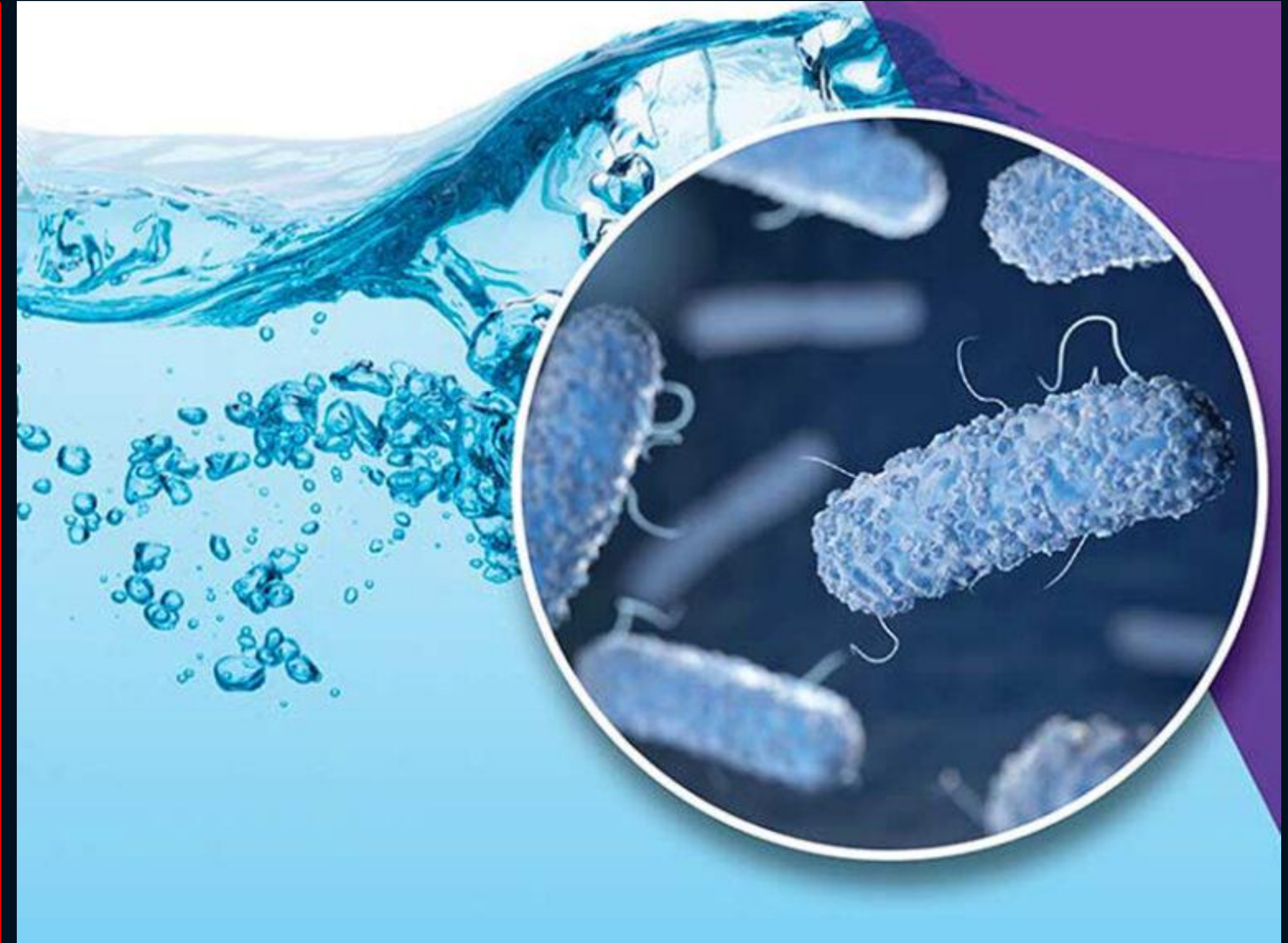
- AC-3 comprised of two supply fan systems that are directed at each other and into the same pressurized discharge plenum
- Inadequate steam absorption section
- Single component failure results in loss of ORs, general pharmacy, and other critical patient care areas



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Connecticut Children's: Challenges

- Legionella is a type of bacteria that can be a problem with stagnant water in domestic water systems within hospitals
- 2022 FGI Guidelines changed maximum hot water return runouts to fixtures from 25' to 10'
- Requires significant coordination of domestic water piping mains, valve locations, etc.



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Connecticut Children's: Solutions and Ideas

- No Value Engineering MEP! Owner team committed
- Releasing units at DD: Early involvement by Trade Partners, Design Team, DPR, and Facilities
- New energy code driving MEP requirements: Heat recovery chillers
- New systems controls
- Shutdown Planning
 - Communication with departments
 - Active construction adjacent to children receiving care
 - Staying on schedule and under budget
 - Superhero Day!

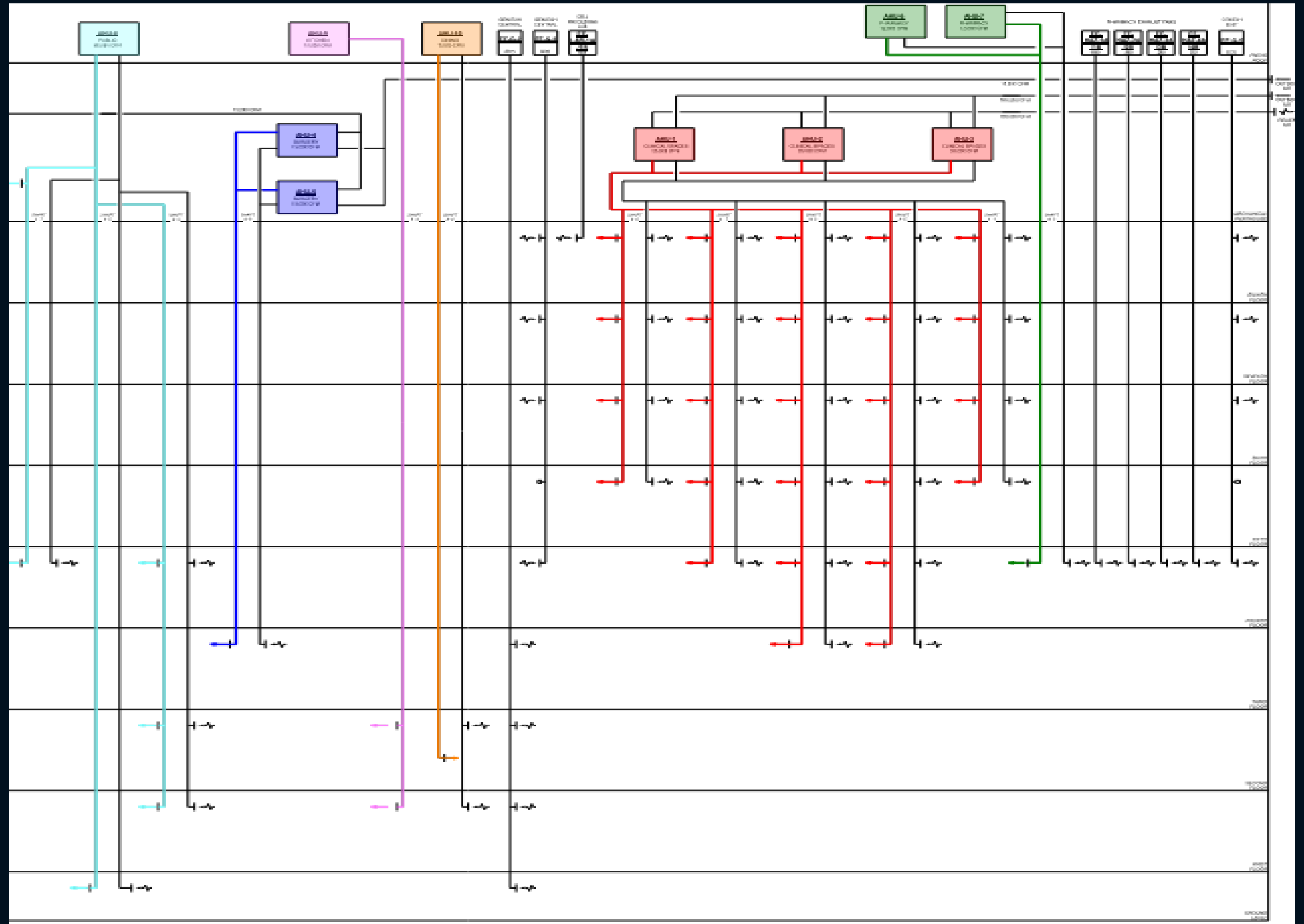
Connecticut Children's: Solutions and Ideas



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Connecticut Children's: Solutions and Ideas

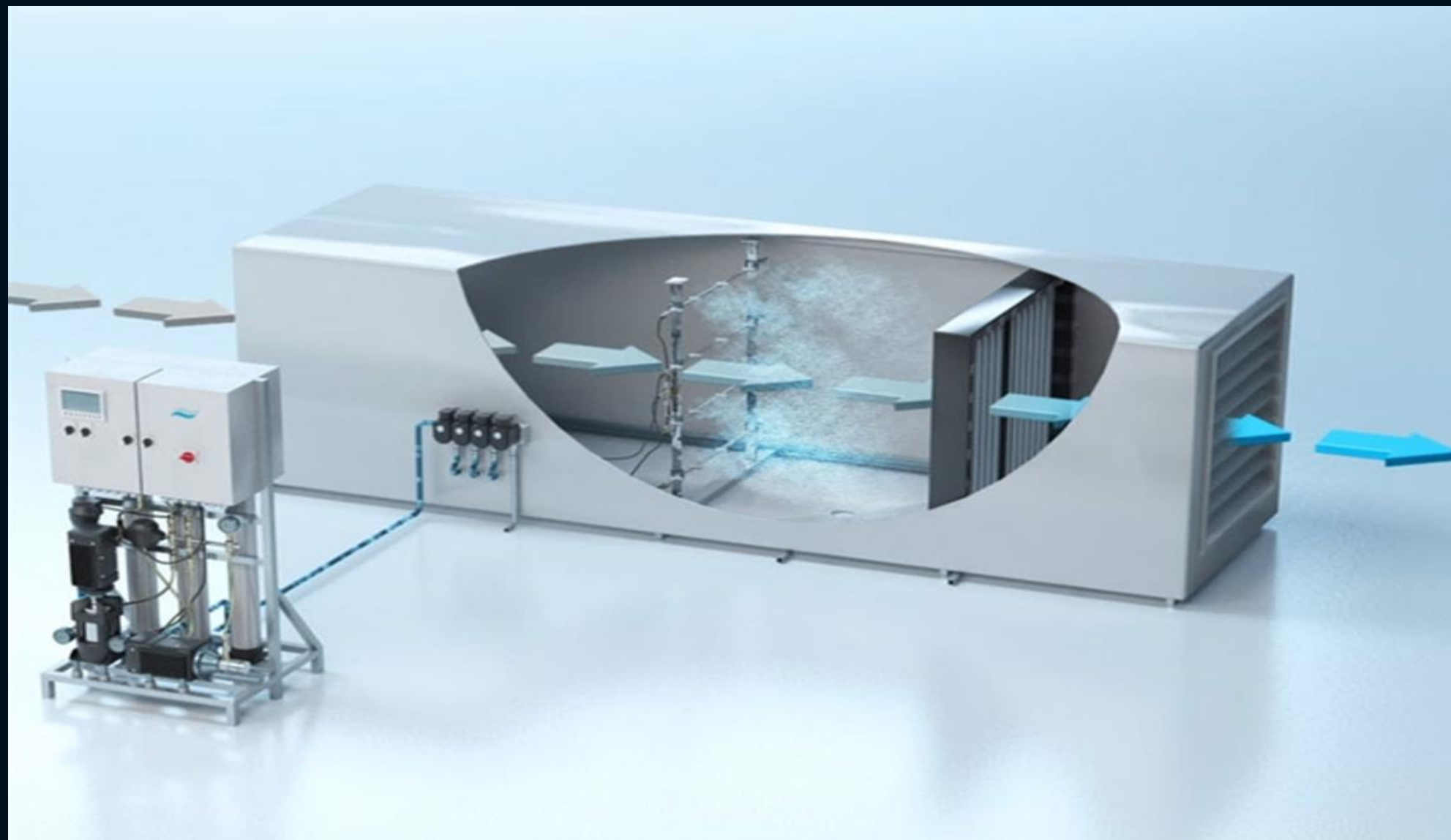
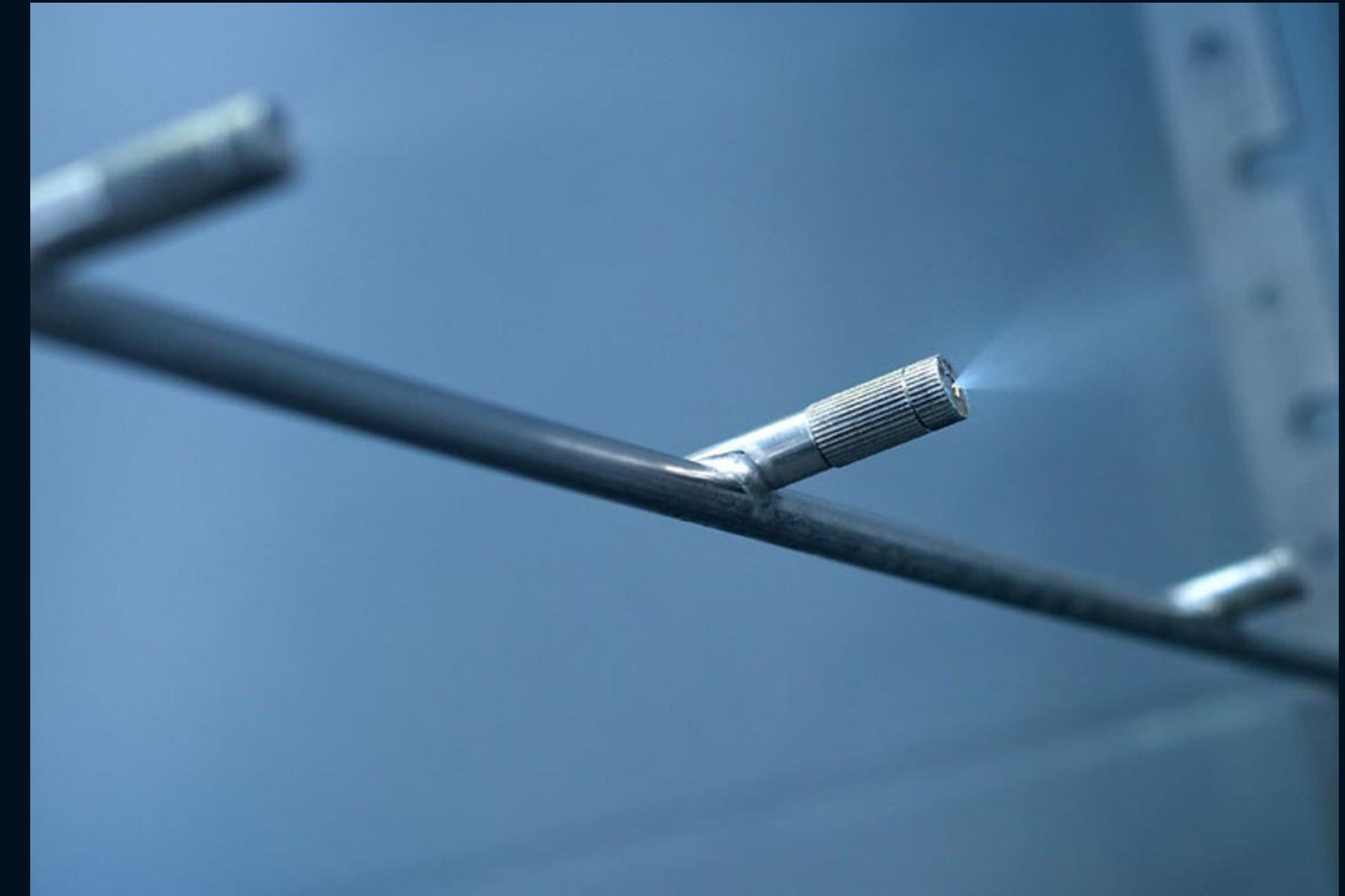
- AHU redundancy
 - Pharmacy (green)
 - Surgical (blue)
 - Clinical Areas (red)
- Fully redundant pharmacy and surgery units for regular maintenance/failure
- Important to balance/commission redundant AHUs at all potential operating points!



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Connecticut Children's: Solutions and Ideas

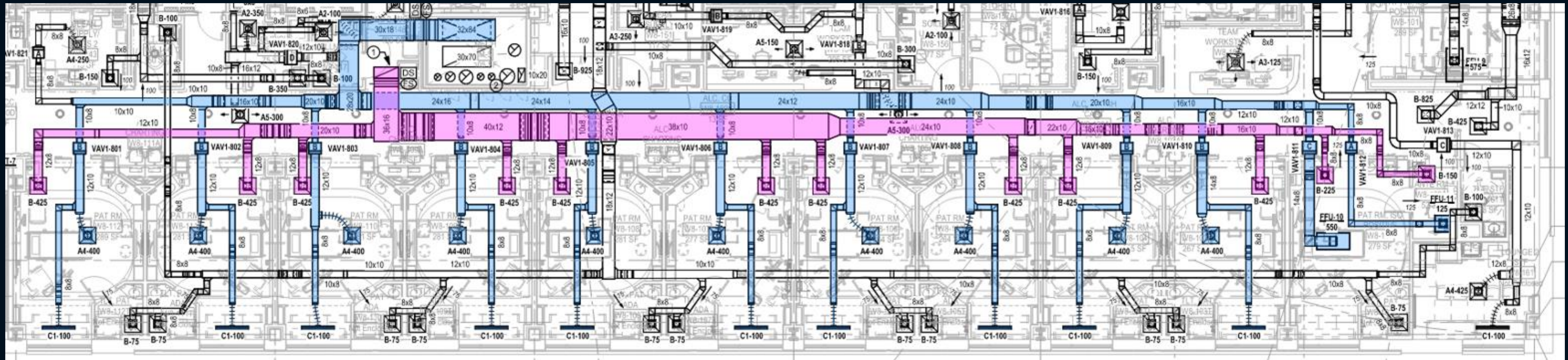
- New inpatient tower designed without steam
- Adiabatic humidification
 - High pressure water droplets sprayed into the air stream
 - Droplet separator downstream removes un-evaporated moisture



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Connecticut Children's: Solutions and Ideas

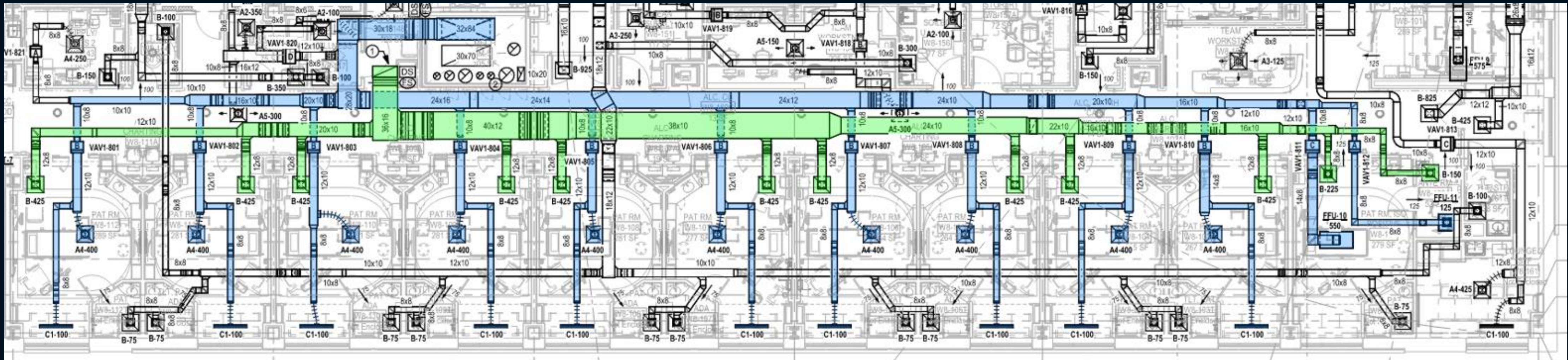
- Flexible Level 8 Acuity Adaptable Suite
 - Standard rooms balanced to slightly negative pressure (pink return)
 - Ability to convert rooms to 100% exhaust in a pandemic surge event
 - Motorized dampers located in Penthouse above for easy changeover



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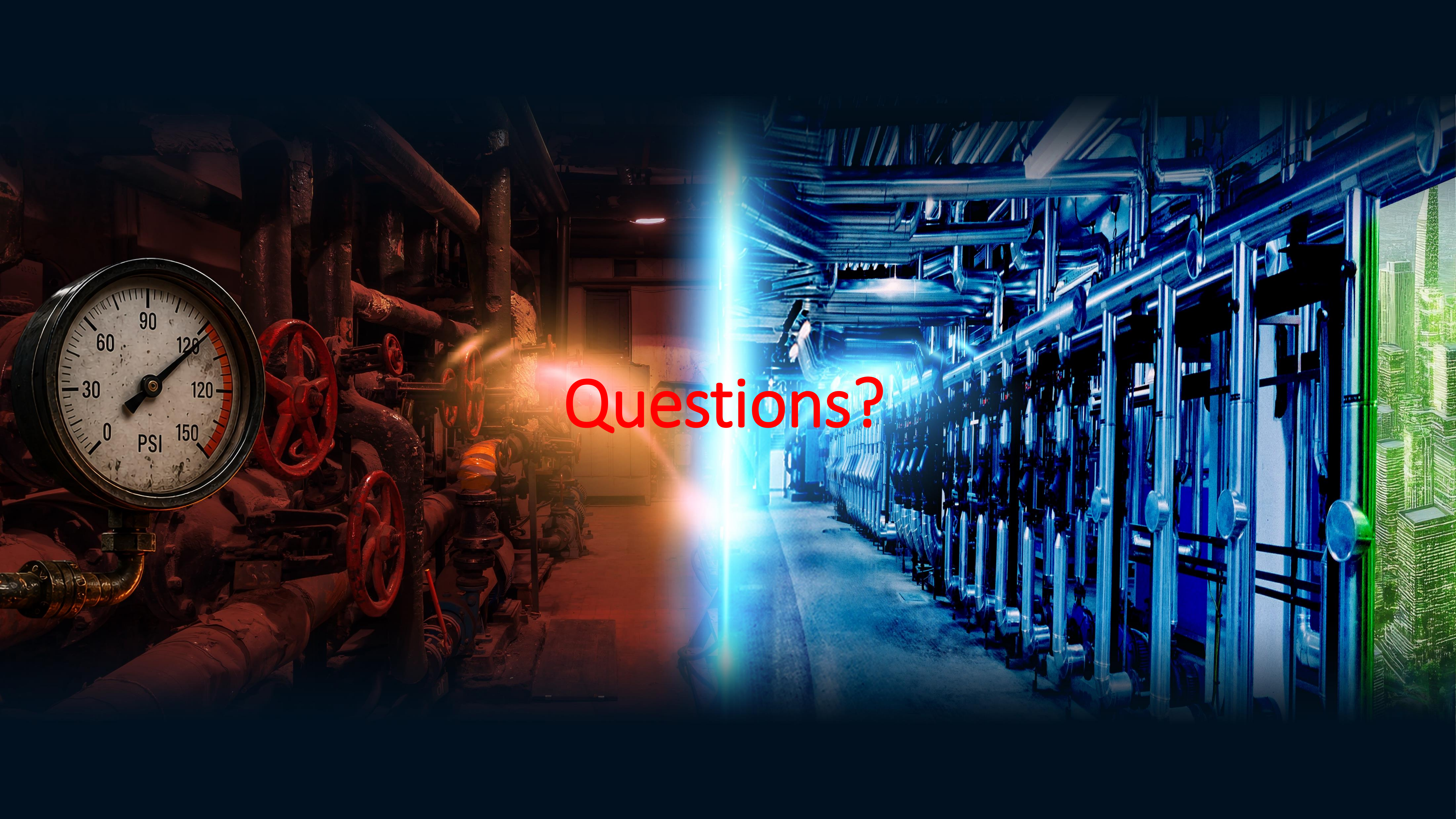
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Rich – final thoughts
Heath – final thoughts
Pete J – final thoughts / closeout
for Q&A



Questions?