



# BOND

## IDEA Presentation

*Threading a Needle at MIT: CUP Expansion and Boiler and Deaerator Upgrade*

June 29, 2015

# Team



Robert D. Smith  
*RMF Engineering*



Jesse Conklin  
*BOND*

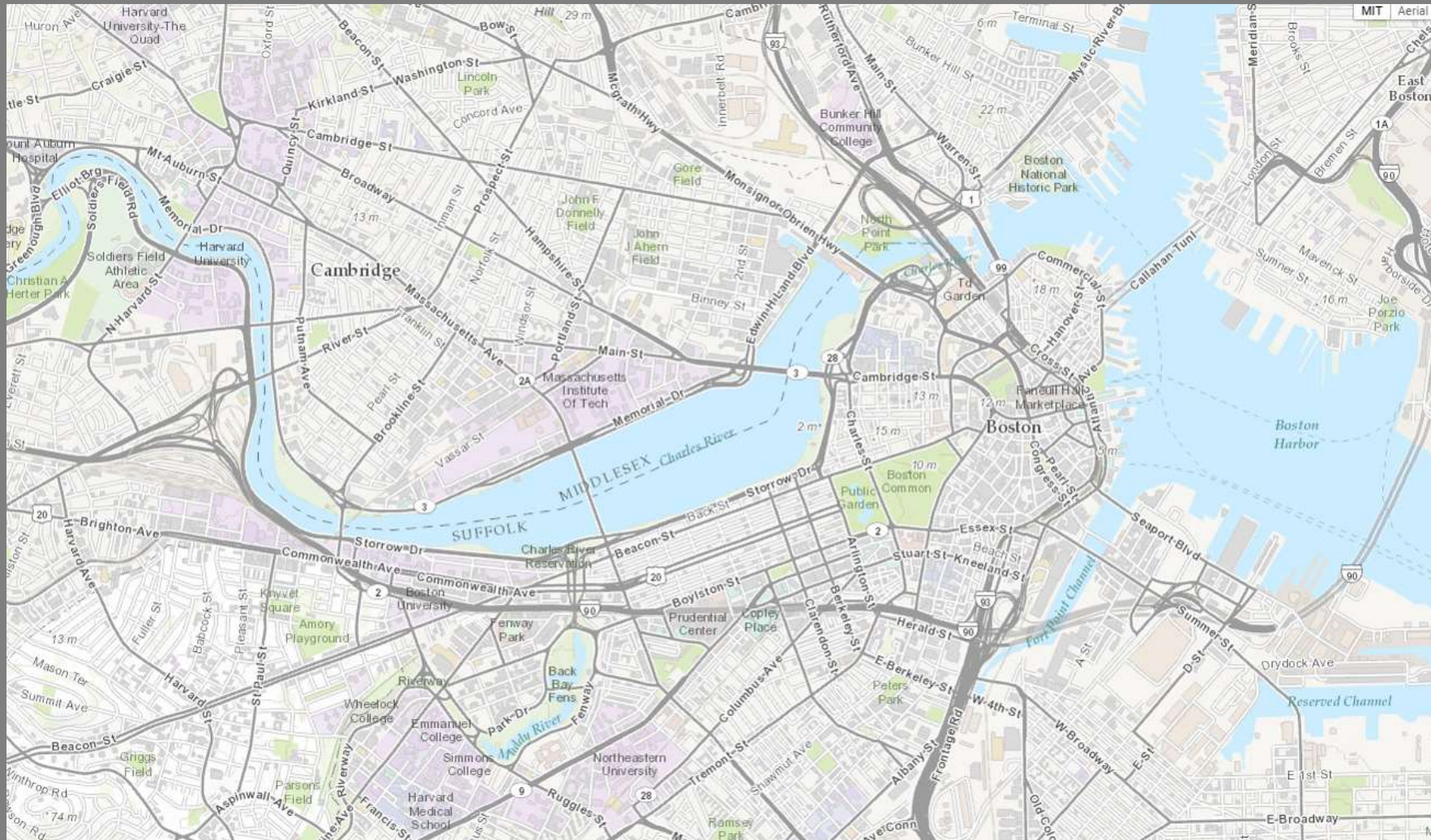


Chris Fogg  
*BOND*



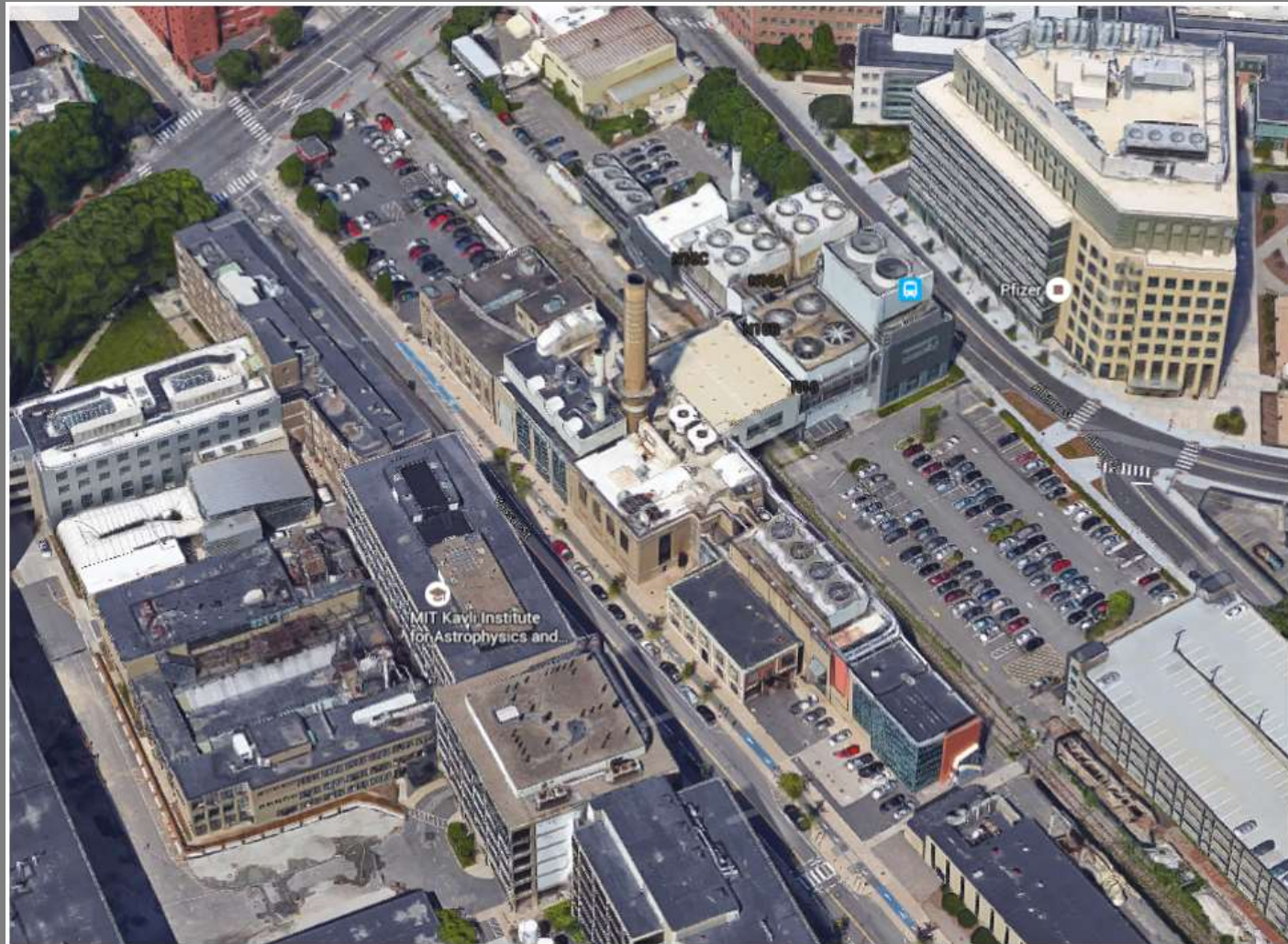
Seth Kinderman  
*MIT*

# Overview

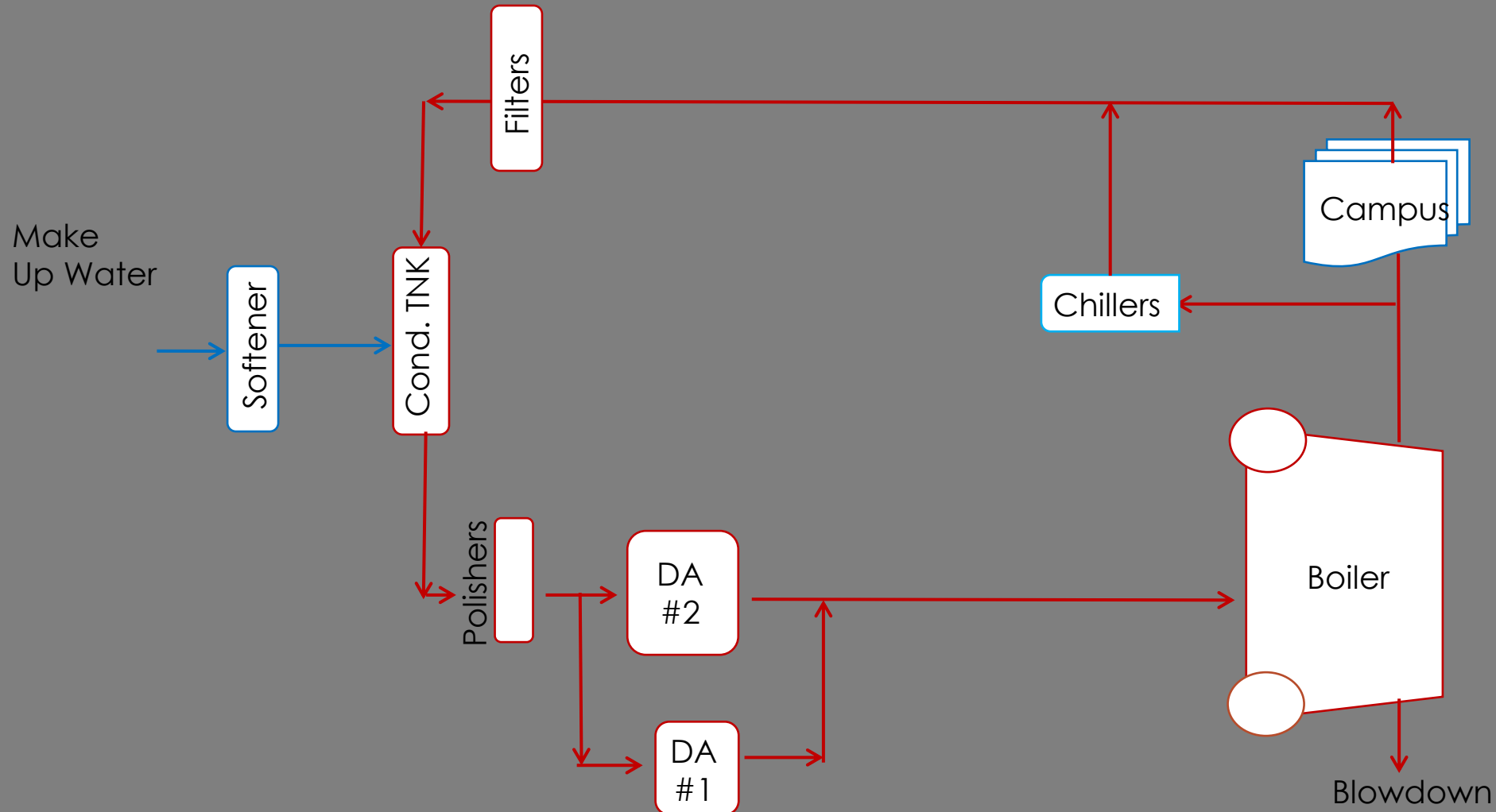




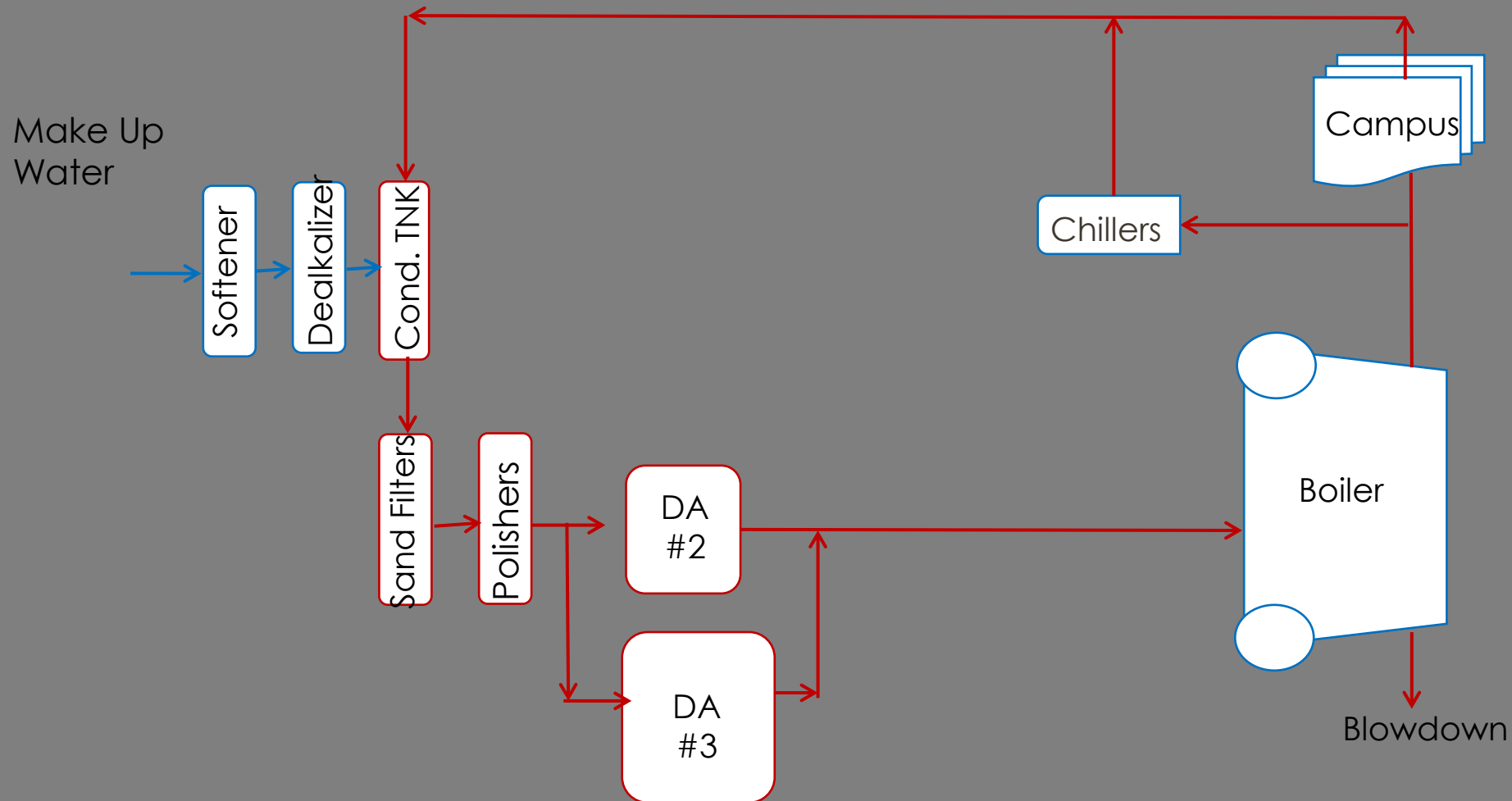
# Overview



# Pre-Project Steam System

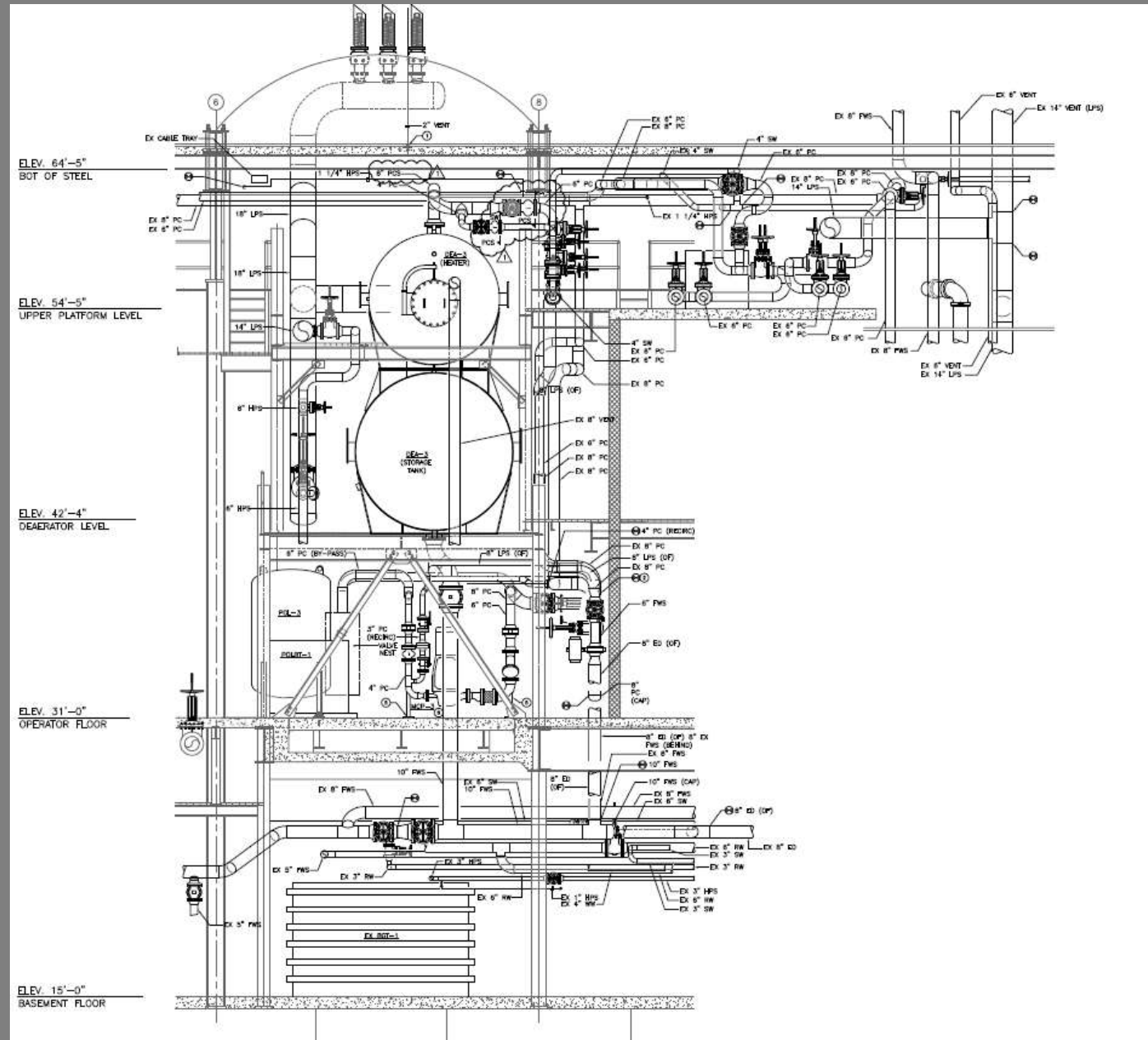


# Post Project Steam System



# Design Considerations

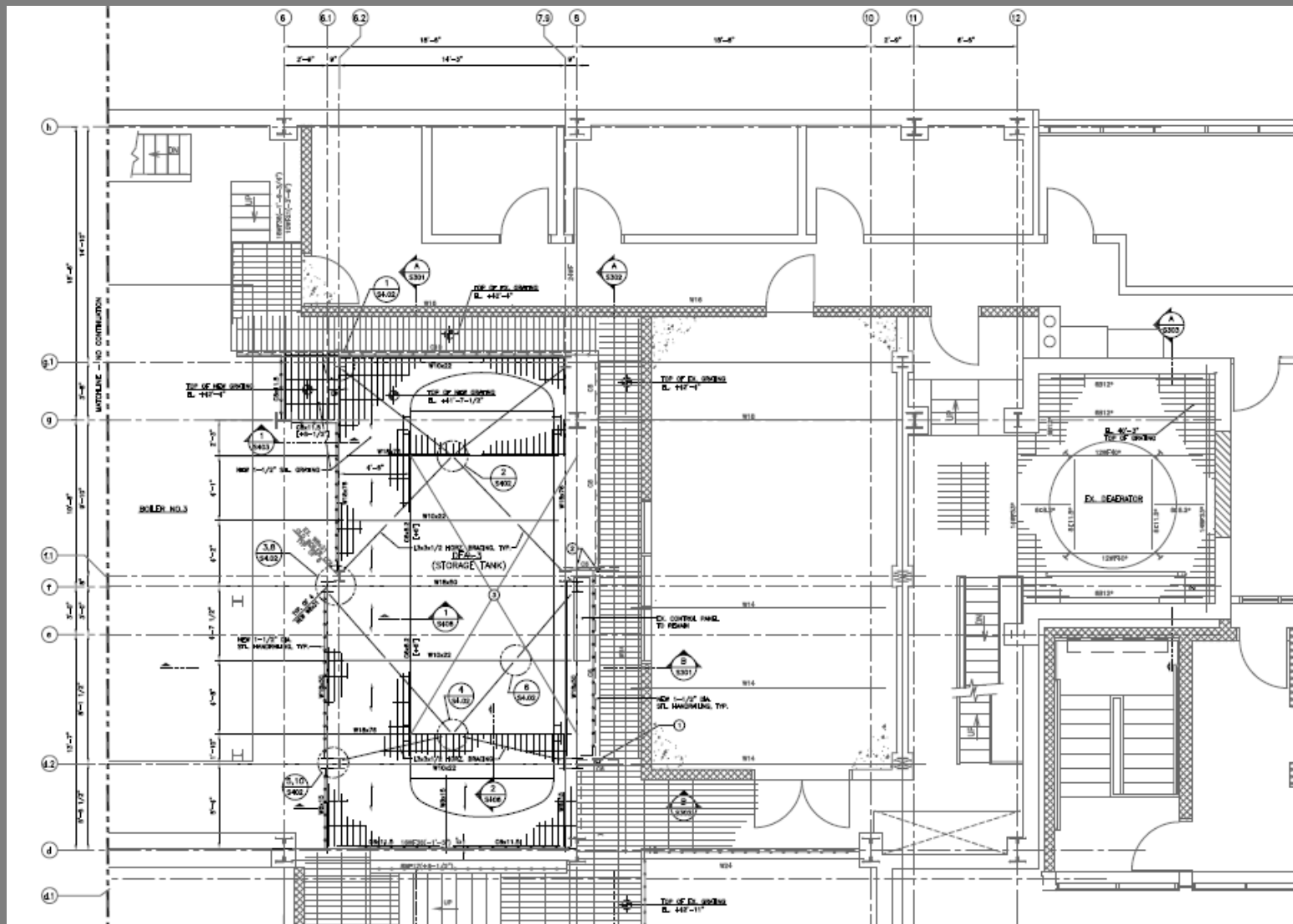
- Install:
  - 500,000 PPH Deaerator
  - 420 GPM, 0.5 Micron Condensate Filter System
  - 270 GPM Raw Water Dealkalizer
  - 600 GPM Condensate Polisher System
- Demolish
  - Existing Boiler 2
  - Existing Condensate Polisher
  - Existing Deaerator
- No Interruptions to Operation



- Active Systems from 1920
- Space Constrained
- Limited Isolation of Active System (Hot Taps)







- Active Access Platforms
- Dense Piping
- Double Duty Framework



100 Ton Support  
System

# Execution: *Preconstruction*

- Provided drawing review comments and budget at 90% CD
- Project Schedule established with major shutdowns planned around campus operations
- Mechanical Piping Tie-in locations marked in field – ACM testing and abatement completed
- Completed Laser Scanning
- Risk Assessment Meeting Held with MIT to identify risk and mitigating strategies

Building Construction | Civil & Utility Construction | Facilities Asset Management Services

**BOND**

RISK/ISSUE	IMPACT	POTENTIAL	MITIGATION/STRATEGY
Valve Isolation for Shutdowns	Worker safety and quality of joints/welds	MEDIUM	Where applicable perform shutdown dryrun to identify valve integrity. Identify other options where operation or sealing capability has been compromised. Review and agree upon best approach and contingency plans with team. Continuously monitor high pressure and critical systems shutdowns.
Re-work DEA-1	Reduced feedwater capacity if Deaerator 2 operation is compromised	MEDIUM	DEA-1 is currently not in service and can be modified at any time however moving this work into the summer will provide the plant with backup feedwater capacity.



# Execution: *Procurement*

- All equipment pre-purchased by BOND with input by RMF and MIT
- Subcontractor pre-qualified based on previous project experience, safety records, & modeling capabilities including second tier subcontractors ie. Crane and Rigging companies
- Allowances established for field assembly of pre-purchased equipment by on site mechanical and electrical contractors
- Budget for additional isolation valves and hot taps where needed due potential for old valves not working



# Execution: *Logistics, Delivery and Rigging, & Use of BL*

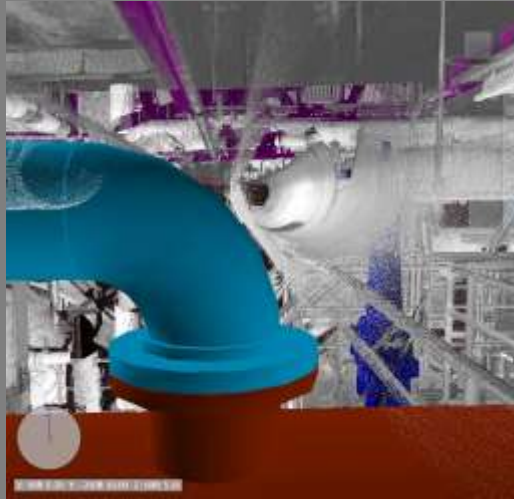
## Laser Scanning (aka Point Cloud)

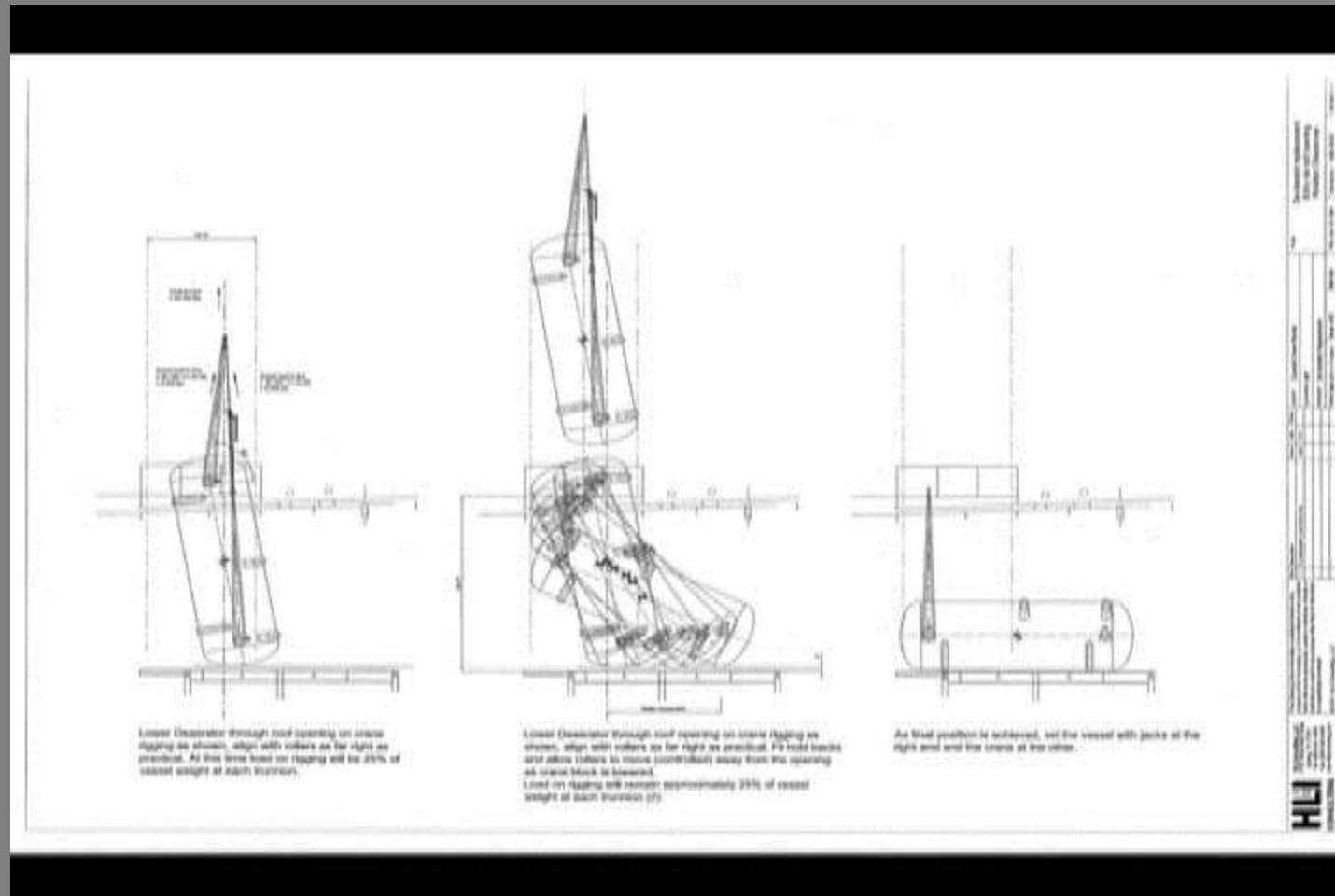
- Safe / Detailed Data Collection
  - 967,000 Points Per Second
  - 120 Meter Range at +/- 2 mm Accuracy
- Gray or Color Data
- No Lighting Required
- Line of Sight Captured





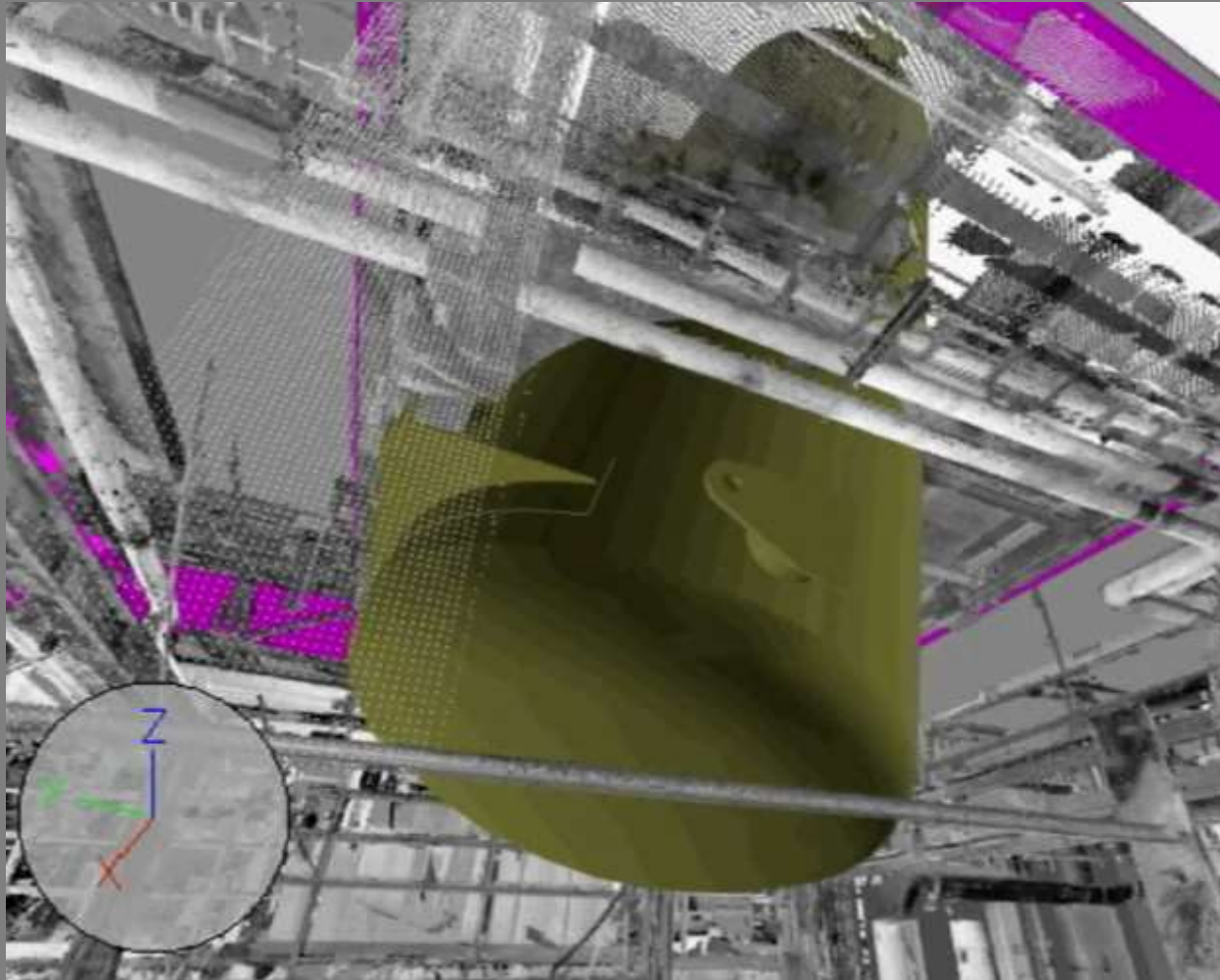
# MEPFP Coordination



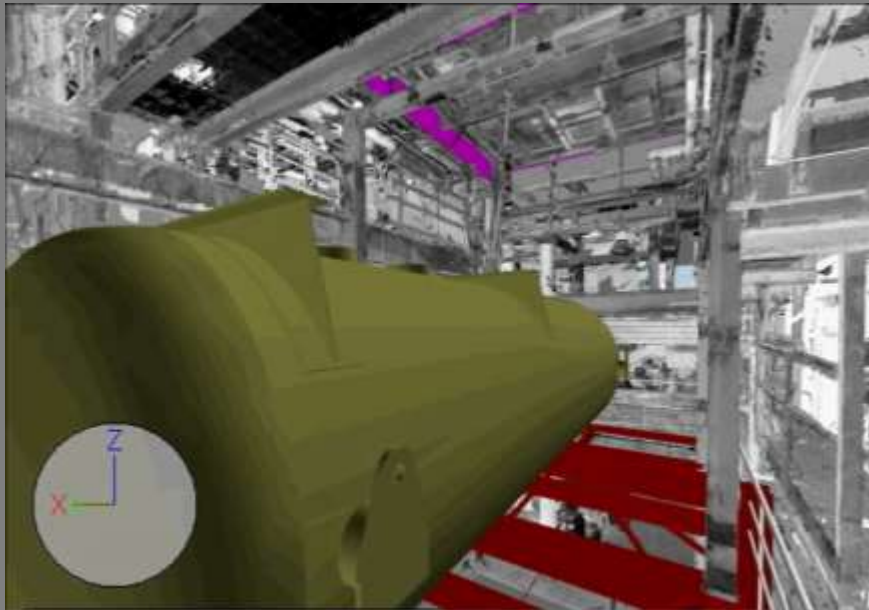




# Critical Pick Planning & Equipment Rigging



# Critical Pick Planning & Equipment Rigging



# Execution: Coordinating System Shutdowns

- RMF's Design was based upon achievable shutdowns
- Shutdown sequences were written with photo ID of each isolation point
- Isolations points were reviewed by MIT CUP operations
- Shutdown procedures were used by MIT CUP operations as a resource during LOTO

Northwest Condensate Filter (Above Kitchenette)

- a. Open Bypass – MCR-63
- b. Close – MCR-61
- c. Close – MCR-62





# Execution: *Schedule / Timing*

- Shutdowns were scheduled around low load days (steam, chilled water)– ie spring, fall and with plant operations
- Scheduled around (3) concurrent projects within the CUP – DA, Boiler, and Air Compressors
- Majority of shutdowns completed with overtime to minimize downtime





# Execution: *Working on an Active Campus*

- No system wide shutdowns allowed – 24/7 operation for steam, electricity and CHW
- Major rigging activities scheduled for weekends and overnight to limit impact on campus



# Execution: *How It All Came Together*



Team

Overview

Design

Execution

Q&A



QUESTIONS &  
ANSWERS