



An NV5 Company

# MSBA CONTRACTOR ROUNDTABLE

May 16, 2018



Winchester High School  
Winchester, MA

- 9:00 A.M. – Welcome and Introduction
- 9:05 A.M. – Presentation
  - ❖ Commissioning
  - ❖ Experiences on MSBA Projects
  - ❖ Best Practices
- 9:45 A.M. - Discussion
- 10:15 A.M. – Meeting Conclusion
  - ❖ Upcoming Meeting Notes





## Massachusetts School Building Authority

*Funding Affordable, Sustainable, and Efficient Schools in Partnership with Local Communities*

SCHOOL DISTRICT

OPM

**COMMISSIONING**



**Michael Feyler**  
*Director / Building Solutions Group  
Sr. Electrical Cx Engineer*

**Michael E. Papagni, PE**  
*Project Manager/  
Sr. Mechanical Cx Engineer*

**Scott Byrne, PE**  
*Cx Engineer*

**Jason Peterson**  
*Cx Engineer*

**Peter Malloy, EIT, CEM**  
*Cx Engineer*

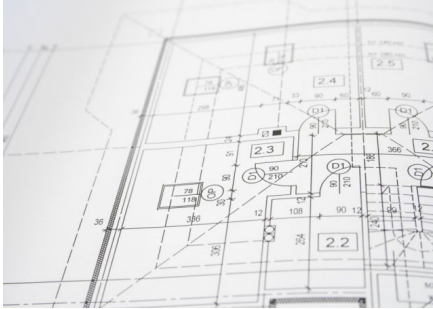
**BUILDING ENVELOPE**



**Michal Velji**  
*Principal-in-Charge*

**Steven Kosilla, AIA, LEED AP**  
*Building Enclosure Specialist*

**Christopher Wolcott, LEED AP**  
*Cx Project Manager*



RDK Engineers, an NV5 Company, is a specialized mechanical and electrical engineering firm offering a spectrum of engineering services - total building systems solutions.

Commissioned over 600 projects.

Nearly 100 of them have been educational projects.

## Market Sectors Include:

- Academic
- Commercial
- Government & Municipal
- Healthcare
- Hospitality & Residential
- Mission Critical
- Retail
- Science & Technology
- Transportation

## Our Staff Includes:

- Mechanical engineers
- Electrical engineers
- Plumbing engineers
- Fire protection engineers
- Energy engineers
- Audiovisual engineers
- **Commissioning engineers**
- Communication distribution designers
- Electronic security engineers
- Code consultants
- Project managers
- Technical and administrative support personnel



Building Enclosure Associates, LLC (BEA) is an MBE certified company based in Charlestown, MA providing consulting and testing services to Architects, Engineers, Building Owners, Property Managers, Universities, Developers and Contractors.

## **What We Do:**

### Consulting Services

- Design for New and Restoration Projects
- Peer Review of Designs by Others
- Preliminary and Detailed Condition Surveys and Reports
- Construction Related Contract Administration and QA/QC Services
- Building Enclosure Commissioning

### Testing Services

- Fenestration Field Testing
- Infrared Roof and Façade Surveys

Commissioned more than seventy Building Envelope projects for clients such as the Massachusetts School Building Authority (MSBA), Technical Centers and Wynn Boston Harbor.

RDK and BEA have partnered on over 20 commissioning projects, twelve have been MSBA projects.

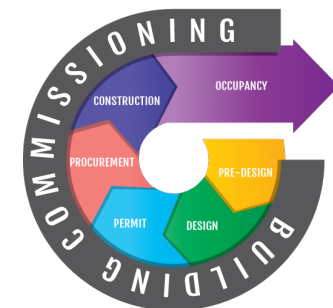


Building commissioning is a quality-focused process of verification of all building systems and subsystems by an independent third party. MSBA-commissioned buildings undergo an intensive quality assurance process that begins during design and continues through construction, occupancy, and initial operations. Commissioning ensures that the new building operates as designed and as the District intended. Commissioning also prepares the building staff to operate and maintain building systems and equipment by ensuring that district personnel receive appropriate operation and maintenance manuals and training by equipment manufacturers and installation contractors.

Commissioning recognizes the integrated nature of all building systems' performance, which impact sustainability, occupant comfort and efficiency. Because all building systems are integrated, a deficiency in one or more components can result in sub-optimal operation and performance among other components adversely affecting operating costs and equipment life.

Commissioned systems - Full Building Commissioning include:

- Building Envelope
- Roofing Systems
- HVAC Systems
- Plumbing Systems
- Voice, Data and Video Systems
- Life Safety Systems
- Building Automation and Control Systems



## Benefits of Commissioning for the District include:

- Construction cost savings
- Improved coordination between design, construction, and occupancy
- Fewer system deficiencies at building turnover
- Improved system and equipment function
- Improved building operation and maintenance
- Lower utility bills through energy savings
- Improved indoor environmental quality and occupant comfort

Building commissioning is a critical component in any "green" or sustainable building program including LEED and MA-CHPS. The process employs several strategies to reduce a building's energy use. Early in the design phase, energy issues are discussed among the project team. In design review, the commissioning consultants look for design issues that may have an impact on maintenance accessibility or lead to inefficient system operation and wasted energy. Upon installation, they direct and observe functional performance testing of systems and equipment to verify proper operation.



## **DESIGN -> CONSTRUCTION -> ACCEPTANCE -> POST-ACCEPTANCE**

- Provide input to the Owner's requirements for the MEP and Building Envelope Systems.
- Owner's advocate to support the Owner, Owner's Project Manager and Operations Staff in assuring that all of the project's design intent is properly implemented from design through operation/occupancy.
- Design reviews of MEP and Building Envelope Systems. Drawings, Specifications and Basis of Design, with trackable comment process. Participate in design review meetings.
- Development of the Commissioning Plan, Test Plan & Schedule, Commissioning Specifications, and Pre-Functional Performance Checklist.
- Conduct Submittal Reviews for MEP and Building Envelope Systems.
- Facilitate Controls Integration Meetings.
- Master project schedule meetings for construction milestones and scheduling of commissioning activities.
- Installation Observations of the MEP and Building Envelope Systems.
- Maintaining of the Commissioning Corrective Actions Log and Pending Issues Log.



## DESIGN -> CONSTRUCTION -> ACCEPTANCE -> CLOSEOUT & WARRANTY

- Development of Functional Testing Documentation and distributing it to the project team for feedback.
- Review of the Testing, Adjusting and Balancing (TAB) Plan and Reports.
- Orchestrate Functional Performance Testing of the Mechanical, Plumbing and Electrical systems.
- Witness acceptance testing of newly installed envelope systems inclusive of water penetration testing in accordance with ASTM E1105 and acceptance testing of new roofing systems shall include field uplift testing in accordance with ASTM E907 as applicable.
- Perform Integrated Systems Testing.
- Assist with problem-solving or resolving non-conformance Issues.
- Perform Deferred / Seasonal Testing of systems in the season they will run in.
- Track outstanding deficiency items and building operation during the warranty period
- Facilitate a Post-Commissioning meeting ten months after substantial completion.
- Prepare and submit a final commissioning report.

## BEST PRACTICES

- Appoint Commissioning (Cx) Coordination Supervisors for MEP/FP & Building Envelope Commissioning
- Include CxA on all relevant correspondence for project: Meeting Minutes, Approved Submittals, RFI's, etc.
- Contractor's Representative to walk with, review items observed during each Cx Visit.
- Cx Coordination Supervisors respond to Cx deficiencies in timely fashion, with photos.
- Commissioning Tab on the Construction Manager's FTP site or Procore, BIM360, etc. for inclusion of deficiencies.
- Cx as topic for discussion in each Construction Meeting, discuss any issues identified during Cx process, any upcoming field testing to be coordinated.
- Cx Milestones in schedule – time added for Building Envelope field testing and MEP/FP Functional Performance Testing.



- Integrate the commissioning schedule into the construction schedule and address commissioning scheduling issues realistically.
- Coordination between Trades
- Timely Response to Corrective Action Items

## **MEP/FP**

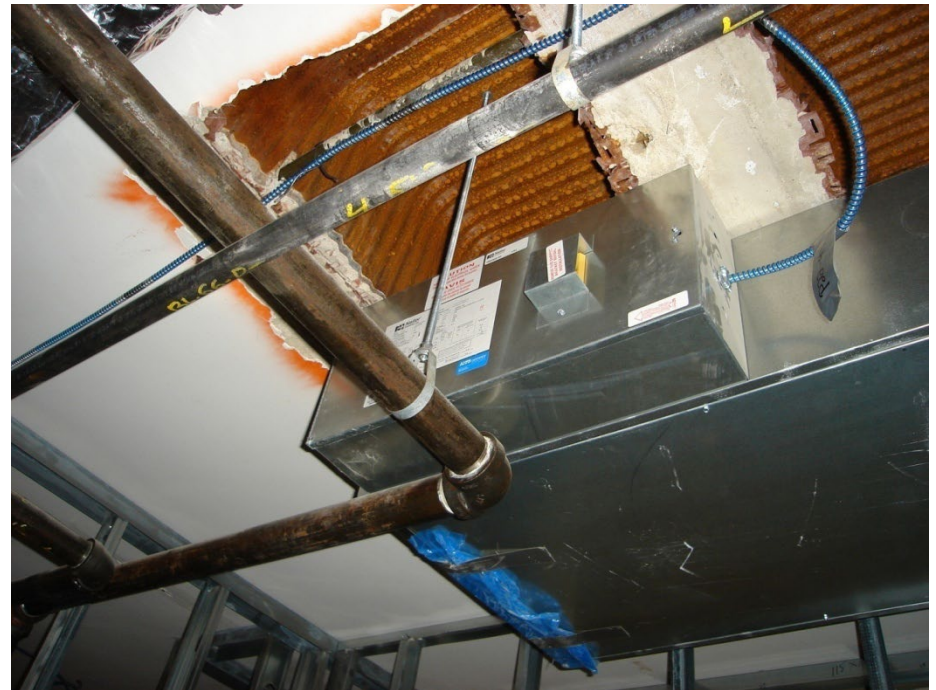
- Clearances
  - Lack of Coordination between Trades
  - Access to equipment for service
  - Code Related
- Installations
  - Equipment not installed per details or manufacturers' instructions
- Programming
  - ATC programming copied from another project .
  - Programming not per Specifications; inclusive of ATC, Lighting Control, Transfer Switches, Security.

## CLEARANCES



Piping in front of unit control panel

Threaded rod hanger in front of control panel



## ACCESS

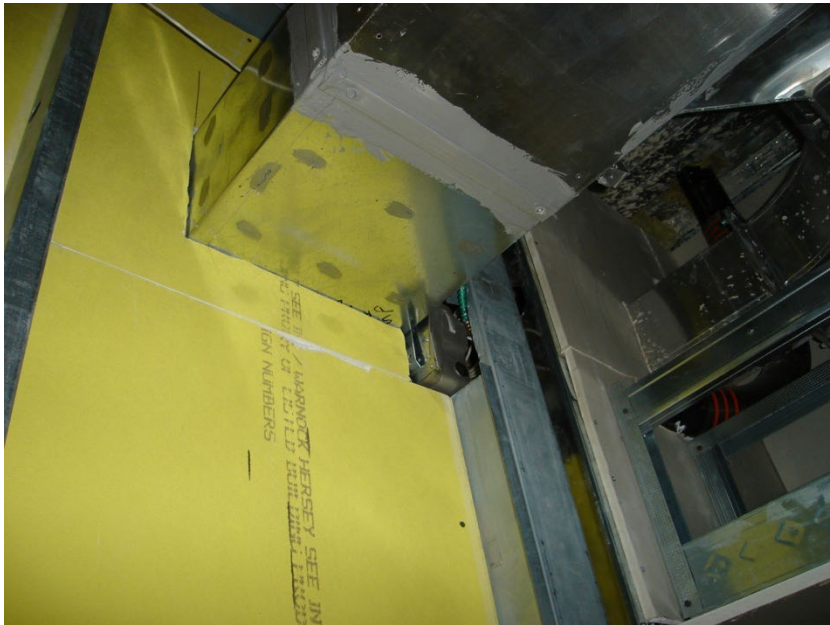


Inadequate access to VRF control panels

“Service openings” had to be provided



## LIFE SAFETY



Smoke/Fire Damper actuator is installed within the shaft wall.

No clearance for maintenance and two-hour rating is not maintained.

Clearances required to combustible construction (ACT in this case). IMC 2015 506.5.4. Ceiling had to be lowered.



## LIFE SAFETY



NFPA 72 - A.17.7.4.1 (2016) Detectors should not be located in a direct airflow or closer than 36 in. (910 mm) from an air supply diffuser or return air opening.

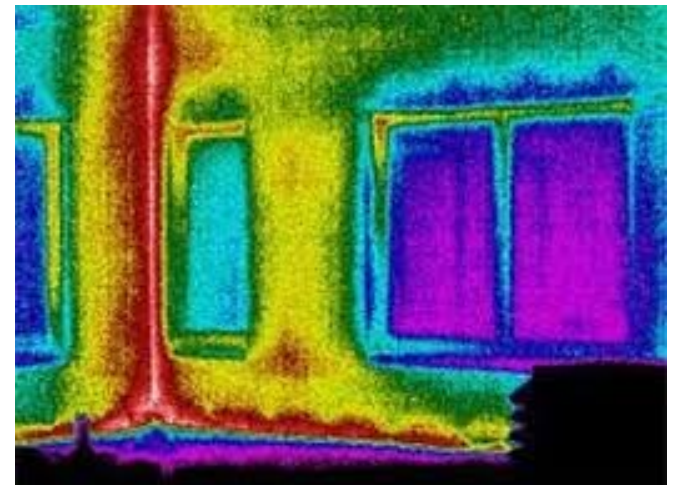
Pull station does not meet ADA Code for accessibility.



Protect completed work from damage by work of other trades

## Building Envelope

- Open penetrations in Air Vapor Barrier (Masons, Metal Panel Installers, etc.)
  - What is acceptable repair method?
  - Ensure all parties are on board, properly equipped.
- Dropped fasteners, debris on completed roofing
  - Who repairs the roof?
- Typical lack of coordination:
  - Roof to Wall, Wall to Foundation,
  - Inside and Outside Corners,
  - Transitions and Penetrations





## AVB



## BEAM



## LADDER



## ROOF



## ROOF EDGES



