

60% CONSTRUCTION DOCUMENTS BEVERLY PUBLIC SCHOOLS



BUILDING BRIGHT FUTURES

collaboration exploration
collaboration research-based learning
research-based learning

May 11, 2016

Report Prepared by:

Ai3 Architects, LLC
526 Boston Post Road
Wayland, MA 01778

Project Number: 1403.00

May 11, 2016

Report Prepared for:

Beverly School Building Committee
City of Beverly
502 Cabot Street
Beverly, MA 01915

Evaluation Team:

Architect:

**Ai3 Architects, LLC
526 Boston Post Road
Wayland, MA 01778**



Structural Engineer:

Engineers Design Group, Inc.
350 Main Street
Malden, MA 02148

Environmental Consultant:

Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Mechanical, Electrical, Plumbing &

Fire Protection Engineers:

Griffith & Vary, Inc.
12 Kendrick Road
Wareham, MA 02571

Code Consultant:

Cosentini Associates
101 Federal Street, Suite 600
Boston, MA 02110

Civil/Site Engineer & Landscape Architect:

PARE Corporation
10 Lincoln Road, Suite 103
Foxboro, MA 02035

Accessibility Consultant:

Kessler McGuinness & Associates, LLC
1121 Washington Street
Newton, MA 02465

Technology Consultant:

Ai3 Architects, LLC
526 Boston Post Road
Wayland, MA 01778

Geotechnical Consultant:

Lahlaf Geotechnical Consulting, Inc.
23 McGinness Way
Billerica, MA 01821

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**** 60% Construction Document Drawings and Project Manual are being provided under a separate cover.**

INTRODUCTION

SUMMARY OF 60% CONSTRUCTION DOCUMENTS

Subsequent to the submittal of Design Development on December 23, 2015, Ai3 Architects, LLC, Heery International, Inc., and Agostini Bacon Construction have been collaborating with the Owner to further refine the Design Development drawings and specifications. The development of the design and documentation during the 60% Construction Document phase included continued weekly meetings with the Working Group, programming meetings with the administration, faculty and staff, meetings with the local police and fire officials, City Planner, City transportation engineers, building officials, Green Sub-committee, School Committee, School Building Committee, and the Beverly City Council.

The discussions and input included all elements of the project. A few examples of the topics discussed include; site parking, site vehicular and pedestrian circulation, site topography, site signage, site utilities, site educational spaces, off site traffic and bus circulation, site paving materials, building branding, exterior building materials, exterior glass and daylighting, space planning and programming, building security and CCTV, building system design (MEP/FP, Structural), etc. The attached drawings, specification and documents contained within the enclosed binder are as a result of the numerous meetings, conversations and input provided by the Owner.

FINAL DESIGN PROGRAM DESIGN PROGRAM SUMMARY

On December 23, 2015, the Educational Space Summary and Designer Certification were submitted to the MSBA as part of the Design Development submittal. There have been a couple minor deviations in the Educational Space Summary since the Design Development submission. The narrative below outlines these changes:

Core Academic Spaces:

No modifications were made to the Core Academic Space category. The overall square footage for the Core Academic Spaces remains at 68,950sf.

Special Education:

No modifications were made to the Special Education category. The overall square footage for the Special Education category remains at 15,850sf.

Art & Music:

No modifications were made to the Art & Music category. The overall square footage for the Art & Music category remains at 6,550sf.

Vocations & Technology:

No modifications were made to the Vocations & Technology category. The overall square footage for the Vocations & Technology category remains at 9,600sf.

Health & Physical Education:

No modifications were made to the Health & Physical Education category. The overall square footage for the Health & Physical Education category remains at 14,840sf.

Media Center:

No modifications were made to the Media Center category. The square footage for the Media Center category remains at 8,401sf.

Dining & Food Service:

No modifications were made to the Dining & Food Service category. The overall square footage for the Dining & Food Service category remains at 15,872sf.

Medical:

No modifications were made to the Medical category. The overall square footage for the Medical category remains at 910sf.

Administration & Guidance:

No modifications were made to the Administration & Guidance category. The overall square footage for the Administration & Guidance category remains at 4,796sf.

Custodial & Maintenance:

No modifications were made to the Custodial & Maintenance category. The overall square footage for the Custodial & Maintenance category remains at 2,870sf.

Other (Auditorium):

No modifications were made to the Other (Auditorium) category. The overall square footage for the Other (Auditorium) category remains at 5,700sf.

No changes in the project design have been made that would impact the final design program submitted and certified by the designer for the 60% Construction Documents submittal.

The following pages contain the signed Educational Space Summary and Designer's Certification which confirm the previously reported area calculations are identical to the Design Development area calculations previously submitted, and the overall square footage of the new facility remains 231,509 square feet.

FINAL DESIGN PROGRAM

EDUCATIONAL SPACE SUMMARY

FINAL DESIGN PROGRAM ARCHITECT'S CERTIFICATION

May 11, 2016
Massachusetts School Building Authority

Re: Designer Certification

Sarah Blanche, Project Manager,

Ai3 Architects hereby certifies the design for the new Beverly Middle School meets the square foot calculations outlined below as previously reported on December 23, 2015 in the Design Development Submission:

Lower Level Gross Floor Area:	24,275sf
First Floor Gross Floor Area:	80,471sf
Second Floor Gross Floor Area:	42,356sf
Third Floor Gross Floor Area:	49,065sf
Fourth Floor Gross Floor Area:	35,342sf

Total All Floors: 231,509sf

The sum all the floor areas equals the gross floor area of 231,509 square feet identified in the Educational Space Summary dated May 11, 2016 submitted with the 60% Construction Documents Submission dated May 11, 2016.

To the best of our ability and to the extent of the information we have produced during the 60% Construction Document phase, the overall gross square footage, as outlined above, is accurate.

Sincerely,
Ai3 Architects, Inc.



Troy L. Randall, Partner, AIA LEED AP BD+C

UPDATED WORK PLAN

UPDATED WORK PLAN

Phase	Responsibility	Description of Key Tasks	Deliverable	Submittal Date	Status
Early Bid Packages	Ai3, UEC, PARE, EDG	BID PACKAGE - Abatement and Demo of Existing Building	Drawings & Specifications	11/18/2015	Complete
	Ai3, EDG	Independent Structural Peer Review (Substructure)	Drawings, Specifications, & Design Calculations	2/22/2016	Complete
	Ai3, Heery	Structural Peer Review Comments (Substructure)	Receive Peer Review Comments	3/4/2016	Complete
	Ai3, Heery, Agostini-Bacon	BID PACKAGE - Structural Piles & Related Sitework	Drawings & Specifications	3/1/2016	Complete
	Ai3, EDG	Independent Structural Peer Review (Superstructure)	Drawings, Specifications, & Design Calculations	3/28/2016	Complete
	Ai3, Heery	Structural Peer Review Comments (Superstructure)	Receive Peer Review Comments	4/8/2016	Complete
	Ai3, Heery, Agostini-Bacon	BID PACKAGE - Foundations & Structural Steel	Drawings & Specifications	4/18/2016	Complete

Phase	Responsibility	Description of Key Tasks	Deliverable	Submittal Date	Status	
60% Construction Documents	PARE	Site Related Code Analysis: Permitting and Zoning	Detailed Review of the Beverly's Regulatory Requirements	5/4/2016	Complete	
	Ai3	Interior Materials	Interior Materials review with Owner	2/9/2016	Complete	
	Ai3	Program Comparison Analysis	Letter from Architect outlining differences from DD Space Summary Submittal	5/9/2016	Complete	
	Ai3	Program Space Summary	Space Summary Document signed and certified by Architect	5/9/2016	Complete	
	Ai3	Project Design Compliance	Letter from Architect verifying compliance of design with DD	5/9/2016	Complete	
	Ai3	Certification of Local Boards and Utility Companies	Provide certification from designer indicating all Local, State, & Utility Officials have been contacted by the designer regarding each utility connection and the persons responsible for permits or connection approval have agreed to the systems' use	5/9/2016	Complete	
	Ai3	60% Drawings and Spec issued for Cost Estimating & Code Review	Drawings and Specifications	4/18/2016	Complete	
	Ai3	60% Drawings and Spec issued for Cx Agent, OPM, Construction Manager Review	Drawings and Specifications	4/18/2016	Complete	
	KMA, Cosentini	Receive Code Analysis	Compliance Letter for Building Code and Accessibility Review	5/4/2016	Complete	
	Ai3	Receive comments from Commissioning Agent	Commissioning Agent review recommendations	5/4/2016	Complete	
	Heery	Receive comments from OPM	OPM review recommendations	5/4/2016	Complete	
	Agostini-Bacon	Receive comments from CM	CM review recommendations	5/4/2016	Complete	
	Design Team	60% Construction Documents	PDF Files	5/9/2016	Complete	
	Design Team	60% Construction Specification	PDF Files	5/9/2016	Complete	
	PM&C	60% Cost Estimate	Detailed Cost Estimate	5/5/2016	Complete	
	PM&C, Agostini-Bacon, Heery, Ai3	Reconcile Cost Estimate	Reconciled Cost Estimates	5/5/2016 - 5/6/2016	Complete	
	Heery	Submit Cost Estimates to MSBA	Reconciled Cost Estimates Submitted to MSBA	5/11/2016	Complete	
	Ai3, Heery, Agostini-Bacon	Value Engineering Report	60% CD VE Report (if required)	5/11/2016	Pending	
	EDG	Structural Design Calculations	Structural Design Calculation Report	5/11/2016	Pending	
	Ai3, EDG	Certification Statement	Statement indicating receipt of Independent Review and incorporation of comments into the final CD drawings	5/11/2016	Complete	
	Ai3 / G&V	60% CD's revised to reflect Cx Agent Review	MEP & FP review revise documents to incorporate Cx Agent Review Comments	5/25/2016	Pending	
	MSBA	MSBA Review Comments	Approval and Comments	6/1/2016 - 6/8/2016	Pending	
	Ai3	Designer Review responses to the 60% MSBA review comments	Additional Supporting Materials & Narrative	6/15/2016 - 6/22/2016	Pending	
	SUBMITTALS					
	Heery	Submit Documents to MSBA	60% CD Submittal	5/11/2016	Pending	

60% CONSTRUCTION DOCUMENTS - BEVERLY PUBLIC SCHOOLS

Phase	Responsibility	Description of Key Tasks	Deliverable	Submittal Date	Status
90% Construction Documents	Ai3	90% Drawings and Spec issued for Cost Estimating	Drawings and Specifications	7/25/2016	
	Ai3	90% Drawings and Spec issued for Cx Agent, OPM, Construction Manager Review	Drawings and Specifications	7/25/2016	
	Ai3	Code Analysis: Accessibility & Building Code Review	Send Out CD's for Code Review	7/27/2016	
	KMA, Cosentini	Building Code and Fire Safety Review	Letter of Compliance from Code Consultants	8/10/2016	
	Cx Agent	90% CD review Responses from Cx Agent	Commissioning Agent review recommendations	8/10/2016	
	Heery	Receive comments from OPM	OPM review recommendations	8/10/2016	
	Agostini-Bacon	Receive comments from CM	CM review recommendations	8/10/2016	
	Ai3, EDG	Final Structural Design Calculations	Design Calculations	8/10/2016	
	Ai3, A&L, G&V	Energy Design Calculations	Design Calculations	8/10/2016	
	Ai3, G&V	Updated Drawings & Specs to reflect Code Compliance Comments from Building Code and Accessibility Reviews	Updated Drawings & Specifications	8/15/2016	
	Ai3	Interior Materials Color Board	Color Board for Owner review	8/10/2016	
	Ai3	Program Space Summary	Space Summary Document signed and certified by Architect	8/15/2016	
	PARE	Site Related Code Analysis: Permitting and Zoning	Update of Beverly's Regulatory Requirements	8/10/2016	
	Heery	Updated Schedule	Schedule	8/15/2016	
	Ai3	Program Comparison Analysis	Letter from Architect outlining differences from 60% Space Summary Submittal	8/15/2016	
	PM&C	90% Cost Estimate	Detailed Cost Estimate	8/11/2016	
	PM&C, Agostini-Bacon, Heery, Ai3	Reconcile Cost Estimate	Reconciled Cost Estimates	8/11/2016 - 8/12/2016	
	Heery	Submit Cost Estimates to MSBA	Reconciled Cost Estimates Submitted to MSBA	8/17/2016	
	Ai3, Heery, Agostini-Bacon	Value Engineering Report	90% CD VE Report (if required)	8/17/2016	
	Ai3, G&V	Updated Drawings & Specs to reflect Cx Review Comments	Updated Drawings & Specifications	8/24/2016	
MSBA	MSBA Review Comments	Approval and Comments	9/7/2016 - 9/14/2016		
Ai3	Designer Review responses to the 90% MSBA review comments	Additional Supporting Materials & Narrative	9/21/2016 - 9/28/2016		
SUBMITTALS					
Heery	Submit Documents to MSBA	90% CD Submittal	8/17/2016		

Phase	Responsibility	Description of Key Tasks	Deliverable	Submittal Date	Status	
90% Construction Documents	Ai3	Designer Certification for Quality Control	Certification stating 100% documents satisfy Ai3's quality control review process as previously submitted in the Design Development submittal	9/30/2016		
	Ai3	100% Specifications complete	Specification for project 100% Complete	9/30/2016		
	Ai3	100% Drawings complete	Drawings for project 100% Complete	9/30/2016		
	Ai3	Certification of Local Boards and Utility Companies	Provide certification from designer indicating all Local, State, & Utility Officials have been contacted by the designer regarding each utility connection and the persons responsible for permits or connection approval have agreed to the systems' use	9/30/2016		
	Ai3	Program Comparison Analysis	Letter from Architect outlining differences from 90% and 100% Space Summary Submittal	9/30/2016		
	Ai3	Program Space Summary	Space Summary Document signed and certified by Architect	9/30/2016		
	Ai3	Project Design Compliance	Letter from Architect verifying compliance of design with Final Design Program	9/30/2016		
	Ai3	Testing and Permits compliance	Letter from Architect stating all testing and permits have been obtained for the project	9/30/2016		
	Ai3, G&V	Compliance with Energy Code	ComCHECK 2012 IECC Report	9/30/2016		
	SUBMITTALS					
	Heery	Submit Documents to MSBA	Drawings & Specifications	10/1/2016		
	Ai3, Heery	Submittal to Local Building Official	2 Sets of plans and specifications including construction control affidavits and final Com Check compliance report for Architectural, HVAC, and Electrical.	10/1/2016		
	Design team	Release Bid Documents	Drawings & Specifications	10/1/2016		

SITE PERMITTING NARRATIVE

SITE PERMITTING NARRATIVE

Based on the 60% Construction Documents for the project site, there are multiple permits that are required at the local, state, and federal level for site construction. The local permitting information was compiled from the City of Beverly Zoning Ordinance, Chapter XXXVIII with amendments through December 2013 (Zoning) and conversations with Steve Frederickson, Director/Building Commissioner of the Beverly Municipal Inspections Department, Leah Zambenardi, Assistant City Planner with the Beverly Planning Board, Aaron Clausen, Director of Planning & Community Development, Stephanie Williams, City Solicitor and Gregory St. Louis, City Engineer. According to the "Zoning Map with Overlays, City of Beverly, Massachusetts – FYE 2014" the Site is located in an area zoned One-Family District (R-10). Educational facilities are noted to be allowed "under special conditions" within a zone R-10 as stated in Zoning section 38-11(A). The following is a list of approved permits:

SITE PLAN REVIEW - PLANNING BOARD

The project is not subject to a Site Plan Review or Special Permit Review by the Planning Board based on conversations with both the City Solicitor and the Director of Planning & Community Development.

ZONING BOARD OF APPEALS

The project is considered a government use under the jurisdiction of the City of Beverly. As such, the Zoning use is allowed in all districts per Zoning Section 38-6(A). Based on conversations with the City Solicitor and the Director of Planning & Community Development, the project is not subject to variance review with the Zoning Board of Appeals.

PARE completed a review of Massachusetts GIS data and conducted a preliminary review of the wetlands onsite. During the field investigation, wetlands were identified on the site. According to the City of Beverly's Wetlands Protection Ordinance have associated minimum 100 foot regulatory buffers as well as local 25-foot No-Disturbance Zones. Work is proposed within the 100 foot buffer of the larger Isolated Vegetated Wetland (IVW) and within the small IVW. Work within the Isolated Vegetated Wetland requires wetland replication at a rate of 2:1 as indicated in the Beverly Wetland Bylaw. Based on the scope of the work, a Notice of Intent (NOI) was required to be submitted to the Beverly Conservation Commission, and the Massachusetts Department of Environmental Protection for work associated with new construction.

A Request for Determination of Applicability (RDA) was requested for work associated with the building demolition and was submitted October 13th 2015. A negative determination for the work associated with building demolition was issued on October 28th 2015.

The NOI associated with the new construction work was submitted December 22nd 2015. An Order of Conditions was approved and issued on February 17, 2016. Plan modifications were submitted following the approval as a minor modification on March 23rd and April 12th 2016. Both minor modifications were accepted from the Conservation Commission with no amendment needed to the original Order of Conditions.

The project required an application to be filed with the Engineering department in regards to "Drainage Alterations" permit and an "Erosion/Sediment Control & Materials Management Application." The Erosion/Sediment Control & Materials Management Application was approved January 15th 2016, and the Drainage Alteration Permit was approved April 8th 2016.

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION (Mass DEP)

The project will meet the 2008 Storm Water Management Guidelines and appropriate submissions will be made to the Beverly Conservation Commission and Mass DEP, the jurisdictional entity for these guidelines.

An Underground Injection Control Registration will need to be filed for any stormwater systems proposed to infiltrate into the ground. Based on the soil conditions encountered on the site, it is not anticipated that stormwater systems will be proposed to infiltrate and therefore an Underground Injection Control Registration is not anticipated to be required.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

The proposed project will require filing a NPDES construction general permit with the EPA for disturbance of an area of more than one acre of land. The Contractor awarded the contract is responsible for filing for the NPDES General Permit and preparing a project specific Stormwater Pollution Prevention Plan. With the start of demolition proposed in January, the Contractor has already filed a Notice of Intent with the EPA and prepared a Stormwater Pollution Plan.

The scope of work for the 60% Construction Documents does not trigger MEPA thresholds. The following are the triggers that were reviewed as part of the design process: In the category of land, creation of ten (10) or more acres of impervious area would require a MEPA review. The total study area is 15.57 acres. In the existing condition, 2.81 acres are impervious, and in the proposed condition, 7.78 acres will be impervious. Under the proposed new construction, this represents an increase in impervious surface of 4.97 acres. In the category of wetlands, waterways and tidelands, the alteration of 5,000 or more square feet of bordering or isolated vegetated wetlands. The design plans include 1,210 square feet of isolated vegetated wetland alteration, which does not exceed the threshold. In the category of transportation, the construction of 300 or more new parking spaces at a single location would require MEPA review. The existing site contains 78 parking spaces. In the proposed design, 293 parking spaces are proposed representing a 215 space increase. As the proposed design does not require review under the land, wetland, or transportation requirements, MEPA review is not required.

As the design plans are developed further, all thresholds will continue to be reviewed in regards to the proposed project. If MEPA review is required, MEPA requires applications to be submitted one year prior to construction.

There are three entrances to the site in the current proposed design. One is designated for authorized vehicles only including designated faculty and busses. The other two are open to all vehicle traffic, one of which is a one way entrance off on Cabot Street, and the other is a two way entrance and exit off of Balch Street. The north Cabot Street entrance is located within a state highway layout. The south Cabot Street entrance and the Balch Street entrance are located within the local roadway layout. Based on the current 60% Construction Document plans, and the traffic impact analysis, the site is subject to a MassDOT Category II – Major Vehicular Access Permit. The review schedule for the permit consists of three separate submissions. A detailed review of each submission is required by MassDOT. The first submission is to be reviewed within 35 business days, the second submission is to be completed within 20 business days and the third submission shall be reviewed within 20 business days. It is anticipated that the permitting process with MassDOT would take approximately three months. The project has been through the first submission in which minor comments were received. Those comments were addressed on the 60% Construction Document plans and they will be submitted shortly for the second submission.

SITE UTILITY NARRATIVE

SITE UTILITY NARRATIVE

The existing conditions utility information was collected through site visits in October of 2014, communications with Roland Adams (Beverly GIS Manager), Gregory St. Louis (City Engineer) and Mike Collins (Commissioner of Public Services and Engineering) as well as data available through MassGIS, Beverly GIS online maps, National Grid Gas and Electric Maps and an on-the-ground survey performed by Welch Associates Land Surveyors, Inc. in May and June of 2015.

SEWER

Sanitary waste from the existing building is conveyed via gravity sewer line to a cross country sewer main. The line that services the building is a 10-inch VC line that exits the east side of the building and then connects to a 21" PVC sewer line which discharges to a 30" RCP sewer main in Balch Street. This is shown on plans entitled "Brimbal Avenue Interceptor Cross Country Balch Street to Cabot Street" dated November 1982 as prepared by Camp Dresser & McKee Inc. The 21" PVC sewer line flows via gravity from Cabot Street, along the east side of the site, towards Balch Street. Plans we obtained do not indicate the presence of an existing exterior grease trap.

Within the scope of the 60% Construction Documents, the existing sewer service will be removed and the 21" PVC sewer line passing through the site will be maintained. As part of the new construction, three 6" SDR gravity sewer service lines leave the proposed building and connect to this existing sewer line. The sewer line collecting kitchen water passes through a grease and oil separator before connecting with the other two lines. A capacity analysis of the 6" sewer line was performed to confirm that it could accept the flows from the proposed Middle School.

WATER

Water mains are located in Cabot and Balch Street. They are 12-inch cast iron and 8-inch cast iron respectively. Fire hydrants are located on Cabot and Balch Streets as well as one onsite. The onsite hydrant is located on the east side of the property at approximately the mid-point of the soccer field. The water main for this hydrant is serviced via the Balch Street water main. Record City information indicates there is a 4-inch water service to the building which is off of Cabot Street. We understand that an existing irrigation system is located in the athletic fields and an irrigation control box was picked up by Welch Associates. However, information as to the pipe sizes and locations is unknown. We would recommend that record plans of the existing irrigation system and its components be provided if future development plans include the use of this system.

Within the scope of the current proposed 60% Construction Documents, the fire hydrant on Balch Street will be removed and relocated to the west side of the proposed curb cut. The existing water service lines will be removed and replaced with an 8" CLDI water line. Two connections will be made to the 12-inch Cabot Street water main and one connection will be made to the 8-inch Balch Street water main.

A hydrant flow test was performed on September 11, 2015. Based on the results, a fire pump was not determined to be necessary at this time. Coordination with the fire department will confirm the final design of the fire suppression system.

Record drainage plans were not available at the City to review. However, Beverly GIS information and Welch Associates survey indicate drainage lines, direction of flow within the lines and pipe sizes. The existing onsite drainage system appears to consist mainly of conveyance via a closed drainage system. Additionally, the onsite closed drainage system acts as a conveyance system for stormwater being captured from portions of Cabot Street as well as the neighborhood to the west which consists of portions of Courtney Drive, Fitzgerald Way and some commercial properties.

The Cabot Street drainage system enters the site north of the building via an 18-inch RCP pipe and continues through the site going beneath the parking lot, the building and the athletic fields. The westerly neighborhood's drainage system enters from the west side of the site via a 24-inch RCP and continues beneath the wetlands and the athletic fields. There is one point of discharge for the drainage system which is located in the south side of the property towards Balch Street via a 30-inch culvert. The stormwater ultimately discharges south to the Shoe Pond Basin through the Cummings Center property. The Cummings Center property is located to the south of the site across Balch Street.

Drainage is collected from impervious and pervious surfaces via catch basins and conveyed via a closed drainage system to the discharge point. It appears that the stormwater system is receiving little treatment in regards to TSS removal.

Within the scope of the 60% Construction Documents, the stormwater from Cabot Street and the neighborhood to the west, as described above, will be re-routed to maintain conveyance through the site in conjunction with the new design.

The current drainage design meets the Massachusetts Department of Environmental Protection stormwater standards, the City of Beverly Stormwater and Construction Site Management Ordinance and meets the 80% TSS removal and peak flow attenuation measures.

National Grid is the supplier of natural gas to the City of Beverly. There is a gas meter and valve at the west side of the existing building near the loading area and a 4" CI gas service coming in the front (north side) of the building. Through coordination with National Grid, Gas service will tie into the existing gas service and be metered on the west side of the building near the loading dock.

National Grid is the supplier of electricity to the City of Beverly. Electricity is supplied below ground for the existing building. The service enters the building from the front (north side) and appears to be a three phase service. Estimated electrical loads for the new school have been calculated. Coordination is ongoing with National Grid regarding service improvements.

BUILDING SYSTEMS

NARRATIVES

UPDATED BUILDING STRUCTURE

SUBSTRUCTURE

FOUNDATIONS

Through conversations with the design team it is our understanding that the superstructure will be supported on pile caps, grade beams, and 65 Ton steel piles. Based on the recommendation of the geotechnical engineer, the columns would bear on reinforced concrete pile caps and the perimeter foundation will consist of 4'-0" deep concrete grade beams. Using the specified pile capacity of 65 Tons a typical interior column in the four story classroom wing would be supported on a 40" deep PC-3 pile cap which would consist of three piles. A typical interior column in the cafeteria would also be supported on a 40" deep PC-3 pile cap consisting of three piles. The columns supporting the long span structure of the single story gymnasium and auditorium would be supported on 40" deep PC-2 pile cap consisting of two piles. The media center and the main entrance lobby would be supported on 40" deep PC-3 pile caps. Brace frame columns will be supported on 40" deep PC-4 pile caps consisting of four piles and varying in geometry. All pile caps associated with the brace frames will be connected with 2'-0" square grade beams with a 40" deep PC-2 pile cap at the mid-span of the grade beam.

SLAB ON GRADE

Based on the recommendation of the Geotechnical Engineer the lowest level of the proposed building would be a 12" thick structural concrete slab reinforced with #7 steel reinforcing bars at 12" o.c. in each direction over a vapor barrier on 2" thick rigid insulation on 12" compacted granular structural fill and a base course of 12" of compacted gravel.

SUPERSTRUCTURE

FLOOR CONSTRUCTION

Typical Classroom Wing Floor Construction

A 4-1/2" normal weight concrete slab on 2" composite metal deck reinforced with welded wire fabric on wide flange steel beams spanning between wide flange steel girders and HSS steel columns. The weight of the structural steel is estimated to be 15 psf for the girders and columns framing.

Typical Cafeteria Floor Construction

A 4-1/2" normal weight concrete slab on 2" composite metal deck reinforced with welded wire fabric on wide flange steel beams spanning between wide flange steel girders and HSS steel columns. The weight of the structural steel is estimated to be 15 psf for the girders and columns framing.

Typical Auditorium Floor Construction

A 4-1/2" normal weight concrete slab on 2" composite metal deck reinforced with welded wire fabric on wide flange steel beams spanning between wide flange steel girders and HSS steel columns. The weight of the structural steel is estimated to be 15 psf for the girders and columns framing.

ROOF CONSTRUCTION

Typical Classroom Wing Roof Construction

The roof construction would be galvanized, corrugated 3" deep, Type 'N' metal roof deck on wide flange steel beams spaced at 8'-0" o.c. spanning between wide flange steel girders and steel HSS columns. The weight of the structural steel is estimated to be 12 psf for the girders and columns framing.

Typical Cafeteria Roof Construction

The roof construction would be galvanized, corrugated 3" deep, Type 'N' metal roof deck on wide flange steel beams spaced at 8'-0" o.c. spanning between wide flange steel girders and steel HSS columns. The weight of the structural steel is estimated to be 12 psf for the girders and columns framing.

Typical Library Roof Construction

The roof construction would be galvanized, corrugated 3" deep, Type 'N' metal roof deck on wide flange steel beams spaced at 8'-0" o.c. spanning between wide flange steel girders and steel HSS columns. The weight of the structural steel is estimated to be 12 psf for the girders and columns framing.

Typical Main Lobby Roof Construction

The roof construction would be galvanized, corrugated 3" deep, Type 'N' metal roof deck on wide flange steel beams spaced at 8'-0" o.c. spanning between wide flange steel girders and steel HSS columns. The weight of the structural steel is estimated to be 12 psf for the girders and columns framing.

Low Roof Structure above the Kitchen, Mechanical Room and the Utility Areas

The roof construction would be galvanized, corrugated 3" deep, Type 'N' metal roof deck on wide flange steel beams spaced at 8'-0" o.c. spanning between wide flange steel girders and steel HSS columns. The weight of the structural steel is estimated to be 12 psf for the girders and columns framing.

Gymnasium Roof Framing

The roof construction would be galvanized, corrugated 3" deep, Type 'N' metal roof deck spanning between wide structural steel joists. The weight of the steel joists and structural steel framing is estimated to be 12 psf. The weight of the structural steel framing supporting the roof and the rigging above the stage is estimated to be 15 psf.

Auditorium Roof Framing

The roof construction would be galvanized, corrugated 3" deep, Type 'N' metal roof deck spanning between wide structural steel joists. The weight of the steel joists and structural steel framing is estimated to be 12 psf. The weight of the structural steel framing supporting the roof and the rigging above the stage is estimated to be 15 psf.

VERTICAL FRAMING ELEMENTS

Columns

Columns in the classroom wings as well as the auditorium will consist of steel HSS columns. In the classroom wings the typical column size will be HSS 8x8x5/16, in the auditorium the typical column size will consist of HSS 12x12x3/8.

Lateral Load-Resisting System

The proposed school structure would be divided into two parts separated by way of expansion joints. One part would comprise the Gymnasium and the Auditorium; the second part of the structure houses the three Academic wings, the Cafeteria, Library/Media Center, the main lobby as well as the administrative wing.

The typical lateral load resisting system throughout the school would be concentric steel braced frames comprised of hollow structural steel sections.

BUILDING SYSTEMS NARRATIVES UPDATED FIRE PROTECTION

GENERAL

The Fire Protection systems shall be provided in accordance with NFPA #13, NFPA #14, the BOCA Fire Prevention Code and the latest Massachusetts State Building Code, NFPA 1.

The fire protection system shall be a wet-pipe, combined sprinkler/standpipe system to which will protect all areas of the building. Each level of the building will be protected as a separate zone of fire protection.

The fire protection system shall commence from a new separate, designated fire water service. Where this service enters the building, a double check backflow preventer shall be provided. A wet-pipe alarm riser shall be provided immediately after the backflow preventer.

A standpipe system will be provided which will interconnect the sprinkler systems and have fire department connections, at the front and rear of the building.

The stairwells will have standpipes complete with fire hose valves with cabinets. Each floor of the building will be a separate sprinkler zones, being fed from a floor control valves connecting to the standpipe riser.

All sprinkler and standpipe piping 2-1/2" and larger in size shall be Schedule 10 steel pipe with rolled joints with victaulic fittings. All piping 2" and smaller shall be Schedule 40 steel pipe with 175 lb. screwed fittings.

All finished areas of the building, with hung ceilings, shall be protected by concealed piping with quick response, semi-recessed pendant sprinkler heads.

All unfinished areas of the building shall be protected with exposed piping having brass, upright sprinkler heads.

All suspended ceilings shall be protected with above and below sprinkler heads.

Sprinkler heads shall be omitted from the main electric room and emergency electric room, provided a two (2) hour fire rating is constructed. Side wall sprinklers will be provided in the MDF rooms.

BUILDING SYSTEMS NARRATIVES UPDATED PLUMBING

GENERAL

The Plumbing Systems of the building shall be provided in accordance with Mass 248 CMR, the Massachusetts Fuel Gas and Plumbing Code and the latest Massachusetts State Building Code.

DOMESTIC WATER

Domestic water will be supplied to the building by a cement-lined, ductile iron water service fed from the municipal system. A backflow preventer and expansion tanks shall be provided immediately after the service enters the building.

Domestic water shall extend out to the building in a series of mains, risers and branches to all fixtures and equipment requiring same. Three (3) gas fired, high efficiency condensing-type, domestic hot water heaters will be provided. Both domestic hot water systems shall have recirculation piping with circulator pumps to return hot water from the most remote points of the hot water systems. The building will be provided with two (2) hot water piping systems; a 140° system to service the kitchen and 120° to serve the remainder of the building. Tempering valves will be provided to reduce the water temperature at all public lavatories to 110°F.

Cold, hot and hot water recirculation piping will run parallel to each other. All domestic water piping shall be of Type "L" copper with wrought copper fittings having press-fit connections. All water piping will be insulated with 1" thick, heavy density, fiberglass insulation having an all purpose jacket. All valves and fittings shall be insulated with pre-molded pipe enclosures packed with fiberglass insulation. Domestic water piping will be supported on trapeze type hangers where three (3) or more lines run together. Pipe will be supported individually on clevis type hangers. Twelve (12) inch long pipe saddles shall be provided between all supports and the insulated pipe.

Wall hydrants shall be provided around the perimeter of the building at approximately 100-foot intervals.

Reduced pressure zone backflow preventers will be provided on the make-up water supply to the mechanical system on the hot and cold water supplies to the Science Areas and on the feeds to various equipment in the Kitchen.

All sanitary system fixtures and equipment on all levels of the building shall flow by gravity from the building to the municipal system. The waste from the kitchen areas shall also flow by gravity, but shall run to a separate, exterior grease interceptor, before combining with the sanitary waste.

Interior DW&V piping above grade shall be service weight, cast iron pipe with "no hub" fittings or polyethylene PPR, for pipe 2" and smaller which may be Type "M" copper tubing with sweat joints.

Sanitary, waste and vent piping below grade and exterior to the building shall be service weight cast iron with hub joints having neoprene gaskets. All underground piping systems shall be provided with under slab hanger system supported from the finish slab. All hanger inserts to be coordinated with structural.

Drains shall be provided on all roof areas and they will be piped down through the building to below the slab, where they will be connected and distributed to the storm water disposal system. All storm piping above slab shall be no-hub cast iron pipe, insulated with 1" thick, heavy density, fiberglass insulation. Storm pipe below the slab shall be hub type, service weight cast iron pipe with resilient rubber gaskets. All underground piping systems shall be provided with under slab hanger system supported from the finish slab. All hanger inserts to be coordinated with structural.

Natural gas will be supplied to the school by a new gas service. The service will be sized to accommodate the needs of the heating, domestic water and cooking requirements of this building.

All gas piping within the building will be Schedule 40 steel pipe. Pipe 3-1/2" and larger will be welded; 3" pipe and smaller shall have screwed fittings.

A system will be provided to provide proper pH adjustment discharge into the building sanitary/waste system. The exact size of the system and type will be designed once the flow rate and chemical discharge ranges have been completed for each grade. System shall consist of acid resistant collection piping for waste and vent, possible pH mixing tank, and chemical tanks with metering pumps and chart recorder.

All water closets, urinals and lavatories shall be of vitreous china and shall be white in color. All fixtures shall meet LEED Standards for water usage.

Water closets shall be wall-mounted units with elongated bowls and 1.28 gallon or less,

SANITARY, WASTE, AND VENT

STORM SYSTEM

NATURAL GAS

**ACID
NEUTRALIZATION
SYSTEM**

FIXTURES

sensor-operated flush valves. Urinals shall be wall-mounted units with 0.125 gallon or less, sensor-operated flush valves. Showers shall have 1.5 GPM shower heads.

Lavatories shall have sensor type, metering faucets with individual hot and cold controls. The supplies and wastes of all handicapped lavatories shall be insulated with pre-formed insulation components.

All classroom sinks will be stainless steel, drop-in units with single lever, ADA approved faucets.

PLUMBING LIFE-CYCLE COST ESTIMATE

Pursuant to the requirements of MGL Chapter 149, Section 44M, the following schematic level life-cycle cost estimates have been prepared, which will define the cost associated with the installation and energy consumption related to the Plumbing systems in this particular school project. It should be noted that the following estimates are based on schematic level plans and system sizes and will most likely change as the project design develops more completely.

The construction costs were calculated using the latest edition of the RS Means Mechanical Cost Data book combined with the latest sub-bid results from similar projects. Energy costs were calculated with the aid of the latest version of the Hourly Analysis Program published by the Carrier Corporation, which utilized typical natural gas and electric rates published by the Energy Information Administration. Maintenance costs were also obtained from RS Means.

Summary of Costs for the Domestic Hot Water Systems:

- Plumbing Construction Cost: **\$111,823.00**
- Plumbing Systems Annual Electric Energy Cost: **\$2,132.00**
- Plumbing Systems Annual Gas Energy Cost: **\$7,668.00**
- Plumbing Systems Annual Maintenance Cost: **\$1,270.00**

BUILDING SYSTEMS NARRATIVES UPDATED HVAC

DESIGN CRITERIA

Interior environmental conditions will be based on Massachusetts Code 780 CMR 12 and ASHRAE Standard 55-2004.

Ventilation of spaces will be designed to meet or exceed the requirements of the latest edition of the Massachusetts State Building Code, the ICC International Mechanical Code and ASHRAE Standard 62-2007, Ventilation for Acceptable Indoor Air Quality.

The HVAC systems will be designed to meet the acoustical requirements of ANSI S12.60-2002. The American National Standards Institute developed this standard specification and design guideline to help eliminate acoustical problems in the design stage of a project. Essentially, the steady background noise level in core learning areas should not exceed an NC of 35.

HEATING SYSTEM

High efficiency, gas fired, condensing boilers will produce hot water to meet the heating needs of the school. Preliminary load calculations indicate that the school will need three (3) boilers each having a capacity of approximately 4,000 MBH. Each boiler will be sized to handle 33% of the peak heating load. The boilers will be manufactured by Cleaver-Brooks, model Clearfire or approved equal and will have a maximum efficiency of up to 99%. Exact size of boilers will be determined during the design phase of the project.

Due to the fact that the specified boilers do not have a minimum flow requirement, the boiler system will be piped in a primary configuration with the hot water reset schedule being maintained by the boilers. Each boiler will be furnished with an automatic two-way control valve to isolate the boiler when not firing.

Hot water will be circulated throughout the facility by individual hot water circulating pumps. The pumps will be designed to operate in a lead/lag configuration such that the lag pump shall automatically start should the lead pump fail. The lead/lag assignment shall be reversible through the automatic temperature control system. The speed of the pumps will be controlled by variable frequency drives (VFD). Exact size of pumps will be determined during the design phase of the project.

Radiant panels or fintube radiation will be installed throughout the perimeter spaces of this school to offset heat loss at the building's envelope. The radiant panels and fintube radiation also have the added benefit of operating at night during the unoccupied mode thereby eliminating the need for the rooftop units to operate to maintain a night set back set point.

Hot water systems will utilize 30% propylene glycol for added freeze protection.

As part of the base design the following spaces will be provided with air conditioning:

- Cafeteria.
- Administration area including Principal's Office, Assistant Principal's Office, School Psychologist's Office, Counselor's Office, Adjustment Counselor's Office, Nurse's Office and conference rooms.
- Teacher's planning/work rooms.
- Multipurpose rooms.
- Sped PT/OT spaces.
- Library/Media center.
- Music/performing arts areas.
- Computer classrooms.

Locker Rooms, kitchen, gymnasium, electric rooms, and shop areas will not be air-conditioned unless specifically directed by school department representatives.

Two (2) high efficiency electric air cooled chillers will be furnished to produce chilled water to meet the cooling needs of the classroom section of the school on a design day. The chillers will be furnished with variable frequency drives for increased energy efficiency. The chillers will be located outside at grade level. Exact chiller size to be determined. Specified chiller shall be compliant with ASHRAE 90.1. Based on preliminary cooling load calculations, it appears that each chiller shall have a capacity of 175 tons.

The chilled water system will be piped in a variable primary configuration. This will permit the use of two-way control valves and variable frequency drives while maintaining constant flow through the chiller as recommended by the chiller manufacturer.

Chilled water will be circulated throughout the facility by dedicated chilled water pumps. The chilled water pumps will be designed to operate in a lead/lag configuration such that the lag pump shall automatically start should the lead pump fail. The lead/lag pump assignment shall be reversible through the automatic temperature control system. The speed of the pumps will be controlled by VFD's. Exact size of pumps will be determined during the design phase.

Chilled water systems will utilize 30% propylene glycol for added freeze protection.

CLASSROOMS

Three (3) variable air volume (VAV) rooftop air handling units with energy recovery will supply tempered air to the classrooms through a system of ductwork, terminal boxes and ceiling diffusers. Essentially, the quantity of air supplied shall meet the heating and ventilating loads of the particular space. This air will also be cooled and dehumidified in the cooling season in order to provide noticeable relief from excessive temperature and humidity.

It is planned that there will be two (2) rooftop energy recovery unit per classroom wing.

Energy recovery rooftop units are an effective way of reducing the overall energy consumption of a building by recovering the heat of the air being exhausted from the school. The energy recovery rooftop units were furnished with the following components:

- Double-wall insulated casings.
- Supply and exhaust fans.
- MERV 13 air filters for superior indoor air quality.
- Energy recovery wheel.
- Hot water heating coil.
- Chilled water cooling coil to provide dehumidification and tempering during the warmer months of the school year.
- Variable frequency drives for supply and exhaust fans.

Space temperature will be maintained by either modulating the terminal box's air damper or hot water reheat coil control valve. During summer months, a discharge air temperature strategy will be implemented, which eliminates the need for hot water reheat in the summer.

Classrooms will also be furnished with perimeter radiant panels designed to offset envelope heat loss.

Space temperature will be sensed with remote space mounted sensors and controlled through the building management system.

Additional energy saving will be achieved by integrating occupancy sensors and space mounted CO2 sensors into the terminal box operation such that when the classrooms are unoccupied or CO2 levels are low, the terminal boxes will reset to a standby mode.

ADMINISTRATION/GUIDANCE/NURSE

These areas will be served by a dedicated variable air volume rooftop air handling unit designed to provide full air conditioning. Each office will have individual control of space temperature utilizing variable air volume terminal boxes with hot water reheat coils controlled by space mounted thermostats.

BAND/CHORAL

A dedicated variable air volume rooftop unit will supply conditioned air to these spaces through a system of ductwork, terminal boxes and ceiling diffusers.

Space temperature will be maintained by either modulating the terminal box's air damper or hot water reheat coil control valve.

Space temperature will be sensed with remote space mounted sensors and controlled through the building management system.

MEDIA CENTER

A dedicated variable air volume rooftop unit will supply conditioned air to the Media Center through a system of ductwork, terminal boxes and ceiling diffusers.

Space temperature will be maintained by either modulating the terminal box's air damper or hot water reheat coil control valve.

Space temperature will be sensed with remote space mounted sensors and controlled through the building management system.

GYMNASIUM

Each gymnasium will be furnished with a dedicated heating and ventilating rooftop unit. Air will be distributed throughout the space via ductwork and supply diffusers.

The heating and ventilating units will be fitted with a hot water coil only.

The rooftop units will utilize the demand controlled ventilation sequence of operation. This strategy permits the modulation of the outside air dampers and fan speed based on the level of CO₂ in the space.

Space temperature will be sensed with remote space mounted sensors and controlled through the building management system.

CAFETERIA

Each Cafeteria will be handled by a dedicated rooftop air-handling unit.

This unit will provide both heating and cooling. The rooftop unit will utilize the demand controlled ventilation sequence of operation. This strategy permits the modulation of the outside air dampers and fan speed based on the level of CO₂ in the space.

Space temperature will be sensed with remote space mounted sensors and controlled through the building management system.

KITCHEN

The kitchen areas will be handled by a roof mounted, gas fired make-up air handling unit specifically designed to provide tempered air to the kitchen in order to offset the amount of air being exhausted through the kitchen hood.

The kitchen hood exhaust system shall be provided with a Mellink kitchen hood exhaust control system, which is designed to vary the speed of the kitchen hood exhaust fan in response to the intensity of the cooking operations taking place. Essentially, the fan will operate at higher speeds when higher heat and smoke producing cooking is taking place. The Mellink system will also modulate the outside air damper and fan speed of the make-up air unit.

AUDITORIUM

The HVAC needs of the auditorium will be accommodated by a dedicated rooftop air handling unit. The rooftop unit will be furnished with a hot water heating coil and chilled water cooling coil.

This unit will provide both heating and cooling. The rooftop unit will utilize the demand controlled ventilation sequence of operation. This strategy permits the modulation of the outside air dampers and fan speed based on the level of CO2 in the space.

Space temperature will be sensed with remote space mounted sensors and controlled through the building management system.

CONTROLS

Griffith & Vary, Inc. recommends this facility be furnished with a Building Management System. This system will feature full Digital Direct Controls (DDC). This system will be capable of controlling the following:

- Space temperature set point.
- Start and stop of all energy recovery rooftop units and air-handling units.
- Start and stop of chillers.
- Enable/Disable boilers.
- Start and stop of chilled water pumps.
- Start and stop of hot water pumps.
- Schedule occupied/unoccupied times for various spaces.
- Monitoring of supply and return temperatures for hot water and chilled water.
- Optimization of plant efficiency.
- Monitoring of mechanical equipment (fans, pumps, boilers, chiller, etc.) and indication of any alarms, which may result from equipment failures.

To save energy required to heat or cool outdoor air, carbon dioxide sensors will be employed in the gymnasium, auditorium, and cafeteria to allow a reduction of outdoor air during periods of low occupancy and motion sensors will also be utilized to allow closure of outdoor air dampers when assembly areas are unoccupied. Classrooms will also have occupancy sensors to modulate the terminal box volume control dampers as a means of saving energy during periods when the classrooms are unoccupied.

Pursuant to the requirements of MGL Chapter 149, Section 44M, the following schematic level life-cycle cost estimates have been prepared, which will define the cost associated with the installation and energy consumption related to the HVAC systems in this particular school project. It should be noted that the following estimates are based on schematic level plans and system sizes and will most likely change as the project design develops more completely.

The construction costs were calculated using the latest edition of the RS Means Mechanical Cost Data book combined with the latest sub-bid results from similar projects. Energy costs were calculated with the aid of the latest version of the Hourly Analysis Program published by the Carrier Corporation, which utilized typical natural gas and electric rates published by the Energy Information Administration. Maintenance costs were also obtained from RS Means.

Summary of Costs:

- HVAC Construction Cost: **\$6,807,900.00**
- HVAC Systems Annual Electric Energy Cost: **\$160,700.00**
- HVAC Systems Annual Gas Energy Cost: **\$21,800.00**
- HVAC Systems Annual Maintenance Cost: **\$6,500.00**

BUILDING SYSTEMS NARRATIVES UPDATED ELECTRICAL

ELECTRIC SERVICE

The building electric service will be served via a pad mounted transformer located on site and installed by the electric utility company. Primary service conduits in concrete duct bank will be provided from the electric utility pole to the transformer via electric utility co. standard manholes. Secondary service feeders and conduits in concrete duct bank will be provided from the transformer to the switchboard. The electric utility co. meter will be mounted on the transformer.

TELEPHONE SERVICE

Telephone service conduits will be provided from a utility pole to the building demarcation point (MDF Room).

FIRE ALARM SERVICE

The fire alarm system will call the Fire Department via radio master box and antenna, and telephone dialer as required by the Fire Department.

CABLE TV SERVICE

Cable TV service conduits will be provided from a utility pole to the building demarcation point (MDF Room).

POWER DISTRIBUTION

The switchboard will be located in the main electric room. Preliminary load calculations indicate that the switchboard will be rated at 4000 amperes, 277/480 volt, three phase, four wire. The main will be provided with a surge protection device. A switchboard distribution section will feed 277/480 volt panelboards and major Mechanical and Plumbing equipment. Dry-type transformers will be provided to distribute 120/208 volt power for branch circuit panelboards and the Kitchen panelboards. One of the kitchen panelboards will be provided with a shunt trip main circuit breaker which will trip if fire suppression under hoods is initiated, shutting down all circuits under hoods. Panelboards with surge protection devices for computers will be provided, fed from computer grade K-rated transformers. Zero sequence harmonic filters connected to the computer panelboards will be provided to reduce neutral currents.

EMERGENCY POWER SYSTEM

A diesel fuel generator with a sound attenuated, weatherproof enclosure will be provided on the site. The generator will be rated at 500kW, 277/480 volt, three phase, four wire. The generator will supply emergency power automatically upon loss of normal power to emergency loads as selected by the Town. Two automatic transfer switches (ATS's) will be provided to separate emergency from optional standby loads. The emergency ATS and

associated emergency panelboards will be located in two hour rated closets with two hour rated feeders. The optional standby ATS and associated panelboards will be located in normal electric rooms.

FIRE ALARM

An addressable manual and automatic fire alarm system will be provided. The fire alarm control panel will be located in the main electric room or an area as so directed by the Fire Department. A remote annunciator panel will be provided in the Vestibule at the Main Lobby and where required by the Fire Department. A map of the entire building will be framed and mounted adjacent to the annunciator. A keyed box will be provided outside the Fire Department entries. Manual pull stations will be located within five feet (5') of each egress door and at the entrance to each Stair. Additional pull stations will be provided as required by Code. Heat detectors will be provided at the top of the elevator shaft and any other areas not provided with protection by the fire suppression system. Smoke detectors will be provided in the Corridors, in Stairs at each floor level, in the Elevator Machine Room, and at all elevator landings for early detection of smoke for recall. All devices including tamper, flow, pressure switches, and PIV, associated with the fire suppression system will be connected to the fire alarm system. Audio/visual appliances will be provided in the Corridors, Classrooms and all large areas such as the Auditorium, Gymnasium, Student Dining, and Media Center. Visual devices will be provided in Toilet and Conference rooms. Mechanical equipment will be shut down by the fire alarm system as required by Code.

LIGHTING

Interior:

In general, highly efficient LED lighting fixtures will be provided throughout the building. Lighting levels will be in accordance with I.E.S. (Illuminating Engineering Society of North America) recommendations and the Massachusetts State Building Code energy requirements. Classrooms will be provided with direct/indirect lighting fixtures. Office areas and Conference rooms will be provided with volumetric lighting fixtures. The Gymnasium will be provided with high bay lighting fixtures. Storage, Mechanical, and Electrical rooms will be provided with strip lighting fixtures. The Main Lobby, Media Center, and Student Dining will be provided with decorative lighting. The Kitchen and Locker rooms will be provided with gasketed wet location recessed prismatic lighting fixtures. Toilet rooms will be provided with down lights and recessed linear lighting fixtures. The Stairs will be provided with down lights, pendant round lighting fixtures, and wall sconces. Corridors will be provided with volumetric, recessed linear, and pendant lighting fixtures. The Auditorium will be provided with recessed linear lighting fixtures, down lights, step lighting, and wall sconces. The Stage will be provided with theatrical lighting fixtures and a dimming system. The dimming system will be connected to the fire alarm system bringing the house lights to full brightness upon initiation of fire alarm system. Edge lit exit signs will be provided at all egress doors and at additional locations as required to identify exit discharge routes. Vandal resistant exit signs will be provided in the Gymnasium.

Exterior:

Wall and pole mounted site lighting fixtures will be LED type.

SWITCHING

Lighting fixtures in rooms less than 900 square feet, will be controlled primarily by room occupancy sensors and local low voltage override dimmers. Lighting fixtures within primary side lighted areas as defined by ASHRAE 90.1 2010 will be daylight harvested via dimming drivers and photosensors. Larger areas not controlled by occupancy sensors and exterior lighting will be controlled through lighting relay panels and low voltage override switches as tied to EMS for scheduling. Digital timer switches will be provided in Storage and Custodial rooms.

DEVICES

General convenience receptacles will be located throughout the building as required. Receptacles provided in Toilet rooms, near sinks, the Kitchen, and outdoors will be provided with ground fault protection. Circuiting will be provided to Kitchen, Mechanical, and Plumbing equipment, and miscellaneous loads as required.

Automatic receptacle control for at least 50% of all 120 volt 15 and 20 amp receptacles in Private Offices, Open Offices, and Computer Classrooms will be provided.

LIGHTNING PROTECTION

The building will be provided with a lightning protection system made up of air terminals on the roof with downlead conductors to ground.

BI-DIRECTIONAL AMPLIFIER SYSTEM

A bi-directional amplifier with coaxial cabling above accessible ceilings will be provided to amplify Fire Department and Police frequencies to ensure that there are no "dead" spots in the building for communication within building.

TECHNOLOGY SYSTEMS BACK BOX AND CONDUIT SYSTEM

A telephone/data/video/security/clock/speaker conduit system consisting of empty back boxes and conduit with pull strings to above accessible ceilings will be provided for technology. Cable tray will be provided above the Corridor ceilings and MDF and IDF rooms for low voltage wiring.

PV SYSTEM CONDUIT SYSTEM

An empty conduit system with pull strings will be provided for the PV system consisting of photovoltaic panels and an inverter. Conduits will be provided from the switchboard to an exterior mounted disconnect switch for shutting down the PV system if need be. Conduits will also be provided from the exterior disconnect switch to the inverter and from the inverter to the banks of photovoltaic panels.

BUILDING SYSTEMS NARRATIVES UPDATED INFORMATION TECHNOLOGY

The science labs will be capable of accommodating an entire class of students (28). Network access in the science labs will be wireless for students. Wireless access points will be installed. Labs will contain the same instructional equipment as a classroom.

27 10 00 STRUCTURED CABLING

The new network design will support a 10GHZ backbone over single mode and multi-mode fiber and up to 10G over Category 6A to the desktop.

Twelve (12) pairs of single mode fiber and twelve (12) pairs of multi mode fiber will be provided from the MDF to each IDF, to be utilized for data, voice, security systems, etc.

Cat 6A cabling will be provided for data, voice, CCTV, and wireless access points (four data drops at each wireless access point location). Wireless access point outlet placements are intended to provide the capability for complete wireless coverage throughout the school.

Each teacher location will have hard wired data ports available.

Category 6A cabling will be provided for the owner provided phone system (support for Voice over IP). A wall phone location with data drop shall be provided in each classroom.

27 21 00 NETWORK SWITCHES

Network electronics (switches) shall be provided by the owner.

27 21 33 WIRELESS ACCESS POINTS

3x3 Wireless access points will be provided, one access point in each classroom, and three in each large group space. Office suites shall also have an access point. Access points may shall be proprietary, Bluesocket, to ensure compatibility with existing district infrastructure.

27 30 00 VOICE COMMUNICATIONS EQUIPMENT

The phone system shall be provided and installed by the owner. The building shall be cabled to support a voice over IP phone system utilizing Cat 6A.

27 40 00 AUDIO-VISUAL COMMUNICATIONS

Video and audio presentation equipment (wall mounted 70" commercial grade display and Apple TV device and voice lift system with amplifier powering up to 4 ceiling speakers) will be permanently installed in classrooms, labs and designated rooms. The PC/laptop in each classroom shall be provided by the owner. 25 presentation cameras will be provided for use in the school.

Local sound systems shall be provided in each of the two Cafés (5/6 & 7/8) and Gym. Projection shall be provided in the lower level Café. These spaces shall also contain assisted listening systems and wired and wireless microphone systems.

Portable recording systems and microphones shall be provided in band and chorus rooms.

A digital signage package shall be provided, with displays installed where shown on the drawings. A 2x3 video wall shall be provided at the main entry.

27 50 00 DISTRIBUTED COMMUNICATIONS AND MONITORING

A public address system shall be provided. Clocks, synchronized with a master clock, shall be provided in every classroom and conference room, and where designated on the drawings. The PA system shall be integrated with the owner provided phone system to allow the use of the phone system for paging within the building.

28 00 00 ELECTRONIC SAFETY AND SECURITY

An access control system shall be provided. The system shall be by Genetec, and will be proprietary to ensure compatibility with district infrastructure and to leverage the district's existing enterprise solution. Card readers shall be located as designated on the drawings. The system shall integrate with the CCTV system. Every exterior door shall have door contacts and a request to exit device. Interior doors shall also contain door contacts and card readers where shown on the drawings.. The main entry shall be equipped with a video entry system. Panic buttons shall be provided as designated on the drawings.

Intrusion detection system and related components shall be provided. Every first floor room with a window shall have a motion sensor. Motion sensors shall also be placed within the hallways and in vestibules to help partition the building into zones for afterhours use of the facility.

An indoor/outdoor CCTV system (IP based) by Genetec, will be provided. The system shall be proprietary to ensure compatibility with the district's CCTV servers and to leverage the district's existing enterprise solution. Coverage shall include hallways, stairwells, building perimeter, and parking (from the building). Other areas, such as the gym, auditorium, café, and admin area shall be included.

LOCAL, STATE, & UTILITY OFFICIALS REVIEW CERTIFICATION

LOCAL, STATE & UTILITY OFFICIALS REVIEW CERTIFICATION

May 11, 2016
Massachusetts School Building Authority

Re: City of Beverly Permit and Filing Status
Sarah Blanche, Project Manager,

The new Beverly Middle School building design is 60% complete and site and structural is 100% (Early Bid Package #2, released 3.1.2016 and Early Bid Package #3, released 4.18.2016) complete. In an effort to obtain the required permits for construction to commence immediately for site and structural followed by the building in the fall of 2016, the Design Team has met with and continues to meet with the following Departments in the City of Beverly on a regular basis:

- Mayor's Office
- Department of Public Services
- Department of Engineering
- Department of Economic Development
- Municipal Inspection/Building Department
- Health Department
- Beverly Fire Department
- Beverly Police Department
- Planning Board
- Conservation Commission

The Design Team has also facilitated meetings and conversations with the following local and state agencies/utility companies for the purposes of providing building and site planning information to further develop the design for the new Beverly Middle School project:

- National Grid (Electrical and Gas Service Provider)
- Comcast (Telephone/Internet and Cable Television Service)
- Massachusetts Historical Commission
- Massachusetts Department of Transportation

The information obtained during these meetings with the utility companies, state and local officials have been incorporated into the 60% Construction Documents.

Sincerely,
Ai3 Architects, Inc.



Troy L. Randall, Partner, AIA LEED AP BD+C

BUILDING CODE ANALYSIS

BUILDING CODE ANALYSIS

The building's code compliance review was performed by an independent consultant as part of the Design Team. Cosentini Associates review the schematic plans for the new Beverly project as part of the Schematic Design submission dated August 6, 2015. Several design meetings were held with the code consultant to specifically review the code analysis sheets included in the 60% Construction Document drawing set. Design discussions focused on travel distances, stair enclosures, construction type, building use type, occupancy loads and calculations.

The new Beverly Middle School project will be designed in accordance with 780 CMR, Massachusetts State Building Code, 9th Edition, which primarily references the 2015 International Building Code (IBC). The building is designed in accordance with the International Energy Conservation Code 2015 (IECC) with Massachusetts amendments as the baseline energy code. The building will be a combination of Type 2A and Type 2B construction with square footages that comply with the allowable building height and area for this building type. The building will be fully sprinklered.

60% Construction Document plans and specifications have been reviewed by our code consultant, Cosentini Associates, Inc. and their 60% Construction Document review letter of compliance is attached. Please refer to the following Code Analysis Sheets in the 60% Construction Documents submittal for more details (G0.01, G0.02, G0.03, G0.04 and G0.05).



Fire and Code Consulting Engineers

101 Federal Street, 6th Floor
Boston, MA 02110

T: 617.748.7800
F: 617.748.7801

www.cosentini.com

Drawing Reviews
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Smoke Control System Design
3rd Party Reviews

May 5, 2016

Troy Randall
A13 Architects
526 Boston Post Road
Wayland, MA 01778

Re: **Beverly Middle School**
Code Analysis Review

Dear Mr. Randall,

Cosentini Associates has reviewed the drawings dated April 18, 2016 for the above referenced project. The drawings reviewed included the following:

Drawing G0.01, Code Analysis
Drawing G0.02, First Floor Fire Safety Plan
Drawing G0.03, Second Floor Fire Safety Plan
Drawing G0.04, Third Floor Fire Safety Plan
Drawing G0.05, Fourth Floor Fire Safety Plan

The drawings were reviewed for compliance with the major fire protection and life safety criteria of the applicable codes. In our opinion, the Beverly Middle School drawings reviewed (as noted above) are in compliance with the requirements of the Massachusetts State Building Code, Ninth Edition.

Sincerely,

COSENTINI ASSOCIATES, INC.
Code Consulting and Fire Engineering Services

Rockwood J. Edwards, PE | Vice President
Phone: 617-748-7800 | Fax: 617-748-7801 | Direct Dial: 617-748-0021
redwards@cosentini-ma.com

Cosentini Associates, Inc. - A Tetra Tech Company
101 Federal Street – Suite 600
Boston, MA 02110
www.cosentini.com

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ADA/MAAB ANALYSIS

ADA/MAAB ANALYSIS

The building's accessibility compliance review was performed by an independent consultant as part of the Design Team. Kessler McGuiness & Associates, LLC prepared a detailed review of the Beverly Middle School drawings for accessibility compliance for persons with disabilities.

Kessler McGuiness & Associates, LLC review the site and building drawings for the new Beverly Middle School. The review focused on compliance with ADA (Americans with Disabilities Act), specifically for compliance with the 2010 ADA Standards for Accessible Design (ADAAG). The drawings were reviewed from compliance with 521 CMR MAAB (Massachusetts Architectural Access Board) which is a specialized section of the Massachusetts State Building Code enforced by the Massachusetts Access Board. Please refer to the attached review letter of compliance based upon the 60% Construction Drawings for site and the building provided for their review.



Kessler McGuinness & Associates, LLC

1121 Washington St.
Newton, MA 02465

V/TTY 617.641.2802
FAX 617.641.2812

www.kmaccess.com
info@kmaccess.com

April 14, 2016

MEMO

To: Brian Heney, LEED AP BD+C

From: Katie McGuinness

Re: **Beverly Middle School**
Beverly, MA

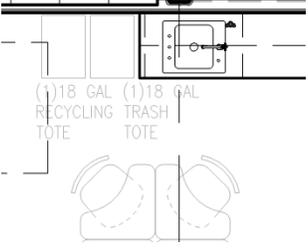
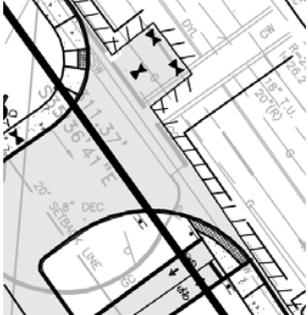
KMA has reviewed the 60% Construction Document drawings which include Architectural, Civil and Landscape Drawings (Rev. dates 04.18.16) of Beverly Middle School, for compliance with:

- ***The 2010 ADA Standards for Accessible Design***
- ***521 CMR: The Rules and Regulations of the Massachusetts Architectural Access Board***

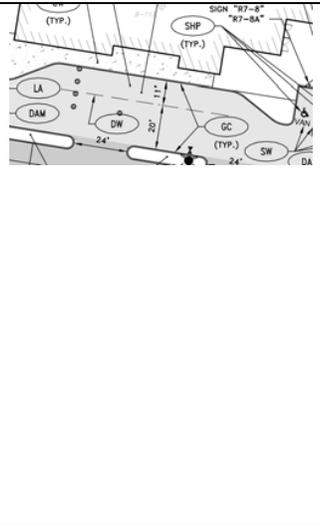
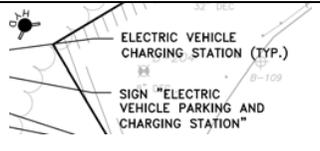
The plans were found to be in substantial compliance, with a few exceptions to be clarified or addressed as construction documents progress. The accessible design issues identified in the review¹ are listed on the following pages.

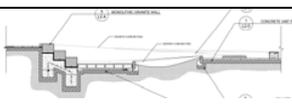
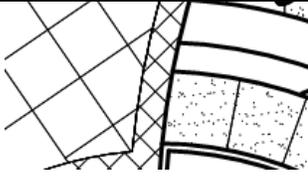
¹ The ADA is a complex civil rights law and 521 CMR is a specialized section of the Massachusetts Building Code. Their requirements are sometimes subject to interpretation by regulatory and/or judicial entities. They contain many concepts and terms which have not yet been fully tested by actual experience or defined in the courts with respect to particular factual situations. The MAAB often interprets its regulations to require greater access than may be understood to be required from a plain reading of its regulations. This review was performed to the professional standard of care of consultants in the community for this type of work.

General Notes			
		Barrier	Example
1.	GN -1	<p>Where required maneuvering space is designed to minimum dimensions there is no room for construction tolerances. For example, the application of tile to vertical surfaces could decrease the clear floor space below the minimum required. KMA recommends that this clear floor space be specified to address elements that typically reduce dimensions – e.g. baseboards, moldings, and tile applied to vertical surfaces and/or that 1"- 2" of additional clear space be provided.</p> <p>For example, current plans show the accessible stalls in multi-user toilet rooms at exactly 60" wide. In addition, when toilet rooms are designed to minimum standards, there is often no place for trash cans and dispensers to be installed without interfering with the required clear floor and maneuvering spaces.</p> <p>Design Team Response: The clear dimension shall be adjusted accordingly for compliance.</p>	<p>The diagram shows a top-down view of a toilet stall. A horizontal dimension line indicates a clear width of 5'-0". A toilet fixture is shown within the stall, and the clear space is defined by the walls and the fixture's footprint.</p>
2.	GN-2	<p>Lockers</p> <p>Confirm that a minimum 5% of student lockers have hardware that can be operated with a closed fist; and are evenly distributed. This includes hallway lockers, lockers within all P.E. areas and employee areas.</p> <p>Design Team Response: Compliance is a requirement of the project specification.</p>	<p>The diagram shows a top-down view of a locker bank. A dimension line indicates a clear width of 18 1/2 inches between the lockers. The lockers are arranged in a row, and the clear space is defined by the edges of the locker units.</p>
3.	GN-3	<p>Tables/Desk/Lab Desks</p> <p>Confirm at least 5%, and no less than one (1) of each type of table/desk within each space has minimum knee clearance of 27" AFF, 30" wide and 19" deep. A table base, such as a pedestal base, cannot interfere with these dimensions.</p> <p>Design Team Response: Compliance is a requirement of the FF&E bid documents.</p>	<p>The diagram shows a top-down view of a teaching station or research area. It features a table with chairs around it. A dimension line indicates a clear width of 4 inches. The text 'TEACHING STATION/ RESEARCH' is present in the diagram.</p>

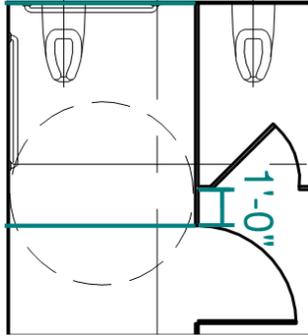
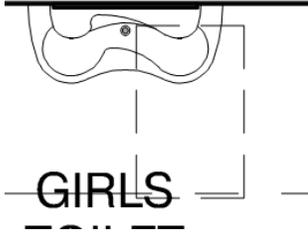
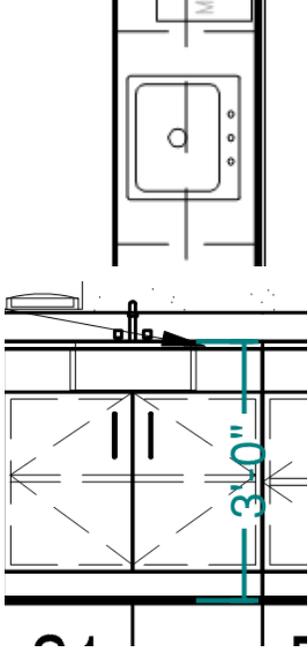
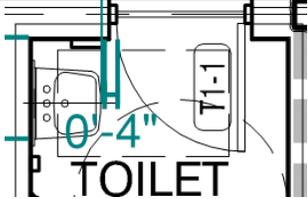
4.	GN-4	<p>Classrooms with Sinks</p> <p>Confirm all classrooms with sinks intended for student use provide at least 5% (and no less than one sink) that:</p> <ul style="list-style-type: none"> • Has knee clearance below that is minimum 27" AFF, 30" wide and 19" deep. • Is mounted maximum 34" AFF. <p>Design Team Response: Compliance is confirmed.</p>	
5.	GN-5	<p>Egress</p> <p>Confirm that there are accessible means of egress from all required EXITS (at the level of exit discharge) to a public r-o-w; or 100' from building; or with exterior areas of rescue assistance as defined in 521 CMR 20.12.2. (521 CMR 20.11)</p> <p>Design Team Response: Compliance is confirmed.</p>	No Image
Civil + Landscape Drawings			
	Sheet	Barrier	Example
6.	C2.0	<p>Curb Cuts Cabot Street</p> <p>Some of the reciprocal curb cuts along Cabot Street are not angled perpendicular to be perpendicular to the curb <u>and</u> perpendicular to the crosswalk or pedestrian path.</p> <p>Design Team Response: We understand that pedestrian paths of travel must be perpendicular to the curb, however, specific, limited conditions when the curb cut cannot be located perpendicular to the path of travel, an apex cut may be used. (521 CMR 21.2.1). The sidewalk along Cabot Street has been updated to provide a 3' grass strip between the roadway and the sidewalk. This change has allowed the curb ramps in the area to be modified be oriented closer to perpendicular to the path of travel. The conditions of 521 CMR 21.2.1 have been met.</p>	

<p>7.</p>	<p>C2.0</p>	<p>Curb Cuts – Balch Street</p> <p>If there is a sidewalk along the vehicular way from the Balch Street entrance, a reciprocal curb cut is required.</p> <p>Design Team Response: An existing reciprocal curb cut is located across the Balch Street entrance west of the abutter's driveway. This requirement is met.</p>	
<p>8.</p>	<p>C2.0</p>	<p>Curb Cuts – General</p> <p>Wherever the sidewalks on the opposite side of the street along Cabot and Balch Street provide a curb cut, confirm a reciprocal curb cut is provided on the school side of the sidewalks.</p> <p>Design Team Response: Sidewalks on the opposite side of Cabot and Balch were reviewed for existing curb cuts. No curb cuts requiring reciprocal curb cuts on the school site of the street exist. New accessible cross walks are proposed across Cabot and Balch St as part of this project. This requirement is met.</p>	
<p>9.</p>	<p>C2.0</p>	<p>Accessible Parking</p> <p>The northwest parking lot has one (1) parking space identified as accessible. The total number of spaces in this lot is 44 parking spaces, which would require a minimum of two (2) accessible parking spaces that need to be provided. Both accessible spaces need to be on the closest route to an accessible entrance.</p> <p>Design Team Response: The total number of parking spaces on the site is 361. The total number of accessible parking spaces on site is 14. These parking spaces are distributed throughout the parking facilities around the site. All Accessible parking spaces have been placed near accessible entrances. 24 employee parking spaces are provided in the northwest parking area. For the 24 spaces, one accessible space is provided. The remainder of the spaces (44) is fleet parking spaces for school buses and vans. It is understood that under the exemption in section 208.1 "Parking spaces used exclusively for buses, trucks, other delivery vehicles, law enforcement vehicles, or vehicular impound shall not be</p>	

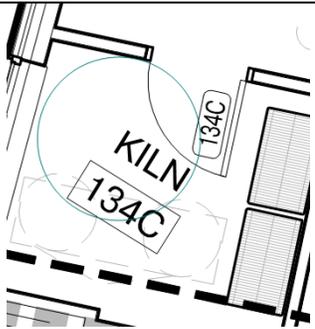
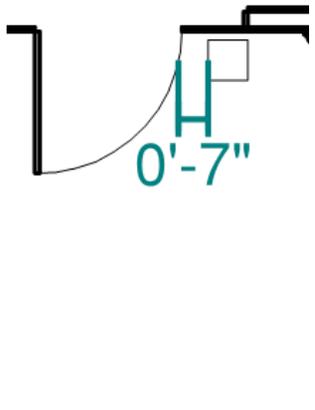
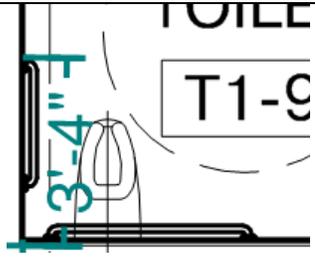
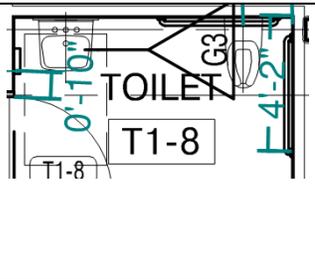
		required to comply with 208"	
10.	C2.0 L3.1	<p>Playing Fields</p> <p>Confirm an accessible path of travel is provided to both sides of each playing field. Landscape drawings appear to identify grass in these areas and the surrounding path is marked for bicycle use.</p> <p>Design Team Response: The grass area in the southwest corner of the site is an open multi-use field not designated for any specific sport or use. The field markings are not part of the project and have been removed from the drawing.</p>	
11.	C2.1	<p>Parent Drop Off Area</p> <p>There is no identified accessible Drop Off Area on plans. Confirm:</p> <ul style="list-style-type: none"> • Detectable warning and/or bollards are provided to separate vehicular and pedestrian routes. • An access aisle will be marked "so as to discourage parking". • Reference 2010 ADA Standards 503. <p>Design Team Response: An ADA drop off area has been provided with a detectable warning panel. Additionally, a cross walk is provided to the ADA parking perpendicular to the ADA drop off space. The dotted line is pavement striping intended to separate the drop-off area from the vehicular path</p>	
12.	C2.1	<p>Parking</p> <p>Confirm Electric Car charging station controls are:</p> <ul style="list-style-type: none"> • Within reach range (48" AFF). • Operable. 	

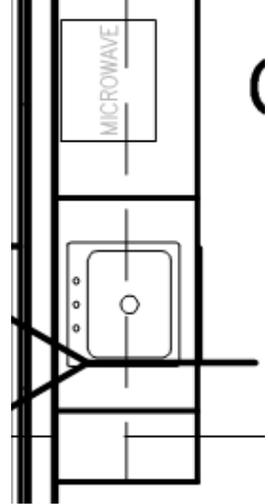
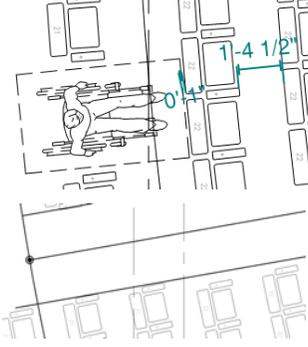
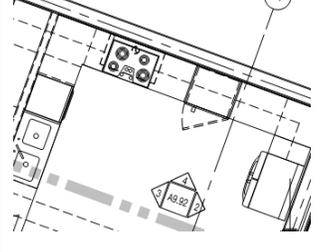
		<ul style="list-style-type: none"> • Have a 30" x 48" clear floor space and • Are on an accessible route. <p>Design Team Response: Each Electric Vehicle Charging station is on an accessible route and is adjacent to an area having 30" x 48" clear floor space. Based on a review of the charging station cut sheet, the equipment is within the operable range.</p>	
13.	C2.1 L2.4	<p>Amphitheatre Seating</p> <p>Confirm:</p> <ul style="list-style-type: none"> • Integrated accessible wheelchair seating will be provided. • Shoulder-to-shoulder alignment of accessible space and companion seat. • There is an accessible route to the accessible seating. <p>Design Team Response: Integrated seating has been accommodated in the latest set of construction drawings dated 2016.04.18 detail 5/L2.4.</p>	
14.	L2.4	<p>Amphitheatre</p> <p>The pathway at the Amphitheatre slope has not been identified. Confirm slope will not exceed 5% running and 2% cross-slope.</p> <p>If the slope is > 5% and this is intended as a ramp, then a variance will be required since circular ramps are not permitted, per 521 CMR 24.10.</p> <p>Design Team Response: Slope for the amphitheater will not exceed 5% see civil engineering drawings for detailed grading plans.</p>	
15.	L.1.0	<p>Hardscape Material</p> <p>The landscape plans identify several types of material for ground covering. Ensure that there are smooth transitions between different materials and that if there is a level change, it is less than 1/2" and beveled.</p> <p>Design Team Response: Paving transitions from paver to paver and paver to pcc of bcp shall be a smooth level change. All paver materials specified as a basis of design have beveled edge.</p>	

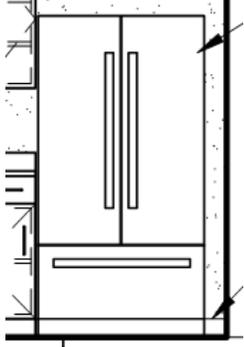
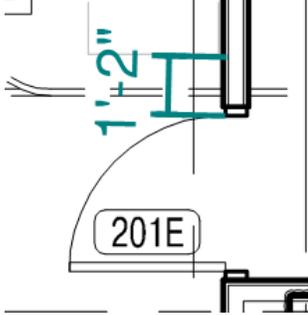
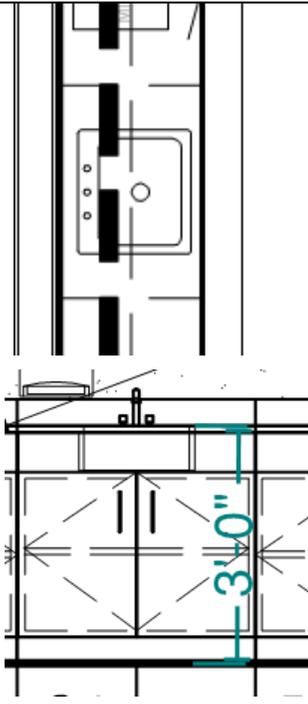
Architectural Drawings			
	Sheet	Barrier	Example
16.	A1.04	<p>Gymnasium #1</p> <ul style="list-style-type: none"> The location of the wheelchair spaces overlaps the accessible route. Confirm egress route and modify if needed. The location of the wheelchair spaces does not provide shoulder alignment with companion seating, per ADA 802.3.1 <p>Design Team Response: An accessible route of 3'-3" is provided between the wheelchair spaces and the competition court. The documents have been adjusted to provide shoulder alignment compliance.</p>	
17.	A1.04	<p>Single-User Toilet Rooms (TL-1B/TL-2B)</p> <p>The door has <18" on the latch pull side for a forward approach @ 14".</p> <p>Design Team Response: Doors TL-1B & TL-2b have been relocated for compliance with 20" of clearance.</p>	
18.	A1.04	<p>Health Classroom</p> <p>Many pieces of equipment lack a minimum 30" x 48" clear floor space. At least one (1) of each type of equipment is required to have clear floor space.</p> <p>Note: Clear floor space can be shared by two pieces of equipment.</p> <p>Design Team Response: Compliance is a requirement of the FF&E bid documents.</p>	
19.	A1.04 A8.33	<p>Girls Locker Room (L05) + Boys Locker Room (L11)</p> <p>The accessible dressing room bench lacks minimum 30" x 48" clear floor space that is perpendicular to the short side of the bench, as required per 2010 ADA 903.2. Confirm that the 60" turning radius is not impeded by the bench.</p> <p>Design Team Response: The layout has been adjusted accordingly to provide compliance.</p>	

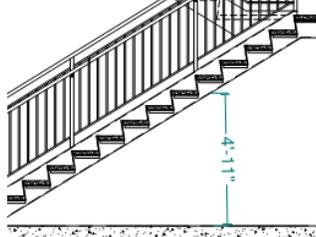
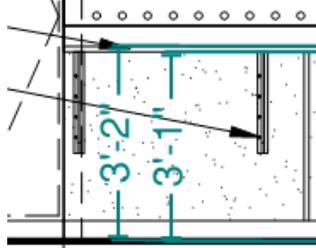
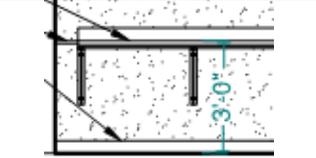
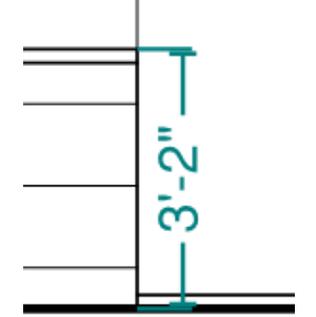
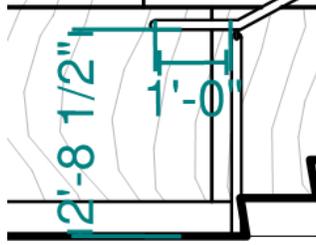
<p>20.</p>	<p>A1.04 A8.33</p>	<p>Girls Toilet (TL-3)</p> <p>The stall door has <18" on the latch pull side for a forward approach @ 12".</p> <p>Design Team Response: The layout has been adjusted accordingly to provide compliance.</p>	
<p>21.</p>	<p>A1.04 A8.33</p>	<p>Boys/Girls Toilet - Lavatory</p> <p>Confirm minimum knee space/depth is provided.</p> <p>ADA 2010 Section 306.2.3 and 521 CMR 30.9.2 require a minimum 17" depth at 27" AFF below the lavatory to allow for knee clearance.</p> <p>Design Team Response: The sink fixture is confirmed ADA compliant.</p>	
<p>22.</p>	<p>A1.11 A9.72</p>	<p>Teachers Main & Time Room</p> <p>The sink is mounted > 34" AFF @ 36" AFF.</p> <p>Note: Although MAAB does not cover employee areas, the 2010 ADA Standards consider employee break rooms places of public accommodation. Sinks within kitchens that do not provide conventional cooking appliance, are required to be mounted maximum 34" AFF and have an accessible parallel approach.</p> <p>Design Team Response: The sinks in the employee areas are confirmed to be mounted at an accessible height and shall be provided with knee clearances for front approach for front approach compliance.</p>	
<p>23.</p>	<p>A1.11</p>	<p>Toilet T1-1</p> <p>The door has <18" clear floor space on the latch pull side for a forward approach @ 4".</p> <p>Design Team Response: The layout has been adjusted accordingly to provide compliance.</p>	

<p>24.</p> <p>A1.11 A1.12 A1.13 A1.21 A1.22 A1.23 A1.31 A1.32 A1.41 A1.42 A1.43</p>	<p>Prep Room</p> <p>The door lacks the minimum 48" clear maneuvering space on the push side for a forward approach. The location of desks at the Small Inclusion Room interferes with the required clear maneuvering space.</p> <p>Rooms: 113B, 131B, 139B, 213B, 231B, 239B, 313B, 331B, 413B, 431B, 439B</p> <p>Design Team Response: The layout has been adjusted accordingly to provide compliance.</p>	
<p>25.</p> <p>A1.11</p>	<p>Toilet T1-2B</p> <p>The door has <32" clear width. A column appears to be in the door. Confirm/modify (graphical?) error.</p> <p>Design Team Response: The layout has been adjusted accordingly to eliminate this conflict.</p>	
<p>26.</p> <p>A1.12</p>	<p>Drinking Fountains (Corridor C102A)</p> <p>The drinking fountain protrudes >4" into the circulation space @ 7".</p> <p>Note: The accessible drinking fountains, per their clearance requirements, are not within the detectable range for someone using a cane. Placing drinking fountains in an alcove is an acceptable strategy, provided the alcove is deep enough.</p> <p>Design Team Response: The layout has been adjusted accordingly to provide compliance.</p>	
<p>27.</p> <p>A1.11 A1.12 A8.31 A9.61</p>	<p>Toilet Rooms 4A/4B</p> <p>The door has <18" clear maneuvering space on the latch pull side @ 14".</p> <p>Toilet Rooms: T1-4A, T1-4B, T2-4A, T2-4B, T3-4A, T3-4B, T4-4A, T4-4B, T1-2B, T1-3B</p> <p>Design Team Response: The layout has been adjusted accordingly to provide compliance.</p>	

28.	A1.13	<p>Kiln Room (132C)</p> <p>If intended for student use, the room lacks minimum 60" turning space. Confirm space using actual dimensions of equipment to be used.</p> <p>Design Team Response: The layout has been adjusted accordingly to provide compliance.</p>	
29.	<p>A1.13</p> <p>A1.23</p> <p>A1.33</p> <p>A1.43</p>	<p>Boys Toilet/Girls Accessible Toilet Stall</p> <p>The accessible stall door has < 18" on the latch pull side for a forward approach @ 7".</p> <p>Rooms: T1-5A, T1-6A, T2-5A, T2-6A, T3-5, T3-6A, T4-5A, T4-6A</p> <p>Design Team Response: The item noted as an obstruction is a plumbing floor drain. This item will not interfere with clear floor space requirements at the accessible stall.</p>	
30.	A1.14	<p>Toilet T1-9</p> <p>The side wall grab bar ends < 42" long and positioned < 54" from the rear wall @ 40".</p> <p>Design Team Response: The layout has been adjusted accordingly to provide compliance.</p>	
31.	A1.14	<p>Toilet T1-8</p> <ul style="list-style-type: none"> The door has < 18" clear maneuvering space on the latch pull side for a forward approach @ 10". The side wall grab bar ends < 54" from the rear wall @ 50". <p>Design Team Response: The layout has been adjusted accordingly to provide compliance.</p>	

<p>32.</p>	<p>A1.14</p>	<p>Custodian Break Room (146B1)</p> <p>Confirm the sink is mounted maximum 34" AFF.</p> <p>Note: Although MAAB does not cover employee areas, the 2010 ADA Standards consider employee break rooms places of public accommodation. Sinks within kitchens that do not provide conventional cooking appliance, are required to be mounted maximum 34" AFF and have a parallel approach.</p> <p>Design Team Response: The sinks in the employee areas are confirmed to be mounted at an accessible height and shall be provided with knee clearances for front approach for front approach compliance.</p>	
<p>33.</p>	<p>A1.14 A10.41</p>	<p>Auditorium 151A</p> <ul style="list-style-type: none"> The locations of the wheelchair spaces do not provide the same distance as other rows between the front edge of the wheelchair accessible space and the back of the next row. This means that the wheelchair user would have to move whenever someone wanted to leave that row. <p>Design Team Response: The layout has been adjusted accordingly to provide compliance.</p> <ul style="list-style-type: none"> The seating aisle ramps do not identify slope. If the running slope is > 5% handrails must be provided. A variance is required in order not to provide handrails adjacent to seating. <p>Design Team Response: Seating aisle ramps are 1:13 slope and therefore will require a variance.</p> <ul style="list-style-type: none"> Confirm signage for companion seating. Confirm assistive listening device is installed and include corresponding identifying signage. Confirm at least 1% of fixed seats have removable armrests and has corresponding identifying signage. <p>Design Team Response: Compliance is a requirement of the project specification for the three items listed above.</p>	
<p>34.</p>	<p>A1.14 A9.92</p>	<p>Attain (Autism) Room</p> <p>The kitchen:</p> <ul style="list-style-type: none"> Lacks a wall oven with floor of the wall oven mounted 30" AFF. Lacks a breadboard adjacent to the wall oven. <p>Design Team Response: The wall oven is placed 30" AFF with breadboard located adjacent per casework</p>	

		<p>type F9.</p> <ul style="list-style-type: none"> The refrigerator freezer is located at the bottom rather than side by side or above the refrigerator, per 521 CMR 32.9 <p>Design Team Response: The refrigerator shall be a side by side refrigerator and the graphic shall confirm compliance.</p>	
<p>35.</p>	<p>A1.21</p>	<p>Resting (201E)</p> <p>Where the bed is positioned, the door lacks minimum 18" clear maneuvering space on the latch pull side for a forward approach @ 14". Confirm the bed can be repositioned to allow clear maneuvering space at the door.</p> <p>Design Team Response: The layout has been adjusted accordingly to provide compliance.</p>	
<p>36.</p>	<p>A1.22 A9.61</p>	<p>Teachers Collaboration Room</p> <p>The sink is mounted maximum >34" AFF @ 36" AFF.</p> <p>Note: Although MAAB does not cover employee areas, the 2010 ADA Standards consider employee break rooms places of public accommodation. Sinks within kitchens that do not provide conventional cooking appliance, are required to be mounted maximum 34" AFF and have a parallel approach.</p> <p>Design Team Response: The sinks in the employee areas are confirmed to be mounted at an accessible height and shall be provided with knee clearances for front approach for front approach compliance.</p>	

37.	<p>A8.11 A10.26 A10.27</p>	<p>Stairs (Typical)/Student Dining</p> <p>The circulation route lacks minimum 80" headroom at the open stairs.</p> <p>Design Team Response: The layout has been adjusted to accommodate a cane detection area to prevent circulation and provide compliance.</p>	
38.	<p>A9.41</p>	<p>Multimedia + Video Applications Lab Elevation</p> <p>The desk top is >28"-34" AFF @ 37" AFF. See GN-3.</p> <p>Design Team Response: The layout has been adjusted to provide compliance.</p>	
39.	<p>A10.11</p>	<p>Multimedia Makerspace Editing Elevation</p> <p>The desk top is >28"-34" AFF @ 37" AFF. See GN-3.</p> <p>Design Team Response: The layout has been adjusted to provide compliance.</p>	
40.	<p>A10.21 A10.22</p>	<p>Student Dining Interior Elevations</p> <p>If this area is intended as a service counter it is > 34" AFF @ 38" AFF.</p> <p>Design Team Response: The location will not be a service counter.</p>	
41.	<p>A10.41</p>	<p>Auditorium Interior Elevation</p> <p>The stair handrail extensions are above 27" and protrude > 4" into the circulation space @ 12".</p> <p>Design Team Response: The layout has been adjusted to provide compliance.</p>	

Please call if you have any questions.

INTERIOR MATERIALS COLOR BOARDS

INTERIOR MATERIALS COLOR BOARDS

One of the primary goals in architecture is to inspire and evoke human emotions through design. As educational designers, we have a unique opportunity to predictably elicit specific behavior and emotional responses through thoughtful design theories manifested in the built environment. Color selection is a crucial component of this process. Color theory in educational facilities, especially in middle school environments, is of utmost importance when dealing with young adults. Color selections can sway thinking, change actions, and cause reactions. Use of color can enhance students' visual processing, while simultaneously promoting calm in an open, safe atmosphere.

We advocate a strategy of "functional" color selection in lieu of "aesthetic" color selection. This functional approach to color selection focuses on using color to achieve an end result such as reduced eye fatigue, increased attention span, and supporting desired behavioral responses in multiple educational settings. We recommend the following functional color selections for the Beverly Middle School. The selections below specifically avoid the use of trendy colors that will appear dated in five to ten years.

CLASSROOMS

Visual stimulation strengthens mental association in the brain, evolving into visual thinking and bolstering creativity. Classroom color selection is vital to student performance. Blacks, browns, and red colors are proven to have a negative impact on the classroom learning environment. Stark white colors, which are appropriate for institutional spaces, are inappropriate for educational facilities because they offer the most light reflectance, thereby causing eyestrain and limited student focus. Classroom colors should be selected in a cream or taupe color palette, which offer a relaxing atmosphere that will allow learners to focus. It is important to select colors in this range with a light reflectance value (LRV) of 85% or higher. A high light reflectance value improves the daylighting quality of the classroom by distributing exterior natural light more evenly. Using the correct color selection on the teaching wall in classrooms will help to reduce instances of eyestrain for students by helping eyes to relax as students look up from a task. Studies suggest that the teaching wall colors should be a medium hue with a LRV of 50% - 60%; the remaining walls will have a neutral tint such as Oyster White, Sandstone, or Beige. The teaching wall treatment also helps to relieve the visual monotony of a classroom and studies have shown this color transition can stimulate a student's brain activity.

LIBRARY MEDIA CENTER

The Beverly Middle School Library Media Center will utilize a color palette that enhances quietness and concentration. The color tones conducive to this type of environment would include pale and light shades of earth color tones complimenting wood trim throughout the Media Center. The ceiling treatment would consist of ACT ceiling tiles, GWB painted soffits with a high LRV to help distribute daylight evenly, and wood ceiling panels. The lighting will complement the color selection and provide a warm inviting color temperature conducive to a calm environment for reading and concentration.

In areas such as Student Dining and the Gymnasium, the color palette will consist of warm stimulating colors with yellow and orange tones. Accents will consist of burgundy (deep red) and navy colors to promote a cheerful, non-aggressive response. Brighter red tones are commonly known to promote aggressive behavior when used in high reaction spaces, therefore its use should be limited to accents.

Research has also highlighted the positive effects the use of natural materials has on human health and well-being. Many natural materials, specifically wood, is considered visually appealing and to have a calming effect on its occupants, resulting in reduced stress and anxiety. The use of natural materials and a color palette is inspired by nature that also reminds us of our connection to the natural environment.

MAIN LOBBY



SW6385
Dover White



SW7062
Rock Bottom



SW6140
Moderate White



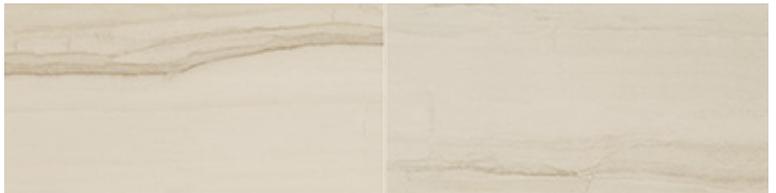
SW6258
Tricorn Black



Plastic Laminate: Wilsonart 7909-60 Fusion Maple
Natural Wood: Clear Finish Maple



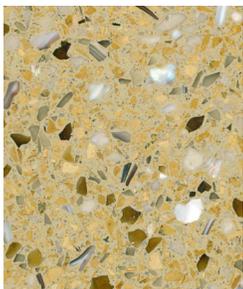
Plastic Laminate: Wilsonart 7971K-12 Uptown Walnut
Natural Wood: Clear Finish Walnut



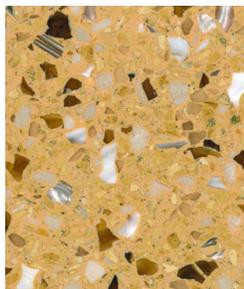
Porcelain Stone Wall Tile
Crossville Moonstruck: AV303 Kosmos



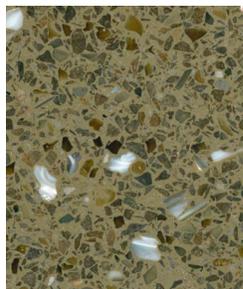
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Custom Field Color



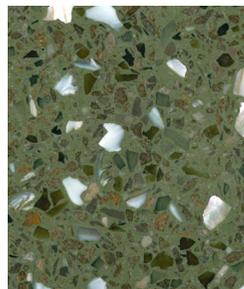
Epoxy Terrazzo
Custom Accent 1



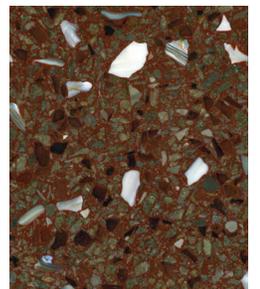
Epoxy Terrazzo
Custom Accent 2



Epoxy Terrazzo
Custom Accent 3



Epoxy Terrazzo
Custom Accent 4



Epoxy Terrazzo
Custom Accent 5

LIBRARY MEDIA CENTER



SW6385
Dover White



SW6140
Moderate White



SW7062
Rock Bottom



Carpet
Tandus Cypher: 39302
Vapor Trail



Carpet
Tandus Cypher: 39306
Dew



Carpet
Tandus Cypher: 39305
Heat Wave



Plastic Laminate: Wilsonart 7909-60 Fusion Maple
Natural Wood: Clear Finish Maple



Plastic Laminate: Wilsonart 7971K-12 Uptown Walnut
Natural Wood: Clear Finish Walnut

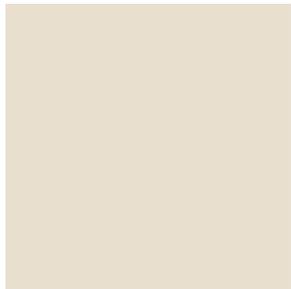
STUDENT DINING



SW6385
Dover White



SW7062
Rock Bottom



SW6140
Moderate White



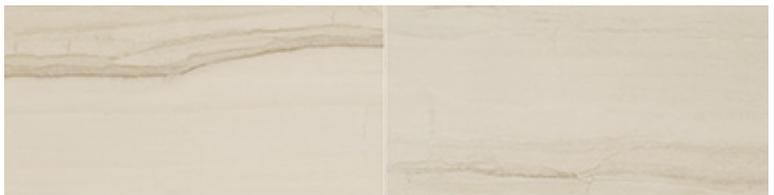
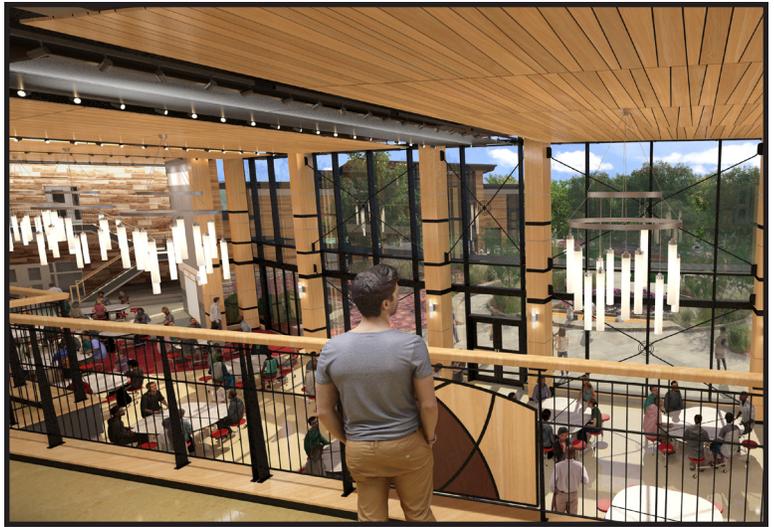
SW6258
Tricorn Black



Plastic Laminate: Wilsonart 7909-60 Fusion Maple
Natural Wood: Clear Finish Maple



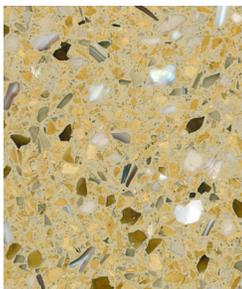
Plastic Laminate: Wilsonart 7971K-12 Uptown Walnut
Natural Wood: Clear Finish Walnut



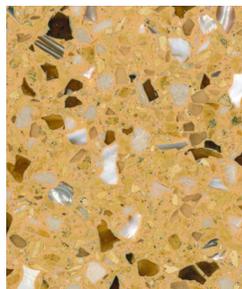
Porcelain Stone Wall Tile
Crossville Moonstruck: AV303 Kosmos



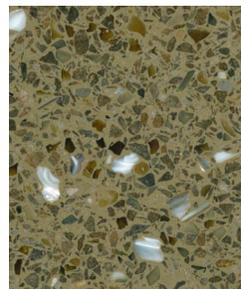
Epoxy Terrazzo
Custom Field Color



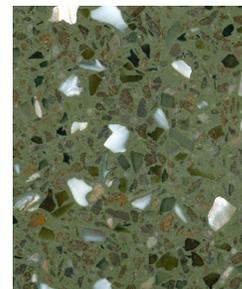
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Custom Accent 1



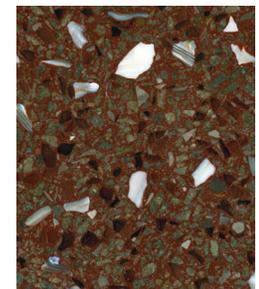
Epoxy Terrazzo
Custom Accent 2



Epoxy Terrazzo
Custom Accent 3



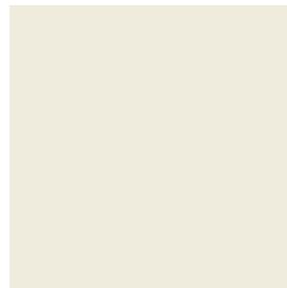
Epoxy Terrazzo
Custom Accent 4



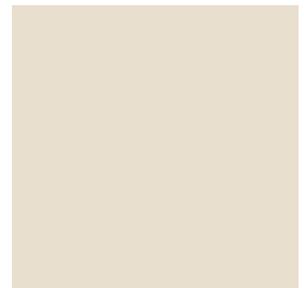
Epoxy Terrazzo
Custom Accent 5



Plastic Laminate: Wilsonart 7909-60 Fusion Maple
 Natural Wood: Clear Finish Maple



SW6385
 Dover White



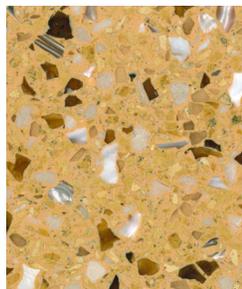
SW6140
 Moderate White



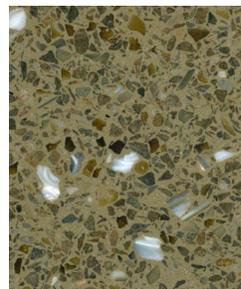
Epoxy Terrazzo
 Custom Field Color



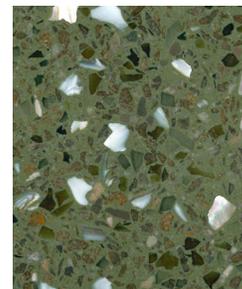
Epoxy Terrazzo
 Custom Accent 1



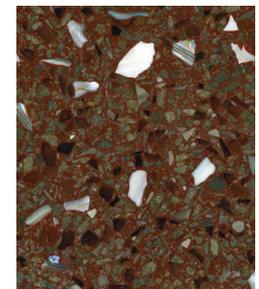
Epoxy Terrazzo
 Custom Accent 2



Epoxy Terrazzo
 Custom Accent 3



Epoxy Terrazzo
 Custom Accent 4



Epoxy Terrazzo
 Custom Accent 5

COMMISSIONING REVIEW

COMMISSIONING REVIEW COMMENTS

Bard, Rao + Athanas Consulting Engineers, LLC (BR+A) is the Commissioning Agent assigned to the Beverly Middle School project by the MSBA. BR+A has completed its review of the 60% Construction Document drawings and specifications. The Owners' Project Manager and Design Team have thoroughly reviewed the comments and recommendations received by the commissioning agent and are working to incorporate those comments into the Construction Documents.

The following pages contain the report and comments prepared by BR+A for the review of the Beverly Middle School project.

Beverly Middle School Commissioning Design Review							
Drawing Title	Status	Reviewed By	Review Date	Issue or Comment	Resolved By	Date	Comments
Electrical							
100% DD's dated 12/2/2106							
E2.04	Closed	BWS	1/5/2016	Show power to split system fan coil in L08 IDF room	RCB	1.25.16	Indoor fan coil units are powered from outdoor units on roof as per General Note on Electrical Roof Plan.
E2.14	Closed	BWS	1/5/2016	Show power to split system fan coil in custodian 146A	RCB	1.25.16	Indoor fan coil units are powered from outdoor units on roof as per General Note on Electrical Roof Plan.
E2.54	Closed	BWS	1/5/2016	Remove duct smokes included on air cooled chillers	RCB	1.25.16	Duct smoke detectors will be provided where required by Code and will be eliminated from air cooled chillers
60% CD's dated 4/18/2016							
E2.14	Open	BWS	4/26/2016	Occupy detail tag			
E3.02	Open	BWS	4/26/2016	Show splits in IDF rooms			
E3.03	Open	BWS	4/26/2016	Show power to kitchen equipment			
E3.04	Open	BWS	4/26/2016	Show power on plans			
Plumbing							
100% DD's dated 12/2/2106							
General	Closed	BWS	1/5/2016	Do transitions need to be shown when changing pipe size?	AMR	1.26.16	No
General	Open	BWS	1/5/2016	Provide riser diagrams	AMR	1.26.16	Will be provided
General	Closed	BWS	1/5/2016	Show emergency showers more clearly	AMR	1.26.16	Detail will be changed
General	Closed	BWS	1/5/2016	Storm water reclaim pumps in schedule, not on drawings	AMR	1.26.16	Storm water tank & pump removed
General	Open	BWS	1/5/2016	Ensure tepid water is being fed to emergency stations	AMR	1.26.16	Refer to detail
General	Closed	BWS	1/5/2016	Label all pumps	AMR	1.26.16	Will be provided
General	Closed	BWS	1/5/2016	Develop a key of plumbing symbols	AMR	1.26.16	Refer to legend sheet P0.1
P0.12	Closed	BWS	1/5/2016	Equipment in top right corner have number tags with no key or indication	AMR	1.26.16	Will be added
P1.04	Closed	BWS	1/5/2016	Incomplete piping in mechanical room L13	AMR	1.26.16	Piping continues to enlarged plan sheet P2.1
P1.14	Open	BWS	1/5/2016	Provide labeling and pipe sizes to piping shown at the top of the drawing	AMR	1.26.16	Pipes labeled
P1.14	Closed	BWS	1/5/2016	Incomplete piping to toilet room T1-9	AMR	1.26.16	Will complete piping when room is completed in architectural plan
P1.41	Closed	BWS	1/5/2016	Where is water serving ES+ESR coming from?	AMR	1.26.16	Prep room on first floor
P2.1	Closed	BWS	1/5/2016	References "continuation on P1.11" provide correct drawing number	AMR	1.26.16	Changed to P1.14



Beverly Middle School Commissioning Design Review							
Drawing Title	Status	Reviewed By	Review Date	Issue or Comment	Resolved By	Date	Comments
P2.1	Open	BWS	1/5/2016	Provide pipe sizes	AMR	1.26.16	Will be added
P2.1	Closed	BWS	1/5/2016	140 degree water coming from shaft from hot water system?	AMR	1.26.16	This is hot water return piping
60% CD's dated 4/18/2016							
P1.04	Open	BWS	4/26/2016	References P2.3 for detail, detail doesn't exist.			
General	Open	BWS	4/26/2016	Provide fixture type where missing			
P1.11	Open	BWS	4/26/2016	No waste and vent riser as referenced			
P1.11	Open	BWS	4/26/2016	P2.5 not in drawing set			
P2.1	Open	BWS	4/26/2016	References details on P2.3			
P2.2	Open	BWS	4/26/2016	Kitchen plan empty			
Fire Protection							
100% DD's dated 12/2/2106							
General	Closed	BWS	1/5/2016	Provide key w/abbreviations, symbols, etc.	AMR	1.26.16	Refer to legend sheet FP0.1
60% CD's dated 4/18/2016							
No further comments							
Controls							
100% DD's dated 12/2/2106							
General	Open	BWS	1/5/2016	Controls drawings do not match schedules	DAH	1.26.16	Document to be updated on future submissions
General	Open	BWS	1/5/2016	Kitchen exhaust fans not included in drawings	DAH	1.26.16	Will be provide on future submissions.
General	Open	BWS	1/5/2016	UH's (non-cabinet) arent included in drawings	DAH	1.26.16	Will be provide on future submissions.
General	Open	BWS	1/5/2016	Fume hoods not shown in drawings	DAH	1.26.16	Detail removed project will not have fume hoods
General	Open	BWS	1/5/2016	Mech/electrical room ventilation not shown on drawings	DAH	1.26.16	Will be provide on future submissions.
60% CD's dated 4/18/2016							
M7.1	Open	BWS	4/26/2016	Call out which sequence applies to which units			
M7.4	Open	BWS	4/26/2016	Sequence shown for AHU's1+2, delete or re-label.			
HVAC							
100% DD's dated 12/2/2106							
General	Open	BWS	1/5/2016	Show FSD's where rated shafts/walls are penetrated	DAH	1/26/2016	FSD will be shown and/or called out in future submissions
General	Closed	BWS	1/5/2016	Heat in stairwells?	DAH	1/26/2016	Heating terminal devices such as unit heater will be placed in all stairwells. Unit will be shown on future submissions.
General	Open	BWS	1/5/2016	Show piping to terminal boxes, cabinet unit heaters, radiant panels, convection units, etc.	DAH	1/26/2016	Piping to devices is ongoing and will be shown on future submissions.
General	Open	BWS	1/5/2016	Provide lengths of radiant panels and FTR	DAH	1/26/2016	Will be provide on future submissions.
General	Open	BWS	1/5/2016	Exhaust fans missing from roof plans	DAH	1/26/2016	Will be provide on future submissions.
General	Closed	BWS	1/5/2016	Exhaust fans referenced on drawings, missing from schedules	DAH	1/26/2016	Will be provide on future submissions.
M1.04	Open	BWS	1/5/2016	No ventilation in mechanical room L13	DAH	1/26/2016	Will be provide on future submissions.

Beverly Middle School Commissioning Design Review							
Drawing Title	Status	Reviewed By	Review Date	Issue or Comment	Resolved By	Date	Comments
M1.11	Closed	BWS	1/5/2016	Missing diffusers	DAH	1/26/2016	Will be provide on future submissions.
M1.12	Open	BWS	1/5/2016	Provide return fan number in tag	DAH	1/26/2016	Will be provide on future submissions.
M1.12	Closed	BWS	1/5/2016	Missing diffusers	DAH	1/26/2016	Will be provide on future submissions.
M1.12	Closed	BWS	1/5/2016	Duct in classroom 122 has no connections to main	DAH	1/26/2016	Drawing has been updated
M1.14	Closed	BWS	1/5/2016	Is exhaust duct in storage 152E connected to EF on roof?	DAH	1/26/2016	26x16 duct shall continue up to EF. EF will be offset to maintain min clearances from intakes.
M1.14	Open	BWS	1/5/2016	Show diffusers in gym	DAH	1/26/2016	Will be provide on future submissions.
M1.14	Closed	BWS	1/5/2016	Show duct from RTU-4	DAH	1/26/2016	Will be provide on future submissions.
M1.14	Closed	BWS	1/5/2016	No exhaust/return from bathroom T1-9	DAH	1/26/2016	Will be provide on future submissions.
M1.21	Closed	BWS	1/5/2016	Show diffusers where missing	DAH	1/26/2016	Will be provide on future submissions.
M1.23	Closed	BWS	1/5/2016	Provide duct direction (up/down) and flow values consistent with the rest of the drawings fir the return shaft near classroom 244	DAH	1/26/2016	All rises and drops will be labeled accordingly. Will be provided on future submissions.
M1.23	Closed	BWS	1/5/2016	Show diffusers where missing	DAH	1/26/2016	Will be provide on future submissions.
M1.24	Closed	BWS	1/5/2016	Show supply/return, show CFM values, show diffusers	DAH	1/26/2016	Will be provide on future submissions.
I.32	Closed	BWS	1/5/2016	Provide exhaust fan number	DAH	1/26/2016	Will be provide on future submissions.
I.32	Open	BWS	1/5/2016	Provide return fan labeling in tag	DAH	1/26/2016	Will be provide on future submissions.
M1.32	Closed	BWS	1/5/2016	Kiln exhaust fan on roof? Clarify	DAH	1/26/2016	Yes fan will be on roof. Will be shown on future submission
M1.33	Closed	BWS	1/5/2016	Provide CFM values for return shaft near classroom 344	DAH	1/26/2016	Will be provide on future submissions.
M1.41	Closed	BWS	1/5/2016	Missing diffusers	DAH	1/26/2016	Will be provide on future submissions.
M1.43	Closed	BWS	1/5/2016	Label return/exh riser with direction and flow values	DAH	1/26/2016	All rises and drops will be labeled accordingly. Will be provided on future
M1.52	Closed	BWS	1/5/2016	RTU's have two different labels	DAH	1/26/2016	Drawing has been updated
M2.11	Open	BWS	1/5/2016	Show direction and size of HW risers	DAH	1/26/2016	All rises and drops will be labeled accordingly. Will be provided on future
M2.14	Open	BWS	1/5/2016	Show RTU's being on roof, label RTU's	DAH	1/26/2016	Will be provide on future submissions.
M2.31	Open	BWS	1/5/2016	Provide pipe sizes	DAH	1/26/2016	Piping sizing is ongoing and will be shown on future submissions.
M3.1	Open	BWS	1/5/2016	Provide more piping detail, show piping to expansion tanks	DAH	1/26/2016	Will be provide on future submissions.
M7.1	Closed	BWS	1/5/2016	Control drawings do not show energy recovery wheel	DAH	1/26/2016	Will be added to control drawings
M7.1	Closed	BWS	1/5/2016	Provide setpoints	DAH	1/26/2016	Will review
60% CD's dated 4/18/2016							
M1.11	Open	BWS	4/26/2016	Provide CFM value for returns in 107 and 114			
M1.11	Open	BWS	4/26/2016	No ventilation to 103			
M1.12	Open	BWS	4/26/2016	No ventilation to electric room 119			
M1.12	Open	BWS	4/26/2016	Provide return flow values where missing			
M1.13	Open	BWS	4/26/2016	Provide EF number for shaft serving kitchen			
M1.13	Open	BWS	4/26/2016	Provide flow values for EF serving kitchen hoods			
M1.14	Open	BWS	4/26/2016	Some diffusers show values, others do not			
M1.21	Open	BWS	4/26/2016	No exhaust from Toiler 2-1			
M1.21	Open	BWS	4/26/2016	Return from main lobby? 2220 CFM supply			



Beverly Middle School Commissioning Design Review							
Drawing Title	Status	Reviewed By	Review Date	Issue or Comment	Resolved By	Date	Comments
M1.21	Open	BWS	4/26/2016	Provide detail for 16" round diffusers			
M1.24	Open	BWS	4/26/2016	Return values for RTU-3?			
M1.24	Open	BWS	4/26/2016	Review RTU-3 connected load			
M1.33	Open	BWS	4/26/2016	No ventilation to kitchen area			
M1.42	Open	BWS	4/26/2016	More detail required for diffusers serving cafeteria			
M1.43	Open	BWS	4/26/2016	Incomplete duct to art classroom			
M1.43	Open	BWS	4/26/2016	Remove info about exhaust duct in classroom 444			
M2.04	Open	BWS	4/26/2016	Incomplete pipe to L02			
M2.04	Open	BWS	4/26/2016	Pipe to kuh in CL02			
M2.04	Open	BWS	4/26/2016	No t-stats shown			
M2.11	Open	BWS	4/26/2016	Label pipe originating in 100A			
M2.13	Open	BWS	4/26/2016	Complete piping to DFC's			
M2.21	Open	BWS	4/26/2016	Piping to TB's/RP's inconsistent			
M2.23	Open	BWS	4/26/2016	HWS/R piping incomplete near T2-7			
M2.32	Open	BWS	4/26/2016	Pipe to FTR			
M3.1	Open	BWS	4/26/2016	More detail required			
Technology Division 27 & 28 Specifications							
100% DD's dated 12/2/2106							
Section 27 10 00 Structured Cabling	Open	JDC	1/15/2016	Confirm Specifications are referring to most current ANSI/EIA/TIA/ BICSI standards	JCJ	1.25.16	Specifications will be reviewed and updated as required.
Section 27 21 33 Data Communication Wireless Access Points	Open	JDC	1/15/2016	Confirm Specifications are referring to most current ANSI/EIA/TIA/ BICSI standards	JCJ	1.25.16	Specifications will be reviewed and updated as required.
Section 27 40 00 Audio-Video Communications	Open	JDC	1/15/2016	Confirm Specifications are referring to most current ANSI/EIA/TIA/ BICSI standards	JCJ	1.25.16	Specifications will be reviewed and updated as required.
Section 27 50 00 Distributed Communications and Monitoring	Open	JDC	1/15/2016	Confirm Specifications are referring to most current ANSI/EIA/TIA/ BICSI standards	JCJ	1.25.16	Specifications will be reviewed and updated as required.
Section 27 50 00 Distributed Communications and Monitoring	Open	JDC	1/15/2016	Confirm Category cable for the clock system Category 5 or Category 6A. Currently the specification is calling for Category 5	JCJ	1.25.16	Specification will be reviewed and updated as required.
Section 27 70 00 Video Distribution System	Open	JDC	1/15/2016	Confirm Specifications are referring to most current ANSI/EIA/TIA/ BICSI standards	JCJ	1.25.16	Specifications will be reviewed and updated as required.
Section 28 00 00 Electronic Safety and Security	Open	JDC	1/15/2016	Confirm Specifications are referring to most current ANSI/EIA/TIA/ BICSI standards	JCJ	1.25.16	Specifications will be reviewed and updated as required.



Beverly Middle School Commissioning Design Review							
Drawing Title	Status	Reviewed By	Review Date	Issue or Comment	Resolved By	Date	Comments
60% CD's dated 4/18/2016							
No further comments							
Technology Division 26, 27, and 28 Drawings							
GENERAL "T" SERIES DRAWINGS REQUIREMENTS	Open	JDC	1/15/2016	1. Confirm horizontal structured cabling distance will not exceed 90M(295') for local Telecomm rooms 2. Define horizontal structured cabling zones on the drawings for Telecomm room demarcation 3. Define vertical pathways between floors for horizontal structured cabling 4. Develop underground conduit site plan for pole mounted Security cameras and incoming Building Services 5. Review Keyplan layouts on drawings	JCJ	1.25.16	Drawings will be reviewed and updated as required.
T2.4	Open	JDC	1/15/2016	Review Grounding Riser diagrams versus the EIA/TIA 607-B for Backbone Copper Riser sizes	JCJ	1.25.16	Drawings will be reviewed and updated as required.
ES.01,ES.02 & ES.03	Closed	JDC	1/15/2016	1. Coordinate Incoming Technology Services Conduits with Division 27 4 conduit versus 6 conduits 2. Low Voltage Pole Riser Detail shown on ES.03 Detail 3 not on ES.02 as ES.01 references. Coordinate Drawings	RCB	1.25.16	1. Technology service conduits have been provided as requested by the Owner; (2) 4" conduits plus a 4" spare for the telephone and for the CATV services for a total of (6) 4" conduits. 2. Reference to Low Voltage Riser Pole Installation Detail on the Site Plan Electrical will be corrected to ES0.3.
E3.01 & E3.02	Closed	JDC	1/15/2016	1. Coordinate Electrical Outlets at Network racks with "T" Series MDF and IDF Room requirements 2. Coordinate "SJ" Security Junction boxes with "T" Series MDF and IDF Room Layouts	RCB	1.25.16	1. Receptacles will be provided as required by the Technology Drawings. 2. Security junction boxes will be provided as required by the Technology Drawings.
E4.02	Closed	JDC	1/15/2016	1. Confirm Telecomm Outlet at Main Fire Alarm Control Panel Location with Division 27 "T" Series	RCB	1.25.16	Two dedicated telephone lines are required to the fire alarm control panel which is located in Main Lobby Vestibule C100A. This will be coordinated with Technology.
E6.01	Open	JDC	1/15/2016	1. Coordinate conduit and back-box requirements with drawings T2.0 and T2.1	RCB	1.25.16	Conduit and back box requirements will be coordinated with the Technology Drawings.
E6.02	Closed	JDC	1/15/2016	1. Confirm if Telecomm Outlets are needed at Lighting Control Panel Locations	RCB	1.25.16	Telecom outlets are not required at lighting control panel locations.
60% CD's dated 4/18/2016							
No further comments							



Beverly Middle School Commissioning Design Review							
Drawing Title	Status	Reviewed By	Review Date	Issue or Comment	Resolved By	Date	Comments
Building Envelope							
100% DD's dated 12/2/2106 with back check of 60% CD set dated 4/18/2016. *Backcheck comments from SGH are in bold and dated "2 May 2016"							
A1.50-A1.54 Roof Plans	Open	AMB	1/14/2016	<u>Roof Plans</u> : Overflow drainage provisions are not clear on the roof plans. We recommend that you (1) provide overflow drains or (2) confirm that structural capacity of the roof is adequate to support the depth of water that could build up on the roof before flowing over the edge. 2 May 2016: No change in this submission.	CLO	1.25.16	Roof structural capacity will be reviewed with structural engineer.
A1.50-A1.54 Roof Plans	Open	AMB	1/14/2016	<u>Roof Plans</u> : We recommend indicating how slope-to-drain is provided on the roof, such as by sloping the metal deck or installing tapered insulation. We also recommend that you include crickets to drain away from all large roof penetrations (Typical). 2 May 2016: The steel roof deck is noted to slope 1/4"/ft. to drain. Various locations across the roof are missing the slope indication. Roof crickets have been added but are also missing at a few locations. The cricket hatch is shown over some entire roof areas; clarify the intent of this installation. Clarify that the screen walls will not disrupt the flow of drainage.	CLO	1.25.16	Roof plan will indicate slopes and location of all tapered insulation as they develop.
A3.01-A3.07 Building Elevations	Open	AMB	1/14/2016	<u>Building Elevations</u> : The building elevations show several canopy roofs, façade step backs, and inverted roof sections. We recommend reviewing these areas for snow and ice accumulation and providing means to prevent falling snow and ice. 2 May 2016: No change in this submission.	CLO	1.25.16	Building elevations will be reviewed.

Beverly Middle School Commissioning Design Review							
Drawing Title	Status	Reviewed By	Review Date	Issue or Comment	Resolved By	Date	Comments
A5.01 Vertical Base Details	Open	AMB	1/14/2016	<p><u>Vertical Base Detail:</u> There is a thermal bridge from the exterior to the interior through the concrete slab. Additional insulation should be provided to comply with the requirements of the IECC.</p> <p>2 May 2016: 2" rigid insulation has been added on the exterior of the foundation wall and on the vertical between the slab and the foundation, and spray-in-place foam insulation has been added to the horizontal of the metal stud base; the thermal bridge from the exterior to the interior through the concrete slab was not addressed by these additions.</p>	CLO	1.25.16	Detail will be evaluated and updated for the next submission.
A5.01 Vertical Base Details	Open	AMB	1/14/2016	<p><u>Slabs On Grade:</u> The slab-on-grade is detailed with an under slab vapor retarder membrane. This is typically sufficient to protect moisture-sensitive floor finishes from moisture vapor, but will not act as a waterproofing membrane. We recommend that you confirm with the geotechnical engineer that the groundwater table is below the base of the slab and that waterproofing is not needed.</p> <p>2 May 2016: No change in this submission.</p>	CLO	1.25.16	This has been reviewed with the geotechnical engineer. A portion of the building in the southwest corner will require waterproofing. This will be updated in the next submission.
A5.01 Vertical Base Details	Open	AMB	1/14/2016	<p><u>Keynote Legend:</u> Legend entry for call-out 07 21 00.01 ("FOAM INSULATION- SPRAY-IN-PLACE – 1-1/2 INCH DEPTH BETWEEN STUDS") does not match Master Keynote List on A0.01 (RIGID INSULATION – 2 INCH – FOUNDATION ONLY"). Clarify which insulation type is required.</p> <p>2 May 2016: The Legend and the Mater Keynote List entry's both read "RIGID INSULATION – 2 INCH – FOUNDATION ONLY"</p>	CLO	1.25.16	Keynotes will be updated to match.
A5.01 Vertical Base Details	Open	AMB	1/14/2016	<p><u>Flashing:</u> Detail 1 indicates aluminum flashing in direct contact with the concrete slab and stone veneer. We recommend that all flashing be either zinc-tin coated copper or stainless steel. When in contact with alkaline materials, such as concrete and mortar, aluminum will corrode. The use of zinc-tin coated copper or stainless steel also allows for the flashing to be continuously soldered, which is more reliable and durable than sealed flashing joints. (Typical).</p> <p>2 May 2016: No change in this submission.</p>	CLO	1.25.16	Flashing will be specified to match manufacturer's recommendations.
A5.01 Vertical Base Details	Open	AMB	1/14/2016	<p><u>Vertical Base Detail:</u> There is no support shown for the stone veneer or the base flashing. Proper support should be provided.</p> <p>2 May 2016: No change in this submission.</p>	CLO	1.25.16	Support will be reviewed.

Beverly Middle School Commissioning Design Review							
Drawing Title	Status	Reviewed By	Review Date	Issue or Comment	Resolved By	Date	Comments
A5.11 Vertical Wall Details	Open	AMB	1/14/2016	<p><u>Exterior Wall Assemblies:</u> The typical wall assemblies include (from exterior to interior) exterior cladding; air, water, and vapor barrier membrane, exterior sheathing, 2 in. thick insulating nail base, and 1-1/2 in. thick spray foam insulation. This wall assemblies places the dedicated vapor retarding material on the exterior side of the insulation, which is likely to result in condensation in the exterior sheathing during cold winter months. We recommend performing a hygrothermal model of this assembly to evaluate the potential for condensation and/or for creating a vapor trap between the exterior membrane and interior spray foam insulation.</p> <p>2 May 2016: While we do not typically recommend relying on dew point analysis for evaluating wall system performance, we will close this item because the design and their consultant reviewed and approved of the system.</p>	CLO	1.25.16	A dewpoint analysis has been performed of this assembly and reviewed with an exterior envelope consultant.
A5.11 Vertical Wall Details	Open	AMB	1/14/2016	<p><u>Exterior Wall Assemblies:</u> The typical exterior wall assemblies do not include a dedicated drainage plane between the cladding and waterproofing membrane. We recommend including a drainage plane within the wall assembly to promote drainage.</p> <p>2 May 2016: No change in this submission.</p>	CLO	1.25.16	The drainage plane is included in the cladding assembly.
A5.11 Vertical Wall Details	Open	AMB	1/14/2016	<p><u>Typical:</u> We recommend that you indicate weeps with regular spacing at all locations with backer rod and sealant. This will allow water to drain from the wall assembly.</p> <p>2 May 2016: No change in this submission.</p>	CLO	1.25.16	Drainage will be reviewed with specified products.
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<p><u>Keynote Legend:</u> Legend entry for call-out 07 81 00.01 (“SEALANT – CONTINUOUS”) does not match Master Keynote List on A0.01 (CEMENTITIOUS FIREPROOFING”). Verify that all call-outs are consistent throughout the drawings (Typical).</p> <p>2 May 2016: No change in this submission.</p>	CLO	1.25.16	Keynotes will be updated to match.

Beverly Middle School Commissioning Design Review							
Drawing Title	Status	Reviewed By	Review Date	Issue or Comment	Resolved By	Date	Comments
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<p><u>Typical</u>: We recommend adding a layer of sheathing on top of the steel deck to support the roof vapor retarder and allow for this material to also serve as the roof air barrier, making roof-wall transitions easier.</p> <p>2 May 2016: No change in this submission.</p>	CLO	1.25.16	Recommendation will be reviewed and updated as required, while staying within project budget.
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<p><u>PVC Flashing Membrane</u>: The termination of the PVC roof membrane is inconsistent; some details indicate the use of termination seal and others do not. Given this is a PVC roof; we recommend that all laps be hot-air welded (Typical).</p> <p>2 May 2016: No change in this submission.</p>	CLO	1.25.16	Details will be reviewed and updated to match specified manufacturers recommendations.
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<p><u>Vapor Retarder</u>: The extension of the roof vapor retarder at penetrations in the roofing is inconsistent; we recommend extending the vapor retarder up to the top of the roofing assembly. This applies to details such as 1, 6, 7 & 8. The installation of the vapor retarder onto the surface of the rigid insulation as shown in Detail 5 is not achievable (Typical).</p> <p>2 May 2016: No change in this submission.</p>	CLO	1.25.16	Details will be reviewed and updated as required.
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<p><u>Typical Hot Pipe Roof Penetration Detail</u>: We recommend providing insulation between the sheet metal collar and the hot pipe penetration.</p> <p>2 May 2016: No change in this submission.</p>	CLO	1.25.16	Detail will be reviewed and updated as required.
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<p><u>Typical Hot Pipe Roof Penetration Detail</u>: We recommend indicating a minimum 8" flashing height from the top of the roofing assembly to the top of the PVC flashing on the sheet metal collar.</p> <p>2 May 2016: No change in this submission.</p>	CLO	1.25.16	Detail will be reviewed and updated as required.
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<p><u>Roof Equipment Curb Detail</u>: We recommend indicating a minimum 8" flashing height from the top of the roofing assembly to the metal coping.</p> <p>2 May 2016: No change in this submission. A 12" flashing height is indicated from the top of the roofing assembly to the top of the curb coping cap.</p>	CLO	1.25.16	Detail will be reviewed and updated as required.
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<p><u>Seismic Rooftop Spring Curb Detail</u>: We recommend indicating a minimum 8" flashing height from the top of the roofing assembly to the location of the fastener at the top of the flashing membrane.</p> <p>2 May 2016: No change in this submission.</p>	CLO	1.25.16	Detail will be reviewed and updated as required.

Beverly Middle School Commissioning Design Review							
Drawing Title	Status	Reviewed By	Review Date	Issue or Comment	Resolved By	Date	Comments
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<p><u>Exterior Ladder Details</u>: We recommend that you provide a flashing detail at ladder penetration locations.</p> <p>2 May 2016: No change in this submission.</p>	CLO	1.25.16	Detail will be reviewed and updated as required.
A5.22 Vertical Roof Details	Open	AMB	1/14/2016	<p><u>Typical AVB Tie-in at Roof</u>: As stated above, we recommend adding a layer of sheathing on top of the steel deck to support the roof vapor retarder and allow this material to also function as the air barrier. This air/vapor barrier should extend down to the wall air/vapor barrier below the blocking.</p> <p>2 May 2016: No change in this submission.</p>	CLO	1.25.16	Detail will be reviewed and updated as required.
A5.22 Vertical Roof Details	Open	AMB	1/14/2016	<p><u>Vertical Roof Detail</u>: There is a thermal bridge from the exterior to the interior through the steel bent plate and steel deck. We recommend providing a thermal break.</p> <p>2 May 2016: Spray-in-place foam insulation has been added at the interior of the metal studs and below the steel roof deck; we recommend thermal modeling of this conditions to confirm that the risk of condensation at this location is minimal.</p>	CLO	1.25.16	Detail will be reviewed and updated as required.
A6.01 Exterior Window Details	Open	AMB	1/14/2016	<p><u>Typ. Detail at Window Perimeter</u>: Membrane flashing at window perimeters should extend from the upturned leg on the attachment angle toward the exterior (below the window frame) rather than to the interior to keep the adhesive side of the membrane out of the wet zone for a more reliable and durable installation.</p> <p>2 May 2016: The membrane flashing is now shown terminated on the exterior sheathing at the window perimeter; we recommend that the membrane flashing extend in board to provide a continuous sill flashing and air barrier seal.</p>	CLO	1.25.16	Detail will be reviewed and updated as required.
A6.01 Exterior Window Details	Open	AMB	1/14/2016	<p><u>Flashing Detail</u>: It is not clear how the Flashing Detail 4 is integrated into Details 5, 6, and 7. We recommend clarifying this detail.</p> <p>2 May 2016: The previous Detail 4 has been removed from the drawing set. We recommend that a pan flashing detail be provided and integrated into the other details.</p>	CLO	1.25.16	Detail will be reviewed and updated as required.

Beverly Middle School Commissioning Design Review							
Drawing Title	Status	Reviewed By	Review Date	Issue or Comment	Resolved By	Date	Comments
Spec. 014500	Open	AMB	1/14/2016	<p><u>Mock-Ups</u>: Specification section 014500-1.2A refers to a section 014338 - Mock-Ups, but this section is not included in the provided specifications or in the Table of Contents. We recommend including requirements for each building enclosure system or typical detail.</p> <p>2 May 2016: Specifications not provided with submission.</p>	CLO	1.25.16	Spec section will be added and developed as the project progresses.
Spec. 014529	Open	AMB	1/14/2016	<p><u>Testing</u>: Specification section 014529.19.B.2.8, 9, and 10, requires testing the fenestration in accordance to AAMA 502-08-Voluntary Specification for Field Testing of Newly Installed Fenestration Products. However, we recommend and MSBA requires testing ASTM E 783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors, and ASTM E 1105 – Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference. We do not recommend allowing the AAMA 1/3 reduction of design pressure for testing under ASTM E1105.</p> <p>2 May 2016: Specifications not provided with submission.</p>	CLO	1.25.16	Specification reference will be updated to match MSBA requirements.
Spec. 042000	Open	AMB	1/14/2016	<p><u>Masonry Ties</u>: The specification calls for single fastener masonry anchors that are blind installed through the cavity materials. These fasteners commonly result in holes in the water/air/vapor barrier at missed studs and may not provide reliable structural anchorage. We recommend using two-anchor ties installed directly to the sheathing prior to other cavity materials for all masonry materials.</p> <p>2 May 2016: Specifications not provided with submission.</p>	CLO	1.25.16	Masonry ties will not be required for the job. This reference will be deleted from the specifications.
Spec. 072733	Open	AMB	1/14/2016	<p><u>Building Envelope Walls Above Grade</u> For your building, the Massachusetts State Building Code, 8th Edition, requires an minimum R value of 13+7.5ci for metal framed walls above grade. Confirm that the required R-value is provided. In addition, confirm that insulation materials (i.e., foam plastic insulation) is only used in exterior wall assemblies that comply with NFPA 285.</p> <p>2 May 2016: Specifications not provided with submission.</p>	CLO	1.25.16	Specifications will be reviewed to confirm compliance with NFPA 285.



Beverly Middle School Commissioning Design Review							
Drawing Title	Status	Reviewed By	Review Date	Issue or Comment	Resolved By	Date	Comments
Spec. 075419	Open	AMB	1/14/2016	<p><u>Building Envelope Roof Insulation</u> For your building, the Massachusetts State Building Code, 8th Edition, requires an minimum R value of 25ci for a roof. The Project Drawings identify the roofing installation as "polyisio rigid insulation" while Specification section 075419.2.3.C calls out "Extruded polystyrene roofing insulation." Clarify which material is intended and confirm that the required R-value is provided.</p> <p>2 May 2016: Specifications not provided with submission.</p>	CLO	1.25.16	Conflict of specifications and drawings will be review and revised.
Spec. 084213	Open	AMB	1/14/2016	<p><u>Aluminum-Framed Storefronts</u> We recommend that you consider specifying curtain wall units in lieu of storefront units for improved performance.</p> <p>2 May 2016: Specifications not provided with submission.</p>	CLO	1.25.16	Recommendation will be reviewed and updated as required, while staying within project budget.
Spec. 085113	Open	AMB	1/14/2016	<p><u>Aluminum Windows</u> We recommend that you specify wept glazing pockets with heel beads of sealant for all windows to improve long term durability.</p> <p>2 May 2016: Specifications not provided with submission.</p>	CLO	1.25.16	Recommendation will be reviewed and updated as required, while staying within project budget.
Spec. 085113	Open	AMB	1/14/2016	<p><u>Project Out Windows:</u> Specification section 085113.1.5.F.7 requires a maximum "U-value" of U_c 0.52. This does not conform to the Massachusetts Building Code which requires a maximum U-value of 0.45. Adjust this value to adhere to the Massachusetts Building Code requirements.</p> <p>2 May 2016: Specifications not provided with submission.</p>	CLO	1.25.16	Specifications will be reviewed and updated as required.
GENERAL COMMENTS:							

PROPRIETARY ITEMS PROPRIETARY ITEMS

The City of Beverly local officials and the School District Administration have evaluated potential proprietary products during the Design Development and Construction Document phases. As a result of the numerous discussions and meetings, the current list of proprietary products has been identified as follows:

Closed Circuit Television (CCTV): Genetec

Access Controls: Genetec

Wireless System (WIFI): Adtran Bluesocket Wireless Devices

Building Management System (BMS): Johnson Controls - Metasys

The next Beverly School Committee meeting is scheduled for Wednesday, May 25th, at which time the Committee will be presented with the above list of proprietary products and back-up documentation provided by the City/District as a result of their investigation into each product. Once the School Committee has provided a formal vote and acceptance of the information in compliance with MGL, the District will provide this information to the MSBA, independent of the attached 60% Construction Document Submission.

APPENDIX A

UPDATED PROJECT BUDGET

Beverly Middle School										HEERY	
MSBA Project Number: 201300300305											
Project Budget: HII-1409500											
Updated: April 22, 2016											
										column f - g	
										column e - f	
MSBA Cost Category	Base Contract Descriptions	Approved Budget	Revised Budget - Per 10-23-2014 - APPROVED BRR #1	Approved PS&B Dated: 09-23-2015 (Including DD Update)	Committed Funds	Approved Invoices To Date	Committed Funds Remaining to be Paid	Approved Budget Less Committed Funds	Scope Items Excluded from Basis of Est Total Facilities Grant or Otherwise Ineligible	Services/Consultants	Month Approved
0000-0000	Feasibility Study Agreement										
0001-0000	OPM - Feasibility Study	\$ 275,000.00	\$ 275,000.00	\$ 240,000.00	\$ 240,000.00	\$ 240,000.00	\$ -	\$ -			
	Heery Invoice #564462					\$ 18,290.00				June 2 thru Sep 12, 2014	Sep-14
	Heery Invoice #572766					\$ 20,954.00					Dec-14
	Heery Invoice #576127					\$ 8,785.00					Jan-15
	Heery Invoice #579088					\$ 23,191.50					Feb-15
	Heery Invoice #582132					\$ 16,093.20					Mar-15
	Heery Invoice #586124					\$ 14,858.78					Apr-15
	Heery Invoice #591365					\$ 24,316.87					Jun-15
	Heery Invoice #598402					\$ 44,527.93					Aug-15
	Heery Invoice #604355					\$ 42,080.65					Dec-15
	Heery Invoice #PJIN0001662					\$ 26,902.07					Feb-16
0002-0000	A&E - Feasibility Study	\$ 650,000.00	\$ 925,000.00	\$ 925,000.00	\$ 925,000.00	\$ 925,000.00	\$ -	\$ -		Review grade reconfig. with MSBA	
	Ai3 Invoice #0001B-1403.00					\$ 120,374.84					Oct-14
	Ai3 Invoice #0002B-1403.00					\$ 64,305.16					Nov-14
	Ai3 Invoice #0003B-1403.00					\$ 43,320.00					Dec-14
	Ai3 Invoice #0004B-1403.00					\$ 88,527.00					Jan-15
	Ai3 Invoice #0005B-1403.00					\$ 92,376.00					Feb-15
	Ai3 Invoice #0006B-1403.00					\$ 72,093.00					Mar-15
	Ai3 Invoice #0007B-1403.00		\$ (29,669.17)			\$ 85,773.50					Apr-15
	Ai3 Invoice #0008B-1403.00					\$ 95,864.50					May-15
	Ai3 Invoice #0009B-1403.00					\$ 116,046.50					Jun-15
	Ai3 Invoice #0010B-1403.00					\$ 95,864.50					Jul-15
	Ai3 Invoice #0011B-1403.00					\$ 50,455.00					Aug-15
0003-0000	Environmental & Site	\$ 175,000.00	\$ 175,000.00	\$ 175,000.00	\$ 201,779.06	\$ 201,779.06	\$ -	\$ (26,779.06)		as it relates to AE options and fee	
	Ai3 Invoice #0001E-1403.00					\$ 7,106.00					Oct-14
	Ai3 Invoice #0002E-1403.00					\$ 54,073.25					Nov-14
	Ai3 Invoice #0004E-1403.00					\$ 7,043.54					Dec-14
	Ai3 Invoice #0005E-1403.00					\$ 3,225.75					Feb-15
	Ai3 Invoice #0006E-1403.00					\$ 302.50					Mar-15
	Ai3 Invoice #0007E-1403.00					\$ 1,518.00					Apr-15
	Ai3 Invoice #0008E-1403.00					\$ 695.75					May-15
	Ai3 Invoice #0009E-1403.00					\$ 2,788.50					Jun-15
	Ai3 Invoice #0010E-1403.00					\$ 53,022.75					Jul-15
	Ai3 Invoice #0011E-1403.00					\$ 58,121.02					Aug-15
	Ai3 Invoice #0012E-1403.01					\$ 13,519.00					Jan-16
	Ai3 Invoice #0015E-1403.01					\$ 363.00					Feb-16
0004-0000	Other	\$ 400,000.00	\$ 125,000.00	\$ 125,000.00	\$ 125,000.00	\$ 86,066.35	\$ 38,933.65	\$ -			Oct-14
	Wylie-Inn Group #7566					\$ 1,188.00					
	Ai3 Invoice #0003E-1403.00					\$ 3,817.02				Printing	Jan-15
	Ai3 Invoice #0005E-1403.00					\$ 1,959.54				Supplies/Binders	Mar-15
	Ai3 Invoice #0010E-1403.00					\$ 940.29				Pre-Construction Services Under FS	Aug-15
	Ai3 Invoice #0015E-1403.01					\$ 4,438.50				Bldg. Info Modeling for Phase I	Feb-16
	Agostini/Bacon Payment Application #1					\$ 17,778.00				Pre-Construction Services Under FS	Jul-15
	Agostini/Bacon Payment Application #2					\$ 17,778.00				Pre-Construction Services Under FS	Sep-15
	Agostini/Bacon Payment Application #3					\$ 17,778.00				Pre-Construction Services Under FS	Aug-15
	Agostini/Bacon Payment Application #4					\$ 17,778.00				Pre-Construction Services Under FS	Sep-15
	Project Dog Inv #9969					\$ 275.00					Mar-16
	North of Boston Media Group Inv #10780527					\$ 648.00					Mar-16
	North of Boston Media Group Inv #10761610					\$ 567.00					Mar-16
	Eileen M. Sacco Inv #15-4					\$ 220.00					Mar-16
	Project Dog Inv #9103					\$ 275.00					Mar-16
	Project Dog Inv #9940					\$ 175.00					Mar-16
	Project Dog Inv #9796					\$ 275.00					Mar-16
	Project Dog Inv #9797					\$ 70.00					Mar-16
	UPS Inv #0000E76520385					\$ 42.00					Mar-16
	UPS Inv #0000E76520474					\$ 43.00					Mar-16
	FedEx Inv #5-113-91796					\$ 21.00					Mar-16

Beverly Middle School										HEERY	
MSBA Project Number: 201300300305											
Project Budget: HII-1409500											
Updated: April 22, 2016											
										column f - g	
										column e - f	
MSBA Cost Category	Base Contract Descriptions	Approved Budget	Revised Budget - Per 10-23-2014 - APPROVED BRR #1	Approved PS&B Dated: 09-23-2015 (Including DD Update)	Committed Funds	Approved Invoices To Date	Committed Funds Remaining to be Paid	Approved Budget Less Committed Funds	Scope Items Excluded from Basis of Est Total Facilities Grant or Otherwise Ineligible	Services/Consultants	Month Approved
	Feasibility Study Agreement -SUB-TOTAL	\$ 1,500,000.00	\$ 1,470,330.83	\$ 1,465,000.00	\$ 1,491,779.06	\$ 1,452,845.41	\$ 38,933.65	\$ (26,779.06)	\$ -		
0100-0000	Administration										
0100-9999	Adjustment										
0101-0000	Legal Fees			\$ 25,000.00	\$ 25,000.00	\$ -	\$ 25,000.00	\$ -	\$ 25,000.00		
0102-0000	Owner's Project Manager										
0102-0400	OPM - Design Development	\$ -		\$ 123,000.00	\$ 123,000.00	\$ 126,916.65	\$ (3,916.65)	\$ -			
	Heery Invoice #PJIN0001662					\$ 120,776.65					Feb-16
	Heery Invoice #PJIN0002551					\$ 6,140.00					Apr-16
0102-0500	OPM - Construction Contract Documents			\$ 281,000.00	\$ 281,000.00	\$ 37,036.86	\$ 243,963.14	\$ -			
	Heery Invoice #PJIN0001662					\$ 2,781.00					Feb-16
	Heery Invoice #PJIN0002551					\$ 34,255.86					Apr-16
0102-0600	OPM - Bidding			\$ 135,000.00	\$ 135,000.00		\$ 135,000.00	\$ -			
0102-0700	OPM - Construction Document Admin.			\$ 2,302,871.00	\$ 2,302,871.00	\$ 58,555.00	\$ 2,244,316.00	\$ -	\$ 107,639.00		
	Heery Invoice #PJIN0001662					\$ 4,320.00					Feb-16
	Heery Invoice #PJIN0002551					\$ 54,235.00					Apr-16
0102-0800	OPM - Closeout			\$ 72,659.00	\$ 72,659.00	\$ -	\$ 72,659.00	\$ -			
0102-0900	OPM - Extra Services	\$ -		\$ -	\$ -		\$ -	\$ -			
0102-1000	OPM - Reimbursables & Other Services	\$ -		\$ 75,000.00	\$ 75,000.00	\$ -	\$ 75,000.00	\$ -			
0102-1100	OPM - Cost Estimates	\$ -		\$ 150,000.00	\$ 150,000.00	\$ 17,381.25	\$ 132,618.75	\$ -			
	Heery Invoice #PJIN0001662					\$ 17,381.25					Feb-16
0102-9900	OPM - Other Project Manager Costs			\$ -	\$ -		\$ -	\$ -			
0103-0000	Advertising			\$ 5,000.00	\$ 5,000.00	\$ -	\$ 5,000.00	\$ -			
0104-0000	Permitting	\$ -		\$ 50,000.00	\$ 50,000.00	\$ 4,098.60	\$ 45,901.40	\$ -	\$ 50,000.00		
	Ai3 Invoice #0015E-1403.01					\$ 1,782.00				MassDOT Access Permit	Feb-16
	Ai3 Invoice #0016E-1403.01					\$ 950.40				MassDOT Access Permit	Mar-16
	Ai3 Invoice #0017E-1403.02					\$ 1,366.20				MassDOT Access Permit	Apr-16
0105-0000	Owner's Insurance	\$ -		\$ -	\$ -		\$ -	\$ -			
0199-0000	Other Administrative Costs	\$ -		\$ -	\$ -		\$ -	\$ -			
	Administration - SUB-TOTAL	\$ -		\$ 3,219,530.00	\$ 3,219,530.00	\$ 243,988.36	\$ 2,975,541.64	\$ -	\$ 182,639.00		
0200-0000	Architect and Engineer										
0200-9999	Adjustment										
0201-0000	A&E - Basic Services										
0201-0400	A&E - Design Development	\$ -		\$ 2,405,416.00	\$ 2,405,416.00	\$ 2,405,416.00	\$ -	\$ -			
	Ai3 Invoice #0012B-1403.00					\$ 477,715.62				Period Ending September 2015	Jan-16
	Ai3 Invoice #0013B-1403.00					\$ 934,744.66				Period Ending October 2015	Jan-16
	Ai3 Invoice #0014B-1403.01					\$ 611,215.21				Period Ending November 2015	Jan-16
	Ai3 Invoice #0015B-1403.00					\$ 381,739.51				Period Ending December 2015	Jan-16
0201-0500	A&E - Construction Contract Documents			\$ 3,571,890.00	\$ 3,571,890.00	\$ 1,852,078.09	\$ 1,719,811.91	\$ -			
	Ai3 Invoice #0013E-1403.01					\$ 7,513.00				Bldg. Info Modeling for Phase 1	Jan-16
	Ai3 Invoice #0014E-1403.01					\$ 15,647.50				Bldg. Info Modeling for Phase 2	Jan-16
	Ai3 Invoice #0016B-1403.00					\$ 664,723.69				Period Ending January 2016	Feb-16
	Ai3 Invoice #0017B-1403.00					\$ 577,375.42				Period Ending February 2016	Mar-16
	Ai3 Invoice #0018B-1403.00					\$ 586,818.48				Period Ending March 2016	Apr-16
0201-0600	A&E - Bidding			\$ 174,615.00	\$ 174,615.00		\$ 174,615.00	\$ -			
0201-0700	A&E - Construction Contract Admin			\$ 1,340,210.00	\$ 1,340,210.00		\$ 1,340,210.00	\$ -	\$ 281,439.00		
0201-0800	A&E - Closeout	\$ -		\$ 128,410.00	\$ 128,410.00		\$ 128,410.00	\$ -			
0201-9900	A&E - Other Basic Services	\$ -		\$ -	\$ -		\$ -	\$ -			
0203-0000	A&E - Reimbursables & Other Services										
0203-0100	A&E - Construction Testing			\$ -	\$ -						
0203-0200	A&E - Printing (over minimum)			\$ 75,000.00	\$ 75,000.00		\$ 75,000.00	\$ -			
0203-9900	A&E - Other Reimbursable Costs			\$ 68,500.00	\$ 68,500.00	\$ 52,890.26	\$ 15,609.74	\$ -			

Beverly Middle School										HEERY	
MSBA Project Number: 201300300305											
Project Budget: HII-1409500											
Updated: April 22, 2016											
column f - g										column e - f	
MSBA Cost Category	Base Contract Descriptions	Approved Budget	Revised Budget - Per 10-23-2014 - APPROVED BRR #1	Approved PS&B Dated: 09-23-2015 (Including DD Update)	Committed Funds	Approved Invoices To Date	Committed Funds Remaining to be Paid	Approved Budget Less Committed Funds	Scope Items Excluded from Basis of Est Total Facilities Grant or Otherwise Ineligible	Services/Consultants	Month Approved
	Ai3 Invoice #0014E-1403.01					\$ 6,939.32				Reimbursable Expenses	Jan-16
	Ai3 Invoice #0013E-1403.01					\$ 1,868.32				Reimbursable Expenses	Jan-16
	Ai3 Invoice #0013E-1403.01					\$ 594.00				MassDOT Access Permit	Jan-16
	Ai3 Invoice #0016E-1403.01					\$ 119.93				DD Phase and Beyond	Mar-16
	Ai3 Invoice #0016E-1403.01					\$ 22,214.50				Bldg. Info Modeling for Phase 2	Mar-16
	Ai3 Invoice #0017E-1403.01					\$ 905.44				DD Phase and Beyond	Apr-16
	Ai3 Invoice #0017E-1403.01					\$ 20,248.75				Bldg. Info Modeling for Phase 2	Apr-16
0204-0000	A&E - Sub-Consultants										
0204-0200	A&E - Hazardous Materials	\$ -		\$ 140,700.00	\$ 140,700.00	\$ 99,181.50	\$ 41,518.50	\$ -			
	Ai3 Invoice #0014E-1403.01					\$ 5,610.00				Phase 2: Hazardous Materials	Jan-16
	Ai3 Invoice #0017E-1403.01					\$ 93,571.50				Surveys, Constr Monitoring, Air Sample	Apr-16
0204-0300	A&E - Geotech & Geotech Environment			\$ 187,500.00	\$ 187,500.00	\$ 25,441.85	\$ 162,058.15	\$ -			
	Ai3 Invoice #0013E-1403.01					\$ 484.00				Geotechnical Evaluation/Phase 1	Jan-16
	Ai3 Invoice #0015E-1403.01					\$ 5,470.08				Geotechnical Evaluation/Phase 2	Feb-16
	Ai3 Invoice #0017E-1403.01					\$ 19,487.77				Geotechnical Evaluation/Phase 2	Apr-16
0204-0400	A&E - Site Survey			\$ 7,930.00	\$ 7,930.00		\$ 7,930.00	\$ -			
0204-0500	A&E - Wetlands			\$ 27,500.00	\$ 27,500.00	\$ 17,186.41	\$ 10,313.59	\$ -			
	Ai3 Invoice #0013E-1403.01					\$ 3,514.50				EnviroPermit Conservation Commish	Jan-16
	Ai3 Invoice #0013E-1403.01					\$ 1,485.00				Wetlands Delineation	Jan-16
	Ai3 Invoice #0014E-1403.01					\$ 603.91				EnviroPermit Conservation Commish	Jan-16
	Ai3 Invoice #0015E-1403.01					\$ 8,236.80				EnviroPermit Conservation Commish	Feb-16
	Ai3 Invoice #0016E-1403.01					\$ 3,088.80				EnviroPermit Conservation Commish	Mar-16
	Ai3 Invoice #0017E-1403.01					\$ 257.40				EnviroPermit Conservation Commish	Apr-16
0204-1200	A&E - Traffic Studies			\$ 25,500.00	\$ 25,500.00	\$ 13,497.50	\$ 12,002.50	\$ -			
	Ai3 Invoice #0014E-1403.01					\$ 6,890.40				Traffic Study (Phase 2)	Jan-16
	Ai3 Invoice #0015E-1403.01					\$ 1,782.00				Traffic Study (Phase 2)	Feb-16
	Ai3 Invoice #0016E-1403.01					\$ 4,825.10				Traffic Study (Phase 2)	Mar-16
	Architect and Engineering - SUB-TOTAL	\$ -		\$ 8,153,171.00	\$ 8,153,171.00	\$ 4,465,691.61	\$ 3,687,479.39	\$ -	\$ 281,439.00		
	CM & Risk Preconstruction Services										
	Pre-Construction Services			\$ 192,064.00	\$ 192,064.00	\$ 72,024.00	\$ 120,040.00	\$ -	\$ 7,093.00		
	Agostini/Bacon Payment App #1					\$ 12,004.00				Period to 10/31/2015	Dec-15
	Agostini/Bacon Payment App #2					\$ 12,004.00				Period to 11/30/2015	Dec-15
	Agostini/Bacon Payment App #3					\$ 12,004.00				Period to 12/31/2015	Jan-16
	Agostini/Bacon Payment App #4					\$ 12,004.00				Period to 01/31/2016	Feb-16
	Agostini/Bacon Payment App #5					\$ 12,004.00				Period to 02/29/2016	Apr-16
	Agostini/Bacon Payment App #6					\$ 12,004.00				Period to 03/31/2016	Apr-16
0300-0000	Site Acquisition										
0300-9999	Adjustment										
0301-0000	Land/Building Purchase		\$ -	\$ -							
0302-0000	Appraisal Fees		\$ -	\$ -							
0303-0000	Recording Fees		\$ -	\$ -							
	Site Acquisition - SUB-TOTAL	\$ -						\$ -	\$ 7,093.00		
0500-0000	Construction Contract										
0500-9999	Adjustment										
0501-0000	Pre-Construction Services										
0502-0000	Construction										
0502-0001	Construction Budget			\$ 90,129,432.00	\$ 90,129,432.00	\$ 1,279,571.83	\$ 88,849,860.17	\$ -			
0502-0010	GMP-FEE (for CM-AT-RISK contracts only)			\$ 1,575,000.00	\$ 1,575,000.00	\$ 22,000.00					
	PAY APP #1					\$ 6,000.00					Feb-16
	PAY APP #2					\$ 6,000.00					Mar-16
	PAY APP #3					\$ 10,000.00					Apr-16
0502-0020	GMP-INSURANCE (for CM-AT-RISK contracts only)			\$ 1,102,031.00	\$ 1,102,031.00	\$ 93,147.00					
	PAY APP #1					\$ 37,605.00					Feb-16
	PAY APP #2					\$ 50,768.00					Mar-16
	PAY APP #3					\$ 4,774.00					Apr-16
0502-0030	GMP-CONTINGENCY (for CM-AT-RISK contracts only)			\$ 5,708,898.00	\$ 5,708,898.00	\$ -					

Beverly Middle School										HEERY	
MSBA Project Number: 201300300305											
Project Budget: HII-1409500											
Updated: April 22, 2016											
										column f - g	
										column e - f	
MSBA Cost Category	Base Contract Descriptions	Approved Budget	Revised Budget - Per 10-23-2014 - APPROVED BRR #1	Approved PS&B Dated: 09-23-2015 (Including DD Update)	Committed Funds	Approved Invoices To Date	Committed Funds Remaining to be Paid	Approved Budget Less Committed Funds	Scope Items Excluded from Basis of Est Total Facilities Grant or Otherwise Ineligible	Services/Consultants	Month Approved
0502-0100	DIVISION 1 - General Requirements			\$ 5,150,888.00	\$ 5,150,888.00	\$ 208,398.03					
	PAY APP #1					\$ 101,213.77					Feb-16
	PAY APP #2					\$ 53,726.70					Mar-16
	PAY APP #3					\$ 53,457.56					Apr-16
0502-0200	DIVISION 2 - Existing Conditions			\$ 1,641,550.00	\$ 1,641,550.00	\$ 951,791.80					
	PAY APP #1					\$ 198,350.00					Feb-16
	PAY APP #2					\$ 228,290.00					Mar-16
	PAY APP #3					\$ 525,151.80					Apr-16
0502-0300	DIVISION 3 - Concrete			\$ 5,301,183.00	\$ 5,301,183.00						
0502-0400	DIVISION 4 - Masonry			\$ 583,543.00	\$ 583,543.00						
0502-0500	DIVISION 5 - Metals			\$ 12,601,078.00	\$ 12,601,078.00						
0502-0600	DIVISION 6 - Wood, Plastics & Composites			\$ 2,684,547.00	\$ 2,684,547.00						
0502-0700	DIVISION 7 - Thermal & Moisture Protection			\$ 7,264,064.00	\$ 7,264,064.00						
0502-0800	DIVISION 8 - Openings			\$ 5,010,165.00	\$ 5,010,165.00						
0502-0900	DIVISION 9 - Finishes			\$ 10,112,087.00	\$ 10,112,087.00						
0502-1000	DIVISION 10 - Specialties			\$ 1,868,210.00	\$ 1,868,210.00						
0502-1100	DIVISION 11 - Equipment			\$ 1,003,500.00	\$ 1,003,500.00						
0502-1200	DIVISION 12 - Furnishings			\$ 1,792,820.00	\$ 1,792,820.00						
0502-1300	DIVISION 13 - Special Construction			\$ -	\$ -						
0502-1400	DIVISION 14 - Conveying Systems			\$ 573,500.00	\$ 573,500.00						
0502-2100	DIVISION 21 - Fire Suppression			\$ 939,778.00	\$ 939,778.00						
0502-2200	DIVISION 22 - Plumbing			\$ 2,485,677.00	\$ 2,485,677.00						
0502-2300	DIVISION 23 - HVAC			\$ 6,308,475.00	\$ 6,308,475.00						
0502-2500	DIVISION 25 - Integrated Automation			\$ 1,137,002.00	\$ 1,137,002.00						
0502-2600	DIVISION 26 - Electrical			\$ 5,425,932.00	\$ 5,425,932.00						
0502-2700	DIVISION 27 - Communications			\$ 2,357,206.00	\$ 2,357,206.00						
0502-2800	DIVISION 28 - Electronic Safety & Security			\$ 1,080,681.00	\$ 1,080,681.00						
0502-3100	DIVISION 31 - Earthwork			\$ 769,450.00	\$ 769,450.00	\$ 4,235.00					
	PAY APP #1					\$ 4,235.00					Feb-16
0502-3200	DIVISION 32 - Exterior Improvements			\$ 3,736,511.00	\$ 3,736,511.00						
0502-3300	DIVISION 33 - Utilities			\$ 1,915,656.00	\$ 1,915,656.00						
	Construction Contract - SUB-TOTAL	\$ 90,129,432.00		\$ 90,129,432.00	\$ 90,129,432.00	\$ 1,215,593.24	\$ 88,913,838.76	\$ -	\$ 20,778,654.00		
0502-9900	Retainage to Contractor					\$ (63,978.59)					
	PAY APP #1					\$ (17,370.19)					Feb-16
	PAY APP #2					\$ (16,939.23)					Mar-16
	PAY APP #3					\$ (29,669.17)					Apr-16
	Alternates SUB-TOTAL	\$ -				\$ -	\$ -	\$ -	\$ -		
0507-0000	Construction Contingency					\$ -					
	Construction Contingency - SUB-TOTAL	\$ -				\$ -	\$ -	\$ -	\$ -		
0508-0000	Change Orders					\$ -					

Beverly Middle School										HEERY	
MSBA Project Number: 201300300305											
Project Budget: HII-1409500											
Updated: April 22, 2016											
	b	c	d	e	f	g	column f - g	column e - f			
MSBA Cost Category	Base Contract Descriptions	Approved Budget	Revised Budget - Per 10-23-2014 - APPROVED BRR #1	Approved PS&B Dated: 09-23-2015 (Including DD Update)	Committed Funds	Approved Invoices To Date	Committed Funds Remaining to be Paid	Approved Budget Less Committed Funds	Scope Items Excluded from Basis of Est Total Facilities Grant or Otherwise Ineligible	Services/Consultants	Month Approved
0600-0000	Miscellaneous Project Costs										
0600-9999	Adjustment										
0601-0000	Utility Company Fees			\$ 50,000.00	\$ 50,000.00		\$ 50,000.00	\$ -			
0602-0000	Testing Services			\$ 150,000.00	\$ 150,000.00		\$ 150,000.00	\$ -			
0603-0000	Swing-space/Modulars			\$ -			\$ -	\$ -			
0699-0000	Other Project Costs (Mailing & Moving)			\$ 100,000.00	\$ 100,000.00		\$ 100,000.00	\$ -	\$ 100,000.00		
	Miscellaneous Project Costs - SUB-TOTAL	\$ -		\$ 300,000.00	\$ 300,000.00	\$ -	\$ 300,000.00	\$ -	\$ 100,000.00		
0700-0000	Furnishings and Equipment										
0700-9999	Adjustment										
0701-0000	Furnishings			\$ 837,000.00	\$ 837,000.00		\$ 837,000.00	\$ -			
0702-0000	Equipment			\$ 837,000.00	\$ 837,000.00		\$ 837,000.00	\$ -			
0703-0000	Computer Equipment			\$ 1,674,000.00	\$ 1,674,000.00		\$ 1,674,000.00	\$ -			
0799-0000	Other Furnishings & Equipment										
	Furnishings and Equipment - SUB-TOTAL	\$ -		\$ 3,348,000.00	\$ 3,348,000.00	\$ -	\$ 3,348,000.00	\$ -	\$ -		
0800-9999	Adjustment										
0801-0000	Owner's Contingency				\$ -		\$ -	\$ -			
	Owner's Contingency - SUB-TOTAL	\$ -			\$ -	\$ -	\$ -	\$ -	\$ -		
	TOTALS	\$ 91,629,432.00	\$ 1,470,330.83	\$ 106,807,197.00	\$ 106,833,976.06	\$ 7,450,142.62	\$ 99,383,833.44	\$ (26,779.06)	\$ 21,349,825.00		
	Total Project Budget (excluding Contingencies)	\$ 106,807,197.00	column d	column e	column f	column g	column f - g	column e - f			
	Scope Items excluded	\$ 21,349,825.00									
	Third Party Funding (Ineligible)	\$ -			99,383,833.44	F - G					
	Estimated Basis of Maximum Total Facilities Grant	\$ 85,457,373.00			(26,779.06)	E - F					
	Reimbursement Rate	56.19%									
	Est. Max. Total Facilities Grant (before recovery)	\$ 48,018,498.00									
	Cost Recovery	\$ -									
	Estimated Maximum Total Facilities Grant	\$ 48,018,498.00									
	Construction Contingency	\$ 2,703,883.00									
	Ineligible Construction Contingency	\$ 1,802,589.00									
	"Potentially Eligible" Construction Contingency	\$ 901,294.00									
	Owner's Contingency	\$ 1,200,000.00									
	Ineligible Owner's Contingency	\$ -									
	"Potentially Eligible" Owner's Contingency	\$ 1,200,000.00									
	Total Potentially Eligible Contingency	\$ 2,101,294.00									
	Reimbursement Rate %	56.19%									
	Potential Additional Contingency Grant Funds	\$ 1,180,717.10									
	Maximum Total Facilities Grant	\$ 49,199,215.10									
	Total Project Budget	\$ 110,711,080.00									

APPENDIX B UPDATED PROJECT SCHEDULE

Activity ID	Activity Name	Duration	Start	Finish	2014												2015												2016												2017												2018												2019																			
					D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J
City of Beverly, MA Module 3																																																																																				
Eligibility Period Activity																																																																																				
2	Invite to Eligibility Period	0		01-Jan-14 A	◆ Invite to Eligibility:Period																																																																															
3	Invite to Feasibility Study	0		26-Mar-14 A	◆ Invite to Feasibility:Study																																																																															
4	ProPay Training Date #1	1	15-Aug-14 A	15-Aug-14 A	I ProPay Training Date #1																																																																															
5	Project Kick Off Meeting	0		05-Sep-14 A	◆ Project Kick Off Meeting																																																																															
Owners Project Manager Selection																																																																																				
7	RFS Ad Appears	65	09-Apr-14 A	12-Jun-14 A	■ RFS Ad Appears																																																																															
Designer Selection																																																																																				
9	RFS Ad Appears	11	02-Jul-14 A	12-Jul-14 A	■ RFS Ad Appears																																																																															
10	Response Due	1	17-Jul-14 A	17-Jul-14 A	I Response Due																																																																															
11	Materials Received by the MSBA	6	25-Jul-14 A	30-Jul-14 A	■ Materials Received by the MSBA																																																																															
12	DSP Meeting Date / Application Review	0		12-Aug-14 A	◆ DSP Meeting Date / Application Review																																																																															
13	DSP Interviews Date	0		26-Aug-14 A	◆ DSP Interviews Date																																																																															
14	Designer Contract Executed	7	26-Aug-14 A	01-Sep-14 A	■ Designer Contract Executed																																																																															
15	Designer Contract Received by the MSBA	1	04-Sep-14 A	04-Sep-14 A	I Designer Contract Received by the MSBA																																																																															
Preliminary Design Program																																																																																				
17	Kick Off Meeting	1	05-Sep-14 A	05-Sep-14 A	I Kick Off Meeting																																																																															
18	PDP Submittal Development	81	05-Sep-14 A	24-Nov-14 A	■ PDP Submittal Development																																																																															
19	PDP Submittal Date (8 weeks before PSR date)	0		26-Nov-14 A	◆ PDP Submittal Date (8 weeks before PSR date)																																																																															
20	MSBA PDP Review	28	26-Nov-14 A	23-Dec-14 A	■ MSBA PDP Review																																																																															
21	Address PDP Comments	21	24-Dec-14 A	13-Jan-15 A	■ Address PDP Comments																																																																															
Preferred Schematic Report																																																																																				
23	PSR Submittal Development	78	26-Nov-14 A	11-Feb-15 A	■ PSR Submittal Development																																																																															
24	PSR Submittal Date	1	12-Feb-15 A	12-Feb-15 A	I PSR Submittal Date																																																																															
25	MSBA PSR Review	14	13-Feb-15 A	26-Feb-15 A	■ MSBA PSR Review																																																																															
26	Address PSR Comments	10	27-Feb-15 A	08-Mar-15 A	■ Address PSR Comments																																																																															
27	FAS Presentation	14	27-Feb-15 A	12-Mar-15 A	■ FAS Presentation																																																																															
28	Address FAS Comments	10	13-Mar-15 A	22-Mar-15 A	■ Address FAS Comments																																																																															
29	PS Board Approval	0		25-Mar-15 A	◆ PS Board Approval																																																																															
Schematic Design																																																																																				
31	SD Submittal Development	180	13-Feb-15 A	11-Aug-15 A	■ SD Submittal Development																																																																															
32	SD Notification Email Sent	2	25-Mar-15 A	26-Mar-15 A	I SD Notification Email Sent																																																																															
33	SD Submittal Date	1	06-Aug-15 A	06-Aug-15 A	I SD Submittal Date																																																																															
34	MSBA SD Review Complete	21	07-Aug-15 A	27-Aug-15 A	■ MSBA SD Review Complete																																																																															
35	Address SD Comments	14	28-Aug-15 A	10-Sep-15 A	■ Address SD Comments																																																																															
36	City Council Approves Project Appropriation	1	15-Sep-15 A	15-Sep-15 A	I City Council Approves Project Appropriation																																																																															
37	MSBA Board Approval	0		30-Sep-15 A	◆ MSBA Board Approval																																																																															
MSBA Agreement Activities																																																																																				
Project Scope and Budget Agreement (PSBA)																																																																																				
40	MSBA Prepares and Issues PSBA	30	30-Sep-15 A	29-Oct-15 A	■ MSBA Prepares and Issues PSBA																																																																															

■ Actual Work
■ Remaining Work
■ Critical Remaining Work
◆ Milestone

DESIGNER'S CONSTRUCTION COST ESTIMATE

APPENDIX C

The OPM, Designer and Construction Manager are working to reconcile the 60% Construction Document phase cost estimates. The reconciled estimates will be provided within 10 working days.

APPENDIX D OPM'S CONSTRUCTION COST ESTIMATE

The OPM, Designer and Construction Manager are working to reconcile the 60% Construction Document phase cost estimates. The reconciled estimates will be provided within 10 working days.

APPENDIX E

CONSTRUCTION MANAGER'S CONSTRUCTION COST ESTIMATE

The OPM, Designer and Construction Manager are working to reconcile the 60% Construction Document phase cost estimates. The reconciled estimates will be provided within 10 working days.

APPENDIX E RECONCILED CONSTRUCTION COST ESTIMATE COMPARISON

The OPM, Designer and Construction Manager are working to reconcile the 60% Construction Document phase cost estimates. The reconciled estimates will be provided within 10 working days.

OPM'S 60% CONSTRUCTION DOCUMENT
APPENDIX G
REVIEW COMMENTS



DESIGN DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 04/29/2016

Originating A/E: A13 Architects / Civil: Pare Corp.
Landscape: Birchwood Design Group
Office Location: Burlington, MA
Reviewer: P. Dennis Pacitti – Marwan A. Elias
Review Location: Heery-Burlington
Type of Review: Quality Assurance / Quality Control

Project Manager: Tom Ellis
Project Architect:
Discipline: Civil/Landscape
Reviewer's Telephone #: 781-281-6146
Reviewer's e-mail: ppacitti@heery.com

- Project Book, Schematic Design, Design Development, 60% Construction Documents, Final

KEY

Insert comments in the "Comment" column with a reference to the particular page, paragraph, or sheet number, which the comment pertains to in the "Spec. Sect./Drawing #" column. A response will be provided with the revised documents as follows:

- Y Comment was incorporated
N Comment was not incorporated – see "Remarks" for explanation
P Comment was incorporated partially - see "Remarks" for explanation

Table with 6 columns: Spec. Sect./Drawing #, Item, Found BY (Initial), Comment, Response Code, Remarks. Includes a 'General Comments' header row and several rows of specific review items.

DESIGN DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 04/29/2016

Spec. Sect./ Drawing #	Item	Found BY (Initial)	Comment All comments are suggestions NOT directives	Response Code	Remarks
C2.1	C06	MA	Should bollards be provided to protect the hydrant in the island of the south parking/south of the gym		
C2.1	C07	MA	The plan shows southwest of the bus parking lot a concrete pad with notation "Future Storage Building On Concrete Pad". This notation should be changed to "Concrete Pad for Future Storage Building".		
C2.1 - C2.2	C08	MA	Why is there hay bales/erosion control system showing on the site improvement plan?		
C3.1	C09	DP	Is fencing/guardrail required at loading dock between Elev. 28' & 25.5'		
C3.1	C10	MA	Should the grading for landscaped area west of the auditorium be modified and revised so that the segmental retaining can be eliminated.		
C3.1	C11	MA	The plan shows a segmental retaining wall at the north corner of the site along the north driveway from Cabot Street with same TW and BW wall elevation of 28.0'. The wall should be shortened to match contour elevation of 29.0'. Alternatively, the wall can be eliminated with slight modifications to the grades in that area.		
C3.2	C12	MA	The grading/ contour lines at the southeast parking lot should be revised to eliminate CB 210. I am not sure why do we need two CB structures in that area?		
C4.1	C13	DP	Label 8" gate valve at Fire service to Bldg.		
C5.1 - C5.2	C14	MA	Since the gravel sub base for the pavement section have been increased from 12" to 30" why do we need to install the 6" perforated underdrain at the edge of pavements and drain structures?		
C5.1	C15	MA	The plan shows a trench drain at the AMPHITHEATER, but the landscape drawing shows granite pavers at that location. Should you provide an area drain in lieu of the curved trench drain?		
C5.1	C16	MA	The circular north east planter along the east side of the building is missing cleanout and drain line connection for the wall foundation drain.		
C5.1	C17	MA	What does the dash/broken line inside the rain garden represents? Is this a drain line?		
C6.1	C18	MA	Typical concrete sidewalk detail shows a 4" concrete slab/walk reinforced with 6x6"-6/6 WWM. This shrinkage reinforcement is under sized and should be revised to WWF 4x4 - W2.9 x W2.9		
C6.1	C19	MA	Note (7) for Typical Concrete Sidewalk "SAND GRAVEL FILL		

DESIGN DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 04/29/2016

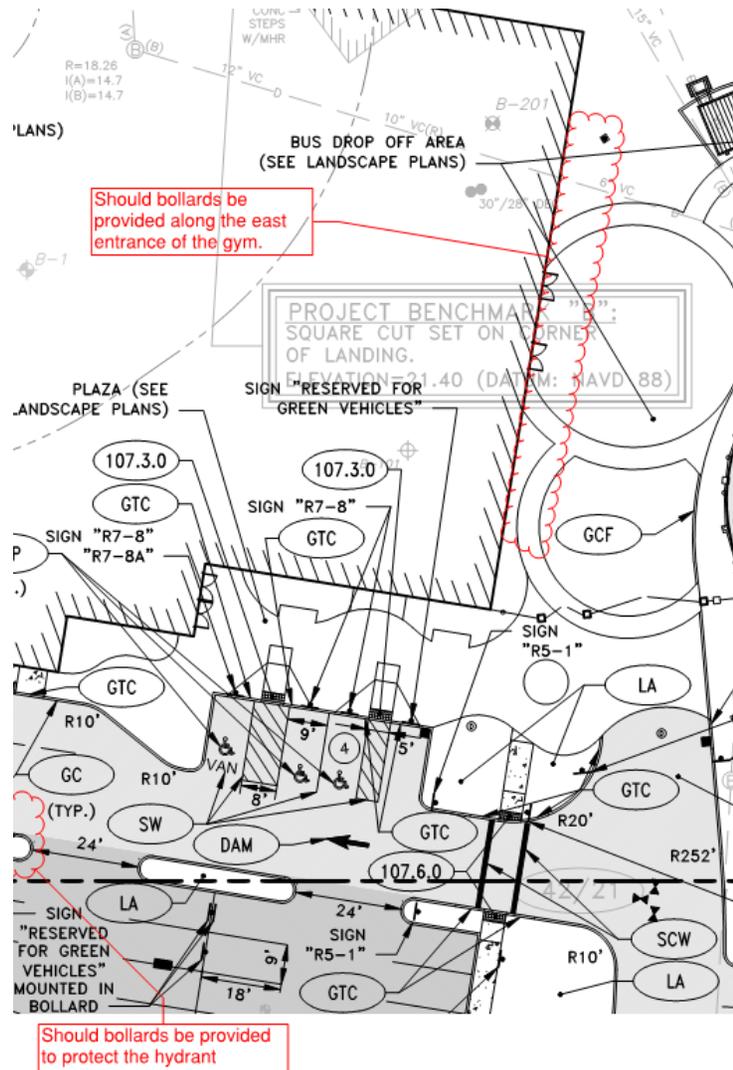
Spec. Sect./ Drawing #	Item	Found BY (Initial)	Comment All comments are suggestions NOT directives	Response Code	Remarks
			SHALL CONFORM TO MASSDOT STD SPECIFICATION MATERIALS SECTION M1.03.0 (TYPE B)". This note should be revised to "Sand gravel sub base material shall conform to structural fill below sidewalks per the project specification"		
C6.5	C20	DP	UDS 1 missing section of pipe at East header		
C6.5	C21	DP	Is gravel base required below concrete base at UDS#2		
C6.6	C22	DP	Provide detail for sewer manhole		
L1.4	C23	DP	Include Landscape Site Plan enlargement for Gym Plaza		
L1.2	C24	DP	Provide layout for expansion joints and weep holes at Type A unit pavers		
L2.0	C25	DP	Show full concrete cradle, front, back, and below all granite curb. Typ.		
L2.0	C26	MA	Details 1, & 3 show an 8" concrete slab/walk reinforced with 6x6"-6/6 WWM. This shrinkage reinforcement is under sized and should be revised to #4 @12" O.C E.W. or to WWF 4x4 - W6 x W6		
L2.0	C27	MA	Detail 4 shows a 12" concrete band reinforced with 6x6"-6/6 WWM. This shrinkage reinforcement is under sized and should be revised to WWF 4x4 - W9 x W9		
L2.0	C28	MA	Details 2, 5, & 7 show a 4" concrete slab/walk reinforced with 6x6"-6/6 WWM. This shrinkage reinforcement is under sized and should be revised to WWF 4x4 - W2.9 x W2.9		
L2.5	C29	DP	L2.5 calls out detail 6/L2.4 & 7/L2.4, details are not shown.		
L (General)	C30	MA	Provide layout, material, & full details drawings for the athletic fields.		
L (General)	C31	MA	Provide cross section of the field (loam/sod/subgrade, and drainage fill between the loam and the subgrade if required.		
General	C32	DP	Is 2000 gal grease trap sufficient capacity		
General	C33	DP	Is floor drain and exterior oil separator required in Custodial work shop?		
General	C34	DP	Add general note and that water main will need to be lowered Max. -7' to avoid utility conflicts.		
ES.01	C35	DP	Conduits not shown to Entry Sign, Site lighting, VCS & PR. Missing detail sheet ES.05		
ES.01	C36	DP	Provide lighting for Entry Sign		

DESIGN DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

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Date: 04/29/2016



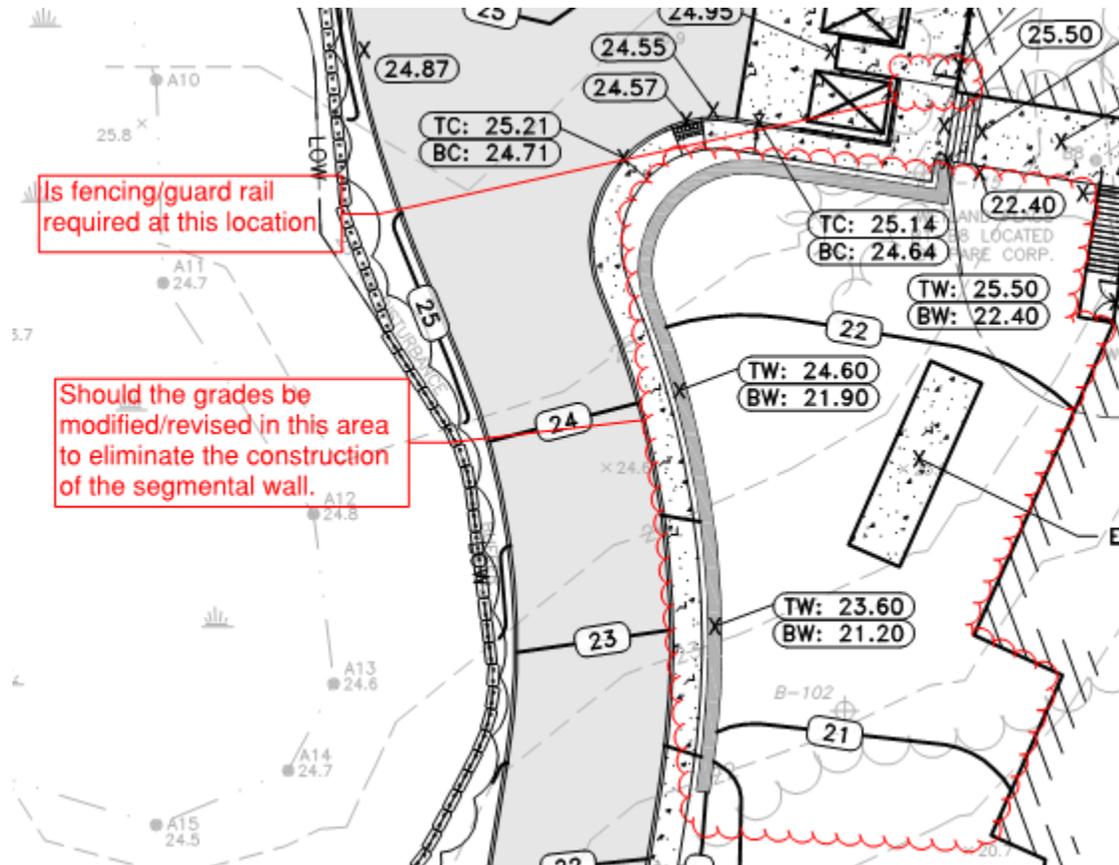
SKETCH FOR ITEMS # C05 & C06

DESIGN DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 04/29/2016



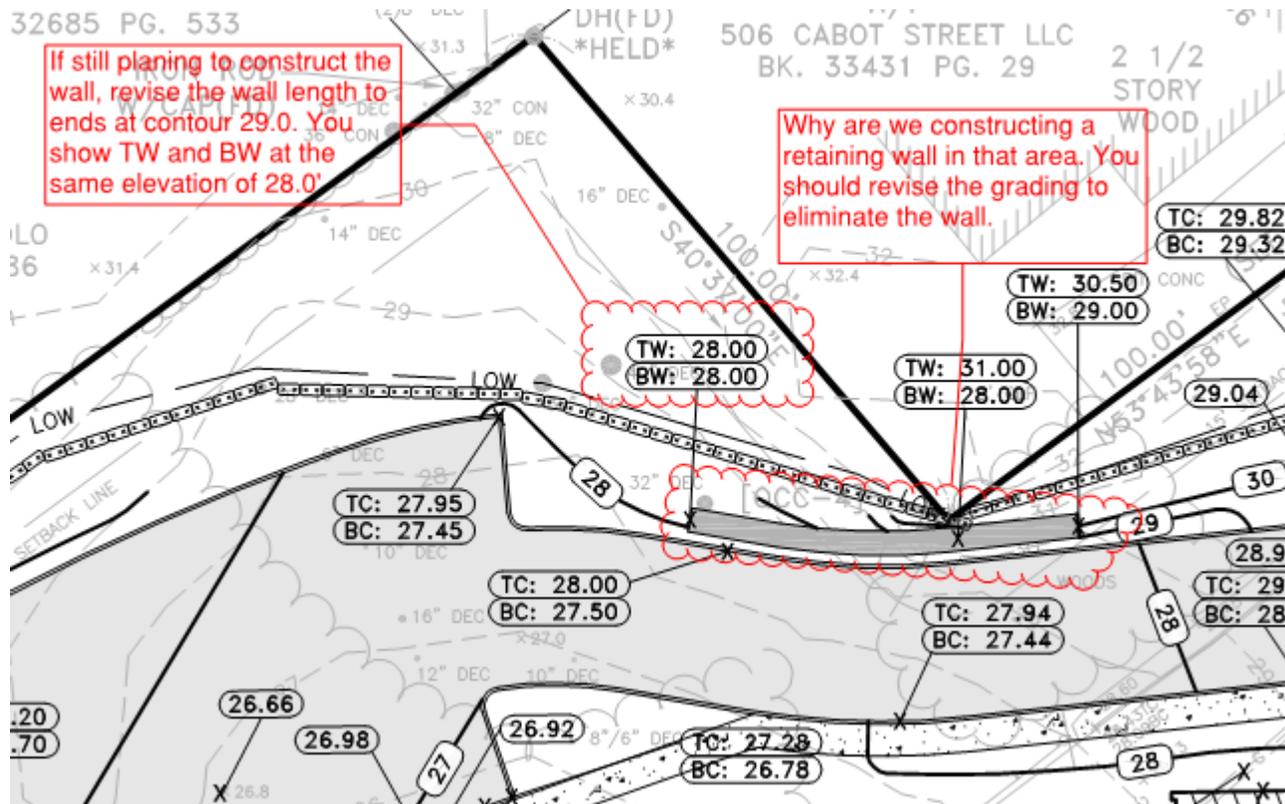
SKETCH FOR ITEMS # C09 & C10

DESIGN DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 04/29/2016



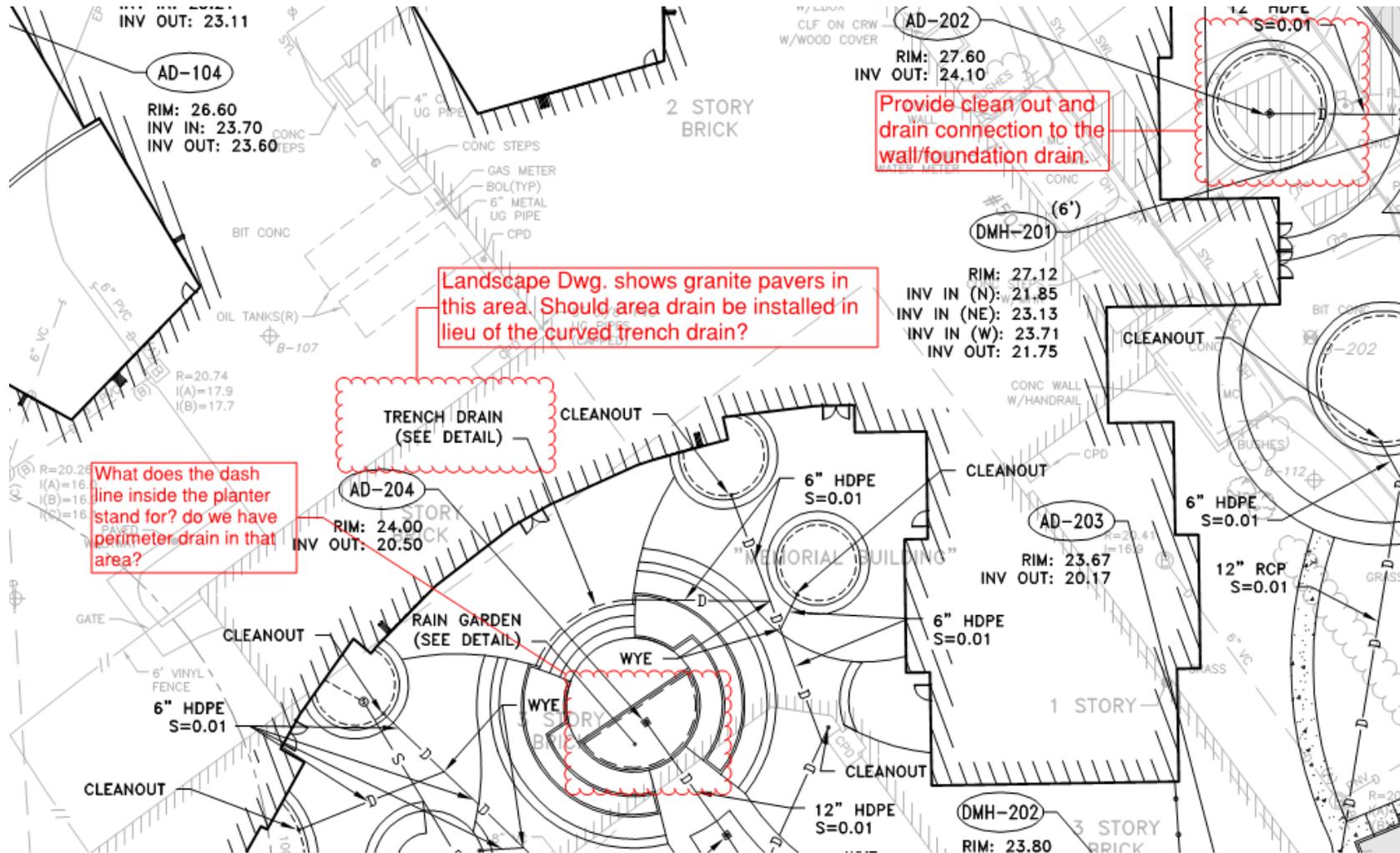
SKETCH FOR ITEM # C11

DESIGN DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 04/29/2016



SKETCH FOR ITEMS # C15, C16, & C17

END OF DOCUMENT



60% CONSTRUCTION DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOLE

Date: 05/6/2016

Originating A/E: A13 Architects / MEP: Griffin & Vary, Inc.

Office Location: Burlington, MA

Reviewer: Joshua Gillespie, Craig Joyner

Review Location: Heery-Atlanta

Type of Review: Quality Assurance / Quality Control

Project Manager: Tom Ellis

Project Architect:

Discipline: FIRE PROTECTION

Reviewer's Telephone #: 404946 2162

Reviewer's e-mail: jgillespie@heery.com

Project Book Schematic Design Design Development 60% Construction Documents Final

KEY

Insert comments in the "Comment" column with a reference to the particular page, paragraph, or sheet number, which the comment pertains to in the "Spec. Sect./Drawing #" column. A response will be provided with the revised documents as follows:

Y Comment was incorporated

N Comment was not incorporated – see "Remarks" for explanation

P Comment was incorporated partially - see "Remarks" for explanation

Spec. Sect./ Drawing #	Item	Comment <i>All comments are suggestions NOT directives</i>	Response Code	Remarks
60% Construction Document Comments				
General	FP01	Drawings are out of order.		
General	FP02	Coordinate tamper switches with fire alarm and/or Division 26.		
General	FP03	Suggest listing all applicable codes on FP0.1.		
General	FP04	Suggest different sprinkler head designation for different types of sprinkler heads (ie. On FP1.24 all the sprinkler heads above and below the floating ceiling appear as the same designation at different sizes).		
FP.01	FP05	Standpipe up at Stair 6 is denoted as a 4" in the vertical and a 6" in the horizontal.		
FP.01	FP06	Fire Protection detail 2/FP0.1 shows an excess pressure pump. Is an excess pressure pump specified for the system?		
FP.01	FP07	Show riser isolation valves per 6.3.2 of NFPA 14.		
FP.01	FP08	The risers for stairs 4, 2, and 3 originate from the Stair 6 riser, rather than the source supply as required by 6.3.2 of		

60% CONSTRUCTION DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOLE

Date: 05/6/2016

		NFPA 14 (i.e. isolation of Stair 6 riser, isolates the other which is prohibited). If there is some state/local exemption unknown to Reviewer, then Reviewer suggests sticking with the base NFPA 14.		
FP.01	FP09	The Zone 1 FDC is not labeled and does not have the same symbol as the Zone 4 FDC, or the device shown on the floor place is incorrectly shown as an FDC.		
	FP10	Consider using another symbol for the source alarm check valve, rather the common pump symbol.		
FP.01	FP11	<p>The schematic diagram is not correct in terms of order of features:</p> <p>Mechanical Room L13 FCV versus FDVs</p> <p>Lower level FDV shown as independent branches from main, when one branches from the other.</p> <p>Zone 4 FCVs are indicated to be in series (consider expand diagram size to show this detailed order, separate details if necessary)</p> <p>Stairs 3,4, and 5 drawn as if connected twice to 6" main (clearly show riser isolation valve).</p> <p>The end of main FDC is shown to be with Stair 3, when it is really a branch that comes off before the Stair 2 riser takeoff.</p>		
FP.01	FP12	<p>Since minimum criteria stipulate that the standpipe is to be designed by contractor (though it appears to be designed already), suggest stipulating the Engineer's understanding of the standpipe flow in the minimum criteria.</p> <p>Alternatively, consider substituting 'constructed' for 'designed' since this appears to be a redundant service for the standpipe design. In that case, stipulate the minimum flow at the FDC to inform Contractor of the criteria for the functional performance test, much like FDV pressure is stipulated.</p>		
FP1.11	FP13	FDC for zone 1 is not labeled. Show check valve, assuming it is a FDC (looks like the device on zone 4).		

60% CONSTRUCTION DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOLE

Date: 05/6/2016

FP.04/FP2.1	FP14	Fire Department Connection is not coordinated with the 6" main.		
FP2.1	FP15	Clear out mechanical piping in background.		
FP2.1/FP.01/F P1.04	FP16	Fire Department Connection location differs from what is shown on the riser diagram on FP0.1 (shown on lower level). Are there multiple fire department connections?		
MSBA Req.	FP17	Not all piping is shown and sized per MSBA requirements for 60% CD set.		

END OF DOCUMENT

60% CONSTRUCTION DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOLE

Date: 05/06/2016

Originating A/E: A13 Architects / MEP: Griffin & Vary, Inc.

Office Location: Burlington, MA

Reviewer: **Jim Anderson**

Review Location: Heery-Atlanta

Type of Review: Quality Assurance / Quality Control

Project Manager: Tom Ellis

Project Architect:

Discipline: **PLUMBING**

Reviewer's Telephone #: **404 946 2129**

Reviewer's e-mail: janderso@heery.com

Project Book
 Schematic Design
 Design Development
 60% Construction Documents
 Final

KEY

Insert comments in the "Comment" column with a reference to the particular page, paragraph, or sheet number, which the comment pertains to in the "Spec. Sect./Drawing #" column. A response will be provided with the revised documents as follows:

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Spec. Sect./ Drawing #	Item	Comment	Response Code	Remarks
All comments are suggestions NOT directives				
Design Development Comments - Open				
P0.1	P01	PLUMBING FIXTURE SCHEDULE Did not see where fixture P-4 was used, however P-4H is used but is not on the schedule. Follow-up: Some showers were also labeled P-4H.		The P# will be worked out, believe all water cooler locations will be bi-level.
P0.1	P02	PLUMBING FIXTURE SCHEDULE On fixtures P-5 through P-11, the water usage is shown as "GPF" but none of these fixtures are flush type.		Proper fixtures will be changed to GPM
P0.1	P03	LEGEND Several abbreviations need to be added to the list. (DWV, GPM, GPF, AVTR, NPCW, NPHW, AV, KW, RS) Follow-up: There are more abbreviations missing than I listed for the DD review.		The Legend will be changed to fit piping systems in the building.

60% CONSTRUCTION DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOLE

Date: 05/06/2016

Spec. Sect./ Drawing #	Item	Comment All comments are suggestions NOT directives	Response Code	Remarks
P0.1	P04	DRAWING LIST Drawing P0.14 is missing from the list.		This list will change as drawings are required, but will be coordinated.
P0.1	P05	DRAWING LIST Drawings P0.11, P1.11, P1.21 & P1.51 should say "ZONES" because they cover multiple zones. P0.13 should be "ZONE", singular.		Will review and modify.
P1.41	P06	In the main toilet rooms, the hose bibbs are labeled as "HB" but on the legend, they are "HB-A".		The A will be removed and the model will be provided in the spec.
P1.13	P07	At the toilet rooms, the isolation valves for the lavatories and toilets are in-line. If the valve is turned off for the lavatories, the toilets will not have water either.		Isolation valve will added and coordinate on the entire project.
P2.2	P08	On the backflow preventer detail, suggest providing a strainer ahead of the backflow preventer.		And up-dated detail will be provided with strainer.
GENERAL	P09	Suggest "clipping away" all plumbing and architectural work beyond the match lines. The drawings now show duplicate work on adjacent zones and are confusing. Also, in several instances, notes and leader lines cross from one sector to another, thereby showing information for one sector in the adjacent one.		Will have that done.
GENERAL	P10	Recommend labeling piping in the direction of flow for clarity. For example, "4" sanitary up" or "4" storm drain up" would be incorrect. Gravity piping is either "down" or "from above." Vent piping would be "up" or "from below"; same for supply piping. Some of the piping is labeled this way but it is not consistent.		Will review.
GENERAL	P11	At many of the sinks, the typical note calls for the waste pipe down, the vent pipe up and down, and 1/2" hot & cold water. However, the way the		Will review.

60% CONSTRUCTION DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOLE

Date: 05/06/2016

Spec. Sect./ Drawing #	Item	Comment	Response Code	Remarks
		<p>drawings are shown, conveys the intent that the designer wants to use combination drain and vent stacks at the sinks. I agree that where applicable, the combination drain and vent stacks are the right choice. This would be noted completely differently that what is currently on the drawings. Also, the water piping would change sizes as it rises through the building and it would be noted as "X" H&CW FROM BELOW AND X" H&CW UP" where is changes sizes.</p> <p>Follow-up: Please confirm that vertical combination waste and vent stacks are allowed by code. I could not find them. Also, recommend using 2" sanitary piping instead of 1½". The smaller pipe may be allowed but leaves no room for spare capacity and the cost impact is minimal.</p>		
GENERAL	P12	In most cases, the isolation valves for the fixtures are shown close to the fixtures and not on the branch lines close to the water mains. The problem with this is if the fixtures were ever removed during a renovation and the water pipes were only removed downstream of the valves, it would leave several feet of dead-end water piping that would grow stagnant and potentially contaminate the domestic water. It is OK to have isolation valves near the fixtures but there should be a valve on the branch as close as practical to the main.		Will be added.
GENERAL	P13	Some fixture designations are missing.		Will be added.
GENERAL	P14	Sump pumps will be required in all of the elevator pits.		This will be coordinated with structural and owner.
Spec. 22 00 00	P15	Paragraph 2.17.D: The last sentence seems to be unfinished.		Will be reviewed and corrected.

60% CONSTRUCTION DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOLE

Date: 05/06/2016

Spec. Sect./ Drawing #	Item	Comment	Response Code	Remarks
		All comments are suggestions NOT directives		
		Follow-up: Also, I didn't see any roof hydrants. Will any be provided?		
Spec. 22 00 00	P16	Paragraph 2.26.A calls for "two (3)" water heaters. Please clarify. Follow-up: I realize that three heaters will be provided but the wording in the specs is still incorrect.		Three heaters will be provided.
60% Construction Documents Comments				
	P17	NOTE: The order of comments about the drawings is based on the order of review. Roof to below grade; zones 1-4.		
P0.1	P18	PLUMBING FIXTURE SCHEDULE The lavatory traps are shown at 1½" but are typically 1¼".		
P0.1	P19	PLUMBING FIXTURE SCHEDULE Fixture P3-B is not on the schedule.		
P0.1	P20	EQUIPMENT SCHEDULE Recommend a separate and more complete schedule for the water heaters showing, gallon capacity, Btus, recovery, etc.		
P0.1	P21	The north arrow and key plan are not needed on this drawing.		
P0.1	P22	DRAWING LIST Drawing P2.2 is not part plans but actually is the enlarged kitchen plan.		
P0.1	P23	DRAWING LIST Drawing P2.3 should be shown as the detail sheet.		
P0.1	P24	Suggest listing applicable codes on this sheet.		
P1.51	P25	Roof drains near RTU-12 appear to have incorrect square footage. Specifically, 4" RD (750 sq.ft) and 4" RD (1160 sq.ft), measure approximately 1750 sq.ft and 1745 sq.ft, respectively.		
P1.51	P26	On plan 2, there are two "low points" that do not have roof drains. Is this correct?		

60% CONSTRUCTION DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOLE

Date: 05/06/2016

Spec. Sect./ Drawing #	Item	Comment All comments are suggestions NOT directives	Response Code	Remarks
P1.51	P27	On plan 1, should there be natural gas routed to the roof top units?		
P1.51	P28	On plan 2, along column line 1-L.6, there are four roof drains but it looks like only two low points. Please clarify.		
P1.41	P29	Missing VTR for plumbing stack located in 407 General Class.		
P1.41	P30	Near column line 1-C/1-4, the cleanout inside the shaft is not accessible.		
P1.41	P31	Near column line 1-F/1-3, the cleanout inside the shaft is not accessible.		
P1.41	P32	In the chase above room 411, there is a 4" acid vent that does not continue on the floor below.		
P1.41	P33	In room 413A, a 3" vent appears to connect to the trap of the sink.		
P1.41	P34	In room 413A, why is the vent from the sink 3" when it comes from a 1½" stack?		
P1.41	P35	In room 413A, the vent piping along the bottom of the room appears to be labeled "CO".		
P1.41	P36	In the large men's room, the sanitary piping does not align with the P1-H fixture.		
P1.42	P37	Vents for 422 General Classroom and 432 General Classroom does not have a VTR		
P1.43	P38	Note VTR shown in 439A Science Classroom Lab 7/8 on sheet P1.43.		
P1.43	P39	Sanitary vent and acid vent connecting are connected together in shaft behind 439B Prep Room. This is a code violation. 248 CMR10.03 dedicated systems state: Dedicated Acid Waste and Special Hazardous Waste Systems. All acid drainage or special drainage and acid vent piping or special vent piping normally associated with exterior or interior acid neutralizing or hazardous waste treatment devices		
P1.43	P40	Acid vent up from floor below is not denoted in shaft behind 439B Prep Room on P1.43.		

60% CONSTRUCTION DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOLE

Date: 05/06/2016

Spec. Sect./ Drawing #	Item	Comment All comments are suggestions NOT directives	Response Code	Remarks
P1.43	P41	Missing VTR for plumbing stack located in 436 General Classroom.		
P1.32	P42	Riser at 319B Cust. appears incorrect.		
P1.33	P43	Dry vent from 334A Art Classroom sinks is connected to the stack serving the sink in 335 Academic Team Room. The connection of the dry vent is below the waste connection of the sink on the fourth floor (435 Academic Team Room). This does not appear to be code compliant		
P1.21	P44	In plan 2, the storm drain piping to a second roof drain was "cut off" and not shown complete.		
P1.21	P45	Just above Stair 2, in the toilet room, the "WCO" is shown as a "UCO".		
P1.11	P46	Plan 2 is labeled as 1.		
P1.21	P47	In room 113A, pipe breaks should be added for clarity.		
P1.21	P48	At room 104A, in the lower left-hand corner, the piping from above is missing.		
P1.21	P49	In room 115, the flow arrows on the domestic water piping are backwards.		
P1.21	P50	In room 115, the storm drain is labeled as 4,655 sq. ft. but on the floor above, it is 4,660 sq. ft. The error continues down to the underslab drawings.		
P1.21	P51	In key note #3, the hot and cold water go down, not up.		
P1.21	P52	Just above room 101G, the configuration of the domestic hot water circulating piping will not work. Ahead of the balancing valve shown there, the circulating piping should be one loop, not two branches.		
P0.11	P53	Plan 2 is labeled as 1.		
P0.11	P54	In plan 2, there are what appears to be random column footings (with no columns) floating around the plan. Please clarify.		

60% CONSTRUCTION DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOLE

Date: 05/06/2016

Spec. Sect./ Drawing #	Item	Comment All comments are suggestions NOT directives	Response Code	Remarks
P0.11	P55	East of the elevator and along column line 1-L, the 6" storm drain from above is shown in the wrong place according to drawing P1.11.		
P0.11	P56	Near the match line at Zone 2, a note showing an invert elevation is shown at the wrong angle.		
P1.52	P57	The two roof drains on the southernmost portion of the zone are not shown at roof low points.		
P1.42	P58	Vents for 422 General Classroom and 432 General Classroom does not have a VTR.		
P1.42	P59	The sanitary vent from the sink in General Classroom 425 is shown connecting to acid vent piping.		
P1.42	P60	The 1" domestic cold water supplying toilet rooms T4-4A & B is probably too small.		
P1.42	P61	In room 433, the 5" storm drain piping down from a roof drain does not align with the roof drain above.		
P1.32	P62	Riser at 319B appears incorrect.		
P1.32	P63	In room 328, the plumbing piping is not aligned with the sink.		
P1.32	P64	In room 322, the plumbing piping is not aligned with the sink.		
P1.22	P65	In room 228A, the plumbing piping from above is not continued down to this floor.		
P1.22	P66	In room 233, the plumbing risers are not shown aligning with the risers from the floors above.		
P1.12	P67	In room 131A, the plumbing risers are not shown aligning with the risers from the floors above.		
P1.12	P68	In room 119B, there is a missing vent in the left wall of the janitor's room.		
P1.12	P69	In room 119B, the vent up does not align with the same vent on the floor above.		
P1.12	P70	The domestic hot water going from room 133 to room 132 changes sizes but there are no branch lines between the two points.		
P0.12	P71	The finished floor elevation is shown twice on the drawing.		

60% CONSTRUCTION DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOLE

Date: 05/06/2016

Spec. Sect./ Drawing #	Item	Comment All comments are suggestions NOT directives	Response Code	Remarks
P0.12	P72	In room 125, the sanitary drain does not align with the drain on the first floor plan.		
P0.12	P73	In room 133, the sanitary drain does not align with the drain on the first floor plan.		
P0.12	P74	In room 131B, the drain pipe is labeled as both "waste" and "acid waste". Please clarify.		
P1.43	P75	Suggest noting VTR shown in 439A Science Classroom Lab 7/8.		
P1.43	P76	Acid vent up from floor below is not denoted in shaft behind 439B Prep Room.		
P1.43	P77	Missing VTR for plumbing stack located in 436 General Classroom.		
P1.43	P78	Sanitary vent and acid vent are connected together in shaft behind 439B Prep Room. This is a code violation. 248 CMR10.03 dedicated systems state: Dedicated Acid Waste and Special Hazardous Waste Systems. All acid drainage or special drainage and acid vent piping or special vent piping normally associated with exterior or interior acid neutralizing or hazardous waste treatment devices.		
P1.43	P79	In room 439A, there appears to be piping provisions for an emergency shower but this doesn't continue anywhere else on the documents. Suggest clarifying.		
P1.43	P80	In room 439B, there appears to be a tank or something similar but it is not labeled.		
P1.33	P81	Dry vent from 334A Art Classroom sinks is connected to the stack serving the sink in 335 Academic Team Room. The connection of the dry vent is below the waste connection of the sink on the fourth floor (435 Academic Team Room). This does not appear to be code compliant.		
P1.33	P82	In room 339B, there is a 4" acid vent on the right side of the room that doesn't belong there.		
P1.33	P83	Along the north wall of the kitchen, room 345A, the pipe risers do not align with the sink on the 4 th floor. This		

60% CONSTRUCTION DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOLE

Date: 05/06/2016

Spec. Sect./ Drawing #	Item	Comment All comments are suggestions NOT directives	Response Code	Remarks
		error continues all the way down to below the first floor slab.		
P1.33	P84	Suggest re-thinking the routing of the 8" storm drain pipe starting at the upper right corner of the kitchen. Taking into account the size of the pipe, distance of run and area of routing, there may be a good possibility of a conflict above the ceiling. Also, the pipe turns down right on column line 3-H which might cause a conflict with the structure.		
P1.23	P85	In room 239B, the acid vent for the sink is labeled "up & up". I don't think this is correct.		
P1.23	P86	Along column line 3.8, there are missing risers from above.		
P1.23	P87	Near the match line with Zone 2, there is a note that is shown at the wrong angle.		
P1.23	P88	There is no plumbing shown for the fixtures in room T2-7.		
P1.13	P89	Sizes not shown on CW, HW, and HWR near the gang restroom.		
P1.13	P90	In room 139B, the 3" acid vent is a 4" acid vent on the 2 nd floor. Should they be the same?		
P1.13	P91	In room 136, the configuration of the domestic hot water return will not work as shown.		
P1.13	P92	Room 145B is an electrical room and there are plumbing water pipes routing through the room. Move water piping to comply with code.		
P1.13	P93	The domestic hot and cold water branches from the mains that supply this zone need isolation valves and a balancing valve on the hot water return.		
P0.13	P94	The finished floor elevation is shown twice on the drawing.		
P0.13	P95	At the match line with Zone 4, a 4" sanitary line appears to stop at the match line. Where does the pipe continue?		
P1.54	P96	In one of the "hatched" roof areas on the south end of the building, two roof drains are shown but the		

60% CONSTRUCTION DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOLE

Date: 05/06/2016

Spec. Sect./ Drawing #	Item	Comment All comments are suggestions NOT directives	Response Code	Remarks
		architecture only shows one low point. In one of the other mentioned areas, the roof drain is not shown at the low point of the roof.		
P1.54	P97	On the north end of the zone, the roof drains do not appear to have been coordinated with the latest architecture yet. The issues continue down through the floors but this will be the only comment for this area for now.		
P1.24	P98	At room 247, why is a 4" sanitary pipe shown for the drinking fountain?		
P1.24	P99	At the south end of the zone, a 4" VTR is shown but it is also shown on the roof plan. Suggest removing from this drawing.		
P1.14	P100	In room 155, the 5" storm drain line is labeled as covering 1900 sq. ft. but on the roof plan, it is 1910 sq. ft.		
P1.14	P101	On the right side of room 155, the 4" vent does not align with the same piping on the floors below.		
P1.14	P102	In room 152D, the 4" storm drain line is labeled as covering 900 sq. ft. but on the roof plan, it is 886 sq. ft.		
P1.14	P103	Suggest adding more "ST" labels on the storm drain piping over the basketball courts.		
P1.14	P104	Near custodian room 150, the branch piping from the plumbing piping coming up from below, needs control valves.		
P1.14	P105	Just north of Stair 8, a horizontal storm drain pipe is labeled as "UP".		
P1.04	P106	In the Mechanical Room, the floor drains and cleanouts don't all align with the underslab drawings.		
P1.04	P107	In the Mechanical Room, there is a missing floor drain when compared with the underslab drawings.		
P1.04	P108	Suggest showing the plumbing and HVAC equipment in the mechanical room to aid coordination.		
P1.04	P109	The piping coming out of the south side of the mechanical room, is not shown on the enlarged mechanical room plan.		

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P0.04	P110	If a reduced pressure zone backflow preventer gets clogged with something such as a rock in the water piping, (I have seen this) the unit can open and dump with the full flow of the pipe. There are (2) 4" backflow preventers so it could be a lot of water. For this reason, I suggest that all of the underfloor drain piping in the mechanical room be changed to 6" and this size carried all of the way to the exterior of the building. It is only 4" now.		
P0.04	P111	In the toilet rooms along column line 4-11, the floor drains are labeled, one as a 2" and one as a 4". Please clarify.		
P0.04	P112	The grease trap and the foundation drains are labeled as having details on drawing P2.2 but the detail sheet is P2.3.		
P0.04	P113	In the lower left corner of the basketball courts, the 6" storm drain line is labeled as covering 3556 sq. ft. but on the roof plan, it is 3560 sq. ft.		
P2.1	P114	The natural gas piping does not continue on drawing P1.14 as indicated.		
P2.1	P115	Where is the cold water, hot water, hot water circulating piping and vent piping that is routed out the south side of the mechanical room and shown on P1.04?		
P2.1	P116	The natural gas, cold water, hot water and hot water return piping does not continue on drawing P1.14 as indicated.		
P2.1	P117	Suggest screening all non-plumbing equipment in the room.		
P2.1	P118	At what pressure does the natural gas enter the building? What pressure will it be distributed at? Will regulators be required in the building?		
P2.2	P119	The kitchen plumbing plan has not yet been started.		
P2.3	P120	Suggest renaming the "WATER METER DETAIL" to "WATER SERVICE DETAIL".		

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		All comments are suggestions NOT directives		
P2.3	P121	On the water meter detail, what is the purpose of the expansion tank? Is it a thermal expansion tank?		
P2.3	P122	On the water meter detail, what to the designations BFP5A and 5B refer to?		
P2.3	P123	On the water meter detail, suggest providing a strainer ahead of both reduced pressure zone backflow preventers.		
P2.3	P124	On the backflow preventer detail, the check valve ahead of the backflow preventer is facing the wrong direction.		
P2.3	P125	On the backflow preventer detail, the check valve ahead of the backflow preventer is facing the wrong direction.		
P2.3	P126	On the backflow preventer detail, suggest providing a strainer ahead of the reduced pressure zone backflow preventer.		
P2.3	P127	On the grease trap detail, the trap is noted to have a capacity of 2000 gallons but in the specs, it is 6000 gallons. Recommend only showing information once.		
P2.3	P128	On the grease trap detail, suggest providing a schedule of dimensions to correlate with the letters on the details, removing the letters and replacing with the actual dimensions or not showing dimensions at all because different manufacturers may build their traps to different dimensions but still have the correct capacity.		
P2.3	P129	On the underslab piping hanger detail, suggest using a clevis hanger for the pipe and just bending the threaded rod inside the slab. This will work just as well and be less costly.		
P2.3	P130	On the underslab piping hanger detail, suggest replacing the word "conduit" with "pipe".		
P2.3	P131	This drawing does not need the north arrow or key plan.		
GENERAL	P132	Several roof drain square footages appear to be incorrect. Suggest confirming roof drain calculations and rain leader		

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		sizes and update square footages and corresponding sizes from the roof down to below grade. Reference specific comments for some examples		
GENERAL	P133	No isometric risers for domestic water, sanitary waste and vent, or storm		
GENERAL	P134	Coordinate location of all pipe risers in shafts with other trades in shaft including Mechanical ducts		
GENERAL	P135	Coordinate all penetrations through rated walls. Add fire stopping details to Plumbing detail sheet P2.3 as needed		
GENERAL	P136	In the previous submittal, there were many emergency showers shown along with a hot water circulating system and temperature maintaining water heater. It is not part of this submittal. Have the showers been eliminated?		
GENERAL	P137	In the large toilet rooms, the sanitary piping is shown very minimally. Will there be enlarged plans provided that show more detail? Also, on several of the drawings, the piping is not correctly aligned with the fixtures or in the chases.		
GENERAL	P138	There are a couple of places where non-potable water piping is indicated supplying science classrooms. However, there is no non-potable water system indicated on the drawings. Please clarify.		
GENERAL	P139	There are several notes referring to "water piping part plans" but none were submitted.		
GENERAL	P140	I get the feeling that the plumbing pipes are being sized to the absolute minimum acceptable. For example, 5" drain piping is shown but is not that commonly used. Suggest stepping from 4" to 6". The price difference is probably minimal because 6" is more popular and it gives you some extra capacity, just in case. Same for the water piping. Going up a pipe size here and there when the calculations get close will never be noticed in the pricing of the system, but again, there is a little extra capacity if needed and velocities in the piping will be reduced.		

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GENERAL	P141	There are many places where notes refer to riser diagrams on drawings that were not submitted.		
GENERAL	P142	Suggest calling reduced pressure zone backflow preventers "RPZs". That is the industry standard and not "RPB". This comment also applies to the specifications.		
GENERAL	P143	On the underslab drainage drawings, there are what appears to be hundreds of columns in places where columns shouldn't be. Some are shown in doors, in the middle of an elevator shaft, throughout the gymnasium floor, etc. I know that these are not columns but they are very distracting. Suggest turning the layer off and screening all background reference files.		
GENERAL	P144	Room names should be shown on the underslab drainage drawings.		
GENERAL	P145	The drawings are not consistent as to showing cleanouts on the first floor drawings. Also, many of the cleanouts that are shown do not accurately align with the cleanouts shown on the underslab drainage drawings. Recommend not showing them on the first floor because they are already shown on the underfloor drainage drawings.		
GENERAL	P146	The drawings are not consistent as to showing cleanouts on the first floor drawings. Also, many of the cleanouts that are shown do not accurately align with the cleanouts shown on the underslab drainage drawings. Recommend not showing them on the first floor because they are already shown on the underfloor drainage drawings.		
GENERAL	P147	Have the depths of the footings been coordinated with the structural engineer where plumbing pipes drop on top of them?		
GENERAL	P148	The drawings are not consistent as to where the keyed notes are located. Some are in the title block below the KEYNOTE LEGEND and some are outside of the border in open plan space.		

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GENERAL	P149	The dashed line around areas that are referred to other drawings looks to be the same weight and pattern as vent piping and is confusing. Consider using a much heavier line weight for the designated areas.		
GENERAL	P150	Suggest not referring to water heaters as "hot water heaters". People outside of our industry frequently use that term but it is not accurate. This also applies to the specifications.		
GENERAL	P151	There are many missing fixture designations.		
GENERAL	P152	In zone 1, main toilet men's rooms, the piping that joins the waste of the urinals and water closets appears to be routed through the corner of the elevator shaft wall. Suggest using separate sanitary drops through the floor and not trying to connect the two chases.		
GENERAL	P153	Confirm all VTRs are located the minimum distance from RTU outside air intakes.		
GENERAL	P154	Coordinate all penetrations through rated walls. Add fire stopping details as needed.		
SPECS Section 22 00 00	P155	Paragraph 2.20.A: I didn't see any master gas valve boxes. Will they be provided?		
SPECS Section 22 00 00	P156	Paragraph 1.3.D: The last sentence seems to be unfinished.		
SPECS Section 22 00 00	P157	Paragraph 1.34.C.3.a: The test pressure for natural gas is very low; <6psi. I know that working gas pressures are usually fairly low but suggest using 50 psi for test pressure.		
SPECS Section 22 00 00	P158	Paragraph numbers after 2.27 are miss-numbered.		
SPECS Section 22 00 00	P159	Paragraph 2.38 (should be 2.28) Hot Water Circulators: In paragraph A, the 120° circulator pump is 15 gpm and the 140° circulator is 10 gpm. However, in paragraph B, it states that <i>each</i> primary 120° return is 10 gpm and <i>each</i> secondary leg is 5 gpm. Furthermore, the 140°		

60% CONSTRUCTION DOCUMENT MSBA REQUIREMENT COMPARISON

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOLE

Date: 05/06/2016

Originating A/E: A13 Architects / MEP: Griffin & Vary, Inc.

Office Location: Burlington, MA

Reviewer: **Jim Anderson**

Review Location: Heery-Atlanta

Type of Review: MSBA Requirement Comparison

Project Manager: Tom Ellis

Project Architect:

Discipline: **PLUMBING**

Reviewer's Telephone #: **404 946 2129**

Reviewer's e-mail: janderso@heery.com

Project Book
 Schematic Design
 Design Development
 60% Construction Documents
 Final

KEY

Insert comments in the "Comment" column with a reference to the particular page, paragraph, or sheet number, which the comment pertains to in the "Spec. Sect./Drawing #" column. A response will be provided with the revised documents as follows:

Y Comment was incorporated

N Comment was not incorporated – see "Remarks" for explanation

P Comment was incorporated partially - see "Remarks" for explanation

Spec. Sect./ Drawing #	Item	Comment All comments are suggestions NOT directives	Response Code	Remarks
MSBA 60% Design Requirements				
N/A	P01	All work done by the Plumbing Subcontractor, which includes all water, gas, air, vacuum, medical gases, sanitary and storm wastes, and accessories. Most of the plumbing piping is shown, but there are some area that have not been completed.		
N/A	P02	Trapping and venting of all plumbing fixtures including floor drains. Same comment as #1.		
N/A	P03	Water and gas supply sources, storm and sanitary discharge mains. This is shown.		
N/A	P04	All piping sizes shall be indicated on drawings and riser diagrams. Indicate all directions of flow and		

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Project Name: BEVERLY MIDDLE SCHOOLE

Date: 05/06/2016

Spec. Sect./ Drawing #	Item	Comment All comments are suggestions NOT directives	Response Code	Remarks
		pitch on piping. There are some pipe sizes that have not been shown. No riser diagrams were submitted for 60%.		
N/A	P05	All piping sizes shall be indicated on drawings and riser diagrams. Indicate all directions of flow and pitch on piping. There are some pipe sizes that have not been shown. No riser diagrams were submitted for 60%.		
N/A	P06	All piping and connections required for other trades (e.g., kitchen equipment, HVAC make-up water, etc.) No kitchen plumbing work was submitted for 60%.		
N/A	P07	Acid waste, vents and neutralization systems for laboratories. Mostly complete.		
N/A	P08	Plumbing Legend and/or graphical symbols on the first sheet of the Plumbing Drawings. Shown but not complete.		
N/A	P09	Plumbing riser diagrams. None submitted.		
N/A	P10	Domestic water booster pumps, boiler feed water, meter location, hose bibbs. Mostly complete.		
N/A	P11	Domestic hot water: storage tanks, piping material, hanger details. Mostly complete but a detail for the water heaters should be provided.		

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		All comments are suggestions NOT directives		
N/A	P12	Domestic hot water: storage tanks, piping material, hanger details. Mostly complete but a detail for the water heaters should be provided.		
N/A	P13	Backflow preventers, and cleanouts. Mostly complete.		

END OF DOCUMENT

60% CONSTRUCTION DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 05/6/2016

Originating A/E: A13 Architects / MEP: Griffin & Vary, Inc.
Office Location: Burlington, MA
Reviewer: Peter Barron, Joshua Gillespie, Rizwan Anwar
Review Location: Heery-Atlanta
Type of Review: Quality Assurance / Quality Control

Project Manager: Tom Ellis
Project Architect:
Discipline: MECHANICAL
Reviewer's Telephone #: 404 946 2123
Reviewer's e-mail: ranwar@heery.com

Project Book
 Schematic Design
 Design Development
 60% Construction Documents
 Final

KEY

Insert comments in the "Comment" column with a reference to the particular page, paragraph, or sheet number, which the comment pertains to in the "Spec. Sect./Drawing #" column. A response will be provided with the revised documents as follows:

Y Comment was incorporated

N Comment was not incorporated – see "Remarks" for explanation

P Comment was incorporated partially - see "Remarks" for explanation

Spec. Sect./ Drawing #	Item	Comment	Response Code	Remarks
All comments are suggestions NOT directives				
Schematic Design Comments - OPEN				
Volume II/ section 230000/ para 1.22	M01	Correct commissioning references to specification number 019113.		
Narrative / page 7 / para. C.2	M02	Typically, electrical rooms that contain heat producing equipment, such as transformers, or equipment with electronics, such as lighting controls, are required to be conditioned to maintain the temperature and humidity within a limited range. Shouldn't these spaces be provided with air conditioning?		
Narrative / page 8 / para. D.1.c	M03	Suggest providing energy recovery on all Roof Top Units not just the three Classroom units. Particularly with the high ventilation demands in the Auditorium, Cafeteria, and Media Center.		

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		No response since SD Review. No response since DD review. Provide solution as determined by life cycle cost benefit.		
Narrative / page 9 / para. D.3	M04	<p>Given the current layout shown on the SD drawings, it appears that the Band/Choral space is not separate from the Auditorium. Suggest that the two separate units currently planned could be combined into a single VAV unit. This would save first cost with minimal impact of comfort or energy.</p> <p>Band and choral space shown with one RTU on Drawings and is shown as a single zone. Consider controlling the RTU as a single zone variable air volume type.</p> <p>Comment pending.</p>		
Narrative / page 9 / para. D.5	M05	<p>Clarify if the designer's intent for the Gymnasium design is to utilize one large RTU or multiple units. Also, are the units going to be single zone VAV or Constant Volume. Be sure to consider the impact on the air distribution if the intent is to reduce air flow based on CO2 levels (paragraph D.5.e).</p> <p>One RTU is on DD Drawings and treats the space as a single zone. Consider control the RTU to be single zone variable air volume type, if cooling is included. Consider destratification strategies to save heating energy.</p> <p>Comment pending.</p>		
Narrative / page 10 / para. D.6	M06	<p>While the current layout in the SD drawings shows two Cafeterias, both of which are two-story spaces, the reviewer cautions the design team that the interconnection between the two space via stairs could result in them be considered a single space Atrium for life safety purposes. Ensure that proper fire separation is provided between the floors to prevent this possibility.</p>		

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		<p>No response since SD Review.</p> <p>No response since DD Review. Coordinate with AHJ that the atria do not require smoke control. Coordinate with Owner whether smoke control is desirable.</p>		
Narrative / page 10 / para. D	M07	<p>No mention of any life safety elements in the HVAC design. There appears to be numerous spaces (or zones) within the building that would require a method of smoke control, either natural or mechanical. Particularly the Classroom wings, the Cafeteria, Auditorium, Gymnasium, and other high occupancy space. Clarify what the designer's intent is regarding some control, smoke detection, interfacing with the buildings fire alarm system, etc. [Identify additional equipment or requirements that are needed to achieve said control.]</p> <p>No response since SD Review.</p> <p>No response since DD Review. Since the atria do not appear to be more than two floors, smoke exhaust may not be necessary, but this interpretations needs to be confirmed with the AHJ. Smoke control in the form of dampers in protected partitions (chase penetrations being one example) are not shown.</p>		
Narrative / page 11 / para. E	M08	<p>No mention of the use of the schools LAN for operation of the HVAC controls. No mention of whether school staff will be able to access the system to monitor, adjust, report, from their work terminals. What about the possibility of a "dashboard" for students to see how the building is working? Clarify the designer's intent as to the level of staff and student access anticipated.</p> <p>No response since SD Review.</p>		

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Design Development Comments - OPEN				
General	M10	<p>While the SD Narrative did include the design alternative's inputs for a life cycle cost analysis, no such analysis is presented. Present alternatives, alternatives' life cycle cost inputs, and make an analysis. This analysis is required by MSBA for DD Deliverables, but was not submitted to OPM.</p> <p>The purpose of LCCA is to evaluate options, to date the reviewer has not seen this such analysis performed for Owner's benefit.</p>	Y	Required documents have been provided to Arch for MSBA submission.
M1.04	M11	<p>Explain the understanding of the elevator equipment room heat generating load and why there is no mechanical cooling in this space. If the elevator equipment room is 'machineless', what about the load for the controller?</p> <p>Consider this comment typical for all elevator equipment rooms.</p> <p>The specs in Volume I indicate a traction style hoistway with the controller in the elevator machine rooms (Machine Room-Less, MRLs). Reviewer is not certain how the code addresses such since the control rooms are not machine rooms (Chapter 30 of IBC mentions a separate AC system for solid state elevator controls, but this might be in context of having the machine in the room). The vent through the wall would meet Title 524 of the CMR for a hydraulic elevator; however it might not be needed or advisable in a control room. Reviewer suggests that DOR coordinate with AHJ regarding specific fire and smoke requirements for the control room.</p>		The drawings are a DD level. Elevator machine rooms' equipment will be review as we move thru the CD phase. Once reviewed, the proper system will be added to the documents. Be it mechanical cooling or exhaust controlled by a rev acting tstat.
M1.04	M12	Corridor space is used for makeup air for lockers and restrooms. Justify how this application does not violate state mechanical code prohibitions for using the corridor as	N	Locker rooms are directly ducted providing supply air to the zone. Locker rooms exhaust rates are not made up from corridor air.

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		<p>makeup air (i.e. there is more outdoor air in the corridor than makeup air).</p> <p>Consider this comment typical for all restrooms and locker room makeup air.</p> <p>Yes, as stated above, there is a prohibition from using the corridor as makeup/relief air in excess of the outdoor air delivered to the corridor. Confirm that makeup air is not in excess of the outdoor air in all instances.</p> <p>For instance, Corridor CL03 has ~900 CFM (75 CFM/WC/urinal) being used for makeup air to the Toilets TL2A and TL1A, but the corridor would not appear to have 900 CFM based on the RTU-1 outdoor air percentage (~33%) and the limited diffusers in the hall. This will cause air to be made up into the corridor, perhaps from the adjacent Classroom L04 or Stair 9.</p>		<p>Additional</p> <p>Using corridor air for make-up is not a code violation. Refer to IMC 2009 403.2.2 Transfer air. Also refer to IMC 2009 601.2 Exceptions which states the following:</p> <p>[B] 601.2 Air movement in egress elements. Exit access corridors shall not serve as supply, return, exhaust, relief or ventilation air ducts.</p> <p>Exceptions:</p> <p>1. Use of a corridor as a source of makeup air for exhaust systems in rooms that open directly onto such corridors, including toilet rooms, bathrooms, dressing rooms, smoking lounges and janitor closets, shall be permitted provided that each such corridor is directly supplied with outdoor air at a rate greater than the rate of makeup air taken from the corridor.</p>
M1.04	M13	<p>Explain the use of rectangular branches to air devices and terminal unit inlets as opposed to circular duct branches.</p> <p>Consider this comment typical for all terminal and air device inlets.</p> <p>Reviewer perceives multiple advantages of round ductwork: lower friction loss per perimeter (or less perimeter need for a given loss), lower weight, fewer supports, easier to seal, all resulting in lower installation costs. Round ductwork has 50% less leakage for a given seal class, so the operating cost is lower. Please justify the use of rectangular.</p>	N	<p>Rectangular branch ductwork will transition to round prior to terminating to box. Either design approach will net the same result.</p>

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M1.04	M14	Consider putting supply air in IDF/Sound L08. Comment pending.	Y	Room will receive dedicated cooling unit in future submissions.
M1.04	M15	Consider putting supply air in Main Elec L12. Consider this comment typical for all electrical rooms. Comment pending.	Y	Electric rooms are consider no occupied spaces and will either received exhaust or cooling unit depending on space load. Will be included in future submissions.
M1.04	M16	Coordinate with the Architect regarding the shaft enclosure for exhaust, supply, and return air. Protect as required by code or above code with smoke dampers, fire dampers, or combination fire and smoke dampers. Consider this comment typical for all shaft penetrations. Comment pending. Also coordinate with Architect regarding exit enclosures, since these can require separate HVAC systems.	Y	Coordination is ongoing. All required fire/smoke protection device will be shown on future submissions.
M1.11	M17	Consider fan coils (or other solution)in stairs and vestibules to condition/heat these areas. Consider this comment typical for all stairs. Comment pending.	Y	Unit heater will be shown in future submissions.
M1.11	M18	The terminal unit in lab 113A has close elbows before and after the terminal unit. Where such situations are unavoidable, maximize straight length of ductwork on either end of the terminal unit. Comment pending. Is return duct in this room at right angles due anticipated sound needing mitigation? If for other reason, please state.	Y	Will review and make adjustment to allow better air flow path.
M1.13	M19	Kitchen HVAC is not indicated. Comment pending.	Y	Will be shown in future submissions.

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M1.13	M20	Consider using two temperature sensors in an averaging strategy for the Small Group 137 and Prep Room 139B. Consider this comment typical for other two room terminal units where one room is exterior. Comment pending.	Y	Will review conditions and take your recommendation into consideration.
M1.14	M21	Consider the use of two temperature sensors used in an averaging strategy for Music Ensemble 152C and 152D. Comment pending.	Y	Will review conditions and take your recommendation into consideration.
M1.14	M22	Consider putting a small amount of supply air (or draw return air from) in Music Storage for ventilation. Comment pending.	Y	Will be shown in future submissions.
M1.14	M23	Fan Coil in Receiving 146F is not labeled. Ventilation strategy for this space is not apparent or quantified via equipment schedules. Comment pending.	Y	Will be shown in future submissions. Will be schedule in future submissions.
M1.14	M24	Toilet exhaust needed for T1-9. Coordination of exhaust is not clear (through roof or connected to other fans).	Y	Will be shown in future submissions.
M1.14	M25	HVAC strategy for Telecom 149 is not clear. Suggest utilizing a nearby terminal unit for small amount of ventilation. Consider this comment typical for all telecom, MDF, and IDF spaces. Comment pending.	Y	Dedicated cooling unit will be provide in future submissions.
M1.21/M6.1	M26	Suggest using radius elbow for return air coming out of chase.	P	Spec and details will call out recommend elbow design.

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Date: 05/6/2016

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		<p>Consider this typical for all 90 degree transitions.</p> <p>Reviewer rescinds previous thoughts in this comment. Is the intention to use vanes at all rectangular elbows per detail on M6.1? Reviewer would prefer vanes for the energy savings. The reviewer suggest that the title for this detail read 'rectangular' rather than 'square'.</p>		
M1.21	M27	<p>IDF HVAC is not indicated. Suggest utilizing a nearby terminal unit for small amount of ventilation.</p> <p>Comment pending.</p>	Y	Dedicated cooling unit will be provide in future submissions.
M1.24	M28	<p>Auditorium lacks refinement to indicate viability of concept (structural coordination, ceiling coordination, diffuser type, duct size, zoning if applicable, sound attenuation).</p> <p>Thank you for the additional detail. Suggest that notes are provided regarding the use of Coordinate with the Architect to be able to show roof space coordination for RTU-3. Coordinate with Architect over these large ducts (Architect is also showing three RTUs at this level and zone but, RTU 1 and 2 are showing up on M1.52... suggest that M1.42 show all equipment viewable from that view).</p> <p>Consider extending the two anterior diffusers out to the back of the auditorium for increased mixing in this seating area.</p> <p>The ADPI (assuming louvered diffusers with a ~20 ft throw) for the band/choral room looks good in cooling, but how is stratification being addressed? Would another diffuser type (for instance, oblong double deflection grilles on round branches on both sides mounted at 45 degree angles with the blades at 45 degree angles and sized large enough such that 50 ft throw</p>	Y	Basic approach is shown at DD level. Document will be expanded on as we proceed thru CD phase.

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		velocity in cooling is not objectionable) minimize warmup times without impacting the ADPI in cooling.		
M1.42	M29	<p>Consider using more than one diffuser for the Teachers Collaboration Room 420. Also the return duct is smaller than the supply. Consider upsizing this return duct.</p> <p>Thanks. Consider a keynote, duct elevation change or different branch diffuser layout to draw attention to the need for maintenance clearance for plan-West terminal unit in this room.</p> <p>When comparing the airflow in this room to General Classroom 422, the CFM/SF is quite different</p>	Y	Will review and make changes as required.
M2.11	M30	<p>Piping path to FTR panel in Media Reading Area 117B lobby is not clear to reviewer.</p> <p>Consider comment typical for all FTRs in this arc-shaped space.</p> <p>Reviewer commends the transition to radiant heating (less likely to be damaged by students!). Piping path is not understood, assuming this is hydronic. Also, if this is hydronic, the Reviewer suggests the use of a heat exchanger to deliver lower temperature water in a separate loop. Please provide temperature parameters of design. Coordinate with Architect regarding slab insulation and thermal breaking for energy conservation.</p>	Y	Will be shown in future submissions.
M2.31	M31	<p>The reviewer is assuming the hot water branches for the Media Reading Area 317B FTRs are coming from the second floor corridor mains. Is this correct? Consider isolation valves for groups of FTRs.</p> <p>Consider this comment typical for all FTRs in this arc-shaped space.</p>	Y	Details of terminal devices call out requirements for isolation valves.

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		<p>All comments are suggestions NOT directives</p> <p>Upon further consideration, if FTRs are to be used, then Reviewer prefers isolation valves at the terminal equipment, rather than getting on a ladder on a balcony.</p> <p>However, why not utilize floor radiant heating here?</p>		
M.2.41/M2.42/ M2.43	M32	<p>Will the exterior walls for Academic Team Room 415 need radiant panels?</p> <p>Comment pending.</p>	Y	Will be shown in future submissions.
M2.42	M33	<p>Will the exterior walls for Teachers Collaboration Room 420 need radiant panels?</p> <p>Comment pending.</p>	Y	Will be shown in future submissions.
M5.2	M34	<p>The Chiller schedule and associated specifications do not mention VFDs, however the IPLV quoted in the schedule implies a VFD based on the manufacturer's catalog. The design narrative explicitly mentions the use of VFDs. The Reviewer suggest that an explicit mention of the VFD option be made in the specs and the schedule.</p> <p>Comment pending.</p>	Y	Will be shown in future submissions.
M5.2	M35	<p>Consider the use of chilled water fan coils for interior loads instead of ductless split systems. Also consider the use of a dry cooler so that the fan coils systems could have economizer option. The energy and maintenance life cycle savings maybe advantageous to the school and the energy savings would be advantageous toward the Stretch Energy Code.</p> <p>If split systems are the choice, then Reviewer recommend that at a DDC temperature sensor (tied to a nearby terminal unit controller, BUS access point, or other means to avoid additional controllers) be used for monitoring and alarm generation. Please keep the thermostat in whatever accounts for a 'hot aisle' and specify setpoints that take into account the energy savings</p>	N	<p>We believe this approach will not provide enough saving to warrant the change to chilled water fan coils. The primary function of the chiller is to provide chilled water to the air handling units. During the winter month the demand on the chillers will be reduced to a faction of it capacity. However the pumps have to operate a minimum speed to maintain flow thru the chiller eliminating energy saving potential. Adding dry cooler feature to chiller comes with an increase upfront cost and added complexity to the units. Typical chillers are not available during winter months in a school setting.</p>

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		possible through elevated hot aisle temperatures consistent with ASHRAE TC9.9 guidelines.		
M5.2	M36	The schedule condensing units are not located on the Drawings. Comment pending.	Y	Will be shown in future submissions.
M6.1	M37	The flue height is a safety concern and the reviewer would prefer this being specified by the Engineer of Record rather than delegating it to the installing Contractor. Comment pending. Reviewer understands that International Fuel Gas Code limits the flue height per Chapter 5.	P	Will review.
M6.3	M38	Coordinate roof cube height to take into account snow build up relative to outdoor air intake. Comment pending.	Y	Will review and call out.
M6.4	M39	Coordinate roof mounted duct support detail specifics such that roof can be replaced without removing ductwork. Please confirm when this has been coordinated with Architect or other roof specialist.	Y	Will coordinate.
M6.4	M40	Consider snow intake when specifying rain hood. Comment pending.	Y	Will review.
M6.5	M41	Correct supply fan viewport detail number to 20 from 23. Correct return fan duplex outlet detail number from 18 to 16. Comment pending.	Y	Will be updated in future submissions.
M7.1	M42	The opening sheet abbreviation list should be expanded to include the abbreviations used on this page. Comment pending.	Y	Will provide list of abbreviation in future submissions. The preference maybe to provide abbreviation within the 7 series drawings.
M7.1	M43	Consider the use of limit switches to protect ductwork or casings. Pressure safeties are mentioned in the sequence, but the Reviewer does not recognize any devices as safeties.	Y	Will be updated in future submissions.

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		There is no high static sequence for either of the AHU sets on this sheet, but there is a low pressure sequence. Comment pending.		
M7.1	M44	Show locations of duct static pressure sensors. Correct for as built condition to document the locations. Consider this comment typical for all static pressure sensors. Ultimately the Reviewer is aiming for the As-built condition to be captured in the plan view on turnover documents.	P	Will call out approximate location. Actual location for sensors to be determined in field.
M7.1	M45	An energy recovery wheel is mentioned; however there is no energy recovery wheel in the diagram or schedule. Consider this comment typical for all AHUs on this sheet. Comment pending. Also utilize language on next sheet about enthalpy wheel lockout for economizer. Define logic to be used in speed control and frost control.	Y	Will be updated in future submissions.
M7.1	M46	Regarding RTU-1, the Reviewer thinks it would be better to describe the position of the freezestat as on the inlet of the cooling coil where bypass air is expected to contact the cooling coil. Consider this comment typical for all units with face and bypass dampers. Sorry for the repeat comment!	P	Will review location of freezestat. Call to place in a manner that if air was to bypass the damper the chilled water coil will be protected.
M7.1	M47	Regarding RTU-1 and RTU-2, the Reviewer prefers that the chilled water valves open and the chilled water pump become energized, if not immediately, at least at a temperature closer to the freezing point of the solution. Consider this comment typical for all freeze protection sequences.	Y	Will review and incorporate protect to the chilled water coil during a freeze trip.

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		Comment pending. Consider the fail position to be normally open.		
M7.2	M48	Regarding RTU with ERU , the Reviewer does not recognize any devices as static pressure safety switches. Comment pending.	Y	Will be updated in future submissions.
M7.2	M49	Regarding RTU with ERU heating unoccupied mode, the Reviewer does not understand why the unit is off yet the hot water valve is open and freezing conditions are not necessarily present. Reviewer understands intent (thanks!). Suggestion for consideration: At 38 deg-F and below, run the supply fan at minimum speed to use building air to keep temperature warmer in the RTU. Open the valve when the temperature in the RTU drops below 40deg F. Even if dampers in terminal units are closed, the duct and damper leakage could suffice for air movement.	Y	The valve is called to be 30% open at 38 degree outside air temp as a preventative measure as opposed to waiting for a freestat to trip.
M7.2	M50	Regarding RTU with ERU , the heat wheel bypass damper devices are not shown on the schematic. Also the economizer dampers are not told what they are attempting to control, instead they are told to avoid a certain condition with the mixed air. Consider this comment typical for all economizer sequences. Comment pending. Also some modest language precision on #2: "is sufficient to meet" should read more along the lines of "is beneficial toward meeting" the cooling requirements. Reviewer notices that mechanical cooling +100% OA is being used to extend economizing hour usage (my compliments), so this language change is more in keeping with the intent, since the ambient conditions might not meet the requirements since colder/dryer air is required.	Y	Will be review and updated in future submissions.

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		All comments are suggestions NOT directives		
M7.2	M51	Regarding RTU with ERU, the unoccupied cooling cycle is not finished. Comment pending.	Y	Will expand on as required.
M7.2	M52	Neither of the sequence sets on this sheet are using optimal start-stop. Comment pending.	Y	Will be review and updated in future submissions.
M7.2	M53	Regarding RTU w/ HWH, the Reviewer does not understand why the unoccupied heating mode as the unit off and the heating valve open when the freeze protection sequence is not engaged. Comment pending. Received response is specific to other diagram. Consider using supply fan for heating the RTU (see comment M104).	Y	The valve is called to be 30% open at 38 degree outside air temp as a preventative measure as opposed to waiting for a freestat to trip.
M7.3	M54	Regarding RTU with ERU, in the unoccupied heating mode, when all air is being recirculated there is no need for heat wheel operation. Comment pending.	Y	Will be review and updated in future submissions.
M7.3	M55	Kitchen EA/MUA: Static pressure safety devices not shown on schematic. Comment pending.	Y	Will be review and updated in future submissions.
M7.3	M56	Kitchen EA/MUA: What is the BAS monitoring in order to modulate the OA and RA dampers? Sequence 7a mentions the control of space pressurization, but no pressure sensors are observed on diagram.	Y	The BAS is monitoring the kitchen hood system.
M7.3	M57	Can the programming be simplified by just having a single unoccupied heating mode that that an optimal start can initialize? Understood. Please incorporate optimal start into the warm-up mode to meet 90.1	Y	The detail only list a single unoccupied heating mode.

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M7.3	M58	<p>Economizer Cooling: If the dampers are modulating to the space temperature and the MUA fan is tracking the exhaust fan speed how is space pressure being controlled?</p> <p>So space pressure is uncontrolled in this mode, but controlled in other modes? Consider a DP sensor with the communicating hall so that this can be monitored.</p>	Y	During economizer space temperature takes control.
M7.3	M59	<p>Terminal units and CO2 control: In one the version of the terminal unit control, the damper modulates to close when there is low CO2 and in the other version it modulates down to some open position. Provide consistent language.</p> <p>The language is still somewhat confusing (high CO2 leads to opening toward the minimum position, for the sheet south detail). Also, if CO2 is above 600 ppm, there is no language about space control. Consider if it would be easier to keep in their damper and valve in their mode of control, but use the CO2 sensor to dynamically reset the minimum damper position. That might even create lower possible minimums for more energy savings.</p>	Y	Will be review and updated in future submissions.
M7.4	M60	<p>AHU-1 and 2: The Reviewer presumes that a space temperature is being used to determine the cooling and heating modes. What happens when the space is within the dead band? Is the fan shutting off? What about ventilation? Is ventilation air coming in without dehumidification?</p> <p>Another option to consider is single zone VAV operation. The Reviewer presumes this is a single zone unit since the fan does not modulate in the sequence. AHU-1 and 2 are not scheduled.</p> <p>So within the deadband, the mode stays the same is the understanding. These units are still not scheduled. Any consideration for these units being single zone VAV type? What about a dehumidification mode? Where are these units being used?</p>	Y	Refer to fist lines of Heating and Cooling occupied. Soppo fans to run continuously.

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M7.4	M61	Regarding the fan coil, the Reviewer is concerned that either the unit operates with a dead band and humid air goes untreated or without the dead band the unit oscillates from cooling (and overcooling) to heating and in the heating mode humid air goes untreated. Thanks! Comment pending. Also no return air enthalpy is shown. If the mixed air enthalpy device is used, then a slip in control could cause the unit to fall out of economizer. Suggest moving the TE to the return and adding a temperature sensor where the TE is currently.	Y	Fan coils as well as all equipment will have dead bands +/- 2 degree (adjustable) from set point. Will expand on in future submissions.
M7.5	M62	Why should the pumps be energized while the boilers are not necessarily firing per 2A? Shouldn't the pumps energize on the call for heat (then followed by a brief delay before firing the boilers)? When the loop return is satisfied for temperature, and no zones are calling for heat, why not shutdown pump to save pumping and reduce loop heat transfer? Also, when the boiler shutdown for summer cycle, consider having the pumps have a minimum run time to washout the residual heat.	Y	The system is a primary secondary pumping arrangement. The building pump are engaged and will run independent of the boilers and respected boiler pumps. Upon a drop in building water temp the boiler will fire and once satisfied the boiler and boiler pumps will deactivate.
	M63	Locate the HW and the CHW DP sensors on the Drawings (taking into account ease of maintenance) and update the Drawings for as-built conditions. Like the duct static pressure sensor, the Reviewer is mostly interested in documenting the As-Built condition.	P	HW and the CHW DP sensors shall be located in field approx. Guide line will be provide. Actual location determined by ATC installer.
M7.5	M64	Provide sequence for stepping down from two chiller operation to 1 chiller operation. Comment pending	Y	Will be included in future submissions.
M7.5	M65	Consider the use of a DP reset strategy based on control valve position.	Y	Will review

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		Comment pending. The goal is LEED V4 which rates the building against ASHRAE 90.1-2010, which includes this strategy in the baseline.		
Spec section 2.3 Boilers	M66	<p>ASTM-CSD-1 CF-310 Primary Safety Control states “each main burner assembly shall be provided with a primary safety control that will de-energize the main gas shutoff valve(s) and shut off pilot fuel upon loss of flame at the point of supervision”, ensure if safety control is specified.</p> <p>2.3.F; boilers efficiency of 98% does not match what listed on M5.1 (95%).</p> <p>2.3.K; boiler sequencing and control system is listed in the specs and again on sheet M7.5. It is recommended to provide sequencing only on drawings.</p> <p>Boiler efficiencies are still inconsistent. Since efficiency is dependent upon HWR temperatures, the Reviewer suggest this temperature is listed on the drawing schedule.</p>	Y	Spec and drawings have been updated for next submission.
Spec section 2.7 Chillers	M67	<p>2.7.C; basis of design chiller manufacturer is not listed under approved manufacturer.</p> <p>Fouling factor for evaporator is not listed.</p> <p>Fouling factor has not been included yet.</p>	Y	Dakkin and York are the same company. Spec has been updated.
Spec section 2.10 Energy recovery unit	M68	<p>Energy recovery unit on drawings are tagged as RTU whereas spec section 2.10 are listing these units as ERU-1 through ERU-8. The number of units scheduled on the drawings are 14. Please make the required correction.</p> <p>Section 2.10.D.8; Variable frequency drives for fan motors, condenser fans and compressors. Is there any condenser fan or compressor on the units? Schedule sheet M5.1 does not address these VFDs either. Please make corrections as needed.</p>	Y	Spec section to be updated in future submissions. All unit will be called RTU rather than ERUs.

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		<p>Section 2.10.11; Rotary enthalpy energy recovery wheel is not listed to have VFD whereas schedule sheet M5.1 lists enthalpy wheel with VFD. Please make corrections as needed.</p> <p>Manufacturer specs are used, see 2.10.V.1. We recommend that these specs shall be thoroughly reviewed and edited to avoid sole sourcing the equipment.</p> <p>Warranty for rooftop units with ERUs is still listed with Annexair specification.</p>		
Spec section 2.13 – 2.16 Fans	M69	Kitchen exhaust fans are not spec'd.	Y	Spec section to be updated in future submissions.
Spec section 2.25	M70	<p>Refrigerant piping insulation is missing.</p> <p>Suggest that refrigerant piping spec include other options as needed (long line applications?) rather than set length (since Reviewer is uncertain about outside unit location). No insulation is mentioned for refrigerant piping. Suggest using manufacturer twin tube insulated piping.</p>	Y	Spec section to be updated in future submissions.
Spec section 2.27	M71	<p>International Mechanical Code Para 508.1.1 requires that kitchen makeup air temperature differential between supply air and space setpoint shall not exceed 10°F. MAU-1 winter LAT is scheduled as 60degrees F, what is space setpoint. MAU-1 is not specified with any cooling; how system would able to comply with above listed Code during cooling seasons?</p> <p>508.1.1 – Refers to the space as conditioned. Is the intent that when economizer is not suitable, all makeup air will be from the corridor? If so, is there enough outdoor air in the corridor to not trigger the excess corridor makeup air prohibitions? And if so, will the exhaust hood function as intended for effluent capture? Please explain</p>	Y	<p>Kitchen design set point is 70. All set points are adjustable by end-user.</p> <p>The kitchen is not air conditioned, therefore there is no air condition design set point.</p>

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		the case of how the space is conditioned when economizer is unavailable and how it complies with 508.1.1 and 601.2 Exception 1.		
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General	M72	Condensate drains are missing on all RTUs. Please add them and route them to nearest drains.		
General	M73	Double line all the double work.		
General	M74	Expected mechanical sections are missing throughout on the plan to demonstrate/perform coordination. Provide section to establish the elevations of piping and ductwork to convey intent to Contractor.		
General	M75	Reviewer is unable to understand how typical classroom supply air is distributed. Architectural reflected ceiling plans show ceilings as lay-in type, but it looks like designer is intended to use side wall grilles. Please clarify and make revision as needed. Reviewer is not able to find return devices in the ceiling for these classrooms. What is the design intent?		
General	M76	Keyed notes are missing on all sheets wherever they are noted on the plans. Add keyed notes.		
General	M77	Reviewer could not find any supply air for stairs throughout the project. IMC table 403 clearly mandates the ventilation requirements all corridors and spaces used as corridor. Review the code requirements and add ventilation to these spaces as needed.		
HVAC Specifications	M78	Consider adding a section that schedules all the necessary submittals. Often when specifications are subdivided (rather		

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		than the current amalgamated 23 00 00, which is totally fine), each division list specifically needs a submittal. In this instance, the Review is finding references to submittals occasionally (controls, for instance) within the document, but not a rigorous, singular display of expected submittals. This would greatly help others (Owner, Contractor, Commissioning Agent, etc.) to efficiently know what the expectation is.		
	M79	Mech Room L13: No heat indicated. Consider heat in all exterior mechanical, electrical, storage and other typically non-occupied rooms.		
M1.11	M80	Secretary 101B: Consider rebalancing the air to send more of it to the East glass. The Reviewer is presuming the load peaks in the morning.		
M1.11	M81	Principal Conference Room 101C: Check the load on this space versus Conference 101G. Both are sized at ~0.75 CFM/SF, but Principal 101C almost an entirely exterior space.		
M1.11	M82	Opp Room 104: Please review the load and air balance within the space. At ~0.3 CFM/SF, there can't be much load in the space with some of the capacity needed for the exterior.		
M1.11	M83	General Classrooms 107 and 108: These have different areas but the same air supply serving them. In general double check classroom loads with required population by Owner and plug load expectation.		
M1.11	M84	Academic Team Room 115: Consider putting a little air toward the exterior. Consider typical for similar spaces (like ATR 133 on M1.12).		

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M1.11	M85	Toilet T1-1: Toilet exhaust does not appear coordinated. Nearby toilet exhaust does not appear to be coordinated with this room.		
M1.11	M86	Corridor C101 only has 110 CFM. Doe this meet the load of the space? Consider this typical for all corridors.		
M1.12	M87	What is driving the load up in the Teacher's Collaboration Room? The CFM/SF is much higher here than in classrooms. Is the population density higher? More plug loads? Both?		
M1.14	M88	What exhaust system is serving the toilets and lockers in the custodian area?		
M1.14	M89	Double wall ductwork in gym is drawn 28" to the outer diameter and drawn 22" to the inner diameter. General Note 8 mentions that all duct dimension are net free area. The dimensioned call out is 28", which is not the net free area as drawn, which is 22". Please rectify the duct as drawn or dimensioned, or please modify General Note 8 for double walled ductwork.		
M1.24	M90	Coordinate the minimum distance from of the open bellmouth return to the supply for acoustical purposes and contractor accountability.		
M1.33	M91	Storage 347: How is this space and the elevator lobby being heated?		
M1.33	M92	Kitchen 345A is not design developed. Where in the documents is the design intent signified?		
M1.42	M93	Coordinate duct over IDF 419. The structured cabling and electrical could be significant.		

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M1.43	M94	Area near Elevator 2: How is this being heated and cooled? No system seems to be developed toward this area.		
M1.43	M95	Cust 447: Exhaust design is not developed. No exhaust system for this space is readily apparent to the Reviewer.		
M1.51/M1.52	M96	Coordinate with Architect regarding walk pads for RTU-8 and -9, ACC-1 and -2, and MUA-1. Coordinate walk pads for exhaust fans. Coordinate walk pads for ductless split systems, if applicable.		
M1.51/M1.52	M97	Consider using a key not to indicate design intent for condensate piping. Consider a coordinating detail.		
M2.04	M98	Coordinate CUH-2 with vestibule wall.		
All mechanical piping	M99	Much of the hot water piping mains are not sized. Will ASHRAE 90.1 maximum flows be used to size the HW pipe (and chilled water)? This is generally life cycle cost beneficial to Owner-Operators.		
All mechanical piping	M100	Consider the use of expansion loops rather than expansion compensators, where space allows. The general experience of Reviewers involved is that compensators are a leak concern more so than elbows.		
All mechanical piping	M101	Consider detailing the distances for guides, anchors, and joints/compensators (the terminology in the specs and drawings are different) based on the basis of design manufacturer. Coordinate the anchor forces with the structural engineer. If the Contractor goes the "or equal" route instead of the basis of design, consider what would be prudent as a submittal for a delegated design.		
All mechanical piping	M102	Some of the linear radiant heating panels have considerable length. Coordinate that capacity at the distal end from the		

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		control valve is sufficient for local comfort within the room. Also where is the panel scheduled? How many passes? The detail shows 4 passes, but the spec does not confirm this?		
M2.11	M103	Why was the heat removed in the Main Lobby Vestibule?		
M2.11	M104	Stair ST3-1: Consider alternate location for sensor as door will hinder any influence CV-2 has on the sensor.		
M2.11	M105	Corridor C101: Pipe anchors are floating without pipe. Is at least one of the compensators missing a pipe anchor?		
M2.11	M106	Main Lobby C100B: Consider moving sensor toward the exterior to be more influenced by exterior load.		
M2.14/M2.21/ M2.41	M107	How is Stair 9 being heated? How is Stair 1 being heated? How is connecting corridor toward the plan-north exterior being heated? Double check that all stairs and corridors have heat.		
M2.21	M108	Corridor C201: Please explain the hot water convector, CV-3, is in an interior space (seems too far away to deal with the plan-west exterior). Is this to handle pickup loads? Consider typical for other similar utilized convectors.		
M2.41	M109	Is the intent to have exposed (insulated) piping in the restrooms for the convectors?		
M3.1	M110	How is the mechanical room ventilated?		
M3.1	M111	Piping near Elev 2 appears to be outside the building. Consider an interior option, if it is currently on the exterior.		
M3.1	M112	Domestic water heaters and expansion tank space are not coordinated.		

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M5.1	M113	Where are the reheat coils located?		
M5.1	M114	Only four VFDs are scheduled. How are the other VFDs intending to be scheduled?		
M5.1	M115	Radiant panel schedule is missing.		
M5.2	M116	Coordinate height restriction for ductless split systems. Also consider that utilizing these height restrictions toward their maximum will reduce service life and add to Owner cost.		
M5.2	M117	Ductless Split-Type Air conditioner Schedule: DFC-11 & 12 are listed as Carrier whereas rest of these units are Mitsubishi. Please verify.		
M5.2	M118	Diffuser, Registers, & Grille Schedule: Titus model TDC louvered face dimensions vary with neck area, and may raise aesthetic issues. Consider OMNI or TMS models instead.		
M6.1, 230000: 2.25 and 2.37	M119	The intention of liner use extent is not clear. Consider the elimination of liner if not critical as it can erode and collect dust over time (AHU startups make an opportune time to blast particulate into the space).		

60% CONSTRUCTION DOCUMENT MSBA REQUIREMENT COMPARISON

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 05/6/2016

Originating A/E: A13 Architects / MEP: Griffin & Vary, Inc.

Office Location: Burlington, MA

Reviewer: Rizwan Anwar, Joshua Gillespie

Review Location: Heery-Atlanta

Type of Review: MSBA Requirement Comparison

Project Manager: Tom Ellis

Project Architect:

Discipline: MECHANICAL

Reviewer's Telephone #: 404 946 2123

Reviewer's e-mail: ranwar@heery.com

Project Book
 Schematic Design
 Design Development
 60% Construction Documents
 Final

KEY

Insert comments in the "Comment" column with a reference to the particular page, paragraph, or sheet number, which the comment pertains to in the "Spec. Sect./Drawing #" column. A response will be provided with the revised documents as follows:

Y Comment was incorporated

N Comment was not incorporated – see "Remarks" for explanation

P Comment was incorporated partially - see "Remarks" for explanation

Spec. Sect./ Drawing #	Item	Comment	Response Code	Remarks
All comments are suggestions NOT directives				
MSBA Comments				
	M01	The LEED score card in Specifications demonstrates the chosen path to meet MSBA requirements for energy usage. Provide energy model summary report that breaks down energy consumption (fans, pumps, lights, refrigeration, heat rejection, plug loads, etc.) to demonstrate the design's progress toward this goal		
	M02	Confirm that the MSBA does not require at least a minimum level of cooling within their kitchen facilities. [Typically, some level of cooling, i.e. spot cooling, hood make-up air conditioning, or cooling at higher indoor temperatures is provided to the kitchen.]		
	M03	Suggest that the narrative include general values used for HVAC calculations, such as building loads by space type, such as, lighting and power wattage per area, ventilation rates, building envelop properties, etc.		

60% CONSTRUCTION DOCUMENT MSBA REQUIREMENT COMPARISON

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 05/6/2016

Spec. Sect./ Drawing #	Item	Comment All comments are suggestions NOT directives	Response Code	Remarks
	M04	How was the proposed system determined? Based on energy consumption, first costs, MSBA direction, suggest adding verbiage to the narrative (or supplement the narrative, or otherwise provide documentation) to clarify why the particular HVAC system was selected. Suggest adding a short summary of the analysis and the results to the narrative for project history		
	M05	No mention of whether any provisions for backup or redundancy in the three classroom RTUs are provided. Were multiple units per wing or at least dual fans (or fan arrays) considered? The classroom units are going to be quite large and redundancy in both the fans (as well as the coils, VFDs, etc.) associated with these unit might be desired by the MSBA. [As currently described if a RTU fails then one entire wing is out of operation, all four floors.]		
	M06	ASHRAE recommends that Gymnasiums be provided with air conditioning in addition to heating and ventilation. This will allow the system to provide dehumidification to maintain space humidity between 35% to 50% RH. These limits are typical for maintaining wooden floors in most gyms. Provide clarification has to how humidity levels will be maintained within the space. Furthermore determine if air conditioned comfort is desired by MSBA		
	M07	Do the building controls need to interface with any MSBA state wide network? Clarify if the system is intended to be local only or remotely monitored. Specification language does existing regarding Beverly and the LAN, but nothing so far regarding MSBA.		
	M08	Construction cost estimates are required by MSBA for DD Deliverables, but were not submitted to the Reviewers.		
	M09	Heating loss-gain and duct static pressure drop calculations are required by MSBA for DD Deliverables, but were not submitted to the Reviewers		

60% CONSTRUCTION DOCUMENT MSBA REQUIREMENT COMPARISON

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 05/6/2016

Spec. Sect./ Drawing #	Item	Comment All comments are suggestions NOT directives	Response Code	Remarks
	M10	Equipment cut sheets are not included with this submittal per MSBA submittal requirements. Provide equipment cut sheets.		
	M11	An updated Basis of Design narrative was not provided to Reviewers, per MSBA requirements.		
	M12	Mechanical requirements per MSBA include: sizing and layout of all duct and piping, all equipment shown (for instance ductless split systems), equipment access indicated (terminal units for instance), and all fire and smoke dampers. These requirements were not fully met.		

END OF DOCUMENT

60% CONSTRUCTION DOCUMENT COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 05/06/2016

Originating A/E:A13 Architects / MEP: Griffin & Vary, Inc.

Office Location: Burlington, MA

Reviewer: **Mike Trinker**

Review Location: Heery-Atlanta

Type of Review:Quality Assurance / Quality Control

Project Manager:Tom Ellis

Project Architect:

Discipline: **ELECTRICAL / TECHNOLOGY**

Reviewer's Telephone #: **404 946 2140**

Reviewer's e-mail: **mtrinker@heery.com**

Project Book
 Schematic Design
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Insert comments in the "Comment" column with a reference to the particular page, paragraph, or sheet number, which the comment pertains to in the "Spec. Sect./Drawing #" column. A response will be provided with the revised documents as follows:

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P Comment was incorporated partially - see "Remarks" for explanation

Spec. Sect./ Drawing #	Item	Comment	Response Code	Remarks
All comments are suggestions NOT directives				
Design Development Comments – Open				
The following comments from the DD Submittal have not been resolved in the 60% CD Documents. Previous comments not included below are Closed.				
26 00 00 – 2.20V.5	E01	Is a Graphic Annunciator or Graphic Floor Plan (Sheet E4.02, Note 5) required adjacent to every LCD Annunciator? If a Graphic Annunciator is required, please define. Follow-up: Specification is unchanged and still requires Graphic Annunciators to be provided.	N	Fire Alarm Annunciators will be provided as defined in the Specifications. Old style graphic annunciators are not required. Floor plans as per Fire Alarm Riser Diagram will be provided.
E1.04, E1.11	E02	Verify Type T fixtures located in elevator pits meets Elevator Code requirement for 10 footcandles minimum. Follow-up: No change to drawings. It is doubtful that design as shown meets Elevator Code footcandle minimum requirements.	Y	Lighting calculations will be performed as design process moves forward.
E1.11 & E1.21	E03	The middle section of the Main Lobby between Col 1-10 & 1-12 appears to have no lights. Follow-up: No change to design. Area still has no lighting shown.	Y	The middle section of the Main Lobby between Col 1-10 & 1-12 is a two story space. Lighting is for this area is specialty lighting and will be incorporated as design process moves forward.

60% CONSTRUCTION DOCUMENT COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 05/06/2016

Spec. Sect./ Drawing #	Item	Comment All comments are suggestions NOT directives	Response Code	Remarks
E1.11, E1.21, E1.31 & E1.41	E04	The plan north end of the Media Reading Area from Col 1-3 to the Open Stair appears to have no lights. Follow-up: No change to design. Area still has no lighting shown.	Y	Lighting layouts will be finalized as design process moves forward.
E1.13, E1.23, E1.33 & E1.43	E05	The plan south end of the Media Reading Area from Col 3-5 to the Open Stair appears to have no lights. Follow-up: No change to design. Area still has no lighting shown.	Y	Lighting layouts will be finalized as design process moves forward.
E2.04	E06	Receptacle layout is minimal at Concessions L01. Possible refrigerators or warming cabinets are not powered. Verify use of this space. Follow-up: No change to design. Area still has no outlets shown.	Y	Receptacles layouts will be finalized as design process moves forward. Concession stand equipment layout has not yet been finalized.
E2.11, E2.12, E2.13, E2.21, E2.22, E2.23, E2.31, E2.32, E2.33, E2.41, E2.42, E2.43	E07	Architectural Plans indicate "Overhead Technology Bus" in every Team Room. Is there any power requirements for these busses as none is shown? Follow-up: No change to design.	N	GnV will verify if power is required for the technology trusses.
E4.01	E08	Cannot find location and schedule for Panelboard WS11 shown on Power Riser connected to Panelboard PP14 PP11 . Also not indicated in PP14 PP11 schedule. Verify existence of this panel. Follow-up: No change to design.	Y	GnV will coordinate/finalize all panel locations.
E4.02, ES.01	E09	The 2" Conduit to the riser pole is not shown on the ES.01 Site Plan. Coordinate location and identification between the detail and plan. Follow-up: No change to design. 2" Conduit still shown on riser to pole.	Y	Fire Alarm 2" conduit has been eliminated as a radio masterbox is being provided.

60% CONSTRUCTION DOCUMENT COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 05/06/2016

Spec. Sect./ Drawing #	Item	Comment	Response Code	Remarks
		All comments are suggestions NOT directives		
E5.02	E10	Confirm secondary service feeder size shown in Switchboard Schedule for 4000 amp main breaker. 10 sets of 750 kcmil copper feeder size appears oversized for 4000 amps. Is this due to derating due to conduit heating? Additionally, as this is a secondary service feeder, ground conductors are not required between the transformer and switchboard as the neutral and ground are bonded at the switchboard. Follow-up: No change to design. Disagree with response as wire is oversized per NEC and can be 10 sets of 600 kcmil. #3/0 ground wires are NOT required in service feeders per NEC 250.20. Additionally, 4-750 kcmil & 1 #3/0 do not fit in a 4" PVC conduit as specified (NEC Tables C.9 or C.10).	N	Wiring is sized as required by NEC.
E5.08, E4.01	E11	Panelboard Schedule for OP33 OP33 indicates 42 pole panelboard however Power Riser E4.01 indicates 2-section panel. Follow-up: No change to design.	Y	GnV will clarify/coordinate pole space quantity with all panelboards.
27 10 00 – 2.7 & T2.6	E12	Why is Cat 5e specified between rooms instead of Cat 6? Follow-up: No change to design. 27 10 00-1.4.B.1 also indicates Type 6A, not 5E.		
T1.14, T1.12, T1.13, T1.22, T1.23, T2.24, T1.32, T1.33, T1.34, T1.42, T1.43, T1.44	E13	Architectural Plans indicate “Overhead Technology Bus” in every Team Room. Is there any requirements for these busses as nothing is shown to be located in them? Follow-up: No change to design.		
T2.6	E14	25 pair Cat 5e cable is noted between rooms. Is Cat 5e cable the correct usage or should this be Cat 6? Follow-up: No change to design.		
T2.6	E15	Coordinate service entrance conduits shown to MDF Room 149 with Electrical Site Plan ES.01 as the (4) 4” shown on this riser does not match the site plan. Follow-up: No change to design.		

60% CONSTRUCTION DOCUMENT COMMENTS

Project Number: Heery No. 1409500

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Date: 05/06/2016

Spec. Sect./ Drawing #	Item	Comment All comments are suggestions NOT directives	Response Code	Remarks
60% Construction Document Comments				
E0.01	E16	Coordinate Site Lighting symbols on legend with symbology used on ES.02.		
ES.01, ES.03	E17	Coordinate Communications Ductbanks B-B& F-F with Technology Riser T2.6. Riser shows 3 service conduits + 1 spare while site plan shows 2 separate sets of 2 conduits + 1 spare.		
ES.01	E18	There are numerous note references to "See Detail on Drawing ES.05." ES.05 is not included in this submittal.		
ES.04	E19	Site Lighting Fixture Schedule has multiple fixtures scheduled with Type "XXX" distribution. By this submittal, distribution should already be determined and corrected on the schedule..		
ES.04	E20	Site Light Type SL4 indicates 474 watts while SL4-C2 indicates 237 watts. The only difference by description is camera mounting, so wattage should be the same between fixture types.		
All E1 Series Lighting Sheets	E21	Emergency Lighting has yet to be determined on the plans as lighting symbology indicates all fixtures as normal at this time.		
E1.11	E22	No lights are shown in Multimedia Marketspace Editing 100B.		
E1.21, E1.22	E23	Lights shown above Technology Applications & Production Lab do not have any fixture Type assigned.		
E1.14, E1.41, E1.43	E24	Elevators 1, 2 & 3 are specified as MRL types with gearless motors mounted in the shaft at the top of the hoistways. As such, these require elevator machine room 19 footcandle lighting available at the top of the shafts.		
E1.24	E25	Verify the need for Type J downlights shown at east side rear of Auditorium. Fixtures appear to be above Vestibule and along exterior of room.		
E2.04, E2.11, E2.12, E2.13, E2.14	E26	No convenience duplex receptacles are shown along any exterior wall locations completely around the building. Are any exterior receptacles needed?		
E2.12	E27	Callout for Cabinet Unit Heater in Stair 4 is missing type.		

60% CONSTRUCTION DOCUMENT COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

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Spec. Sect./ Drawing #	Item	Comment	Response Code	Remarks
		All comments are suggestions NOT directives		
E2.14	E28	Electrical Rooms adjacent to "Network Telecom Room" indicate a callout to an enlarged plan that is undefined at this time.		
All E2.x Series Power Plans	E29	Verify accessibility of all corridor cable trays shown with ceiling accessibility. Wood Clouds and Wood Slats shown on RCP's appear to block access.		
All E2.x Series Power Plans	E30	Cable trays are shown only as straight runs in Classroom Corridors. How do these transition into IDF or systems closets?		
All E2.x Series Power Plans	E31	Ceiling mounted Fire Alarm smoke detectors in Corridors do not appear to be coordinated with ceilings shown on the RCP's. If these detectors are to be located above floating ceilings, this should be noted.		
E2.51, E2.52, E2.53, E2.54	E32	Mechanical Units are not referenced in correct locations on these plans, based upon coordination with Architectural and Mechanical Sheets. It appears that the referenced Mechanical File has shifted position.		
E3.01	E33	Part Plan 5, Panel WS11 is not located in Electrical Room 103		
E3.02	E34	There is no part plan for Elevator No. 2 Equipment room power/communications/fire alarm connections.		
E3.03, E3.04	E35	Electrical Plans for the Kitchens and Serveries have no outlet layouts started at this time.		
E5.02	E36	Main Switchboard and OEDP04 are schedules with a short circuit value of 100,000 A.I.C. This appears to be a placeholder for pricing and conservatively sized. Verify.		
E5.03 through E5.09	E37	All panelboard schedules are sized with a short circuit value of 65,000 A.I.C. regardless of equipment voltage, ampacity rating and feeder source. This appears to be a placeholder for pricing and very conservatively sized, particularly for 208/120 volt equipment. Verify.		

60% CONSTRUCTION DOCUMENT COMMENTS

Project Number: Heery No. 1409500

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Spec. Sect./ Drawing #	Item	Comment All comments are suggestions NOT directives	Response Code	Remarks
E5.03 through E5.09	E38	Panel schedule format used shows load name and circuit breaker size only and does not include VA or kVA loads on the forms. Due to this, it will be difficult to verify loading on individual pieces of equipment as the design progresses without access to the engineer's calculations. Not sure that the MSBA or local AHJ would be accepting of schedules without loads as the project is submitted for construction.		
E6.02	E39	Details 1, 2 & 5 all indicate Classroom Lighting Control. As design progresses, please differentiate usage of the three details either in plan or by notations on the details.		
E6.03	E40	Sheet submitted in this package is completely blank.		
All Technology Floor Plans	E41	Consider screening back of Architectural Plan similar to Electrical drawings. In many locations, technology symbols are difficult to determine due to conflict with architectural element or Room Text.		
All Technology Floor Plans	E42	Corridor mounted speakers do not appear to be coordinated with Reflected Ceiling Plans. Speaker placement is shown across breaks in ceiling types, and there does not appear to be any differentiation for recessed in ceiling vs. mounted in exposed structure.		
T1.44	E43	Elevator No. 2 Vestibule at Roof Level is not shown. Is anything required in this space?		
T2.2	E44	Schedule still not complete with watermark indicating that quantities of cameras are current		
T2.3	E45	Notes along bottom of Enlarged Plan are cut off of sheet.		



60% CONSTRUCTION DOCUMENT MSBA REQUIREMENT COMPARISON

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 05/06/2016

Originating A/E:A13 Architects / MEP: Griffin & Vary, Inc.
Office Location: Burlington, MA
Reviewer: **Mike Trinker**
Review Location: Heery-Atlanta
Type of Review: MSBA Requirement Comparison

Project Manager: Tom Ellis
Project Architect:
Discipline: **ELECTRICAL / TECHNOLOGY**
Reviewer's Telephone #: **404 946 2140**
Reviewer's e-mail: **mtrinker@heery.com**

Project Book Schematic Design Design Development 60% Construction Documents Final

KEY

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Spec. Sect./ Drawing #	Item	Comment	Response Code	Remarks
All comments are suggestions NOT directives				
MSBA Review Template				
The following comments are based upon a review of the Electrical documents vs. the MSBA 60% Submittal Review Template:				
Electrical Drawings:	E01	Item #2 indicates that interior Lighting should be complete, including branch circuiting and switching. There are areas on all floors that are still missing light fixtures and branch circuiting has not yet been started.		
Electrical Drawings:	E02	Item #2 indicates that receptacle layouts should be complete, including branch circuiting. There are areas such as Kitchens & Concession where receptacles have yet to be designed. Branch circuiting has also not been started anywhere in interior of the building.		
Electrical Drawings:	E03	Item #3 indicates that locations and controls for all motors should be shown. While this is done for all motors shown on the plan, the HVAC layout was not complete as the split systems for IDF rooms are not shown, and Exhaust fan design on the roof does not appear complete.		

60% CONSTRUCTION DOCUMENT MSBA REQUIREMENT COMPARISON

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 05/06/2016

Spec. Sect./ Drawing #	Item	Comment	Response Code	Remarks
		All comments are suggestions NOT directives		
Electrical Drawings:	E04	Item 11 indicates that One Line Diagrams should include load KVA and available short circuit at every piece of equipment. As there are no branch circuit loads yet entered into panelboards, all sizing is based upon prior estimated load calculations. Short circuit calculations also do not appear to have been performed yet as all panelboards are rated the same at a conservative value of 65,000 AIC.		

END OF DOCUMENT

Heery Commissioning Design Review Comments
Beverly Middle School

ID	Document Type	Discipline	Comment Reference	Comment Description	Comment Date	Comment By	Response Date	Response By	Response Description	Closed Date	Closed By	Status
<p>4th PARTY CxA REVIEW BASED ON THE FOLLOWING DOCUMENTS Project Manual and Drawings by Ai3 Architects, 04/18/16 Building Commissioning Manual, BR+A, March 2016 MEP and FP Schematic Design Narrative, G&V Consulting Engineers, 12/16/15</p>												
60-001	General	General	-	01 10 00 states LEED v4. No OPR document is found. An Owners Project Requirements document is required to meet EA Prereq Fundamental Commissioning. As a prerequisite there is no certification with an OPR. The intent is to have the OPR completed prior to BOD (although in reality this does not always occur.)	05/02/16	LKB						Open
60-002	General	General	-	01 10 00 states LEED v4. Please confirm it is in the project CxA's scope (or other qualified party's scope) to provide a Current Facilities Requirements and Operations and Maintenance Plan. This is a new requirement in LEED v4 for EA Prereq Fundamental Commissioning.	05/02/16	LKB						Open
60-003	General	General	-	01 10 00 states LEED v4. (Note reviewer does not know which points for EA Enhanced Commissioning, so the assumption is all of them). Confirm it is in the CxA's scope to develop an On Going Commissioning Plan.	05/02/16	LKB						Open
60-004	General	General	-	01 10 00 states LEED v4. (Note reviewer does not know which points for EA Enhanced Commissioning, so the assumption is all of them). If pursuing Option 1, Path2 additional point, confirm it is in project CxA's scope to create an MBCx Plan (or update the Cx Plan with MBCx requirements), incorporate scope into the documents, and implement the MBCx Plan.	05/02/16	LKB						Open
60-005	Cx Plan	General	-	Comment for record purposes only. Commissioning Plan(s) reviewed for informational purposes.	05/02/16	LKB						Open
60-006	BOD	General	-	Comment for record purposes only. Design Narrative / BOD reviewed for informational purposes.	05/02/16	LKB						Open
60-007	Specs	General	01 33 00	01 33 00 Submittal Procedures. Recommend incorporating language for routing of CxA reviews in parallel to reviews by AE of Record, to meet LEED requirements.	05/02/16	LKB						Open
60-008	Specs	General	01 73 00	01 73 00 Execution and 01 81 13 Sustainable Design Requirements. Both sections have separate and different descriptions of flushout and IAQ testing. 01 73 00-1.12 and 01 81 13-3.4. Recommend showing requirements in one section only so there are no potential conflicts or misses by the project team.	05/02/16	LKB						Open
60-009	Specs	General	01 77 00	01 77 00 Close Out Procedures. Recommend adding to 1.4.a "All commissioning functional testing."	05/02/16	LKB						Open
60-010	Specs	General	01 91 13	01 91 13 General Commissioning Requirements section 3.8 contains training requirements that differ from 01 79 00 Demonstration and Training. Recommend that 01 91 13-3.8 be remove and requirements blended into 01 79 00 so that there are no conflicts or misses by the project team.	05/02/16	LKB						Open

60-011	Specs	General	01 19 13	01 19 13 General Commissioning Requirements section 4.2.C.12 states trending requirements for ATC system. These requirements are better suited for 23 00 00-2.51 Automatic Temperature Control so there are no conflicts or misses by the project team.	05/02/16	LKB								Open
60-012	Specs	General	01 19 13	01 19 13 General Commissioning Requirements section 4.2.C.18 adds a workstation and license requirement for the ATC system. These requirements are better suited for 23 00 00-2.51 Automatic Temperature Control so there are no conflicts or misses by the project team.	05/02/16	LKB								Open
60-013	Specs	General	Div 07 & Div 08	Div 07 and Div 08 in general do not require any field testing of assemblies. In part 3 Field Quality control they refer to 01 45 00 Quality Control which specifies a QC process however no actual QC testing. 01 91 19 Exterior Enclosure Commissioning does contain testing of assemblies, however there is no cross reference from applicable Div 07 and Div 08 specs. If the intent of the specs is to only specify enclosure testing in 01 91 19, then recommend part 3 of each applicable Div 07 and Div 08 spec specifically reference to 01 91 19.	05/02/16	LKB								Open
60-014	Specs	Enclosure	Div 07 & Div 08	Div 07 and Div 08 and 01 91 19 Exterior Enclosure Commissioning. Has the team considered any ASTM testing of water proofing systems?	05/02/16	LKB								Open
60-015	Specs	Enclosure	Div 07 & Div 08	Div 07 and Div 08 and 01 91 19 Exterior Enclosure Commissioning. Has the team considered any ASTM testing of curtain wall systems?	05/02/16	LKB								Open
60-016	Specs	Enclosure	Div 07 & Div 08	Div 07 and Div 08 and 01 91 19 Exterior Enclosure Commissioning. To verify the overall building air barrier systems, has the team considered a building pressure blower door test with an IR scan?	05/02/16	LKB								Open
60-017	Specs	Plumbing	22 00 00	22 00 00 Plumbing, section 1.35.B. Refers to 01 91 00 Commissioning, which exists as 01 91 13 General Commissioning. Recommend updating references.	05/02/16	LKB								Open
60-018	Specs	Plumbing	22 00 00	22 00 00 Plumbing. No sump pumps found. Are elevator sump pumps required at the elevators?	05/02/16	LKB								Open
60-019	Specs	HVAC	23 00 00	23 00 00 HVAC, section 1.22.B. Refers to 01 91 00 Commissioning, which exists as 01 91 13 General Commissioning. Recommend updating references.	05/02/16	LKB								Open
60-020	Specs	HVAC	23 00 00	23 00 00 HVAC, section 2.26. For make-up air units consider requiring startup by a manufacturer's authorized technician.	05/02/16	LKB								Open
60-021	Specs	HVAC	23 00 00	23 00 00 HVAC, section 2.32. For pumps over 1hp consider requiring startup and alignment by a manufacturer's authorized technician.	05/02/16	LKB								Open
60-022	Specs	HVAC	23 00 00	23 00 00 HVAC, section 2.47. For VFDs consider requiring startup and programming by a manufacturer's authorized technician.	05/02/16	LKB								Open
60-023	Specs	Electrical	26 00 00	26 00 00 Electrical; section 2.29 Lighting Control. 2.29.J states owner provided workstation. Please verify with owner.	05/02/16	LKB								Open
60-024	Specs	Electrical	26 00 00	26 00 00 Electrical; section 2.29 Lighting Control. Please define graphics programming requirements for central lighting control.	05/02/16	LKB								Open
60-025	Drawings	Plumbing	P Series	Plumbing Drawings. No sump pumps found at elevators. Are elevator sump pumps required?	05/02/16	LKB								Open

60-026	Drawings	Plumbing	P Series	Plumbing Drawings. Confirm riser diagrams for each system will be shown on a future submission.	05/02/16	LKB						Open
60-027	Drawings	Plumbing	P Series	Plumbing Drawings. Confirm a single line for the DHW heating system will be shown on a future submission.	05/02/16	LKB						Open
60-028	Drawings	HVAC	M5.1	M5.1. ERU detail. Three notes are shown however none are applied to the schedule. Perhaps add them to the schedule or call them "General notes for all units".	05/02/16	LKB						Open
60-029	Drawings	HVAC	M6.2	M6.2. HHW coil detail. Consider permanent pressure and temperature gages at HHWS and HHWR connections.	05/02/16	LKB						Open
60-030	Drawings	HVAC	M6.2	M6.2. CHW coil detail. Shows a pressure gage on supply but not on return. Consider permanent pressure gages at CHWR connections.	05/02/16	LKB						Open
60-031	Drawings	HVAC	M6.2	M6.2. Consider P/T ports (ie pete's plugs) on each connection to four pipe FCU detail, two pipe FCU detail, unit heater detail, cabinet unit heater detail.	05/02/16	LKB						Open
60-032	Drawings	HVAC	M Se	M Series. For ductless split systems, recommend that AE of Record show refrigerant line sizes on documents. Could be on plans, single lines, schedules, or details.	05/02/16	LKB						Open
60-033	Drawings	HVAC	M6.3	M6.3. Hot Water Convector Detail. Recommend P/T ports (ie pete's plugs) on supply and return.	05/02/16	LKB						Open
60-034	Drawings	HVAC	M6.3	M6.3. Hot Water Convector Detail. Recommend separate balance and isolation valves on return side, so that proper TAB setting is not lost when servicing unit.	05/02/16	LKB						Open
60-035	Drawings	HVAC	M6.3	M6.3. Rooftop Unit Curb detail shows spring isolation curb. This is the only place that appears to show that requirement. Recommend showing requirement as note in equipment schedule for applicable equipment, so there is a stronger contractual requirement for the isolation curbs.	05/02/16	LKB						Open
60-036	Drawings	HVAC	M6.4	M6.4. Radiant Panel Detail. Recommend P/T ports (ie pete's plugs) on supply and return.	05/02/16	LKB						Open
60-037	Drawings	HVAC	M6 Series	M6 Series. No detail found for VAV HHW piping connections. Recommend including detail.	05/02/16	LKB						Open
60-038	Drawings	HVAC	M6 Series	M6 Series. No detail found for Boiler installation and piping details. Recommend including detail.	05/02/16	LKB						Open
60-039	Drawings	HVAC	M6 Series	M6 Series. No detail found for Chiller installation and piping details. Recommend including detail.	05/02/16	LKB						Open
60-040	Drawings	HVAC	M7.1	M7.1, VAV Rooftop unit w/ HHW and CHW. Notes on P&ID say duct smokes installed by others, however sequence first paragraph conflicts that and says to install them. Please clarify.	05/02/16	LKB						Open
60-041	Drawings	HVAC	M7.1	M7.1, VAV Rooftop unit w/ HHW and CHW. Duct pressure high limit after return fan and duct pressure low limit sensor before supply fan are required by sequence but not shown on P&ID. Please coordinate.	05/02/16	LKB						Open
60-042	Drawings	HVAC	M7.1	M7.1, VAV Rooftop unit w/ HHW and CHW. A morning warm-up sequence is shown however a morning cool-down is not.	05/02/16	LKB						Open
60-043	Drawings	HVAC	M7.1	M7.1, VAV Rooftop unit w/ HHW and CHW. Occupied Heating describes energy recovery wheel however wheel is not shown on P&ID. Please coordinate.	05/02/16	LKB						Open
60-044	Drawings	HVAC	M7.1	M7.1, VAV Rooftop unit w/ HHW and CHW. Occupied Heating describes energy recovery wheel however wheel is not shown on P&ID. Please coordinate.	05/02/16	LKB						Open
60-045	Drawings	HVAC	M7.1	M7.1, VAV Rooftop unit w/ HHW and CHW. For occupied cooling mode, the discharge air setpoint is not defined.	05/02/16	LKB						Open

60-046	Drawings	HVAC	M7.1	M7.1, VAV Rooftop unit w/ HHW and CHW. Occupied Heating and Cooling are defined separately. Please define appropriate deadband to prevent simultaneous heating and cooling.	05/02/16	LKB														Open	
60-047	Drawings	HVAC	M7.1	M7.1, VAV Rooftop unit w/ HHW and CHW. Emergency power. It is not defined here or elsewhere on M7 series where the ATC system gets an input to know whether the building is on emergency power or not. Please show input on M7 series.	05/02/16	LKB															Open
60-048	Drawings	HVAC	M7.1	M7.1, Rooftop unit w/ HHW and CHW and DCV. Warmup does not define the duration of the cycle.	05/02/16	LKB															Open
60-049	Drawings	HVAC	M7.1	M7.1, Rooftop unit w/ HHW and CHW and DCV. Occupied mode states to maintain a room temp of 68dF. Presumably this is a heating setpoint? Please clarify as written it would be cooled to 68 as well.	05/02/16	LKB															Open
60-050	Drawings	HVAC	M7.1	M7.1, Rooftop unit w/ HHW and CHW and DCV. Please define a deadband between heating and cooling setpoints to prevent simultaneous heating and cooling.	05/02/16	LKB															Open
60-051	Drawings	HVAC	M7.1	M7.1, Rooftop unit w/ HHW and CHW and DCV. Smoke detectors shown as wired by others however is shown as wired to ATC system. Please clarify.	05/02/16	LKB															Open
60-052	Drawings	HVAC	M7.1	M7.1, HHW Convector and Fin Tube. Please clarify AE recommended setpoints.	05/02/16	LKB															Open
60-053	Drawings	HVAC	M7.1	M7.1, HHW Convector and Fin Tube. Some P&IDs in the set show a direct link to BAS. This does not. Please clarify if these points are on the BAS / ATC system, and if not please state this is standalone control NOT on BAS / ATC.	05/02/16	LKB															Open
60-054	Drawings	HVAC	M7.1	M7.1, General Exhaust and Toilet Exhaust. Given the CT is shown on P&ID, recommend the sequence require the system to show fan status.	05/02/16	LKB															Open
60-055	Drawings	HVAC	M7.1	M7.1, General Exhaust and Toilet Exhaust. Given the CT is shown, recommend adding an alarm for fan status mismatch. (Such as fan is running when it should not be, or fan is not running when it should be).	05/02/16	LKB															Open
60-056	Drawings	HVAC	M7.1	M7.1, HHW Radiant Panel. Please clarify AE recommended setpoints.	05/02/16	LKB															Open
60-057	Drawings	HVAC	M7.1	M7.1, HHW Radiant Panel. Panels are scheduled to operate in unoccupied mode. Normally radiant panels are for occupant comfort and not general heating. Presumably in unoccupied there are no occupants. Should these systems be OFF in unoccupied?	05/02/16	LKB															Open
60-058	Drawings	HVAC	M7.1	M7.1, HHW Radiant Panel. Some P&IDs in the set show a direct link to BAS. This does not. Please clarify if these points are on the BAS / ATC system, and if not please state this is standalone control NOT on BAS / ATC.	05/02/16	LKB															Open
60-059	Drawings	HVAC	M7.2	M7.2. Rooftop Unit with ERU, HHW & CHW. Sequence step 1 states that smoke detectors are wired by others however presumably the wiring to the ATC on the P&ID is by ATC. Please clarify.	05/02/16	LKB															Open
60-060	Drawings	HVAC	M7.2	M7.2. Rooftop Unit with ERU, HHW & CHW. Sequence item 3 states unit shall shut-down in general alarm, however there is no general alarm defined. Please reconsider and/or define under what alarm conditions unit shuts down (other than freeze protection which is already defined).	05/02/16	LKB															Open

60-061	Drawings	HVAC	M7.2	M7.2. Rooftop Unit with ERU, HHW & CHW. Duct pressure high limit after return fan and duct pressure low limit sensor before supply fan are required by sequence but not shown on P&ID. Please coordinate.	05/02/16	LKB													Open
60-062	Drawings	HVAC	M7.2	M7.2. Rooftop Unit with ERU, HHW & CHW. A morning warm-up sequence is shown however a morning cool-down is not.	05/02/16	LKB													Open
60-063	Drawings	HVAC	M7.2	M7.2. Rooftop Unit with ERU, HHW & CHW. Unless a morning cooldown sequence is spec'd, presumably morning warmup cycle would run fans 30 minutes even when no warmup is required. If no cooldown sequence, should warmup be disabled over a certain OA temperature?	05/02/16	LKB													Open
60-064	Drawings	HVAC	M7.2	M7.2. Rooftop Unit with ERU, HHW & CHW. Morning warmup sequence 2 states to control to return air setpoint of 72dF, however item 3 states under 40dF OA to open heating valve 100%. Which takes priority?	05/02/16	LKB													Open
60-065	Drawings	HVAC	M7.2	M7.2. Rooftop Unit with ERU, HHW & CHW. Morning warmup sequence 2 states to control to return air setpoint of 72dF, however in occupied mode unit controls to discharge air temp setpoint. Recommend unit control to the same point in occ vs morning warmup. Please clarify.	05/02/16	LKB													Open
60-066	Drawings	HVAC	M7.2	M7.2. Rooftop Unit with ERU, HHW & CHW. Morning warmup sequence 2 states to control to return air setpoint of 72dF, which leaves operation of CHW valve in question. Does the unit also cool to 72dF return air if needed? If so, what prevents simultaneous heating and cooling?	05/02/16	LKB													Open
60-067	Drawings	HVAC	M7.2	M7.2. Rooftop Unit with ERU, HHW & CHW. For Occupied cooling, please provide the discharge air setpoint, and name appropriate deadband to prevent simultaneous heating and cooling.	05/02/16	LKB													Open
60-068	Drawings	HVAC	M7.2	M7.2. Rooftop Unit with ERU, HHW & CHW. Emergency power. It is not defined here or elsewhere on M7 series where the ATC system gets an input to know whether the building is on emergency power or not. Please show input on M7 series.	05/02/16	LKB													Open
60-069	Drawings	HVAC	M7.2	M7.2. Rooftop Unit with ERU, HHW & CHW. Static safeties section discusses a return duct low static safety that is not shown on the P&ID. Please coordinate.	05/02/16	LKB													Open
60-070	Drawings	HVAC	M7.2	M7.2. Rooftop Unit with ERU, HHW & CHW. Heat Wheel. Should the manufacturer's heat wheel control output status to the ATC, and ATC report status of the heat wheel?	05/02/16	LKB													Open
60-071	Drawings	HVAC	M7.2	M7.2. Rooftop Unit with ERU, HHW & CHW. Sequence shows control of heat wheel by manufacturer, and thereby implies that some drybulb and wetbulb temp sensors may be needed too, but are not shown on P&ID. Please coordinate P&ID and sequence.	05/02/16	LKB													Open
60-072	Drawings	HVAC	M7.2	M7.2. Rooftop Unit with ERU, HHW & CHW. P&ID shows an airflow measuring station on the supply and return fan, however they are not discussed in the sequence. Please coordinate.	05/02/16	LKB													Open
60-073	Drawings	HVAC	M7.2	M7.2. Rooftop Unit w/ HHW and DCV. Sequence first paragraph states that smoke detectors are wired by others however presumably the wiring to the ATC on the P&ID is by ATC. Please clarify.	05/02/16	LKB													Open

60-074	Drawings	HVAC	M7.2	M7.2. Rooftop Unit w/ HHW and DCV. Morning warm up. As written unit will have a warm up cycle for 30 mins even when OA temps are warm, spending an extra 30 mins of fan energy. Should this mode be disabled over a certain OA temp?	05/02/16	LKB									Open	
60-075	Drawings	HVAC	M7.2	M7.2. Rooftop Unit w/ HHW and DCV. Occupied mode states to maintain a room temp of 68dF. Presumably this is a heating setpoint? Please clarify as written it would be cooled to 68 as well.	05/02/16	LKB										Open
60-076	Drawings	HVAC	M7.2	M7.2. Rooftop Unit w/ HHW and DCV. Please define a deadband between heating and cooling setpoints to prevent simultaneous heating and cooling.	05/02/16	LKB										Open
60-077	Drawings	HVAC	M7.2	M7.2. Rooftop Unit w/ HHW and DCV. Static safeties section discusses a return duct low static safety that is not shown on the P&ID. Please coordinate.	05/02/16	LKB										Open
60-078	Drawings	HVAC	M7.2	M7.2. Rooftop Unit w/ HHW and DCV. Winter summer changeover described in the sequence is not reflected in P&ID. Please update P&ID to show.	05/02/16	LKB										Open
60-079	Drawings	HVAC	M Series	M Series. For RTU-7 and -8 summer/winter changeover there will be a mixing of glycol in the CHW system, and for each change a slow dilution of glycol in the HHW system. AE of Record please confirm this is acceptable. Recommend acknowledgment of this condition from the owner.	05/02/16	LKB										Open
60-080	Drawings	HVAC	M7.3	M7.3. Rooftop Unit w/ Energy Recovery, HHW. P&ID shows a 'floating' CT and Relay that should probably be moved to the supply fan.	05/02/16	LKB										Open
60-081	Drawings	HVAC	M7.3	M7.3. Rooftop Unit w/ Energy Recovery, HHW. P&ID shows an airflow measuring station on the supply and return fan, however they are not discussed in the sequence. Please coordinate.	05/02/16	LKB										Open
60-082	Drawings	HVAC	M7.3	M7.3. Rooftop Unit w/ Energy Recovery, HHW. P&ID shows "Frost Control" for the heat wheel by manufacturer, however the sequence requires control of VFD by manufacturer, and thereby implies that some drybulb and wetbulb temp sensors may be needed too. Please coordinate P&ID and sequence.	05/02/16	LKB										Open
60-083	Drawings	HVAC	M7.3	M7.3. Rooftop Unit w/ Energy Recovery, HHW & CHW. Heat Wheel. Should the manufacturer's heat wheel control output status to the ATC, and ATC report status of the heat wheel?	05/02/16	LKB										Open
60-084	Drawings	HVAC	M7.3	M7.3. Rooftop Unit w/ Energy Recovery, HHW. Smoke detectors shown as wired by others however is shown as wired to ATC system. Please clarify.	05/02/16	LKB										Open
60-085	Drawings	HVAC	M7.3	M7.3. Rooftop Unit w/ Energy Recovery, HHW. Sequence item 2 states unit shall shut-down in general alarm, however there is no general alarm defined. Please reconsider and/or define under what alarm conditions unit shuts down (other than freeze protection which is already defined).	05/02/16	LKB										Open
60-086	Drawings	HVAC	M7.3	M7.3. Rooftop Unit w/ Energy Recovery, HHW. Morning warm up. As written unit will have a warm up cycle for 30 mins even when OA temps are warm, spending an extra 30 mins of fan energy. Should this mode be disabled over a certain OA temp?	05/02/16	LKB										Open

60-087	Drawings	HVAC	M7.3	M7.3. Rooftop Unit w/ Energy Recovery, HHW. Morning warm up Sequence 3 calls for HHW control valve to control to space temp. However unit does not have space temp, in occupied and unoccupied it controls to 60dF discharge air temp. Please coordinate.	05/02/16	LKB						Open
60-088	Drawings	HVAC	M7.3	M7.3. Rooftop Unit w/ Energy Recovery, HHW. Heating Occupied and Unoccupied Sequence 3 states energy recovery wheel control by manufacturer, but does not define the control sequence. Please define control sequence.	05/02/16	LKB						Open
60-089	Drawings	HVAC	M7.3	M7.3. Kitchen Ventilation and Exhaust. Sequence step 2 call for a high static at outlet of supply fan and low static at inlet, however they are not shown on P&ID. Please confirm they are necessary (normally found on VAV system) and if show on P&ID.	05/02/16	LKB						Open
60-090	Drawings	HVAC	M7.3	M7.3. Kitchen Ventilation and Exhaust. Provide heating space temperature setpoints for morning warmup, occupied no cooking, occupied with cooking, and unoccupied.	05/02/16	LKB						Open
60-091	Drawings	HVAC	M7.3	M7.3. Kitchen Ventilation and Exhaust. Sequence 5 morning warmup. Please define duration of morning warmup cycle.	05/02/16	LKB						Open
60-092	Drawings	HVAC	M7.3	M7.3. Kitchen Ventilation and Exhaust. Sequence 6.c, please define what happens in the "post purge cycle".	05/02/16	LKB						Open
60-093	Drawings	HVAC	M7.3	M7.3. Kitchen Ventilation and Exhaust. Sequence 7.a, please provide an initial offset setpoint.	05/02/16	LKB						Open
60-094	Drawings	HVAC	M7.3	M7.3. Kitchen Ventilation and Exhaust. For sequence 7a and 10a, please provide the space pressure setpoint.	05/02/16	LKB						Open
60-095	Drawings	HVAC	M7.3	M7.3. Kitchen Ventilation and Exhaust. Sequence 7a and 10a call for dampers to control space pressure, however a space pressure sensor is not shown on P&ID. Please coordinate.	05/02/16	LKB						Open
60-096	Drawings	HVAC	M7.3	M7.3. Kitchen Ventilation and Exhaust. Kitchen Hood sequence 4, please define at what speed should the exhaust fan operate in fire emergency mode.	05/02/16	LKB						Open
60-097	Drawings	HVAC	M7.3	M7.3. Kitchen Ventilation and Exhaust. Economizer cooling. Please define the cooling setpoint, and deadband to prevent simultaneous economizer and heating.	05/02/16	LKB						Open
60-098	Drawings	HVAC	M7.3	M7.3. Kitchen Ventilation and Exhaust. Please define ATC alarms.	05/02/16	LKB						Open
60-099	Drawings	HVAC	M7.3	M7.3. VAV Terminal w/ Reheat & Radiant Panels. Please define occupied and unoccupied setpoints.	05/02/16	LKB						Open
60-100	Drawings	HVAC	M7.3	M7.3. VAV Terminal w/ Reheat & Radiant Panels. Has the project team considered a discharge air temperature sensor for better system monitoring and troubleshooting?	05/02/16	LKB						Open
60-101	Drawings	HVAC	M7.3	M7.3. VAV Terminal w/ Reheat & Radiant Panels. Classroom CO2 Sensor. Please clarify in the sequence. When CO2 is below 600ppm does the box close beyond the minimum to a truly closed position?	05/02/16	LKB						Open
60-102	Drawings	HVAC	M7.3	M7.3. VAV Terminal w/ Reheat & Radiant Panels. Classroom CO2 Sensor. If the box is only closing towards the minimum and not beyond, then recommend deleting the low-end part of this sequence. It would be overriding the temperature control only to be re-overridden to continue to maintain the temperature control. (If needed for clarification call reviewer at 571-481-1769).	05/02/16	LKB						Open

60-103	Drawings	HVAC	M7.3	M7.3. VAV Terminal w/ Reheat & Radiant Panels. Please require that airflow should be shown on graphics. (Lessons learned).	05/02/16	LKB													Open	
60-104	Drawings	HVAC	M7.3	M7.3. VAV Terminal w/ Reheat & Radiant Panels. Define alarms for each zone, if any.	05/02/16	LKB														Open
60-105	Drawings	HVAC	M7.4	M7.4. AHU-1 and -2 HHW and CHW. Please coordinate duct smoke scope and wording to be similar for all units. This wording implies a different scope than units shown on previous pages.	05/02/16	LKB														Open
60-106	Drawings	HVAC	M7.4	M7.4. AHU-1 and -2 HHW and CHW. Morning warm up. As written unit will have a warm up cycle for 30 mins even when OA temps are warm, spending an extra 30 mins of fan energy. Should this mode be disabled over a certain OA temp?	05/02/16	LKB														Open
60-107	Drawings	HVAC	M7.4	M7.4. AHU-1 and -2 HHW and CHW. Morning warm up. Morning warmup controls to space temperature, however occupied and unoccupied control to discharge air temperature. Recommend they control to same point for consistency. Please coordinate.	05/02/16	LKB														Open
60-108	Drawings	HVAC	M7.4	M7.4. AHU-1 and -2 HHW and CHW. Occupied Heating. Please provide the recommended discharge air temperature setpoint.	05/02/16	LKB														Open
60-109	Drawings	HVAC	M7.4	M7.4. AHU-1 and -2 HHW and CHW. Unnoc Heating. Please provide the recommended discharge air temperature setpoint.	05/02/16	LKB														Open
60-110	Drawings	HVAC	M7.4	M7.4. AHU-1 and -2 HHW and CHW. Occupied cooling. Please provide a cooling discharge air setpoint, and define a deadband to prevent simultaneous heating and cooling.	05/02/16	LKB														Open
60-111	Drawings	HVAC	M7.4	M7.4. AHU-1 and -2 HHW and CHW. Discharge Air Reset Control. Given the control of the unit this section appears to be out of place and may be left over from a VAV unit?	05/02/16	LKB														Open
60-112	Drawings	HVAC	M7.4	M7.4. AHU-1 and -2 HHW and CHW. Setpoints to enable occupied mode. Unit controls to discharge air temp. Presumably a space temperature setpoint would enable unoccupied heating. Please define this setpoint in the sequence.	05/02/16	LKB														Open
60-113	Drawings	HVAC	M7.4	M7.4. Fan Coil Unit. Morning warm up. As written unit will have a warm up cycle for 30 mins even when OA temps are warm, spending an extra 30 mins of fan energy. Should this mode be disabled over a certain OA temp?	05/02/16	LKB														Open
60-114	Drawings	HVAC	M7.4	M7.4. Fan Coil Unit. Morning warm up. Sequence calls to control to return air temperature, however none is shown in the P&ID. Please coordinate, or perhaps consider making this space temperature.	05/02/16	LKB														Open
60-115	Drawings	HVAC	M7.4	M7.4. Fan Coil Unit. Morning warmup controls to return are temperature, however occupied and unoccupied control to space air temperature. Recommend they control to same point for consistency. Please coordinate.	05/02/16	LKB														Open
60-116	Drawings	HVAC	M7.4	M7.4. Fan Coil Unit. Occupied mode states to maintain a room temp of 68dF. Presumably this is a heating setpoint? Please clarify as written it would be cooled to 68 as well.	05/02/16	LKB														Open

60-117	Drawings	HVAC	M7.4	M7.4. Fan Coil Unit. Cooling valve is stated to control to discharge air temperature setpoint however heating controls to space temperature. Recommend they control to the same point for simplicity and consistency. Please coordinate.	05/02/16	LKB								Open
60-118	Drawings	HVAC	M7.4	M7.4. Fan Coil Unit. Unoccupied mode. Heating valve is controlled to discharge air temperature, however in occupied it controls to space temperature. Recommend they control to the same point for simplicity and consistency. Please coordinate.	05/02/16	LKB								Open
60-119	Drawings	HVAC	M7.4	M7.4. Cabinet Heaters. Some P&IDs in the set show a direct link to BAS and other show a Stand Alone Thermostat. This does not show either. Please clarify.	05/02/16	LKB								Open
60-120	Drawings	HVAC	M7.4	M7.4. Cabinet Heaters. Please define setpoint for aquastat.	05/02/16	LKB								Open
60-121	Drawings	HVAC	M7.4	M7.4. Unit Heaters. Please define setpoint for aquastat.	05/02/16	LKB								Open
60-122	Drawings	HVAC	M7.4	M7.4. Dishwasher Exhaust. Have you considered a timer switch for this system, so that it is not left on inadvertently for long periods of time.	05/02/16	LKB								Open
60-123	Drawings	HVAC	M7.4	M7.4. Electric Room Ventilation. Some P&IDs in the set show a direct link to BAS and other show a Stand Alone Thermostat. This does not show either. Please clarify.	05/02/16	LKB								Open
60-124	Drawings	HVAC	M7.4	M7.4. Electric Room Ventilation. Please provide a recommended setpoint for system operation.	05/02/16	LKB								Open
60-125	Drawings	HVAC	M7.4	M7.4. Mechanical Room Ventilation. Please provide a recommended setpoint for system operation.	05/02/16	LKB								Open
60-126	Drawings	HVAC	M7.5	M7.5. Glycol. Please define any points or alarms that may be on the ATC. As read it appears this is entirely stand alone. Should any alarms be on the ATC?	05/02/16	LKB								Open
60-127	Drawings	HVAC	M7.5	M7.5. Boilers P&ID. Recommend pressure gages on the HHWS and HHWR pipe to each boiler. At a bare minimum P/T ports (pete's plugs).	05/02/16	LKB								Open
60-128	Drawings	HVAC	M7.5	M7.5. Boilers P&ID. Consider a check valve or two-way control valve at each boiler to prevent reverse flow through an inactive unit.	05/02/16	LKB								Open
60-129	Drawings	HVAC	M7.5	M7.5. Boilers P&ID. Please confirm 8" pipe size to each boiler. Could be excessive given header and entire system are both 8".	05/02/16	LKB								Open
60-130	Drawings	HVAC	M7.5	M7.5. Boilers. Please define if system is Lead-Lag1-Lag2 (able to run three boilers) or Lead-Lag-Standby (only run two boilers).	05/02/16	LKB								Open
60-131	Drawings	HVAC	M7.5	M7.5. Boilers. Sequence step 2. Please define how boilers stage. For example, when Lead boiler is at 100% and calling for second boiler, does lead boiler stay at 100% and then modulate from min to max? Or do lead and lag together drop to min fire then modulate up in tandem?	05/02/16	LKB								Open
60-132	Drawings	HVAC	M7.5	M7.5. Boilers. Sequence step 3 calls for boilers to be de-energized with OA temps above 60dF. However some zones have HHW reheat in the VAVs and may not control to temperature. AE to verify.	05/02/16	LKB								Open
60-133	Drawings	HVAC	M7.5	M7.5. Boilers. Sequence step 3 calls for boilers to be de-energized with OA temps above 60dF. Please clarify whether the pumps continue to run or not to serve the HHW reheat loads.	05/02/16	LKB								Open

60-134	Drawings	HVAC	M7.5	M7.5. Boilers. For HHW DP control, has the project team considered a DP setpoint reset strategy to conserve pumping energy?	05/02/16	LKB														Open	
60-135	Drawings	HVAC	M7.5	M7.5. Boilers. Please define boiler alarms on ATC.	05/02/16	LKB															Open
60-136	Drawings	HVAC	M7.5	M7.5. Boilers. Please define integration requirements for boiler controllers to the ATC.	05/02/16	LKB															Open
60-137	Drawings	HVAC	M7.5	M7.5. Boilers. Please define integration requirements for pump VFDs to the ATC.	05/02/16	LKB															Open
60-138	Drawings	HVAC	M7.5	M7.5. Boilers. Is a HHW flow meter and BTU energy trend points desirable for system monitoring and LEED M&V purposes?	05/02/16	LKB															Open
60-139	Drawings	HVAC	M7.5	M7.5. Chillers P&ID. Please confirm 8" pipe size to each chiller. Could be excessive given the entire system is sized 8".	05/02/16	LKB															Open
60-140	Drawings	HVAC	M7.5	M7.5. Chillers P&ID. Should a balance valve be installed at each chiller to set proper flow?	05/02/16	LKB															Open
60-141	Drawings	HVAC	M7.5	M7.5. Chillers P&ID. System shows a common make-up PRV for CHW and HHW. Should the CHW and HHW each have their own PRV as they may operate at different pressures?	05/02/16	LKB															Open
60-142	Drawings	HVAC	M7.5	M7.5. Chillers P&ID. Consider a CHWR temperature sensor prior to the bypass valve for system monitoring and troubleshooting.	05/02/16	LKB															Open
60-143	Drawings	HVAC	M7.5	M7.5. Chillers. Please define integration requirements for boiler controllers to the ATC.	05/02/16	LKB															Open
60-144	Drawings	HVAC	M7.5	M7.5. Chillers. Please define integration requirements for pump VFDs to the ATC.	05/02/16	LKB															Open
60-145	Drawings	HVAC	M7.5	M7.5. Chillers. Sequence 4.a.4. Typo? Should "blow" be "flow"?	05/02/16	LKB															Open
60-146	Drawings	HVAC	M7.5	M7.5. Chillers. Sequence step 5. For CHW DP control, has the project team considered a DP setpoint reset strategy to conserve pumping energy?	05/02/16	LKB															Open
60-147	Drawings	HVAC	M7.5	M7.5. Chillers. Given the flow meter and temp sensors, consider a requirement for calculated energy point, both instantaneous and totalized energy use. Very helpful for trending analysis and could be useful for LEED M&V.	05/02/16	LKB															Open
60-148	Drawings	HVAC	M7.5	M7.5. Chillers. Define CHW system alarms.	05/02/16	LKB															Open
60-149	Drawings	HVAC	M7 Series	M7 Series. AHUs generally do not show a dedicated AFMS for outside air and associated alarms to ATC. This was required for LEED v3. AE to confirm if this is required in LEED v4 and coordinate accordingly.	05/02/16	LKB															Open
60-150	Drawings	HVAC	M7 Series	M7 Series. VFDs on P&IDs show "ATC Connection" but do not further clarify what is to be integrated. If any level of integration is desired beyond the direct minimum to perform the sequence, then it must be defined in the documents.	05/02/16	LKB															Open
60-151	Drawings	HVAC	M7 Series	M7 Series. In general duct smoke detectors are shown as "furnished, installed, wired by others". Consider alternate wording as presumably the wiring to alarm the ATC system is by ATC. (Yes the power and fire alarm wiring are by others).	05/02/16	LKB															Open
60-152	Drawings	HVAC	M7 Series	M7 Series. No whole-building electrical, water, or gas meters are shown on ATC. They may be desirable for LEED M&V purposes. Please confirm.	05/02/16	LKB															Open

60-153	Drawings	HVAC	M7 Series	M7 Series. Please confirm no DHW monitoring or alarms are required on ATC. None are shown.	05/02/16	LKB														Open	
60-154	Drawings	HVAC	M7 Series	M7 Series. Please confirm no DHW recirc pump scheduling is required on ATC. None shown.	05/02/16	LKB															Open
60-155	Drawings	HVAC	M7 Series	M7 Series. Please confirm no elevator sump pump alarms are required on ATC. None are shown. (Noted in plumbing review section that no pumps are shown at this time either).	05/02/16	LKB															Open
60-156	Drawings	HVAC	M7 Series	M7 Series. Please confirm no alarms from the PH neutralizer system for acid waste are required on ATC. None are shown.	05/02/16	LKB															Open
60-157	Drawings	HVAC	M7 Series	M7 Series. Please confirm no DHW monitoring or alarms are required on ATC. None are shown.	05/02/16	LKB															Open
60-158	Drawings	HVAC	M7 Series	M7 Series. Please confirm no kitchen walk-in box refrigerator or freezer alarms are required on ATC. None are shown.	05/02/16	LKB															Open
60-159	Drawings	Electrical	E5.01	E5.01. Bordered text on notes difficult to read. Please QC prior to next submission.	05/02/16	LKB															Open
60-160	Drawings	Electrical	E6.03	E6.03. Detail 1 Typical Classroom Lighting Control. Shows connection to third party device. Please clarify to what this is connecting and sequence / intent for third party device.	05/02/16	LKB															Open
60-161	Drawings	Electrical	E6.03	E6.03. Detail 1 Typical Classroom Lighting Control. Recommend showing in diagram networking connections to/from controller.	05/02/16	LKB															Open
60-162	Drawings	Electrical	E6.03	E6.03. Detail 2 Classroom Lighting Control. Shows connection to third party device. Please clarify to what this is connecting and sequence / intent for third party device.	05/02/16	LKB															Open
60-163	Drawings	Electrical	E6.03	E6.03. Detail 2 Classroom Lighting Control. Recommend showing in diagram networking connections to/from controller.	05/02/16	LKB															Open
60-164	Drawings	Electrical	E6.03	E6.03. Detail 3. Wall mounted occupancy sensor. Please define sequence, including delay time for each space type.	05/02/16	LKB															Open
60-165	Drawings	Electrical	E6.03	E6.03. Detail 3. Wall mounted occupancy sensor. Please clarify whether these sensors are integrated with central control system are intended to be standalone.	05/02/16	LKB															Open
60-166	Drawings	Electrical	E6.03	E6.03. Detail 5 Classroom Lighting Control. Shows connection to third party device. Please clarify to what this is connecting and sequence / intent for third party device.	05/02/16	LKB															Open
60-167	Drawings	Electrical	E6.03	E6.03. Detail 5 Classroom Lighting Control. Recommend showing in diagram networking connections to/from controller.	05/02/16	LKB															Open
60-168	Drawings	Electrical	E6.03	E6.03. Detail 6. Occupancy Sensor Manual On. Please define sequence, including delay time for each space type. In sequence define what is meant by 'manual on'.	05/02/16	LKB															Open
60-169	Drawings	Electrical	E6.03	E6.03. Detail 7. Shows pipe hanger??	05/02/16	LKB															Open
60-170	Drawings	Electrical	E6.03	E6.03. Bordered text on notes difficult to read. Please QC prior to next submission.	05/02/16	LKB															Open
60-171	Drawings	Electrical	E6.03	E6.03. For each of the lighting details, please clarify to which areas they apply. For example, three are shown as classrooms. How can the team differentiate requirements?	05/02/16	LKB															Open
60-172	Drawings	Electrical	E6 Series	E6 Series. Lighting Controls. Please show lighting control requirements and sequences for all other areas that are on the central lighting controls system. It will also be helpful to define which areas are NOT on the central system, so there are no clarifications/changes needed during the project.	05/02/16	LKB															Open

60-173	Drawings	Electrical	E Series	E Series. Lighting Controls. Please show single line networking requirements for lighting control system.	05/02/16	LKB						Open
60-174	Drawings	Electrical	E Series	E Series. Lighting Controls. Please indicate whether site lighting is on central lighting controls system, and please define the sequence.	05/02/16	LKB						Open

Open	174
Closed	0
CNC	0
Total	174

60% CONSTRUCTION DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOLE

Date: 05/06/2016

Spec. Sect./ Drawing #	Item	Comment <i>All comments are suggestions NOT directives</i>	Response Code	Remarks
VALUE ENGINEERING SUGGESTIONS				
VE Item	P161	Use PVC for drainage, waste, vent and storm drain systems.		
VE Item	P162	Use CPVC for domestic water piping.		
VE Item	P163	Use piston type water hammer arrestors instead of bellows type.		
VE Item	P164	Use manual flush valves and faucets instead of electronic.		
	P165			
	P166			

END OF DOCUMENT

60% CONSTRUCTION DOCUMENT REVIEW COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 05/6/2016

Spec. Sect./ Drawing #	Item	Comment All comments are suggestions NOT directives	Response Code	Remarks
VALUE ENGINEERING COMMENTS				
M5.1	M120	Value Engineering: Was the use of Total Energy Recovery via a wheel economically justified? Typically, the reviewer has found that in northern climates and with lower summer time occupancy, schools tend to utilize winter time heat sensible heat recovery via plate heat exchangers. Total Energy Recovery Wheels have higher first and yearly maintenance costs than plate exchangers with marginal energy benefits. Additionally, there is an issue with cross contamination with wheels that you don't have with sensible only heat recovery. Thus improved IAQ when using plate exchangers. Provide requested justification for higher first cost.		
M5.3	M121	Value Engineering: Where are all the sound attenuators located (presuming half of them are for the rooftop unit connections)? Consider the deletion of the sound attenuators if they are not critical to the LEED acoustical performance prerequisite.		
M6.1	M122	Value Engineering: Consider the use of flexible duct on supply grilles to damper rattling and ease of constructability, with maximum length specified.		

END OF DOCUMENT

60% CONSTRUCTION DOCUMENT COMMENTS

Project Number: Heery No. 1409500

Project Name: BEVERLY MIDDLE SCHOOL

Date: 05/06/2016

Spec. Sect./ Drawing #	Item	Comment All comments are suggestions NOT directives	Response Code	Remarks
VALUE ENGINEERING SUGGESTIONS				
VE	E46	Consider Aluminum bussing instead of Copper for the switchboard.		
VE	E47	Consider Aluminum bussing instead of Copper for all panelboards.		
VE	E48	Zero Sequence Harmonic Filters are specified for use ahead of various Computer/Technology panels. Are these devices necessary for this installation? Consider removing.		
VE	E49	Lightning Protection Roof Air Terminals and Conductors are specified to be Copper with bi-metallic bronze fittings where in contact with aluminum surfaces. Consider allowing Aluminum air terminals and conductors on the roof.		
VE	E50	The Lighting Control System described in the 26 00 00 specifications and shown on the drawings includes a complex Digital Control Panel system with Bacnet BAS integration and communication capability through PC's, internet and telephone access. All sensors and devices are addressable including local room controllers, occupancy sensors and daylighting sensors. Designer stated that this was required to meet Energy Code Requirements. While lighting controls are required by these codes, consideration can be given to simplification of the system.		
VE	E51	Ceiling finish/Lighting design is complex in many areas, including Corridors. Consider simplification.		

END OF DOCUMENT

APPENDIX H
CONSTRUCTION MANAGER'S
60% CONSTRUCTION DOCUMENT
REVIEW COMMENTS



New Beverly Middle School Project

Bacon-Agostini Project No. 257

Construction Manager's 60% CD Review Comments

May 6, 2016

1 Technical Accuracy

Since Bacon-Agostini was selected as the Construction Manager for the New Beverly Middle School Project, nearly 12 months ago, we have met numerous times with design team members to review technical details and proposed construction methods. Bacon-Agostini worked with the geotech and structural engineers to develop additional soil boring locations to better define the length of structural piles prior to bid. Bacon-Agostini worked with design team members to rule out the ground improvement method of soil improvements due to existing soil conditions and the limitations on available equipment across the country (only 1 subcontractor known with proper equipment to address up to 65 feet of soft clay soils.) Bacon-Agostini worked with the design team to analyze several different types of structural piles, based on cost and availability, leading to a mutually agreeable solution to utilize steel h-piles. Bacon-Agostini also worked with the structural engineers to analyze installation methods for the extensive rebar required for pile caps, grade beams and structural slabs and to agree on methods that will maintain the integrity of the rebar following installation while providing for worker safety while working around the installed rebar. Additionally, Bacon-Agostini worked with the architect to develop methods for fireproofing of structural steel through anticipated winter weather, to review the need for geotextile fabrics to address the clay soils on the site, and to review the need and possible solutions for foundation and slab dampproofing.

2 Efficiency

Bacon-Agostini has worked cooperatively with the design team to develop a plan for Early Packages that provides the most efficient release of documents to initiate construction work as early as possible to help maintain the Owner's schedule to occupy and utilize the new building in the Spring of 2018. To date, the abatement and demolition of the existing building has been completed and driving of structural piles is starting any day. This process will allow the start of foundations and structural steel as the final design documents are released for bid near the end of September 2016.

Bacon-Agostini has also worked with the design team to develop a sequencing plan for construction that enables work on the 4-story classroom wings to start as early in the process as possible. We have worked with the design team to identify the ideal time to install wick drains and soil surcharges, so as not to impact the ongoing construction schedule. We have also attended meetings with the architect to review specific construction details related to framing and blocking of exterior walls, soffits and roof edges to improve the efficiency of the construction. Additionally, we have commented on the planned use of epoxy terrazzo flooring and the benefits of not recessing the concrete slabs for this product and have provided references for quality subcontractors that have efficiently installed this product for us in the past.

3 Coordination

Bacon-Agostini has participated in coordinated review meetings with the architect and their design consultant in the early stages of the development of the architect's BIM model of the project. Bacon-Agostini also

continues to review the contract drawings with an eye towards coordination of MEP systems with structural steel openings as well as equipment locations within the building (i.e. irrigation system controls in the mechanical room.) Specific coordination comments are listed below that address items such as roof scuttles potentially conflicting with ceilings and MEP piping/ductwork, ceilings conflicting with kitchen equipment, MEP systems conflicting with structural steel and MEP systems conflicting with ceilings and/or ceiling clouds.

4 Constructability

Bacon-Agostini has worked with the design team to address constructability issues starting with the poor clay soils on the site. We worked with the design team to specify a construction pad or platform of geotextile, imported soils and crushed stone that would be adequate to support the crane loads expected during the pile driving operation. The same approach was used to consider construction access around the site in conjunction with planned future driveways and parking areas and the anticipated issues with installation of two large planned underground drainage structures. Bacon-Agostini has worked with the design team to analyze constructability issues with rebar installation as well as plans to address underground plumbing penetrations at foundation elements given that foundations will start a few months before a plumbing Trade Contractor will be under contract. The same approach was used to address the design and layout of structural steel to address HVAC equipment loads and penetrations that will need to be finalized after the HVAC Trade Contractor is under contract following the release of bid documents in late September. As noted above, specific meetings with the architect have also focused on constructability issues related to applied fireproofing, exterior wall framing, roof edge blocking details, soffit framing, etc.

5 Cost Effectiveness

One of the first assignments that Bacon-Agostini received after being selected as Construction Manager was to analyze a proposed option for the building frame to utilize timber framing as a main design feature. Unfortunately, the cost of this proposed option was beyond the Project budget and a typical structural steel frame was designed for the Project. As noted above, Bacon-Agostini participated in a lengthy analysis on the cost effectiveness of the proposed soil improvement and/or structural pile design options. Bacon-Agostini continues to participate in design review meetings and offer our experience and input on the cost effectiveness of various construction details. Where possible, Bacon-Agostini has engaged specific vendors and/or subcontractors for their assistance and input in not only the materials or products selected, but also the most cost-effective detailing needed to save not only the cost but also time on the Project schedule. Previous meetings have looked at items such as various types of building siding, intumescent paint versus spray fireproofing, natural stone veneer versus simulated stone products, the use of epoxy terrazzo, the advantages and costs of various roofing materials, the proposed thickness of bituminous concrete pavements, and an analysis of the Owner's request to utilize concrete drainage pipe in lieu of HDPE piping. In all cases to date, the design team has been receptive to review and consider the most cost effective option proposed.

<u>Sheet</u>	<u>Comment</u>
6 G0.01	Based on our 4/26/16 meeting with the Beverly Building Commissioner, we will need to confirm that the 9th Edition of the MA Building Code is in effect at the time of bid.
7 C4.1	It is our understanding that there may be some work being completed with the City's Route 1A Project (i.e. curbs & sidewalks) that is also shown on our drawings. We should eliminate any duplication.
8 C5.1	12" drain pipe leaving CB-222 is shown as HDPE. Please confirm that the City does not require RCP for this 12" drain pipe.
9 C5.2	There are several drain pipes along the east side of the parking lot that are shown as 24" HDPE. Please confirm that the City does not require 24" RCP for these pipes.
10 C5.2	There are several drain pipes along the west and south sides of the parking lot that are shown as 24" and 30" RCP. It was our understanding that the City would allow HDPE for drain pipes larger than 18". Please confirm.
11 C6.1	A 30" processed gravel subbase is a substantial revision since the DD drawings.
12 C6.2	There are several areas in the Segmental Retaining Wall Detail where text is shown as squares?
13 C6.2	The Concrete Stair section includes a note to "Compact Subgrade (Typ.)". Given the

- expectation that we will encounter poor clay soils in the subgrade, please advise if any geotextile or imported soils will be required.
- 14 C6.4 Please confirm that all typical details that refer to undisturbed material under or along trenches or supporting thrust blocks have considered the poor clay soils expected to be found.
- 15 C6.5 Note 1 on the Concrete Foundation Plan should provide the concrete strength required.
- 16 C6.5 Note 2 on the Concrete Foundation Plan Detail refers to a allowable soil pressure. Does this requirement take into consideration the poor clay soils that we are expecting?
- 17 L1.0 Landscaping drawings include several references to landscape boulders. Given the extent of clay on the site, and the expectation that we will not find many or any boulders, please confirm that we are expecting to import landscape boulders.
- 18 L2.0 & L2.7 Please confirm that all typical details that refer to compacted subgrade under or along proposed improvements have considered the poor clay soils expected to be found.
- 19 L3.5 Please confirm that root balls resting on undisturbed clay subgrade will be acceptable.
- 20 A1.04 It appears that some column line tags are missing to the right of 4-Q.8.
- 21 A1.04 There appears to be walk-off mats at the Gym Lobby & Vestibule that should be tagged.
- 22 A1.04 Confirm that Health Classroom equipment is provided by FFE.
- 23 A1.04 Confirm that Health Classroom mirrors are furnished and installed by the Glazing Trade contractor.
- 24 A1.04 There are several faded notes (i.e. Plam shelf in Toilets) that appear to be reminders to complete in future sets. Please confirm.
- 25 A1.04 There is a note in Corridor CL05 that refers to an interior ramp that is not found.
- 26 A1.11 Same as comment 16 above for other sheets/building areas.
- 27 A1.11 Should there be a second ESTOP button near the corridor door at Tech Lab 116?
- 28 A1.11 Locker counts in the corridors refer only to one row at each location. If "lockers" are defined as 3-teir, this should not be a problem.
- 29 A1.11 Confirm that the plumbing chase between Toilets T1-2B & T1-3B is sufficient for a back to back carrier to eliminate the problem we encountered at Franklin HS.
- 30 A1.11 conflict with the jamb and that hold opens are noted to be provided with extensions as required.
- 31 A1.11 Some of the classroom fire extinguishers and brackets are tagged but not all.
- 32 A1.11 Code plans seem to show Fire Extinguisher Cabinets in Science rooms but none are tagged.
- 33 A1.12 The keytag in 126 is conflicting with the room name.
- 34 A1.12 Same comments as 21, 23, 24, 25, 26 & 27 for this and all architectural sheets.
- 35 A1.14 Stair 8 shows a grade of 100' near the egress door and then an arrow down the stairs where the grade is shown as 107'. Please clarify.
- 36 A1.14 Grades in the Auditorium would be helpful.
- 37 A1.14 Please confirm that a slope of "1:13" on the 39' long ramps between seating is correct.
- 38 A1.14 Will there be anything to close of the casework/sink on the south end of Band/Chorus when the seating is extended?
- 39 A1.21 (typ) There appear to be monitors/displays in the main corridor near the entrance to each Academy that are not yet tagged.
- 40 A1.31 Custodian 302 does not appear to have a mop sink.
- 41 A1.41 There appears to be a rouge bookshelf to the east of Instructional Coach 417B.
- 42 A1.43 We have run into problems in the past where the elevator equipment room is separated from the elevator shaft requiring the equipment room to be vented into the shaft and all duct and cabling required to be installed in a rated chase. Please clarify.
- 43 A1.51 There is a roof scuttle tagged in Zone 1B that is not shown on the reflected ceiling plan for the same area. Please confirm the roof scuttle is intended for this area.
- 44 A1.51 No roof ladders were found on the roof plans.
- 45 A1.54 There is a roof scuttle shown above the mechanical room, however, it is not shown on the reflected ceiling plan. This also needs to be coordinated with MEP drawings/clearances as well as structural steel drawings.
- 46 A2.04 3 metal panels are tagged in Corridor CL03, however, another 6 panels appear to continue into CL04. All panels should be tagged.

- 47 A2.04 There is an HVAC diffuser that seems to conflict with metal clouds in Corridor CL04.
- 48 A2.11 The text and elevation reference at wood slat ceilings is difficult to read.
- 49 A2.11 We should review/clarify the edge detail where radiant panels may be supported by ceiling edge track, particularly if the track will be for tegular edge tile.
- 50 A2.11 Exposed ceilings at corridors should be tagged.
- 51 A2.12 Corridor C100 is tagged as exposed but no such tag is provided at C102.
- 52 A2.13 The kitchen hood should be shown on the reflected ceiling plan.
- 53 A2.13 Is there a soffit and/or detail at the cooler/freezer?
- 54 A2.14 7 of 8 metal panels are tagged.
- 55 A2.21 The Zone 1B detail is labelled as "Zone 5"
- 56 A2.21 The "GWB SLOPED" tags are written over the section tags in the media center plan.
- 57 A2.21 What are the 3 round features in the media center? Light fixtures? Soffits? Same comment applies to the cafeteria.
- 58 A2.21 The exposed tag at the ACT4 panel at the lobby appears to tag the border of the panel.
- 59 A2.21 The height of the ACT-4 ceilings at the cafeteria appears to be taken off the 2nd floor elevation, rather than the 1st floor where the space is exposed. The Media Center and Tech Lab appear to be correct.
- 60 A2.24 Lights, sprinkler heads and HVAC diffusers should be shown for the Auditorium.
- A2.31 The tag for GWB to the north of the room tag for 317B appears misplaced.
- 61 A2.31 Should there be a reference to sheet A2.42 in the Media/Reading Area?
- 62 A2.41 Duct mains appear to be shown in corridor backgrounds for this floor.
- 63 A2.41 Same comment as #54 above for this floor.
- 64 A3.01 One of our siding subcontractors has suggested that the vertical reveals on the siding could be adjusted to maximize the standard length of the available materials which would also reduce the cutting necessary to match the layout as currently designed. Perhaps utilize a full length panel in the center, and cut panels at each side of each large area on the north elevations of each Zone and around the Auditorium & Gym areas?
- 65 A4.01 Is there an overall key plan that defines where the Building Sections are taken?
- 66 A4.11 Steel outriggers are shown at the overhangs at the main entry. Should this exposed steel be galvanized? Primed to be field painted? ColorGalv?
- 67 A5.01 and does not seem to extend down below where the interior slab insulation is located. Is this correct?
- 68 A6.01 Please confirm that the height of window type M is the same height as type L.
- 69 A6.21 With the extent of the curtainwall at the main entry, we should review and discuss the location and provisions for ADA door operators, key fob pads, AiPhone monitors/panels, FA control panels, security keypads, etc.
- 70 A7.01 Revise General Note 8 per recent discussions.
- 71 A7.01 Edit General Note 9 to change "Trip" flooring to "Strip" flooring.
- 72 A7.01 General Notes 10 & 11 appear to be duplicated.
- 73 A7.01 Complete spec references at Finish Legend.
- 74 A7.41 We should review and clarify the trim/closure details where the corridor lockers meet the wall tile, wall tile trim, drywall, etc.
- 75 A8.22 I believe there needs to be a vent/screen from the equipment room into the shaft and that it needs to be protected in a rated shaft/enclosure. Same applies for any cables or hoses connecting both.
- 76 A9.11 The keynote legend does not appear to match the detail elevations. For example, detail 4 tags the fire extinguisher as sealant, the ACT as a high performance coating, the steel beam as an expansion joint cover, etc.
- 77 A9.13 Please confirm that a chase is not required behind science casework for plumbing & electrical.

APPENDIX I
DESIGNER'S RESPONSE TO PREVIOUS MSBA
COMMENTS

District: City of Beverly School:

Middle School Submittal:

Design Development

Submittal Date: **December 23, 2015**

Review Date: **(December 24, 2015 - January 12, 2016)**

Reviewed by: **Gienapp Design, Karl Brown, Christy Murray, Paul Fowkes, Lee Deveau, Rich Hudson**

Design Team/OPM Response Date: **January 28, 2016**

MSBA REVIEW COMMENTS:

The following comments¹ on the Design Development submittal are issued pursuant to a review of the project submittal document dated *December 23, 2015*, for replacement of *Brisco Middle School*, and presented as a Design Development submission, as produced by Ai3 Architects and its consultants. Certain supplemental components from the Owner's Project Manager (OPM)-Heery International, Inc., are included. Documents received at MSBA on December 23, 2015.

1) Summary Comments:

- Reconciled construction cost estimate including Designer/OPM comparison chart:
 - *Three cost estimates are included: the Designer's estimate (PM&C) of \$90,390,326; the OPM's estimate of \$90,023,922 and; the Construction Manager's estimate of \$90,031,047. It is stated in the submittal that the reconciled cost estimate and comparison will be provided under separate cover. This should be provided with, or ahead of the District's response to this review.*
Response: The requested information has been provided at the end of this response.
- List of proprietary items (if any), associated District affidavit, and certified copy of vote
 - Provide an updated list identifying all proprietary items (if any) with an affidavit which shall indicate an elected body of the district (school committee, city or town council, or selectmen, - but not an ad-hoc building committee) has been presented with proposals for proprietary requirements approval action, has had an opportunity to investigate, or to require staff or consultant investigation upon each item so proposed, and has majority voted in an open public session that it is in the public interest to do so. Provide

¹The written comments provided by the MSBA are solely for purposes of determining whether the proposed plans and specifications, and any other design documents submitted for MSBA review, appear consistent with the MSBA's guidelines and requirements and are not for the purpose of determining whether the proposed plans and specifications meet any other legal requirements imposed by federal, state or local law, including, but not limited to, zoning ordinances and by-laws, environmental regulations, building codes, sanitary codes, safety codes and public procurement laws or for the purpose of determining whether the proposed plans and specifications and any other design documents submitted for MSBA review meet any applicable professional standard of care or any other standard of care. Project designers are obligated to implement detailed technical review procedures to effect coordination of design criteria, buildability, and technical adequacy of construction documents. Each city, town and regional school district shall be solely responsible for ensuring that its plans and specifications comply with all applicable provisions of federal, state, and local law, including, but not limited to, all procurement laws. The MSBA recommends that each city, town and regional school district have its legal counsel review its plans and specifications to ensure that it is in compliance with all provisions of federal, state and local law prior to bidding. The MSBA shall not be responsible for any legal fees or costs of any kind that may be incurred by a city, town or regional school district in relation to MSBA requirements or the preparation and review of the project's plans and specifications.

MSBA with a certified copy of the vote of the elected body. For each item of material or equipment, the specifications shall provide for a minimum of three named brands of material or equipment and the words "or equal" or a description of material or equipment which can be met by a minimum of three manufacturers or producers, and the words "or equal". Proprietary products shall not be specified except as provided by M.G.L. c. 30, § 39M; however, when they are specified, proprietary specifications are subject to the "or equal" provisions of c. 30, § 39M. *It is stated in the project documents that the design team and District are evaluating items to be specified proprietary and this will be included in the 60% submission. Although this is acceptable to MSBA, it was noted in the August 28, 2015 responses to the Schematic Design submission the proposed proprietary items would be provided with the Design Development submission.*

2) OPM deliverables:

- Develop project scope, schedule of budget:
 - Update project budget; *A Project Budget of \$110,711,080 is included. The budget is dated September 23, 2015. An updated project budget should be provided with the reconciled cost estimate.*
Response: Budget included with the Design Development dated September 23, 2015 is still valid.
- Coordinate design; make recommendations to the Owner. *The items indicated below are not specifically addressed in the OPM's materials. Please include this with the next submission.*
 - Technical accuracy
 - Efficiency
 - Coordination
 - Constructability
 - Cost effectiveness**Response:** The OPM is reviewing the Design Development submission that was submitted to the MSBA on 12/23/2015 and will include their comment addressing these topics in the 60% CD submission. The comments will be provided to the designer as soon as they are completed.
- Review designer submissions; make recommendations to Owner
 - Provide additional supporting information: *The OPM's documents include a review of the MEFPF drawings. However, many of the comments appear to be out of date; e.g. the comments indicate that the electrical calculations, lighting fixture catalog cuts and energy conservation narratives are not included. However, these documents are included in the submission. The OPM's review comments should be updated and included in the District's response to this review.*
Response: Original Schematic Design comments were included along with the "new" comments. The comments will be updated in the next submission.
- Coordinate the commissioning consultants' review
 - Incorporate Cx recommendations: *There are no commissioning consultant comments included in the submission and there is no reference to the commissioning consultant in the documents. Per email dated January 4, 2016, the commissioning consultant will provide design comments to the project team on January 15, 2016.*
Response: Commissioning agent comments were received and are being addressed by the designer. A copy of the comments with designer responses is included at the end of this response.

3) Designer deliverables:

- Target dates for all filings and permits
 - Security and visual access requirements;
 - Confirmation that the persons responsible for implementation of the District's emergency procedures, and responding emergency medical, fire protection, and police agency representatives have been consulted in the planning process and any associated requirements have been included in the project. *The document refers to a review of these items with the police department and others. However, in this submission there is not an acknowledgment that this is necessarily all of the parties responsible for these requirements (in the Designer's responses to the schematic design submission they stated "please consider this verification" that they have reviewed it with the appropriate parties). Please confirm.*

Response: Confirmed.

- Life Cycle cost analysis for energy and water consuming devices: *The cost analysis for water consuming devices does not appear to be included. This should be provided in the next submission.*

Response: Language will be revised in the next submission.

- Updated space summary and signed certification that reflects the current design. *Provided, with the following MSBA review analysis of area:*

Spaces	PFA Space Summary	DO Space Summary	60% Space Summary	90% Space Summary	Difference to PFA	Comments
Core Academic Spaces	68,390	68,950			560	The overall net square footage in this category increased by 560 nsf during DD.
Special Education	15,850	15,850			-	No changes have been made since the approved PFA space summary.
Art and Music	6,550	6,550			-	No changes have been made since the approved PFA space summary.
Vocations and Technology	9,600	9,600			-	No changes have been made since the approved PFA space summary.
Health and Physical Education	15,400	14,840			(560)	The overall net square footage in this category decreased by 560 nsf during DD.
Media Center	8,401	8,401			-	No changes have been made since the approved PFA space summary.
Dining and Food Service	15,872	15,872			-	No changes have been made since the approved PFA space summary.
Medical	910	910			-	No changes have been made since the approved PFA space summary.
Administration and Guidance	4,796	4,796			-	No changes have been made since the approved PFA space summary.
Custodial and Maintenance	2,870	2,870			-	No changes have been made since the approved PFA space summary.
Other	5,700	5,700			-	No changes have been made since the approved PFA space summary.
Total Building Net	154,339	154,339			-	No changes have been made since the approved PFA space summary.
Total Gross	231,509	231,509			-	No changes have been made since the approved PFA space summary.
Grossing Factor	1.50	1.50			-	No changes have been made since the approved PFA space summary.

- Written summary comparing the project design with the final design program
 - Explanation of deviations within the space summary from the Project Funding Agreement. *Included. MSBA accepts this variation to the approved project with no further action required.*
 - *DESE verbally approved revisions to SPED spaces on December 15, 2015. Formal written approval of these changes is still outstanding.*

4) Drawing Requirements

- Site and utility drawings
 - Existing and proposed contours and locations of the proposed building or addition(s). Show entry level elevation and key exterior grades at perimeter. Indicate all retaining walls. Include benchmarks of site if survey is available. *A benchmark is not shown on the survey. This should be included in the next submission.*
Response: This information will be included in the next submission.
 - Building locations fixed and referenced from main survey baseline, if available. *There does not appear to be a working point fixing the building location to a main survey baseline. This should be included in the next submission.*
Response: This information will be included in the next submission.
- Building drawings and other graphic and written requirements with floor plans showing: (minimum 1/8" = 1'0")
 - Floor elevations; *Floor elevations tied to the survey are not shown on the plans and should be provided in the next submission.*
Response: Reference of floor elevations referenced to survey will be included in the next submission.
- Large scale plans showing key areas e.g. lobby, special spaces. Indicate surface materials. (minimum scale 1/4" = 1'0"); *Floor finish materials are not indicated on the enlarged plans and should be provided in the next submission.*
Response: Floor finish materials will be indicated on the enlarged plans and/or Room Finish Schedule as best appropriate in the next submission.
- Building sections: One transverse and one longitudinal section. Indicate floor to ceiling heights and floor-to-floor heights. Label all spaces: *While ceiling heights are indicated on the reflected ceiling plan, they are not shown on the building sections as required. This should be included in the next submission.*
Response: Reference to the reflected ceiling plans will be made on the building sections. Ceilings will be coordinated but not called out in order to avoid duplication and potential conflict in the drawing set.
- Building elevations showing;
 - Floor elevations, floor-to-floor height, and overall height related to benchmarks on site plans; *Floor elevations are not tied to a benchmark. Please provide in the next submission.*
Response: Reference of floor elevations referenced to survey will be included in the next submission.
 - Materials indicating major control and expansion joints, and divisions of materials where required; *Expansion joints are not indicated on the elevations and should be included in the next submission.*

Response: This information will be included in the next submission.

- Exterior grades and topographical features in context. *Exterior grades and topographical features are not included on the elevations and should be added for the next submission.*

Response: Exterior grades and topographical features will be coordinated in the next submission.

- Reflected ceiling plans: Show prototypical structural, fire protection, mechanical and electrical information for classrooms and major spaces, including lighting layouts with ceiling height and material changes; *Fire protection sprinkler head locations are not shown on the ceiling plans and should be included in the next submission.*

Response: Sprinkler heads locations will be included in the next submission.

- Schedules;

- Equipment schedules, e.g., food service, instructional media. *The food service equipment schedule and any equipment for instructional media are not included and should be provided in the next submission.*

Response: Equipment schedules will be further developed in the next submission.

- Structural Concepts;

- Locations and dates of test boring holes and results of soil investigation, including water levels, allowable solid bearing pressure and bottom grades of footing and slabs. *Boring and test pit locations are not shown on the structural drawings but are included in the geotechnical report provided in the previous submission. Consider adding a reference on the structural drawings where to find this information.*

Response: Boring and test pit locations are shown on the civil existing condition site plan drawings. Reference to this will be reviewed as the drawings develop.

- Preliminary details including floor and roof deck, statements as to methods of lateral bracing and how requirements of earthquake code will be met. *The means to provide lateral bracing and seismic protection does not appear to be included on the structural drawings. Please include in the next submission.*

Response: Lateral bracing and seismic protection will be included in the next submission.

- Heating, Ventilating and Air Conditioning Systems;

- Heat gain and loss calculations. *The heat gain and loss calculations are not included on the drawings but are included in the project binder. Consider adding a reference on the drawings where to find this information.*

Response: Heat gain and loss calculations are submitted with the binder for MSBA review. Heat gain and loss calculations are not issued with bid documents. Drawing reference would not be necessary.

- Electrical Systems;

- Lighting shall be indicated as to type, location and intensities in foot-candles for each special and typical space. Provide fixture cuts of typical lighting fixtures, e.g., classrooms. Provide fixture cuts for special lighting applications. *The design criteria for foot-candles and lighting fixtures are not included and should be provided in the next submission.*

Response: This information was included separate from the drawings in the Design Development report starting on page 71. Please confirm if additional information is required.

- Fire alarm system drawings showing all initiation and signaling devices, control panels, annunciator panels, etc. *Fire alarm drawings are not included and should be provided in the next submission.*

Response: Fire alarm equipment is shown on the Power Plans.

5) Project Manual Requirements:

- Outline Specifications in CSI Master spec Divisions Including: *The specifications included with this submission are formatted as a complete three-part specification, rather than an outline specification. While this format provides more specific information than an outline specification it is not as clear in presenting overall systems as is an outline specification. However, it appears the appropriate information is communicated between the drawings and specifications.*

- Elevators, dumbwaiters and platform lifts; capacities, speed, travel in feet, landings, operation, controls, platform sizes, machine type and location, car and entrance finishes, signals. *This section includes language that requests one year of ongoing maintenance to be included as part of the bid. MSBA funding does not apply to ongoing maintenance contracts. Revise section language prior to the next submission.*

Response: Language will be revised in the next submission.

6) Additional Findings / Comments:

- Project manual refers to the requirements of the Town of Abington in some locations. Please review and make edits as necessary.

Response: Reference to the Town of Abington will be revised to read “City of Beverly” in the next submission.

This estimate summary represents the results of the three independent estimates AFTER the reconciliation process. The data below represents the RECONCILED Estimates for the New Beverly Middle School Project. Overall the project is considered on-budget. The project team will continue with their vigilant efforts to look for and find efficiencies, alternate methods, substitutions, etc. to keep this project on budget.

UNIFORMAT SUMMARY - LEVEL 2

	Approved Budget	Per SF	%
A SUBSTRUCTURE			
A10 FOUNDATIONS	\$8,661,726	\$37.13	8.67%
A20 SUBGRADE ENCLOSURES	\$0	\$0.00	0.00%
A40 SLABS-ON-GRADE	\$0	\$0.00	0.00%
A60 WATER AND GAS MITIGATION	\$0	\$0.00	0.00%
A90 SUBSTRUCTURE RELATED ACTIVITIES	\$0	\$0.00	0.00%
B SHELL			
B10 SUPERSTRUCTURE	\$8,055,454	\$34.53	8.06%
B20 EXTERIOR VERTICAL ENCLOSURES	\$8,798,120	\$37.72	8.80%
B30 EXTERIOR HORIZONTAL ENCLOSURES	\$1,727,670	\$7.41	1.73%
C INTERIORS			
C10 INTERIOR CONSTRUCTION	\$7,459,477	\$31.98	7.46%
C20 INTERIOR FINISHES	\$3,442,232	\$14.76	3.44%
D SERVICES			
D10 CONVEYING	\$430,000	\$1.84	0.43%
D20 PLUMBING	\$3,008,324	\$12.90	3.01%
D30 HVAC	\$8,137,370	\$34.88	8.14%
D40 FIRE PROTECTION	\$951,038	\$4.08	0.95%
D50 ELECTRICAL	\$8,652,653	\$37.09	8.66%
D60 COMMUNICATIONS	\$0	\$0.00	0.00%
D70 ELECTRONIC SAFETY AND SECURITY	\$0	\$0.00	0.00%
D80 INTEGRATED AUTOMATION	\$0	\$0.00	0.00%
E EQUIPMENT & FURNISHINGS			
E10 EQUIPMENT	\$1,335,974	\$5.73	1.34%
E20 FURNISHINGS	\$2,290,884	\$9.82	2.29%
F SPECIAL CONSTRUCTION & DEMOLITION			
F10 SPECIAL CONSTRUCTION	\$35,000	\$0.15	0.04%
F20 FACILITY REMEDIATION	\$1,735,000	\$7.44	1.74%
F30 DEMOLITION	\$632,500	\$2.71	0.63%
G BUILDING SITEWORK			
G10 SITE PREPARATION	\$1,726,765	\$7.40	1.73%
G20 SITE IMPROVEMENTS	\$2,344,492	\$10.05	2.35%
G30 LIQUID AND GAS SITE UTILITIES	\$1,104,424	\$4.73	1.11%
G40 ELECTRICAL SITE IMPROVEMENTS	\$656,040	\$2.81	0.66%
G50 SITE COMMUNICATIONS	\$202,677	\$0.87	0.20%
G90 MISCELLANEOUS SITE CONSTRUCTION	\$0	\$0.00	0.00%
Z General Requirements			
TOTAL DIRECT COST	\$71,387,820	\$306.04	71.43%
Z GENERAL			
Z10 GENERAL CONDITIONS/REQUIREMENTS 7.75%	\$4,341,939	\$18.61	4.34%
Z70 TAXES, PERMITS, INSURANCE & BONDS			
Z7030 Insurance 1.00%	\$868,582	\$3.72	0.87%
Z7050 Builders Risk Allowance	\$0	\$0.00	0.00%
Z7070 Bond Fees 1.00%	\$394,405	\$1.69	0.39%
Z90 FEES AND CONTINGENCIES			
Z9010 Overhead 2.50%	\$0	\$0.00	0.00%
Z9030 Profit 2.00%	\$1,623,316	\$6.96	1.62%
TOTAL DIRECT COST W/OUT CONTINGENCIES	\$78,616,062	\$337.03	78.66%
Z9050.10 Design Contingencies 12.00%	\$6,747,967	\$28.93	6.75%
Z9050.30 Bidding Contingencies 2.00%	\$1,711,712	\$7.34	1.71%
Z9050.50 Escalation Contingencies 5.75%	\$3,053,693	\$13.09	3.06%
TOTAL CONSTRUCTION COST	\$90,129,434	\$386.38	90.18%

	B-A	Delta budget	PM&C	Delta budget	Heery	Delta budget
\$ 2,812,073	\$5,849,653	\$ 9,099,413	(\$437,687)	\$ 6,517,323	\$2,144,403	
\$ 4,295,614	(\$4,295,614)	\$ 555,640	(\$555,640)	\$ 393,069	(\$393,069)	
\$ 2,034,354	(\$2,034,354)	\$0	\$0	\$ 2,072,586	(\$2,072,586)	
	\$0	\$0	\$0	\$ 27,125	(\$27,125)	
	\$0	\$0	\$0	\$ 162,000	(\$162,000)	
	\$0	\$0	\$0	\$0	\$0	
\$ 8,560,373	(\$504,919)	\$ 8,760,551	(\$705,097)	\$ 8,815,490	(\$760,036)	
\$ 9,507,378	(\$709,258)	\$ 9,749,670	(\$951,550)	\$ 9,106,436	(\$308,316)	
\$ 2,491,922	(\$764,252)	\$ 2,328,985	(\$601,315)	\$ 1,961,992	(\$234,322)	
	\$0	\$0	\$0	\$0	\$0	
\$ 8,587,485	(\$1,128,008)	\$ 8,442,739	(\$983,262)	\$ 8,383,024	(\$923,547)	
\$ 7,104,273	(\$3,662,041)	\$ 7,031,323	(\$3,589,091)	\$ 4,646,232	(\$1,204,000)	
	\$0	\$0	\$0	\$0	\$0	
\$ 573,500	(\$143,500)	\$ 558,325	(\$128,325)	\$ 525,000	(\$95,000)	
\$ 2,485,677	\$522,647	\$ 2,687,450	\$320,874	\$ 2,581,249	\$427,075	
\$ 7,445,477	\$691,893	\$ 7,308,409	\$828,961	\$ 7,559,184	\$578,186	
\$ 939,778	\$11,260	\$ 921,165	\$29,873	\$ 951,036	\$2	
\$ 8,863,819	(\$211,166)	\$ 9,198,707	(\$546,054)	\$ 5,454,194	\$3,198,459	
	\$0	\$0	\$0	\$ 1,982,861	(\$1,982,861)	
	\$0	\$0	\$0	\$ 969,089	(\$969,089)	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
\$ 822,000	\$513,974	\$ 1,071,439	\$264,535	\$ 1,489,474	(\$153,500)	
\$ 1,690,375	\$600,509	\$ 1,812,017	\$478,867	\$ 2,686,384	(\$395,500)	
	\$0	\$0	\$0	\$0	\$0	
\$ 315,350	(\$280,350)	\$ 145,350	(\$145,350)	\$ 210,000	(\$175,000)	
\$ 1,674,381	\$60,619	\$ 1,674,381	\$60,619	\$ 1,000,000	\$735,000	
\$ -	\$632,500	\$ -	\$632,500	\$ 641,550	(\$9,050)	
	\$0	\$0	\$0	\$0	\$0	
\$ 769,450	\$957,315	\$ 736,349	\$990,416	\$ 793,229	\$933,536	
\$ 3,736,511	(\$1,392,019)	\$ 3,755,671	(\$1,411,179)	\$ 3,239,857	(\$895,365)	
\$ 1,915,656	(\$811,232)	\$ 2,024,635	(\$920,211)	\$ 2,494,127	(\$1,389,703)	
\$ -	\$656,040	\$ -	\$656,040	\$ 421,694	\$234,346	
\$ -	\$202,677	\$ -	\$202,677	\$ 202,677	\$0	
	\$0	\$0	\$0	\$0	\$0	
\$ 1,658,730	\$ -	\$ -	\$ -	\$ -	\$0	
\$ 78,284,176	(\$6,896,356)	\$ 77,862,219	(\$6,474,399)	\$ 75,286,882	(\$3,899,062)	
	\$0	\$0	\$0	\$0	\$0	
\$ 3,379,132	\$962,807	\$ 5,006,453	(\$664,514)	\$ 5,044,221	(\$702,282)	
\$ -	\$0	\$0	\$0	\$0	\$0	
\$ 405,209	\$463,373	\$ 364,520	\$504,062	\$ 361,490	\$507,092	
\$ 280,390	(\$280,390)	\$ 252,235	(\$252,235)	\$ 233,389	(\$233,389)	
\$ 351,152	\$43,253	\$ 349,874	\$44,531	\$ 359,883	\$34,522	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
\$ 1,441,106	\$182,210	\$ 1,423,905	\$199,411	\$ 1,422,503	\$200,813	
\$ 84,141,165	(\$5,525,103)	\$ 85,259,206	(\$6,643,144)	\$ 82,708,368	(\$4,092,300)	
\$ 2,524,235	\$4,223,732	\$ 2,335,867	\$4,412,100	\$ 3,928,647	\$2,819,320	
\$ 1,682,823	\$28,889	\$ 1,627,320	\$84,392	\$ 1,732,740	(\$21,028)	
\$ 1,682,823	\$1,370,870	\$ 1,167,933	\$1,885,760	\$ 1,654,167	\$1,399,526	
\$ 90,031,046	\$98,388	\$ 90,390,326	(\$260,892)	\$ 90,023,922	\$105,512	



Beverly Middle School 100% DD (12-2-15) Commissioning Design Review							
Drawing Title	Status	Reviewed By	Review Date	Issue or Comment	Resolved By	Date	Comments
Electrical							
E2.04	Open	BWS	1/5/2016	Show power to split system fan coil in L08 IDF room	RCB	1.25.16	Indoor fan coil units are powered from outdoor units on roof as per General Note on Electrical Roof Plan.
E2.14	Open	BWS	1/5/2016	Show power to split system fan coil in custodian 146A	RCB	1.25.16	Indoor fan coil units are powered from outdoor units on roof as per General Note on Electrical Roof Plan.
E2.54	Open	BWS	1/5/2016	Remove duct smokes included on air cooled chillers	RCB	1.25.16	Duct smoke detectors will be provided where required by Code and will be eliminated from air cooled chillers
Plumbing							
General	Open	BWS	1/5/2016	Do transitions need to be shown when changing pipe size?	AMR	1.26.16	No
General	Open	BWS	1/5/2016	Provide riser diagrams	AMR	1.26.16	Will be provided
General	Open	BWS	1/5/2016	Show emergency showers more clearly	AMR	1.26.16	Detail will be changed
General	Open	BWS	1/5/2016	Storm water reclaim pumps in schedule, not on drawings	AMR	1.26.16	Storm water tank & pump removed
General	Open	BWS	1/5/2016	Ensure tepid water is being fed to emergency stations	AMR	1.26.16	Refer to detail
General	Open	BWS	1/5/2016	Label all pumps	AMR	1.26.16	Will be provided
General	Open	BWS	1/5/2016	Develop a key of plumbing symbols	AMR	1.26.16	Refer to legend sheet P0.1
P0.12	Open	BWS	1/5/2016	Equipment in top right corner have number tags with no key or indication	AMR	1.26.16	Will be added
P1.04	Open	BWS	1/5/2016	Incomplete piping in mechanical room L13	AMR	1.26.16	Piping continues to enlarged plan sheet P2.1
P1.14	Open	BWS	1/5/2016	Provide labeling and pipe sizes to piping shown at the top of the drawing	AMR	1.26.16	Pipes labeled
P1.14	Open	BWS	1/5/2016	Incomplete piping to toilet room T1-9	AMR	1.26.16	Will complete piping when room is completed in architectural plan
P1.41	Open	BWS	1/5/2016	Where is water serving ES+ESR coming from?	AMR	1.26.16	Prep room on first floor
P2.1	Open	BWS	1/5/2016	References "continuation on P1.11" provide correct drawing number	AMR	1.26.16	Changed to P1.14
P2.1	Open	BWS	1/5/2016	Provide pipe sizes	AMR	1.26.16	Will be added
P2.1	Open	BWS	1/5/2016	140 degree water coming from shaft from hot water system?	AMR	1.26.16	This is hot water return piping



Beverly Middle School 100% DD (12-2-15) Commissioning Design Review							
Drawing Title	Status	Reviewed By	Review Date	Issue or Comment	Resolved By	Date	Comments
Fire Protection							
General	Open	BWS	1/5/2016	Provide key w/abbreviations, symbols, etc.	AMR	1.26.16	Refer to legend sheet FP0.1
Controls							
General	Open	BWS	1/5/2016	Controls drawings do not match schedules	DAH	1.26.16	Document to be updated on future submissions
General	Open	BWS	1/5/2016	Kitchen exhaust fans not included in drawings	DAH	1.26.16	Will be provide on future submissions.
General	Open	BWS	1/5/2016	UH's (non-cabinet) arent included in drawings	DAH	1.26.16	Will be provide on future submissions.
General	Open	BWS	1/5/2016	Fume hoods not shown in drawings	DAH	1.26.16	Detail removed project will not have fume hoods
General	Open	BWS	1/5/2016	Mech/electrical room ventilation not shown on drawings	DAH	1.26.16	Will be provide on future submissions.
HVAC							
General	Open	BWS	1/5/2016	Show FSD's where rated shafts/walls are penetrated	DAH	1/26/2016	FSD will be shown and/or called out in future submissions
General	Open	BWS	1/5/2016	Heat in stairwells?	DAH	1/26/2016	Heating terminal devices such as unit heater will be placed in all stairwells. Unit will be shown on future submissions.
General	Open	BWS	1/5/2016	Show piping to terminal boxes, cabinet unit heaters, radiant panels, convection units, etc.	DAH	1/26/2016	Piping to devices is ongoing and will be shown on future submissions.
General	Open	BWS	1/5/2016	Provide lengths of radiant panels and FTR	DAH	1/26/2016	Will be provide on future submissions.
General	Open	BWS	1/5/2016	Exhaust fans missing from roof plans	DAH	1/26/2016	Will be provide on future submissions.
General	Open	BWS	1/5/2016	Exhaust fans referenced on drawings, missing from schedules	DAH	1/26/2016	Will be provide on future submissions.
M1.04	Open	BWS	1/5/2016	No ventilation in mechanical room L13	DAH	1/26/2016	Will be provide on future submissions.
M1.11	Open	BWS	1/5/2016	Missing diffusers	DAH	1/26/2016	Will be provide on future submissions.
M1.12	Open	BWS	1/5/2016	Provide return fan number in tag	DAH	1/26/2016	Will be provide on future submissions.
M1.12	Open	BWS	1/5/2016	Missing diffusers	DAH	1/26/2016	Will be provide on future submissions.
M1.12	Open	BWS	1/5/2016	Duct in classroom 122 has no connections to main	DAH	1/26/2016	Drawing has been updated
M1.14	Open	BWS	1/5/2016	Is exhaust duct in storage 152E connected to EF on roof?	DAH	1/26/2016	26x16 duct shall continue up to EF. EF will be offset to maintain min clearances from intakes.
M1.14	Open	BWS	1/5/2016	Show diffusers in gym	DAH	1/26/2016	Will be provide on future submissions.
M1.14	Open	BWS	1/5/2016	Show duct from RTU-4	DAH	1/26/2016	Will be provide on future submissions.
M1.14	Open	BWS	1/5/2016	No exhaust/return from bathroom T1-9	DAH	1/26/2016	Will be provide on future submissions.
M1.21	Open	BWS	1/5/2016	Show diffusers where missing	DAH	1/26/2016	Will be provide on future submissions.
M1.23	Open	BWS	1/5/2016	Provide duct direction (up/down) and flow values consistent with the rest of the drawings fir the return shaft near classroom 244	DAH	1/26/2016	All rises and drops will be labeled accordingly. Will be provided on future submissions.
M1.23	Open	BWS	1/5/2016	Show diffusers where missing	DAH	1/26/2016	Will be provide on future submissions.
M1.24	Open	BWS	1/5/2016	Show supply/return, show CFM values, show diffusers	DAH	1/26/2016	Will be provide on future submissions.
1.32	Open	BWS	1/5/2016	Provide exhaust fan number	DAH	1/26/2016	Will be provide on future submissions.



Beverly Middle School 100% DD (12-2-15) Commissioning Design Review							
Drawing Title	Status	Reviewed By	Review Date	Issue or Comment	Resolved By	Date	Comments
1.32	Open	BWS	1/5/2016	Provide return fan labeling in tag	DAH	1/26/2016	Will be provide on future submissions.
M1.32	Open	BWS	1/5/2016	Kiln exhaust fan on roof? Clarify	DAH	1/26/2016	Yes fan will be on roof. Will be shown on future submission
M1.33	Open	BWS	1/5/2016	Provide CFM values for return shaft near classroom 344	DAH	1/26/2016	Will be provide on future submissions.
M1.41	Open	BWS	1/5/2016	Missing diffusers	DAH	1/26/2016	Will be provide on future submissions.
M1.43	Open	BWS	1/5/2016	Label return/exh riser with direction and flow values	DAH	1/26/2016	All rises and drops will be labeled accordingly. Will be provided on future
M1.52	Open	BWS	1/5/2016	RTU's have two different labels	DAH	1/26/2016	Drawing has been updated
M2.11	Open	BWS	1/5/2016	Show direction and size of HW risers	DAH	1/26/2016	All rises and drops will be labeled accordingly. Will be provided on future
M2.14	Open	BWS	1/5/2016	Show RTU's being on roof, label RTU's	DAH	1/26/2016	Will be provide on future submissions.
M2.31	Open	BWS	1/5/2016	Provide pipe sizes	DAH	1/26/2016	Piping sizing is ongoing and will be shown on future submissions.
M3.1	Open	BWS	1/5/2016	Provide more piping detail, show piping to expansion tanks	DAH	1/26/2016	Will be provide on future submissions.
M7.1	Open	BWS	1/5/2016	Control drawings do not show energy recovery wheel	DAH	1/26/2016	Will be added to control drawings
M7.1	Open	BWS	1/5/2016	Provide setpoints	DAH	1/26/2016	Will review
Technology Division 27 & 28 Specifications							
Section 27 10 00 Structured Cabling	Open	JDC	1/15/2016	Confirm Specifications are referring to most current ANSI/EIA/TIA/ BICSI standards	JCJ	1.25.16	Specifications will be reviewed and updated as required.
Section 27 21 33 Data Communication Wireless Access Points	Open	JDC	1/15/2016	Confirm Specifications are referring to most current ANSI/EIA/TIA/ BICSI standards	JCJ	1.25.16	Specifications will be reviewed and updated as required.
Section 27 40 00 Audio-Video Communications	Open	JDC	1/15/2016	Confirm Specifications are referring to most current ANSI/EIA/TIA/ BICSI standards	JCJ	1.25.16	Specifications will be reviewed and updated as required.
Section 27 50 00 Distributed Communications and Monitoring	Open	JDC	1/15/2016	Confirm Specifications are referring to most current ANSI/EIA/TIA/ BICSI standards	JCJ	1.25.16	Specifications will be reviewed and updated as required.
Section 27 50 00 Distributed Communications and Monitoring	Open	JDC	1/15/2016	Confirm Category cable for the clock system Category 5 or Category 6A. Currently the specification is calling for Category 5	JCJ	1.25.16	Specification will be reviewed and updated as required.
Section 27 70 00 Video Distribution System	Open	JDC	1/15/2016	Confirm Specifications are referring to most current ANSI/EIA/TIA/ BICSI standards	JCJ	1.25.16	Specifications will be reviewed and updated as required.
Section 28 00 00 Electronic Safety and Security	Open	JDC	1/15/2016	Confirm Specifications are referring to most current ANSI/EIA/TIA/ BICSI standards	JCJ	1.25.16	Specifications will be reviewed and updated as required.



Beverly Middle School 100% DD (12-2-15) Commissioning Design Review							
Drawing Title	Status	Reviewed By	Review Date	Issue or Comment	Resolved By	Date	Comments
Technology Division 26, 27, and 28 Drawings							
GENERAL "T" SERIES DRAWINGS REQUIREMENTS	Open	JDC	1/15/2016	1. Confirm horizontal structured cabling distance will not exceed 90M(295') for local Telecomm rooms 2. Define horizontal structured cabling zones on the drawings for Telecomm room demarcation 3. Define vertical pathways between floors for horizontal structured cabling 4. Develop underground conduit site plan for pole mounted Security cameras and incoming Building Services 5. Review Keyplan layouts on drawings	JCJ	1.25.16	Drawings will be reviewed and updated as required.
T2.4	Open	JDC	1/15/2016	Review Grounding Riser diagrams versus the EIA/TIA 607-B for Backbone Copper Riser sizes	JCJ	1.25.16	Drawings will be reviewed and updated as required.
ES.01,ES.02 & ES.03	Open	JDC	1/15/2016	1. Coordinate Incoming Technology Services Conduits with Division 27 4 conduit versus 6 conduits 2. Low Voltage Pole Riser Detail shown on ES.03 Detail 3 not on ES.02 as ES.01 references. Coordinate Drawings	RCB	1.25.16	1. Technology service conduits have been provided as requested by the Owner; (2) 4" conduits plus a 4" spare for the telephone and for the CATV services for a total of (6) 4" conduits. 2. Reference to Low Voltage Riser Pole Installation Detail on the Site Plan Electrical will be corrected to ES0.3.
E3.01 & E3.02	Open	JDC	1/15/2016	1. Coordinate Electrical Outlets at Network racks with "T" Series MDF and IDF Room requirements 2. Coordinate "SJ" Security Junction boxes with "T" Series MDF and IDF Room Layouts	RCB	1.25.16	1. Receptacles will be provided as required by the Technology Drawings. 2. Security junction boxes will be provided as required by the Technology Drawings.
E4.02	Open	JDC	1/15/2016	1. Confirm Telecomm Outlet at Main Fire Alarm Control Panel Location with Division 27 "T" Series	RCB	1.25.16	Two dedicated telephone lines are required to the fire alarm control panel which is located in Main Lobby Vestibule C100A. This will be coordinated with Technology.
E6.01	Open	JDC	1/15/2016	1. Coordinate conduit and back-box requirements with drawings T2.0 and T2.1	RCB	1.25.16	Conduit and back box requirements will be coordinated with the Technology Drawings.
E6.02	Open	JDC	1/15/2016	1. Confirm if Telecomm Outlets are needed at Lighting Control Panel Locations	RCB	1.25.16	Telecom outlets are not required at lighting control panel locations.
Building Envelope							
A1.50-A1.54 Roof Plans	Open	AMB	1/14/2016	<u>Roof Plans:</u> Overflow drainage provisions are not clear on the roof plans. We recommend that you (1) provide overflow drains or (2) confirm that structural capacity of the roof is adequate to support the depth of water that could build up on the roof before flowing over the edge.	CLO	1.25.16	Roof structural capacity will be reviewed with structural engineer.



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A1.50-A1.54 Roof Plans	Open	AMB	1/14/2016	<u>Roof Plans:</u> We recommend indicating how slope-to-drain is provided on the roof, such as by sloping the metal deck or installing tapered insulation. We also recommend that you include crickets to drain away from all large roof penetrations (Typical).	CLO	1.25.16	Roof plan will indicate slopes and location of all tapered insulation as they develop.
A3.01-A3.07 Building Elevations	Open	AMB	1/14/2016	<u>Building Elevations:</u> The building elevations show several canopy roofs, façade step backs, and inverted roof sections. We recommend reviewing these areas for snow and ice accumulation and providing means to prevent falling snow and ice.	CLO	1.25.16	Building elevations will be reviewed.
A5.01 Vertical Base Details	Open	AMB	1/14/2016	<u>Vertical Base Detail:</u> There is a thermal bridge from the exterior to the interior through the concrete slab. Additional insulation should be provided to comply with the requirements of the IECC.	CLO	1.25.16	Detail will be evaluated and updated for the next submission.
A5.01 Vertical Base Details	Open	AMB	1/14/2016	<u>Slabs On Grade:</u> The slab-on-grade is detailed with an under slab vapor retarder membrane. This is typically sufficient to protect moisture-sensitive floor finishes from moisture vapor, but will not act as a waterproofing membrane. We recommend that you confirm with the geotechnical engineer that the groundwater table is below the base of the slab and that waterproofing is not needed.	CLO	1.25.16	This has been reviewed with the geotechnical engineer. A portion of the building in the southwest corner will require waterproofing. This will be updated in the next submission.
A5.01 Vertical Base Details	Open	AMB	1/14/2016	<u>Keynote Legend:</u> Legend entry for call-out 07 21 00.01 (“FOAM INSULATION- SPRAY-IN-PLACE – 1-1/2 INCH DEPTH BETWEEN STUDS”) does not match Master Keynote List on A0.01 (RIGID INSULATION – 2 INCH – FOUNDATION ONLY”). Clarify which insulation type is required.	CLO	1.25.16	Keynotes will be updated to match.
A5.01 Vertical Base Details	Open	AMB	1/14/2016	<u>Flashing:</u> Detail 1 indicates aluminum flashing in direct contact with the concrete slab and stone veneer. We recommend that all flashing be either zinc-tin coated copper or stainless steel. When in contact with alkaline materials, such as concrete and mortar, aluminum will corrode. The use of zinc-tin coated copper or stainless steel also allows for the flashing to be continuously soldered, which is more reliable and durable than sealed flashing joints. (Typical).	CLO	1.25.16	Flashing will be specified to match manufacturer's recommendations.
A5.01 Vertical Base Details	Open	AMB	1/14/2016	<u>Vertical Base Detail:</u> There is no support shown for the stone veneer or the base flashing. Proper support should be provided.	CLO	1.25.16	Support will be reviewed.

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A5.11 Vertical Wall Details	Open	AMB	1/14/2016	<u>Exterior Wall Assemblies:</u> The typical wall assemblies include (from exterior to interior) exterior cladding; air, water, and vapor barrier membrane, exterior sheathing, 2 in. thick insulating nail base, and 1-1/2 in. thick spray foam insulation. This wall assemblies places the dedicated vapor retarding material on the exterior side of the insulation, which is likely to result in condensation in the exterior sheathing during cold winter months. We recommend performing a hygrothermal model of this assembly to evaluate the potential for condensation and/or for creating a vapor trap between the exterior membrane and interior spray foam insulation.	CLO	1.25.16	A dewpoint analysis has been performed of this assembly and reviewed with an exterior envelope consultant.
A5.11 Vertical Wall Details	Open	AMB	1/14/2016	<u>Exterior Wall Assemblies:</u> They typical exterior wall assemblies do not include a dedicated drainage plane between the cladding and waterproofing membrane. We recommend including a drainage plane within the wall assembly to promote drainage.	CLO	1.25.16	The drainage plane is included in the cladding assembly.
A5.11 Vertical Wall Details	Open	AMB	1/14/2016	<u>Typical:</u> We recommend that you indicate weeps with regular spacing at all locations with backer rod and sealant. This will allow water to drain from the wall assembly.	CLO	1.25.16	Drainage will be reviewed with specified products.
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<u>Keynote Legend:</u> Legend entry for call-out 07 81 00.01 (“SEALANT – CONTINUOUS”) does not match Master Keynote List on A0.01 (CEMENTITIOUS FIREPROOFING”). Verify that all call-outs are consistent throughout the drawings (Typical).	CLO	1.25.16	Keynotes will be updated to match.
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<u>Typical:</u> We recommend adding a layer of sheathing on top of the steel deck to support the roof vapor retarder and allow for this material to also serve as the roof air barrier, making roof-wall transitions easier.	CLO	1.25.16	Recommendation will be reviewed and updated as required, while staying within project budget.
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<u>PVC Flashing Membrane:</u> The termination of the PVC roof membrane is inconsistent; some details indicate the use of termination seal and others do not. Given this is a PVC roof; we recommend that all laps be hot-air welded (Typical).	CLO	1.25.16	Details will be reviewed and updated to match specified manufacturers recommendations.
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<u>Vapor Retarder:</u> The extension of the roof vapor retarder at penetrations in the roofing is inconsistent; we recommend extending the vapor retarder up to the top of the roofing assembly. This applies to details such as 1, 6, 7 8. The installation of the vapor retarder onto the surface of the rigid insulation as shown in Detail 5 is not achievable (Typical).	CLO	1.25.16	Details will be reviewed and updated as required.
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<u>Typical Hot Pipe Roof Penetration Detail:</u> We recommend providing insulation between the sheet metal collar and the hot pipe penetration.	CLO	1.25.16	Detail will be reviewed and updated as required.



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A5.21 Typical Roof Details	Open	AMB	1/14/2016	<u>Typical Hot Pipe Roof Penetration Detail:</u> We recommend indicating a minimum 8" flashing height from the top of the roofing assembly to the top of the PVC flashing on the sheet metal collar.	CLO	1.25.16	Detail will be reviewed and updated as required.
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<u>Roof Equipment Curb Detail:</u> We recommend indicating a minimum 8" flashing height from the top of the roofing assembly to the metal coping.	CLO	1.25.16	Detail will be reviewed and updated as required.
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<u>Seismic Rooftop Spring Curb Detail:</u> We recommend indicating a minimum 8" flashing height from the top of the roofing assembly to the location of the fastener at the top of the flashing membrane.	CLO	1.25.16	Detail will be reviewed and updated as required.
A5.21 Typical Roof Details	Open	AMB	1/14/2016	<u>Exterior Ladder Details:</u> We recommend that you provide a flashing detail at ladder penetration locations.	CLO	1.25.16	Detail will be reviewed and updated as required.
A5.22 Vertical Roof Details	Open	AMB	1/14/2016	<u>Typical AVB Tie-in at Roof:</u> As stated above, we recommend adding a layer of sheathing on top of the steel deck to support the roof vapor retarder and allow this material to also function as the air barrier. This air/vapor barrier should extend down to the wall air/vapor barrier below the blocking.	CLO	1.25.16	Detail will be reviewed and updated as required.
A5.22 Vertical Roof Details	Open	AMB	1/14/2016	<u>Vertical Roof Detail:</u> There is a thermal bridge from the exterior to the interior through the steel bent plate and steel deck. We recommend providing a thermal break.	CLO	1.25.16	Detail will be reviewed and updated as required.
A6.01 Exterior Window Details	Open	AMB	1/14/2016	<u>Typ. Detail at Window Perimeter:</u> Membrane flashing at window perimeters should extend from the upturned leg on the attachment angle toward the exterior (below the window frame) rather than to the interior to keep the adhesive side of the membrane out of the wet zone for a more reliable and durable installation.	CLO	1.25.16	Detail will be reviewed and updated as required.
A6.01 Exterior Window Details	Open	AMB	1/14/2016	<u>Flashing Detail:</u> It is not clear how the Flashing Detail 4 is integrated into Details 5, 6, and 7. We recommend clarifying this detail.	CLO	1.25.16	Detail will be reviewed and updated as required.
Spec. 014500	Open	AMB	1/14/2016	<u>Mock-Ups:</u> Specification section 014500-1.2A refers to a section 014338 - Mock-Ups, but this section is not included in the provided specifications or in the Table of Contents. We recommend including requirements for each building enclosure system or typical detail.	CLO	1.25.16	Spec section will be added and developed as the project progresses.



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Spec. 014529	Open	AMB	1/14/2016	<u>Testing:</u> Specification section 014529.19.B.2.8, 9, and 10, requires testing the fenestration in accordance to AAMA 502-08-Voluntary Specification for Field Testing of Newly Installed Fenestration Products. However, we recommend and MSBA requires testing ASTM E 783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors, and ASTM E 1105 – Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference. We do not recommend allowing the AAMA 1/3 reduction of design pressure for testing under ASTM E1105.	CLO	1.25.16	Specification reference will be updated to match MSBA requirements.
Spec. 042000	Open	AMB	1/14/2016	<u>Masonry Ties:</u> The specification calls for single fastener masonry anchors that are blind installed through the cavity materials. These fasteners commonly result in holes in the water/air/vapor barrier at missed studs and may not provide reliable structural anchorage. We recommend using two-anchor ties installed directly to the sheathing prior to other cavity materials for all masonry materials.	CLO	1.25.16	Masonry ties will not be required for the job. This reference will be deleted from the specifications.
Spec. 072733	Open	AMB	1/14/2016	<u>Building Envelope Walls Above Grade:</u> For your building, the Massachusetts State Building Code, 8th Edition, requires an minimum R-value of 13+7.5ci for metal framed walls above grade. Confirm that the required R-value is provided. In addition, confirm that insulation materials (i.e., foam plastic insulation) is only used in exterior wall assemblies that comply with NFPA 285.	CLO	1.25.16	Specifications will be reviewed to confirm compliance with NFPA 285.
Spec. 075419	Open	AMB	1/14/2016	<u>Building Envelope Roof Insulation:</u> For your building, the Massachusetts State Building Code, 8th Edition, requires an minimum R-value of 25ci for a roof. The Project Drawings identify the roofing installation as "polysio rigid insulation" while Specification section 075419.2.3.C calls out "Extruded polystyrene roofing insulation." Clarify which material is intended and confirm that the required R-value is provided.	CLO	1.25.16	Conflict of specifications and drawings will be review and revised.
Spec. 084213	Open	AMB	1/14/2016	<u>Aluminum-Framed Storefronts:</u> We recommend that you consider specifying curtain wall units in lieu of storefront units for improved performance.	CLO	1.25.16	Recommendation will be reviewed and updated as required, while staying within project budget.
Spec. 085113	Open	AMB	1/14/2016	<u>Aluminum Windows:</u> We recommend that you specify wept glazing pockets with heel beads of sealant for all windows to improve long term durability.	CLO	1.25.16	Recommendation will be reviewed and updated as required, while staying within project budget.

