ADDENDUM
NO. 3

June 11, 2020

Franklin Central Junior High School – Additions and Upgrades
10440 Indian Creek Road
Indianapolis, IN 46259

TO: ALL BIDDERS OF RECORD

This Addendum forms a part of and modifies the Bidding Requirements, Contract Forms, Contract Conditions, the Specifications, and the Drawings dated May 18, 2020, by Schmidt Associates. Acknowledge receipt of the Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of Pages ADD 3-1 through ADD 3-2, and attached Schmidt Associates Addendum No. 3, dated June 11, 2020 consisting of 7 pages, Specification Section 230800 - Commissioning Plan and Drawing Sheets: A214.

BID OPENING

Due to current COVID-19 social distancing guidelines, the Bid Opening on Tuesday June 16, 2020 at 2:00 PM will **ONLY be available to watch via MS Teams Meeting**. See MS Teams Meeting Link contained in Addendum No. 2 if you would like to watch the live stream of the Bid Opening.

SPECIFICATION SECTION 01 12 00 MULTIPLE CONTRACT SUMMARY

1. Paragraph 3.03B BID CATEGORY NO. 2 – MASONRY

   Add the following Clarification:
   - Repair/patch existing CMU partitions to remain which are tied into CMU walls scheduled for demolition; this includes repair/patching at new openings created within existing CMU and brick walls.

2. Paragraph 3.03C BID CATEGORY NO. 3 – STRUCTURAL STEEL

Add the following Clarifications (Supersedes Addendum No. 2):

- Coordinate all required floor and roof openings with the MEP/FP Contractors.
- Furnish and deliver steel decking roof material for Unit C to **Bid Category No. 4 Contractor**; **Bid Category No. 4 Contractor** shall unload, hoist and install steel deck roof material at Unit C. All other metal deck roof material shall be furnished and installed by **Bid Category No. 3 Contractor**.

3. Paragraph 3.03D BID CATEGORY NO. 4 – METAL FRAMING/DRYWALL/CEILINGS

Add the following Clarifications:

- Steel decking roof material for Unit C shall be furnished by **Bid Category No. 3 Contractor; Bid Category No. 4 Contractor** shall unload, hoist and install same. (Supersedes Addendum No. 2)
- Vented Nail Base per Section 06 16 00 Sheathing shall be provided by **Bid Category No. 5 Contractor**.
- Repair/patch existing drywall partitions to remain which are tied into drywall partitions scheduled for demolition; this includes repair/patching at new openings created within existing drywall partitions.

4. Paragraph 3.03E BID CATEGORY NO. 5 – ROOFING

Add the following Clarifications:

- Provide Vented Nail Base per Section 06 16 00 Sheathing

5. Paragraph 3.03L BID CATEGORY NO. 12 – ELECTRICAL & TECHNOLOGY

Add the following Specification Section:
23 08 00 Commissioning Plan (Coordinate with Owner)

Add the following Clarification:

- Bid Category No. 12 Contractor shall provide manpower and technical support as required to assist the Owner's Commissioning Agent as indicated in Section 23 08 00 Commissioning Plan.

ADDENDUM NO. 3
JUNE 11, 2020

PREPARED BY SCHMIDT ASSOCIATES FOR:
FRANKLIN CENTRAL JUNIOR HIGH SCHOOL – ADDITIONS
FRANKLIN TOWNSHIP COMMUNITY SCHOOL CORPORATION

This Addendum consists of 7 Addendum pages and 31 attachment pages totaling 38 pages.

Acknowledge receipt of this Addendum by inserting its number on the Bid Form. Failure to do so may subject the Bid to disqualification. This Addendum is part of the Contract Documents.

Bidder is encouraged to verify with reprographer of record all Addenda issued (do not rely exclusively on third party plan room services).

PART 1 - CHANGES TO PRIOR ADDENDA (NOT APPLICABLE)

PART 2 - CHANGES TO THE PROJECT MANUAL

Modifications described herein shall be incorporated in the Project Manual. All other Work shall remain unchanged.

2.1 DIVISION 08 – OPENINGS

A. **Section 084523 "FIBERGLASS-SANDWICH-PANEL ASSEMBLIES"**

1. MODIFY Text 1.2 A, 1. as follows:

   "1. Wall Assemblies - Translucent Panel T1"

2. DELETE AND REPLACE Text within 1.8 C, 2 as follows:

   Delete "20 years" and replace with "10 years"

3. DELETE Text within 2.1 C, 1 as follows:

   Delete "… [1/60] [1/90] …"

4. DELETE Text within 2.1 C, 2 as follows:

   Delete "… [1/60] [1/90] [1/120] …"

5. DELETE Text within 2.1 D, 2 as follows:

   Delete "…<Insert number>… <Insert number>…"

6. DELETE Text within 2.1 D, 3 as follows:

Delete "…<Insert number>…"

7. DELETE Paragraph 2.1 E in its entirety.

8. DELETE Text within 2.1 F as follows:

   Delete "… [6.24 lbf/sq.ft.] [10 lbf/sq. ft.] … <Insert value>…"

9. DELETE Text within 2.1 H, 1 as follows:

   Delete "…<Insert temperature range>…"

10. DELETE Text within 2.1 I, 3 as follows:

    Delete "…<Insert value>… [1.57 lbf/sq. ft.] …<Insert value>"

11. DELETE Subparagraph 2.3 A, 1 in its entirety.

12. DELETE Text within 2.3 E, 1 as follows:

    Delete "…0.060 inch…"

13. DELETE AND REPLACE Subparagraph 2.3 H, 3 in its entirety and replace with the following:

    "3. Combustibility Classification: Class CC1 for interior face sheet, Class CC2 for the exterior face sheet based on testing according to ASTM D 635."

14. DELETE Text within 2.3 H, 4 as follows:

    Delete "…Class B …. Test Class C…"

15. DELETE Text within 2.3 H, 5 as follows:

    Delete "…Class B Class C…"

16. DELETE Text within 2.3 H, 7 as follows:

    Delete "… 60 ft. x lbf…230 ft x lbf…"

17. DELETE AND REPLACE Subparagraph 2.4 A, 1 as follows:

    "1. Construction: Thermally broken, extruded aluminum."

18. DELETE Text within 2.6 A as follows:

    Delete "…70…".

B. **Section 083473 "SOUND CONTROL DOOR ASSEMBLIES"**

1. DELETE AND REPLACE Subparagraph 2.5 A, "?. Hardware Preparation" as follows:

   "2.1 Hardware Preparation: Factory prepare sound-control doors to receive hardware; include cutouts, reinforcement, mortising, drilling, and tapping, according to the Door Hardware Schedule and templates furnished as specified in Section 087100 "Door Hardware.

a. Reinforce doors to receive door hardware.
b. Locate door hardware as indicated, or if not indicated, according to NAAMM-HMMA 831, "Recommended Hardware Locations for Custom Hollow Metal Doors and Frames."

2. ADD Paragraph 2.5 C as follows:
"C. Sound-Control Wood Door Fabrication: Factory fit doors to suit frame-opening sizes indicated, with u Sound-Control Wood Door Fabrication: Factory fit doors to suit frame-opening sizes indicated, with uniform clearances and bevels according to referenced quality standard, unless otherwise indicated. Comply with final door hardware schedules and hardware templates.
   1. Locate door hardware as indicated, or if not indicated, according to DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

3. ADD Paragraph 2.6 as follows:
"WOOD SOUND-CONTROL DOORS

   A. Manufacturers: Subject to compliance with requirements, :
      1. AMBICO Limited.
      2. Krieger Specialty Products Company.
      3. Overly Door Company.
   B. Description: Provide flush-design sound-control doors, 1-3/4 inches (44 mm) thick; with manufacturer's standard sound-retardant core as required to provide STC rating indicated. Fabricate according to WDMA 1.S.1-A.
   C. Materials: Comply with Section 081416 "Flush Wood Doors" for grade, faces, veneer matching, fabrication, finishing, and other requirements unless otherwise indicated.
      1. Glazing: As required by sound-control door assembly manufacturer to comply with sound-control requirements.
   D. Finishes:
   1. Factory finish sound-control wood doors to match doors specified in Section 081416 "Flush Wood Doors." "

C. **Section 087100** "**DOOR HARDWARE**"

1. MODIFY Document Hardware Group 17 as follows:

"Hinges to be provided by 083473 Sound Control Door Assemblies
Panic Hardware to be adjusted to Surface Vertical Rods 9927L 996L LBR
Adjust LCN Closure to work with cam hinge provided with Sound Control Doors
Sounds seals and gaskets to be provided by 083473 Sound Control Door Assemblies"

2. MODIFY Document Hardware Groups 23 and 24 as follows:

"Hinges to be provided by 083473 Sound Control Door Assemblies
Panic Hardware to be adjusted to Surface Vertical Rods 9927L 996L LBR and 9927-DT 996-DT LBR.
Adjust LCN Closure to work with cam hinge provided with Sound Control Doors
Sounds seals and gaskets to be provided by 083473 Sound Control Door Assemblies"

D. **Section 089000 "LOUVERS AND VENTS"**

1. DELETE Paragraph 2.3 B in its entirety.

2.2 DIVISION 23 - HEATING, VENTILATING, AND AIR-CONDITIONING(HVAC)

A. **Section 230800 "COMMISSIONING PLAN"**

1. ADD Document "Commissioning Plan" per the attached.

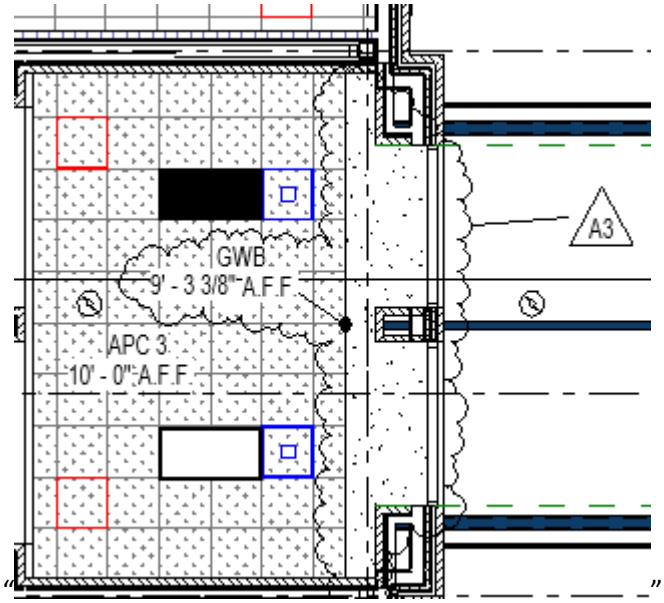
PART 3 - CHANGES TO THE DRAWINGS

Modifications described herein shall be incorporated in the Drawings. All other Work shall remain unchanged.

3.1 A-SERIES DRAWINGS

A. **Drawing Number AC1C1 FIRST FLOOR REFLECTED CEILING PLAN - UNIT C**

1. MODIFY Drawing 2A/AC1C1 Vestibule C199A ceiling to add a bulkhead as follows:



B. **Drawing Number AC1C2 SECOND FLOOR REFLECTED CEILING PLAN - UNIT C**

1. MODIFY Drawing 3A/AC1C2 as follows:

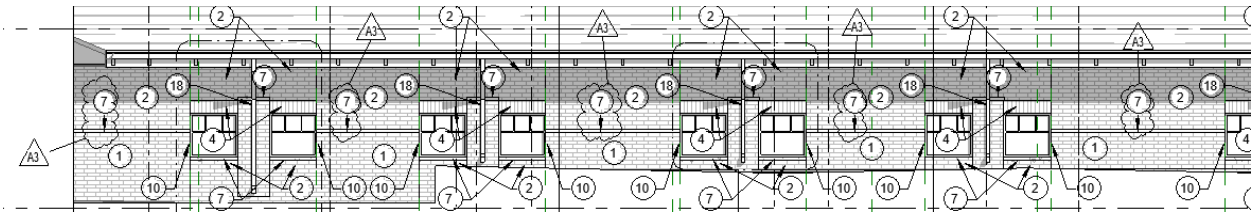
   "Change ceiling type in Room C202 from APC-4 to APC-1."

C. **Drawing Number A212 BUILDING ELEVATIONS**

1. MODIFY Elevation 1B/A212 as follows:

"Extend Cast Stone Band between pairs of windows on Second Floor all the way to the existing band "

"



"

D. **Drawing Numbers A212, A213 BUILDING ELEVATIONS AND A214 EXTERIOR ELEVATION DETAILS**

1. ADD Note 28 and 28 to the Building Elevation Notes as follows:

"

28	075423 TPO BASE FLASHING TO EXTEND UP FACE OF WALL, AND TERMINATE WITH REGLET AND COUNTERFLASHING UNDER THE CAST STONE SILL. REFERENCE 4A/A312.
29	075423 TPO BASE FLASHING TO EXTEND UP FACE OF WALL, MINIMUM OF 12 INCHES AND TERMINATE WITH REGLET AND COUNTERFLASHING.

A3

"

2. DELETE AND REPLACE Note 17 of the Building Elevations Notes as follows:

"17. 077100 – 4" x 8" ALUMINUM GUTTER. "

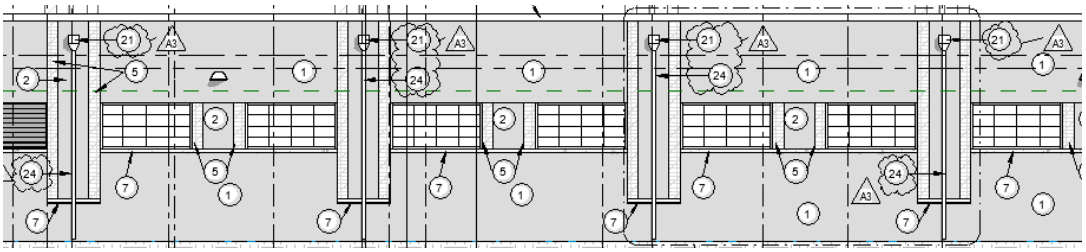
3. DELETE AND REPLACE Note 21 of the Building Elevation Notes as follows:

"21. 077100 MANUFACTURED METAL SCUPPER."

E. **Drawing Number A-213 BUILDING ELEVATIONS**

1. MODIFY Drawing 3A/A213 as follows:

"



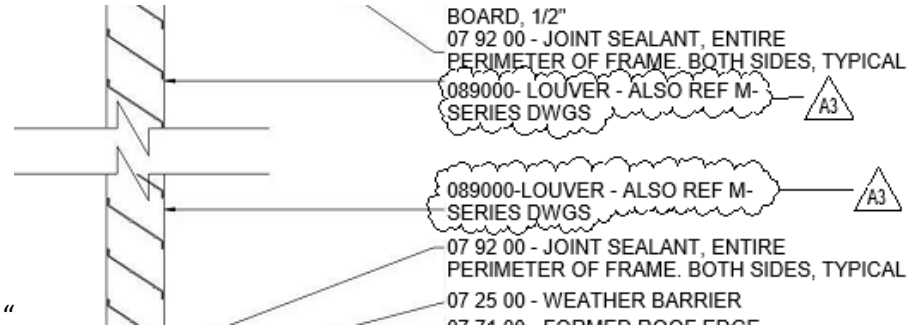
"

F. **Drawing Number A214 EXTERIOR ELEVATION DETAILS**

1. DELETE AND REPLACE Drawing A214 per the attached.

G. **Drawing Number A-314 WALL SECTIONS AND DETAILS**

1. MODIFY Notes on Detail 2A/A-314 as follows:



H. **Drawing Number A-402 ENLARGED STAIR PLANS**

1. DELETE AND REPLACE in Details the following Specification Reference in its entirety and replace with the following:

   Delete all “06 20 00” references and replace with “06 40 23” .

I. **Drawing Number A-600 DOOR AND FRAME SCHEDULE**

1. ADD Note 4 in Notes column for opening H101Bb as follows:

ST	--		25	POWER	F118c
HM	--		06		G103
HM	--		24	4 A3	H101Bb
HM	--		23	4	H112a
HM	--		24	4	H112b

3.2 I-SERIES DRAWINGS

A. **Drawing Number I-201 INTERIOR ELEVATIONS -UNIT H**

1. ADD General Note to INSTRUMENT STORAGE SCHEDULE as follows:

   “INSTRUMENT STORAGE GENERAL NOTE:
   PROVIDE GRILLE DOORS FOR EACH INDIVIDUAL COMPARTMENT OF THE INSTRUMENT STORAGE CABINETS.”

2. MODIFY Schedule Visual Display on all I-Series Drawings as follows:

A3

VISUAL DISPLAY SCHEDULE				
ID	DESCRIPTION	WIDTH	HEIGHT	COUNT
4TB	TACK BOARD	4' - 0"	4' - 0"	36
4TB5	TACK BOARD	4' - 0"	5' - 0"	3
8MB	MARKER BOARD	8' - 0"	4' - 0"	1
8MB5	MARKER BOARD	8' - 0"	5' - 0"	3
8MBS5	MARKER BOARD	8' - 0"	5' - 0"	3
8TS	TACK STRIP	8' - 0"	0' - 3"	21
10TB	TACK BOARD	10' - 0"	4' - 0"	19
16MB	MARKER BOARD	16' - 0"	4' - 0"	21

END OF ADDENDUM 3

Level 2, Comprehensive Commissioning Plan

For

Franklin Central Junior High School Additions and Renovations

Prepared by:

Bledsoe Building Commissioning
1400 Sunday Drive
Indianapolis, Indiana 46217

Level 2, Comprehensive Commissioning Plan

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I. GENERAL COMMISSIONING

1.0 DEFINITION

Commissioning is the process by which the Owner ensures that all building systems perform interactively according to the Owner's Project Requirements and that they are commissionable, functional and maintainable.

Commissioning is the process of reviewing, planning, documenting, scheduling, testing, adjusting, verifying, and training to provide a facility, which operates as a fully functional system as per the design intent. The commissioning process covers, pre-design, design, construction, startup, functional testing and training of operators for the buildings systems.

2.0 PLAN

This Level 2, comprehensive commissioning plan is to describe the commissioning process for the listed project. This plan is the Level 2, comprehensive commissioning plan; it provides the basis for the commissioning process, including the responsibilities, authority and lines of communication of the commissioning team during each phase of Level 2, comprehensive commissioning.

As your Commissioning Administrator it is our goal to provide the highest level of functional integrity and reliability of the subject facility. This is accomplished through coordination and efforts of the owner, designers, contractors and the commissioning authority.

3.0 FACILITY DESCRIPTION

This is an existing two story building that is to undergo several additions and mechanical systems upgrades. These upgrades will impact the entire school building as well as the mechanical cooling and heating water systems.

4.0 COMMISSIONING TEAM MEMBER RESPONSIBILITIES

A. The Owner:

1. Has sole authority to negotiate contracts, order changes to the construction contract, and make final contract related decisions such as the acceptance of equipment, systems, operational and functional test results.
2. Determines the scope of commissioning for the project.
3. Provides commissioning direction to all commissioning team members.
4. Serves as the final authority for all commissioning related disputes, communications and resolutions.

B. Facility User:

1. Is the Commissioning Team's authority on the facilities operation and maintenance needs.
2. Provides communication and operational needs of the facilities staff.
3. Attends periodic commissioning meetings.
4. Attends training for facilities operations presented by the commissioning team.
5. Functions as a Witness Authority if designated by the Commissioning Administrator (Cx) and Owner.
6. Incorporates the commissioned facility into the facility's maintenance program.

C. Architect:

1. Is the Commissioning Team's authority on the overall facilities design intent.
2. Provides communication and operational assistance with commissioning issues, conflicts and design questions with the design staff.
3. Attends periodic commissioning meetings.
4. Attends appropriate training for facilities operations presented by the commissioning team.
5. Provides training and training assistance concerning the design intent and the basis of design.

D. Mechanical Engineer:

1. Is the Commissioning Team's authority on the facilities mechanical design intent.
2. Provides communication and operational assistance with commissioning issues, conflicts and design questions with the design staff.
3. Attends periodic commissioning meetings.
4. Reviews the mechanical contractor's submittal in cooperation with the Commissioning Administrator (Cx) for conformance to the design intent.
5. Provides training and training assistance concerning the design intent and the basis of design.

E. Plumbing Engineer:

1. Is the Commissioning Team's authority on the facilities plumbing design intent.
2. Provides communication and operational assistance with commissioning issues, conflicts and design questions with the design staff.
3. Attends periodic commissioning meetings.
4. Reviews the plumbing contractor's submittal in cooperation with the Commissioning Administrator (Cx) for conformance to the design intent.
5. Provides training and training assistance concerning the design intent and the basis of design.

F. Electrical Engineer:

1. Is the Commissioning Team's authority on the facilities electrical design intent.
2. Provides communication and operational assistance with commissioning issues, conflicts and design questions with the design staff.
3. Attends periodic commissioning meetings.
4. Reviews the electrical contractor's submittal in cooperation with the Commissioning Administrator (Cx) for conformance to the design intent.
5. Provides training and training assistance concerning the design intent and the basis of design.

G. Construction Manager / General Contractor:

1. The CM/GC is the main communication contact for all commissioning work. The CM/GC contractor shall provide and coordinate the following activities:
2. Provides communication between the owner, commissioning authority, design professionals and all subcontractors.
3. Schedules and holds commissioning and coordination meetings.
4. Coordinates all commissioning schedules from the Commissioning Administrator, (Cx) to the contractors doing the startup and commissioning tasks.
5. Coordinates and tracks all corrective work required to complete the commissioning work.

H. Mechanical Contractor:

1. The mechanical contractor is the Commissioning Teams primary authority on the materials and methods used to implement the mechanical project scope of work.
2. Attend commissioning meetings and provides commissioning coordination for all mechanical systems commissioning activities.
3. Provide all required submittal information required for the design of commissioning tests by the commissioning administrator.
4. Assists the Cx in reviewing and modifying commissioning check lists for mechanical systems, for consistency with the materials and methods used in the construction of the mechanical systems.
5. Provides technicians, tools and instrumentation for mechanical commissioning activities and tests.

6. Performs pre-functional installation inspections and completes inspection check sheets.
7. Performs or manages pre-functional start up tests and completes start up check sheets.
8. Assist CA in developing commissioning schedules for all mechanical commissioning activities and complete all mechanical commissioning activities to those schedules.
9. Complete all corrective action, on a timely basis as required to complete all mechanical commissioning activities.
10. Prepare all operating and maintenance manuals and all required as built documents in accordance with the specifications prior to owner training activities as dictated by the commissioning schedule.
11. Provide owner training in accordance with the owner training agenda and schedule provided by the Cx.

I. Electrical Contractor:

1. The electrical contractor is the Commissioning Teams primary authority on the materials and methods used to implement the electrical project scope of work.
2. Attend commissioning meetings and provides commissioning coordination for all electrical systems BBC commissioning activities.
3. Provide all required submittal information required for the design of commissioning tests by the commissioning administrator.
4. Assists the Cx in reviewing and modifying commissioning check lists for electrical systems, for consistency with the materials and methods used in the construction of the electrical systems.
5. Provides technicians, tools and instrumentation for electrical commissioning activities and tests.
6. Performs installation inspections and completes inspection check sheets.
7. Performs or manages pre-functional start up tests and completes start up check sheets.
8. Assist Cx in developing commissioning schedules for all electrical commissioning activities and complete all electrical commissioning activities to those schedules.
9. Complete all corrective action, on a timely basis as required to complete all electrical commissioning activities.
10. Prepare all operating and maintenance manuals and all required as built documents in accordance with the specifications prior to owner training activities as dictated by the commissioning schedule.
11. Provide owner training in accordance with the owner training agenda and schedule provided by the Cx.

J. Controls Contractor:

1. The controls contractor is the Commissioning Teams primary authority on the materials and methods used to implement the controls project scope of work.
2. Attend commissioning meetings and provides commissioning coordination for all controls systems commissioning activities.
3. Provide all required submittal information required for the design of commissioning tests by the commissioning administrator.
4. Assists the Cx in reviewing and modifying commissioning check lists for controls systems, for consistency with the materials and methods used in the construction of the controls systems.
5. Provides technicians, tools and instrumentation for controls commissioning activities and tests.
6. Performs installation inspections and completes inspection check sheets.
7. Assists Cx in performing the commissioning controls pre-functional point-to-point test.
8. Performs under the direction of the Cx all functional testing.
9. Assist Cx in developing commissioning schedules for all controls commissioning activities and complete all controls commissioning activities to those schedules.
10. Complete all corrective action, on a timely basis as required to complete all controls commissioning activities.
11. Prepare all operating and maintenance manuals and all required as built documents in accordance with the specifications prior to owner training activities as dictated by the commissioning schedule.
12. Provide owner training in accordance with the owner training agenda and schedule provided by the Cx.

K. TAB Contractor:

1. The TAB contractor is the Commissioning Teams primary authority on the materials and methods used to implement the TAB project scope of work.
2. Attend commissioning meetings and provides commissioning coordination for all TAB systems commissioning activities.

3. Provide all required submittal information required for the design of commissioning tests by the commissioning administrator including a complete TAB Plan describing the TAB procedures and sample TAB forms to be used on the project.
4. Assists the Cx in reviewing and modifying commissioning check lists for TAB systems, for consistency with the materials and methods used in the construction of the TAB systems.
5. Provides construction installation verification for all mechanical equipment. Any concerns or deficiencies will be submitted through a site inspection report.
6. Provides technicians, tools and instrumentation for TAB commissioning activities and tests.
7. Assist Cx in developing commissioning schedules for all TAB commissioning activities and complete all TAB commissioning activities to those schedules.
8. Complete all corrective action, on a timely basis as required to complete all TAB commissioning activities.
9. Prepare all TAB reports and all required as built documents in accordance with the specifications prior to owner training activities as dictated by the commissioning schedule.

L. Commissioning Administrator:

1. The commissioning administrator (Cx) is the Owner's commissioning consultant and the leader of the Commissioning Team. The Cx advises the Owner on issues involving the commissioning process and its intended results. The Cx shall direct the commissioning process in accordance with the project commissioning specification to provide long-term performance and maintainability of the systems included in the scope of work.
2. The Cx is authorized and obligated **to advise** the Owner of issues involving the design, construction materials, system start up, testing, adjusting and balancing, and other activities that are required to maximize system performance and maintainability.
3. The Cx is authorized and obligated **to make recommendations** to the Owner regarding the acceptance, modification, rejection of materials, construction procedures, schedules, tests, reports, or other items pertaining to the systems within the commissioning scope of work.
4. The Cx is **not authorized to change existing contract documents**, schedules, costs, or scope of work for any parties contracted on the project. The Cx is **not empowered to direct any contractor**, subcontractor or person on the project as to required changes in the work, materials used or construction methods utilized in completing their scope of work. All directives for corrective action will come through the contract chain of command as dictated by the contract documents.
5. The Cx is responsible for the following construction phase activities:
   - Attends pre-commissioning meeting with contractors to introduce the commissioning process.
   - Provides plan, specification and submittal review for possible conflicts, deficiencies, ability to be tested and balanced, ability to be commissioned and coordination between disciplines.
   - Attends on-site commissioning meetings as required to coordinate the commissioning process.
   - Assists CM/GC in developing all commissioning schedules.
   - Assists contractors in developing all pre-functional installation check sheets.
   - Assist contractors in developing all pre-functional start up to be performed by the contractor in the start up of all equipment and systems included in the scope of work.
   - Develops all functional performance tests (FPT) or reviews the controls contractors FPT (for completeness) to be performed by the contractors and the Cx in the performance of the functional tests for all systems included in the scope of work.
   - Makes recommendation to the Owner regarding the acceptance of all equipment and system tests.
   - Reviews all final operation and maintenance manuals and all "As Built" documents for use in the Owner training seminar.
   - Attends the Owner training seminar, including all documentation for future use by the owner.
   - Provides the final commissioning report to the Owner.
   - Coordinates and schedules any post season commissioning tests required by the specification.

M. Witness Authority:

1. The Owners witness observes all required system tests and demonstrations required by the project specification and commissioning specification. The Owners witness shall observe and review the results of each test or demonstration form, sign and date each form.
2. The Cx shall be the Owners primary witness authority. The Owner or the Cx may appoint other witness authorities as required to provide a complete and comprehensive commissioning program. Any person or persons appointed as an approved witness authority shall be qualified and experienced in the scope of work being tested or demonstrated.
3. The Cx is responsible for making recommendations regarding the acceptability of any test results. When other witness authorities other than the Cx observe project tests, the Cx shall review these tests for recommendations for acceptance by the Owner.
4. If deficiencies are discovered during a test the witness shall document the deficiency on the test form along with a complete description of the problem, its cause, and any recommended solution.
5. Only the Owner has the authority to accept any test or recommendation regardless of the commissioning team's recommendations.

II. DESIGN PHASE

1.0 GENERAL

The objectives for the commissioning team during the design phase are as follows:

- Provide a design that is functional, efficient, maintainable, and commissionable.
- Provide a review and documentation process that ensures that all systems are capable of meeting the Owner's Project Requirements (OPR) and involves all appropriate team members.
- Produce construction documents that adequately reflect the OPR and clearly defines the commissioning effort to be accomplished in the construction phase.

2.0 SYSTEMS

The following systems will be commissioned during the design phase:

1. Mechanical:
    a. Central Plant Systems
    b. Air Handling Systems
    c. Exhaust systems
    d. Duct Distribution Systems
    e. Piping Distribution Systems
    f. Direct digital control systems

COMMISSIONING PLAN - DESIGN PHASE

3.0 DESIGN PHASE COMMISSIONING

TITLE	NAME	COMPANY	VOICE	FAX	E-MAIL
Cx	John Zeilinga	Bledsoe Bldg. Commissioning	317-821-4750	317-821-4751	jzeilinga@bledsoe-bbc.com
Owners Project Manager		Skillman			
Mechanical Engineer		Schmiddt Associates			
Facility Manager					

4.0 DOCUMENT REVIEW COMMENT FORM

The Cx will distribute the Document Review Comment Form to the architect. The architect will be responsible to distribute the document to the design team members. When submitting the form to the Cx, please fill out each comment line with as much explanation as required to address the issue/item completely.

The architect will consolidate the response comments and forward them to the owner and Cx. The owner should review the A/E responses to make sure there are no items or issues outstanding that require further discussion.

COMMISSIONING PLAN - DESIGN PHASE

5.0 DESIGN PHASE COMMISSIONING SCHEDULE

Activity	Estimated Duration	Schedule Date
Owners OPR Review	1 Hour	TBD
95% Review Meeting with Design Team	1 Hour	TBD

Commissioning Plan - CONSTRUCTION PHASE

III. CONSTRUCTION PHASE

1.0 SYSTEMS

The following systems will be commissioned during the Construction phase:

1. Mechanical:
   a. Central Plant Systems
   b. Air Handling Systems
   c. Exhaust systems
   d. Duct Distribution Systems
   e. Piping Distribution Systems
   f. Direct digital control systems

2.0 CONSTRUCTION PHASE COMMISSIONING ACTIVITIES

Commissioning during the construction phase is intended to assure the Owner that the project requirements are met during the construction effort; to verify that equipment and systems are installed according to the design requirements, manufacturer's recommendations, and to industry accepted minimum standards and that they receive adequate operational checkout by installing contractors. The commissioning process does not take away from or reduce the responsibility of the system designers or installing contractors in providing complete and fully functional systems.

The Commissioning Authority (C_x) is responsible for coordinating and scheduling the commissioning team and the contractors' activities, as they relate to the commissioning process, during the construction effort of the project. This effort begins with an initial Commissioning Kick-off Meeting at which the commissioning process is described and the various tasks to be accomplished during the construction of the project are identified. The C_x will explain his role and the expectations from the contractor's team in this process, and will answer questions and provide comments regarding the commissioning process. The contractor needs to have all relevant subcontractors at this meeting.

The quality of the commissioning process is dependent upon each contractor providing and completing inspections and tests in accordance with the specifications. The Owner has directed that any additional cost incurred by the commissioning team, design team or by the Owner due to the additional retesting of systems and/or equipment not tested or installed correctly shall be borne by the associated contractor.

3.0 FINAL PLAN AND SCHEDULE FOR COMMISSIONING ACTIVITIES

The C_x will meet with the contracting team and provide preliminary commissioning schedule durations to be included in the project schedule by the contractors. In support of this effort, the C_x will schedule and conduct additional periodic Commissioning Coordination meetings, as required to plan, scope, coordinate, schedule future activities and resolve problems as required throughout construction.

The C_x will distribute minutes of all Commissioning Coordination meetings to all parties involved in the commissioning activities.

4.0 REVIEW OF CONTRACTOR'S SUBMITTALS

The C_x will review normal contractor submittals for equipment that is to be commissioned for compliance with the requirements of the commissioning effort and general conformance with the documented Owner's Project Requirements and Basis of Design. The C_x review is not intended to replace the design team's review of the submittals. The C_x's comments will be furnished to the design team and the Owner for their information. Final approval authority and responsibility for contractor submittals remains with the design team.

The C_x may request and review additional information required performing commissioning tasks, such as O&M materials, contractor start-up, checkout, and pre-functional testing procedures.

5.0 REVIEW AND DOCUMENTATION OF MECHANICAL CONTRACTORS INSTALLATIONS

The Contractor shall install all systems in accordance with the drawings and specifications and to standard industry quality standards. The contractor shall provide first party inspections of all installations and verify in writing that they are installed correctly. The C_x will assist the contractor in compiling Pre Functional checklists to document the completion of the manufacturer's recommended installations procedures if required. The TAB contractor shall provide second party validation by completing commissioning installation check sheets verifying that the correct equipment is installed at the correct location and it is complete ready for startup activities. The C_x may elect to observe some installation tests as a third party validation.

6.0 REVIEW AND DOCUMENTATION OF MECHANICAL CONTRACTOR'S EQUIPMENT START-UP AND PREFUNCTIONAL TESTING PROCEEDURES

The C_x will review and, at his discretion, may observe, contractor start up procedures and practices for compliance with specification, design requirements, and accepted practices. The C_x will review and recommend approval of the contractor's proposed startup procedures. The C_x will assist the contractor in compiling Pre-functional checklists to document the completion of the manufacturer's recommended start up procedures. The contractor or his suppliers shall perform all required start up tests as required by the manufacture. Each piece of equipment receives full pre-functional checkout by the contractor. No sampling strategies are allowed. In general, the pre-functional testing for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system. The contractor shall correct all deficiencies found.

7.0 REVIEW AND DOCUMENTATION OF CONTROL CONTRACTORS INSTALLATIONS

The Control Contractor shall install all systems in accordance with the drawings and specifications and to standard industry quality standards. The contractor shall provide first party inspections of all installations and verify in writing that they are installed correctly. The C_x will assist the contractor in compiling Pre Functional checklists to document the completion of the manufacturer's recommended installations procedures if required.

Before equipment and system startup, the contractor shall provide complete control sequences, interlock drawings and layout drawings to the C_x. The control contractor and the C_x shall work with contractors and design engineers until sufficient definition of the required operating sequences has been achieved for the C_x to be able to write detailed testing procedures. With assistance and review from installing contractors as necessary, the C_x will write the functional performance test procedures for equipment and systems. Required performance testing may include control system trending, stand-alone data logger monitoring and/or manual functional testing. These Functional Performance Test procedures will be provided to the contractor and design team for review, comment and agreement prior to the beginning of functional testing of equipment or systems.

8.0 REVIEW AND DOCUMENTATION OF CONTROL CONTRACTOR'S EQUIPMENT START UP

The Control Contractor shall install all required equipment, devices, software and provide all programming to meet the control intent of the construction documents. Part of the contractors check out procedure shall be to perform a complete point-to-point test as well as calibration of each sensor and ranging of each actuator. The contractor shall provide complete written documentation of all start up activities and tests. All required controls start up activities, checklists, calibrations, of the system shall be completed and approved by the C_x prior to beginning the TAB effort

The Cx team lead by the C_x shall perform an independent third party validated point-to-point test and instrument calibration test of all points assisted by the control contractor. No sampling strategies will be allowed. The contractor shall correct all deficiencies found.

The controls contractor will also meet with the TAB contractor prior to the start of TAB and review the TAB plan to determine the capabilities of the control system for use in TAB. The controls contractor will provide the TAB with any necessary unique instruments or software for setting terminal unit boxes and instruct TAB in their use. The controls contractor will provide a technician qualified to operate the controls to assist the TAB contractor in performing TAB.

9.0 REVIEW AND DOCUMENTATION OF TEST AND BALANCE CONTRACTOR'S ACTIVITIES

The Test and Balance (TAB) contractor will submit an outline of his proposed test and balance procedures, plan and approach to the C_x prior to starting the TAB effort.

The contractor will include an explanation of his intended use of the building control system in the proposed TAB effort. The C_x will review the contractor's plan for completeness, requirements of the commissioning process, and coordination issues and shall provide comments to the contractor, the design team, and the Owner. The C_x shall provide third party validation of the TAB process by observing repeatability tests of certain components and systems as selected by the C_x. Repeatability tests will be conducted until the C_x has confidence in the accuracy of the TAB report.

The TAB contractor shall provide all re-balance activities as required to solve any balance accuracy issues found.

The TAB contractor shall provide second party validation of all mechanical equipment installations by completing commissioning installation check sheets verifying that the correct equipment is installed at the correct location and it is complete ready for start-up activities.

10.0 REVIEW AND DOCUMENTATION OF ELECTRICAL CONTRACTORS INSTALLATIONS

The Contractor shall install all systems in accordance with the drawings and specifications and to standard industry quality standards. The contractor shall provide first party inspections of all installations and verify in writing that they are installed correctly. The C_x will assist the contractor in compiling Pre Functional checklists to document the completion of the manufacturer's recommended installations procedures if required. The contractors testing agency shall perform second party installation validations as part of their testing protocols. The C_x may elect to observe some installation tests as a third party validation.

11.0 REVIEW AND DOCUMENTATION OF ELECTRICAL CONTRACTOR'S EQUIPMENT START-UP AND PREFUNCTIONAL TESTING PROCEEDURES

The C_x will review and, at his discretion, may observe, contractor or testing agency start up procedures and tests for compliance with specifications. Each piece of equipment shall be tested as specified and no sampling strategies will be allowed. Contractor or testing agency shall provide complete documentation of all start up and testing activities.

Commissioning PLAN – CONSTRUCTION PHASE

12.0 CONSTRUCTION PHASE COMMISSIONING TEAM

TITLE	NAME	COMPANY	VOICE	FAX	E-MAIL
Cx	John Zeilinga	Bledsoe Bldg. Commissioning	317-821-4750	317-821-4751	jzeilinga@bledsoe-bbc.com
Owners Project Manager		Skillman			
Mechanical Engineer		Schmidt Associates			
Facility Manager					
Mechanical Contractor					
DDC Controls Contractor					
Test & Balance Contractor					

13. CONSTRUCTION PHASE SCHEDULE

Activity	Estimated Duration	Schedule Date
Construction/Commissioning Kick-off Meeting with Contractors	1 Hour	TBD

Commissioning PLAN - CONSTRUCTION PHASE

14. EQUIPMENT TO BE COMMISSIONED

Equipment Tag	Location	Description	Tests & Check Sheets		
			Inspection	Start Up	FPT
TC1-01 thru		VAV Box	Mech.	Mech.	BBC
TC1-32					
AHU-C1		Air Handling Unit	Mech.	Mech.	BBC
AHU-C2		Air Handling Unit	Mech.	Mech.	BBC
AHU-H1		Air Handling Unit	Mech.	Mech.	BBC
AHU-L3		Air Handling Unit	Mech.	Mech.	BBC
BP-A1		Boiler Pump	Mech.	Mech.	BBC
BP-A2		Boiler Pump	Mech.	Mech.	BBC
BP-A3		Boiler Pump	Mech.	Mech.	BBC
BP-A4		Boiler Pump	Mech.	Mech.	BBC
CHWP-A4		Chilled Water Pump	Mech.	Mech.	BBC
CHWP-A5		Chilled Water Pump	Mech.	Mech.	BBC
EF-C1-1		Exhaust Fan	Mech.	Mech.	BBC
EF-C2-1		Exhaust Fan	Mech.	Mech.	BBC
EF-C3-1		Exhaust Fan	Mech.	Mech.	BBC
RF-H1		Exhaust Fan	Mech.	Mech.	BBC
EUH-C1		Electric Unit Heater	Mech.	Mech.	BBC
EUH-C2		Electric Unit Heater	Mech.	Mech.	BBC
EUH-L1		Electric Unit Heater	Mech.	Mech.	BBC
EUH-L2		Electric Unit Heater	Mech.	Mech.	BBC
Alternates					
CH-1		Chiller	Mech.	Mech.	BBC
CH-2		Chiller	Mech.	Mech.	BBC
B-A1		Boiler	Mech.	Mech.	BBC
B-A2-A		Boiler	Mech.	Mech.	BBC
B-A2-B		Boiler	Mech.	Mech.	BBC
B-A3		Boiler	Mech.	Mech.	BBC
B-A4		Boiler	Mech.	Mech.	BBC

COMMISSIONING PLAN – CONSTRUCTION PHASE

14. EQUIPMENT TO BE COMMISSIONED

Equipment Tag	Location	Description	Tests & Check Sheets		
			Inspection	Start Up	FPT

Commissioning PLAN - ACCEPTANCE PHASE

IV. ACCEPTANCE PHASE

1.0 ACCEPTANCE PHASE C_X ACTIVITIES

Commissioning activities during the acceptance phase are intended to verify and document proper performance and compliance with the requirements of the Contract Documents of equipment and systems installed and to verify that the owner's operating personnel are adequately trained and that the operation and maintenance (O&M) documentation left on site is complete.

The commissioning process will achieve the following specific objectives:

2.0 FUNCTIONAL PERFORMANCE TESTING (For Level 2 Commissioning)

Functional Performance Testing is the dynamic testing of systems (rather than just components) under full operation. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all of the control system's sequences of operation and components are verified to be responding as the sequences state. The C_x develops (with input from the controls contractor) the functional test procedures in a sequential written form, coordinates, oversees the actual test procedures, and documents the testing. The actual testing of the equipment and systems is performed by the installing contractor or vendor.

In general, each piece of equipment and system will be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part- and full-load) as defined by the project required sequences of operation. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc. shall also be tested. Equipment capacities will be evaluated to confirm compliance with project requirements.

Before test procedures are written, the contractors shall provide all requested documentation requested by the C_x. Including list of change orders affecting equipment or systems, updated points list, control sequences and setpoints. The $C_{x,}$ in collaboration with the appropriate contractor (controls contractor), develops specific test procedures to verify proper operation of each piece of equipment and system. Prior to execution, the C_x provides a copy of the functional performance tests to the installing contractors who review the tests for feasibility, safety, and warranty and equipment protection. Functional testing and verification may be achieved by manual testing or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by stand-alone data loggers, as approved by the $C_{x.}$ As defined by the project specifications, not all pieces of identical equipment will undergo in-depth testing. Some degree of "sampling" may be utilized.

The C_x will verify the proper calibration and operation of the automatic temperature control system and any associated monitoring and logging capabilities before it is used in other testing activities. When approved by the $C_{x,}$ the system may be used to

verify proper operation of other equipment. The C_x will also verify the accuracy of the test and balance report during this phase.

The C_x will schedule functional performance tests through the construction manager, the general contractor, and the appropriate installing contractor. Testing will proceed from components to subsystems to systems and finally to interlocks and connections between systems. Corrections of minor deficiencies identified during this process may be made during the tests at the discretion of the C_x. Significant deficiencies or non-conformance issues are documented by the C_x and reported to the construction manager, general contractor and Owner. The appropriate contractor will correct the deficiency, and notify the C_x that the system is ready for retesting. The C_x recommends acceptance of each functional performance test to the construction manager and the Owner. For items in dispute the design team shall be the deciding authority and final authority shall be the Owners.

The C_x will document the Functional Performance Testing process and submit a report describing the results of the testing effort, and comparing the measured performance of the installed systems and equipment to the design requirements. The C_x will recommend acceptance of the installed systems and equipment or recommend corrective measures.

Acceptance criteria for equipment and systems will be based on their demonstrated ability to meet the performance requirements of the contract drawings and specifications. Unless more stringent criteria or requirements are defined elsewhere the following standards will be used:

3.0 SYSTEMS MANUALS AND DOCUMENTATION

The C_x reviews the contractor's proposed O&M manuals, system documentation, and redline as-builts for systems that were commissioned for completeness and to verify compliance with the specifications. The C_x recommends approval and acceptance of these sections of the O&M manuals to the construction manager. The C_x also reviews each equipment warranty and verifies that all requirements to keep the warranty valid are clearly stated

The systems manuals should provide all information necessary to understand, operate, and maintain the installed systems and equipment.

The systems manuals and documentation will contain the following items:

- An index to the systems manual contents
- A description of the installed systems and equipment, including equipment capacities and limitations
- Operating procedures of all systems and equipment for normal, abnormal, and emergency modes of operation
- Recommended maintenance procedures and intervals for all equipment
- Written sequences of operation as actually installed and implemented, to include all control system data such as setpoints, schedules, and calibration
- These sequences shall identify all devices and sensors using the same

nomenclature and identifiers as the as-built control drawings and system documentation. Drawings shall show the location of all control system panels, sensors, and test ports.

- Complete documentation of the programming of the control system
- As-built drawings of the construction

4.0 OPERATING PERSONNEL TRAINING

Owner training and orientation on equipment and systems provided by the contractor is defined in the project specifications. The training will be scheduled by the general contractor. The training schedule will identify all the equipment for which training or orientation will be provided, the type and number of trainees, rigor of training desired by the Owner, and the primary responsible subcontractor.

Prior to each training session, the providing contractor will provide a training agenda for his area of training responsibility. This agenda shall be provided to the C_x for approval prior to training instruction. When the training is complete, the contractor provides a copy of the document to the Owner and C_x. The C_x will review the training documentation and recommend final approval. The C_x at his discretion may witness any of the training sessions.

COMMISSIONING PLAN – ACCEPTANCE PHASE

COMMISSIONING TRAINING PLAN

The training session is intended to provide the owner with a complete understanding of all technical systems in the facility covered in the commissioning scope and as covered in the project specifications. Training shall consist of classroom training and field observation of system operation startup, shut down, maintenance and trouble shooting.

All O&M manuals and shop drawings must be submitted and approved prior to the training session. Provide one copy of approved O&M manuals to commissioner prior to scheduling training. Commissioner will review O&M manuals for completeness and to see if sufficient information is included for proper operator training.

For this project the training scope shall be:

Subject	Firm	Instructor
Control Systems	Control Contractor	

Each instructor shall provide a training agenda for his session. The Agenda shall be submitted for review prior to the training session. The training agenda format shall be as outlined in the attached training agenda sample outline.

Each instructor shall provide whatever training materials are required such as Submittal Information, Maintenance Manuals, Shop Drawings, Diagrams, Etc, required to provide training sufficient to fully train the customer’s operators to operate and maintain the installed system.

Each instructor’s presentation may be video tapped for future use by the owner.

COMMISSIONING PLAN – ACCEPTANCE PHASE

TRAINING AGENDA
(Sample Outline)

Subject: _____
Instructor: _____
Firm: _____
Address: _____
Address: _____
Phone: _____
Fax: _____

Subject Description: _____

Reference Documentation: _____

Classroom Training Agenda	
Item 1:	General Product description: (Review Submittal documents)
Item 2:	Standard operating procedures with standard conditions and settings. (Review Maintenance Manual)
Item 3:	Maintenance Procedures and Required Maintenance Materials (Review Maintenance Manual)
Item 4:	Procedure to call for warranty diagnosis and repair
Item 5:	Description for disassembly, diagnostics and repair procedures. (Review Maintenance Manual)
Item 6:	Repair parts & Maintenance parts procurement procedures. (Review Maintenance Manual)
Item 7:	Recommended spare parts list
Item 8:	Available advanced training
Item 9:	Question & Answer period

Field Training Agenda	
Item A:	Demonstrate Start Up Procedures
Item B:	Demonstrate Normal Operation Conditions & Settings
Item C:	Demonstrate Shut Down Procedures
Item D:	Demonstrate Maintenance Procedures
Item E:	Question & Answer period

Software Training Agenda	
Item 1:	Train Operators for Start Up Procedures - log On / Log Off and user management
Item 2:	Review Basic System Architecture, Components used
Item 3:	Train Operators for Normal Operator Functions, Schedule, Override, Setpoint Change
Item 4:	Train Operators to utilize all reports, alarms, logs and data trends
Item 5:	Train Operators on basic programming, diagnostics and troubleshooting
Item 6.	Demonstrate Maintenance Procedures
Item 7.	Question & Answer period

5.0 ACCEPTANCE PHASE COMMISSIONING TEAM

TITLE	NAME	COMPANY	VOICE	FAX	E-MAIL
Cx	John Zeilinga	Bledsoe Bldg. Commissioning	317-821-4750	317-821-4751	jzeilinga@bledsoe-bbc.com
Owners Project Manager		Skillman			
Mechanical Engineer		Schmidt Associates			
Facility Manager					
Mechanical Contractor					
DDC Controls Contractor					
Test & Balance Contractor					

COMMISSIONING PLAN – ACCEPTANCE PHASE

6.0 ACCEPTANCE PHASE SCHEDULE

Activity	Estimated Duration	Schedule Date

Commissioning TEAM – WARRANTY Phase

V. WARRANTY PHASE

1.0 WARRANTY PHASE C_X ACTIVITIES

Commissioning during the warranty period is intended to assist the Owner and facility operating staff in ensuring that the facility equipment warranties are in force and that all identified discrepancies have been addressed and corrected before the warranty period expires. During the warranty period, seasonal testing and other deferred testing required is completed according to the Specifications. Tests are executed and documented as for the Functional Performance Testing. Any deficiencies identified are corrected by the appropriate contractor, witnessed by facilities staff and the $C_{x.}$ Any final adjustments to the O&M manuals and as-builts due to the deferred testing are made. In addition the C_x will return to the project approximately 10 months into the warranty period. During this visit(s) the C_x will review with facility staff the current building operation and the condition of outstanding issues related to the original and seasonal commissioning. The C_x will also interview facility staff and identify problems or concerns they have operating the building as originally intended. The C_x will make suggestions for improvements and for recording these changes in the O&M manuals. The C_x will identify areas that may come under warranty or under the original construction contract. The C_x will also assist facility staff in developing reports and documents and requests for services to remedy outstanding problems.

2.0 WARRANTY PHASE DOCUMENTATION

During the warranty phase, the C_x will oversee the contractor's development of the required project documentation, to include:

- Updated and corrected as-built documentation, reflecting any changes made during the warranty period.
- Maintenance records for commissioned equipment, to include any required repairs or unscheduled maintenance. This should include a log of any complaints or problems experienced, the findings of any investigations, and any corrective actions or repairs implemented.
- Recommendations and documentation of any modifications to the equipment and system operating procedures.

3.0 LESSONS LEARNED WORKSHOP

If so desired by the Owner the Cx shall conduct a Lessons Learned Workshop in conjunction with the 10 month site visit. The purpose of the Lessons Learned Workshop is to determine what commissioning process could be improved for future projects.

4.0 WARRANTY PHASE COMMISSIONING TEAM

TITLE	NAME	COMPANY	VOICE	FAX	E-MAIL
Cx	John Zeilinga	Bledsoe Bldg. Commissioning	317-821-4750	317-821-4751	jzeilinga@bledsoe-bbc.com
Owners Project Manager		Skillman			
Mechanical Engineer		Schmidt Associates			
Facility Manager					
Mechanical Contractor					
DDC Controls Contractor					
Test & Balance Contractor					

5.0 WARRANTY PHASE SCHEDULE

Activity	Estimated Duration	Schedule Date
		TBD