AUSTIN Independent School District | Contract and Procurement Services

ADDENDUM No. 1
Request for Competitive Sealed Proposals (CSP)
19CSP085- Renovations at Casey Elementary

December 21, 2018

<u>Item 1:</u> CHANGES TO PROJECT MANUAL AND CLARIFICATIONS CAN BE FOUND AT PLANROOM.MILLERIDS.COM UNDER 19CSP085

S. Kanetzky Engineering, LLC
Mechanical, Electrical, Plumbing Consulting Engineers

CASEY ELEMENTARY SCHOOL
RENOVATIONS AT CASEY ELEMENTARY SCHOOL

For AUSTIN INDEPENDENT SCHOOL DISTRICT

ADDENDUM NO. 01: December 21, 2018

TO: ALL BIDDERS OF RECORD

This Addendum forms a part of the Contract Documents for the above project and modifies the original Drawings and Specifications, to the extent noted herein. Where provisions of the following supplementary data differ from the original Contract Documents, this Addendum shall govern and take preference.

Careful note of this Addendum shall be taken by all parties of interest so that proper allowance and necessary adjustment is made in all computations, estimates and contracts and so that all trades affected are fully advised in the performance of the work which will be required.

This Addendum must be acknowledged in the appropriate section of the Bid Proposal to be accepted.

ATTACHMENTS

Project Manual Cover_Casey ES-Addendum 01.pdf
Table of Contents-Casey ES-Addendum 01.pdf

SPECIFICATIONS

The following specifications have been added to identify the requirements for Commissioning and the requirements for acoustical ceilings and floor patching. Note that the areas of work for acoustical ceilings and floor patching are called out on the mechanical drawings to support the replacement of mechanical units.

016500 General August 2018-Addendum 01
095100 Acoustical Ceilings-Addendum 01
096500 Resilient Flooring-Addendum 01
096800 Carpet-Addendum 01
096900 Carpet Tile-Addendum 01
099000 Painting and Coating-Addendum 01
230100 Commissioning Of Mechanical Systems-Addendum 01
260100 Commissioning Of Electrical Systems-Addendum 01

DRAWINGS

The following drawings are being re-issued for this Addendum as Revision No. 1 with the changes clouded

	MECHANICAL
M0.1	MECHANICAL NOTES, SYMBOLS AND ABBREVIATIONS
MP3.1	FIRST FLOOR MECHANICAL AND PLUMBING DEMOLITION PLAN "A&B"
MP3.2	FIRST FLOOR MECHANICAL AND PLUMBING DEMOLITION PLAN "C"
MP3.4	ROOF MECHANICAL AND PLUMBING DEMOLITION PLAN "A&B"
MP3.5	ROOF MECHANICAL AND PLUMBING DEMOLITION PLAN "C"

MP6.1	FIRST FLOOR MECHANICAL AND PLUMBING REVISED PLAN "A&B"
MP6.2	FIRST FLOOR MECHANICAL AND PLUMBING REVISED PLAN "C"
MP6.3	SECOND FLOOR MECHANICAL AND PLUMBING REVISED PLAN "F"
M8.1	MECHANICAL SCHEDULES
M9.1	RTU CONTROL DIAGRAMS

ELECTRICAL

E1.2	FIRST FLOOR PLAN ELECTRICAL DEMOLITION PLAN "C"
E2.1	FIRST FLOOR ELECTRICAL REVISED PLAN "A&B"
E2.2	FIRST FLOOR ELECTRICAL REVISED PLAN "C"
E2.3	FIRST FLOOR ELECTRICAL REVISED PLAN "F"
E2.4	ROOF ELECTRICAL REVISED PLAN "A&B"
E3.1	ELECTRICAL SCHEDULES AND DETAILS

CLARIFICATIONS

GENERAL

1. During the pre-bid meeting on site, it was asked if there were original drawings for the building.

   Response: The original drawings received from AISD will be uploaded for the Architectural, Structural, Mechanical, Electrical and Controls. Note that these are NOT verified as built documents and are only included for reference.

ROOFING

2. During the pre-bid meeting on site, it was asked if there will be any roofing details.

   Response: Roofing details will be addressed in Addendum No. 2. Note that Addendum 1 drawings have referenced roofing work that will be required.

ELECTRICAL

1. Sheet E1.2:
   Notes were updated to instruct the electrical contractor to re-use the existing raceways and conductors.

2. Sheet E2.1:
   Notes were updated to make the locations of panels AL2 and AC1 were located.

3. Sheet E2.2:
   Drawings and Notes were updated to show and instruct the electrical contractor to disconnect and re-install existing 2x4 fixtures in the area of work.

4. Sheet E2.3:
   Drawings and Notes were updated to show and instruct the electrical contractor to disconnect and re-install existing 2x4 fixtures in the area of work.

5. Sheet E2.4:
   Notes were updated to instruct the contractor that all raceways on the roof shall be galvanized rigid conduit per Electrical Specifications.

6. Sheet E3.1:
   Details 1 and 2 were updated to instruct the electrical contractor to refer to the roofing plans for electrical rack mounting details.

MECHANICAL

1. M0.1
   Updated drawing index and Revised Note 14

2. MP3.1
   Added Keyed Notes 5 and 6 to indicated work associated with ceiling and floor to support the MEP work.

3. MP3.2
   - Added Key Note 4 to indicate the requirement for temporary cooling in the library during construction.
   - Added Key Note 5 to indicate work associated with ceiling.

4. MP3.4
   - Added Keyed Note 2 to indicate that plywood is to be used to protect the existing roof during construction.

   Revised requirement in Construction Note 3.c. for work associated with condensate piping.
5. MP3.5
   - Added Keyed Note 2 to indicate that plywood is to be used to protect the existing roof during construction.

6. MP6.1
   - Added Keyed Note and updated Construction note to indicate new roof hydrants.
   - Added Keyed Notes 6,7, 8, and 9 to indicated work associated with ceiling and floor to support the MEP work

7. MP6.2
   - Added Key Note 4 to indicate work associated with ceiling.

8. MP6.3
   Added Keyed Notes 3 and 4 to indicated work associated with ceiling and floor to support the MEP work.

9. MP6.4
   - Added Keyed Notes 3 and 4 to indicate the new and existing gas piping be primed, painted and provided with new supports.
   - Added Keyed Note 5 to show location of roof hose bibbs.
   - Added Keyed Notes 6 and 7 to indicate areas of work for the roof repair and installation of safety rails respectively. Note that the roofing and safety rail details will be issued in Addendum No. 2.

10. M8.1
    Updated Equipment schedules.

11. M9.1
    Revised to indicate outside air flow station.

12. M9.2
    Added sheet for FCU controls.

REQUEST FOR SUBSTITUTIONS

No substitutions have been accepted by the Owner.

END of ADDENDUM No. 01

Sincerely,

Tom Borkowski

Tom Borkowski, P.E.
Director of Mechanical Engineering
S. Kanetzky Engineering, LLC
TBPE F-2356

Project Manual

Addendum 01

Renovations
at
Casey Elementary School

9400 Texas Oaks Dr.
Austin, TX 78748

AISD Project No. #19-0015-CASEY

Issued for Construction
November 28, 2018

Owner
Austin Independent School District
AISD Construction Management Department
812 San Antonio, Suite 200
Austin, TX 78701

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Table of Contents

SECTION 016500 – GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.

B. Related Sections:
   1. Division 22 Section “Commissioning of Plumbing Systems” for commissioning process activities for plumbing systems, assemblies, equipment and components.
   2. Division 23 Section "Commissioning of Mechanical Systems" for commissioning process activities for mechanical systems, assemblies, equipment, and components.
   3. Division 26 Section "Commissioning of Electrical Systems" for commissioning process activities for electrical systems, assemblies, equipment, and components.

1.3 DEFINITIONS

A. Approval: Acceptance that a piece of equipment or system has been properly installed and is functioning in tested modes according to Contract Documents.

B. Basis of Design (**BoD**): A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process. Describes systems, components, conditions, and methods chosen to meet design intent.

C. Building Commissioning: A joint team effort to ensure that all mechanical equipment, controls, and systems function together properly to meet the design intent, to document system performance parameters for fine-tuning of control sequences and operational procedures, and to ensure that personnel are adequately trained to operate systems.

D. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

E. Commissioning Authority (**CxA**): Independent agent hired by Owner and not associated with Contractor or its subcontractors, Architect or its sub-consultants, or Owner’s Contracting Officer Technical Representative or its staff or consultants. Under Owner’s direction, and not Contractor’s direction, CA will direct and coordinate day-to-day commissioning activities without assuming oversight responsibilities.

F. Commissioning (**Cx**) Process: A process that encompasses and coordinates the traditionally separate functions of system documentation, equipment start-up, control system calibration, testing and balancing, training and performance testing. Commissioning requirements do not supersede other requirements of the specifications, but may expand on some of them.

G. Commissioning Team: Consists of a Commissioning Authority retained by the Owner, Owner's Representative, major equipment suppliers and Contractors/subcontractors.

H. Design Build Contractor (**D-B**): Representatives from the Design Build contractor, with whom Owner is contractually obligated to carry out overall planning, coordination, and control of project from inception to completion in accordance with contract documents.

I. Deferred Functional Tests: Functional tests performed later, after Substantial Completion, due to partial occupancy, equipment, seasonal requirements, design, or other Site conditions that disallow test from being performed.

J. Design Intent: Dynamic document that provides explanation of ideas, concepts, and criteria that are considered to be important to Owner. Initially, outcome of programming and conceptual design phases.

K. Functional Test: Test of dynamic function of systems, as opposed to components, under full operation in various modes through all control system’s sequences of operation using manual (direct observation) or monitoring methods following prescribed test procedures in sequential written form.

L. Owner's Project Requirements (**OPR**): A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

M. Pre-functional Checklist: List, provided by Commissioning Authority to installer, of items to inspect and elementary component tests to conduct to verify proper installation of equipment prior to functional testing.

N. Sampling: Functionally testing only a fraction of total number of identical or near identical pieces of equipment.

O. Seasonal Commissioning: Testing of equipment that can be done only during periods of peak heating or cooling, when HVAC equipment is operating at full-load or heavy-load conditions.

P. Simulated Condition: Condition created for purpose of testing response of system.

Q. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

R. Trending: Monitoring using building control system.

1.4 COMMISSIONING TEAM

A. Members Appointed by D-B: Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to, representatives of D-B, including Project superintendent and all subcontractors, installers, suppliers, specialists, etc. who are responsible for installing systems under this project.

B. Members Appointed by Owner:

1. Owner:
   Austin Independent School District
   812 San Antonio St
   Austin, Texas 78701
   Contact: Bob Cervi, Executive Director of Construction Management and Facilities
   Phone (office): 512-414-8948
   E-mail: robert.cervi@austinisd.org

2. Commissioning Authority (CxA):
   ACR Engineering
   3001 South Lamar, Ste. 210
   Austin, Texas 78704
   Contact: Ricardo Troncoso, P.E.
   Phone (office): 512-440-8333
   Phone (mobile): 512-563-3493 E-mail: rtroncoso@acreng.com

3. MEP Engineer:
   S. Kanetzky Engineering, LLC
   5920 W. William Cannon
   Bldg. 7, Suite 200
   Austin, Texas 78749
   Contact: Tom Borkowski
   Phone (office): 512-329-5774
   E-mail: tborkowski@skaneng.com

1.5 RESPONSIBILITIES

A. Responsibilities of the CxA during the Construction Phase include, but are not limited to the following:

1. Coordinate and direct each step of the total Commissioning Process for systems being installed as part of this contract. Coordinate commissioning work schedule with Owner and D-B.

2. Provide commissioning plan.
3. Attend planning and job-site meetings as required to obtain information relating to Commissioning Process. Convene commissioning team meetings as required.
4. Plan and conduct Commissioning scoping and coordination meetings. Provide notice to all Team members to attend scheduled commissioning meetings.
5. Request all information required for Commissioning Process from manufacturers, D-B, and Design Professionals.
6. Review Design Professionals' design documents to gain clear understanding of design intent.
7. Review D-B submittals for compliance with commissioning needs.
8. Verify that systems and equipment have been installed and started in accordance with manufacturer's recommendations and with generally recognized construction standards, and that documentation of such has been provided.
9. Assist in resolving discrepancies.
10. Conduct periodic site observations during constructions and issue Cx Field Reports to documents findings and issues requiring Owner or Architect attention.
11. Prepare Pre-Functional Checklists to ensure systems have been installed according to project specifications. Verify that Pre-Functional Checklists have been addressed by D-B and are accurate. Deliver final Pre-Functional Checklists to Owner.
12. Prepare Functional Test procedures to demonstrate performance of systems according to project specifications. Observe and document performance of systems, as per process detailed in Functional Test procedures.
13. Verify the execution of commissioning process activities using random sampling. The sampling rate may vary from 1 to 100 percent. Verification will include, but is not limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the requirement, the CxA will report the failure in the Issues Log.
14. Prepare and maintain an Issues Log.
15. Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.
16. Review testing and balancing (TAB) reports; notify Owner of deficiencies.
17. Recommend acceptance or non-acceptance of systems to Owner.
18. Verify that Operations and Maintenance (O&M) documentation is acceptable. Operations and Maintenance manuals shall be submitted simultaneously to CxA and to Design Professionals for review.
19. Prepare and maintain a current facilities requirements and operations and maintenance plan that contains the information necessary to operate the space efficiently.
20. Verify that training has taken place by collecting training documentation from D-B.
21. Compile and maintain commissioning record.
22. Provide pre-final and final commissioning reports to all commissioning team members. The report shall include:

    a. Communications between Owner, CxA, Design Professionals, Vendors, and/or D-B and Subcontractors related to Commissioning Process.
    b. Minutes of Commissioning meetings.
    c. Findings and pertinent observations.
    d. A listing of any deficiencies, unresolved issues, and compromises in the environmentally responsive features of the project.
    e. Manufacturer's start-up reports.
    f. An Issues Log which will:

1) List design, installation, and performance issues that are at variance with the Owner's project requirements and Contract Documents.
2) Identify and track issues as they are encountered, documenting the status of unresolved and resolved issues.
3) Document corrective modifications made.

g. Pre-Functional Checklists.
h. Testing plans and Functional Test reports.
i. Listing of off-season test(s) not performed and a schedule for their completion.

23. Conduct an inspection of the building and its systems within 10 months after substantial completion and prior to the expiration of warranties. Prepare a report documenting findings that should be addressed prior to expiration of warranties. (Not in scope)

B. Contractor: Responsibilities of the Design Build Contractor as related to Commissioning Process include, but are not limited to the following:

1. Facilitate coordination of Commissioning work by CxA.
2. Attend Commissioning meetings or other meetings called by CxA to facilitate the Commissioning Process.
3. Integrate and coordinate commissioning process activities with construction schedule.
4. Provide CxA with all submittals, start-up instructions manuals, operating parameters, and other pertinent information related to Commissioning Process. This information shall be provided directly to the CxA as a digital PDF file at the same time that the submittals are made to the architect and/or engineer.
5. Review and accept Pre-Functional/Construction checklists provided by the CxA.
6. Review CxA's Functional Test procedures for feasibility, safety, and impact on warranty, and provide CxA with written comment on same.
7. Provide all documentation relating to manufacturer's recommended performance testing of equipment and systems.
8. Provide Operations and Maintenance Data to CxA for preparation of checklists and training manuals.
9. Provide testing and balancing report.
10. Provide As-built drawings and documentation to facilitate Functional Testing.
11. Assure and facilitate participation and cooperation of specialty subcontractors (electrical, mechanical, controls, etc.) and equipment suppliers as required for the Commissioning Process.
12. Install systems and equipment in strict conformance with project specifications, manufacturer's recommended installation procedures, and Pre-Functional Checklists, as prepared by CxA.
13. Require subcontractors to inspect systems installed and fill out Pre-functional Checklists (provided by CxA) to verify installation has taken place in accordance with manufacturer's instructions, and in a workmanlike manner in accordance with project documents and generally accepted construction practices. Certify to CxA that installation work listed in Pre-functional Checklists has been completed and accompany CxA during verification of completed Pre-functional Checklists.
14. Provide data concerning performance, installation, and start-up of systems.
15. Provide copy of manufacturer's filled-out start-up forms for equipment and systems.
16. Ensure systems have been started and fully checked for proper operation prior to arranging for Functional Testing with CxA. Prepare and submit to CxA written certification that each

piece of equipment and/or system has been started according to manufacturer's recommended procedure, and that system has been tested for compliance with operational requirements.

a. D-B shall carry out manufacturer's recommended start-up and testing procedures, regardless of whether or not they are specifically listed in CxA's Functional Test procedures.
b. D-B is not relieved of obligation for systems / equipment demonstration where performance testing is required by specifications, but a Functional Performance Test is not specifically designated by CxA.

17. Coordinate with CxA to determine mutually acceptable date for Functional Performance Tests.
18. Direct and coordinate commissioning testing among subcontractors, suppliers, and vendors.
19. Complete commissioning process test procedures.
20. Provide qualified personnel to assist and participate in Commissioning.
21. Provide test instruments and communications devices, as prescribed by CxA and where identified in this specifications manual, as required for carrying out Functional Testing of systems.
22. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
23. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
24. Ensure deficiencies found in the Commissioning Process are corrected within the time schedule shown in the Cx report.
25. Prepare and submit to CxA proposed Training Program outline for each system.
26. Coordinate and provide training of Owner's personnel. Provide CxA with proposed training agenda no less than 14 days prior to proposed training sessions. Provide documentation that training took place (including system being trained, trainer's name and contact information, sign-in sheet verifying who attended training, length of training, and signature of owner's authorized person certifying training took place satisfactorily).
27. Provide a tracking method to ensure that all required positions or person received training.
28. Prepare Operation and Maintenance manuals and As-Built drawings in accordance with specifications; submit copy to CxA in addition to other contractually required submissions. Revise and resubmit manuals in accordance with Design Professionals and CxA's comments.
29. All costs associated with the participation of D-B, Sub-Contractors, and Equipment Vendors in the Commissioning Process shall be included as part of the Construction Contract.

C. Subcontractors and vendors shall prepare and submit to Commissioning Authority Manufacturer's installation and performance test procedures to demonstrate performance of systems according to these specifications and checklists prepared by Commissioning Authority.

D. Owner's Representative: Responsibilities of the Owner's Representative as related to the Commissioning Process include, but are not limited to the following:

1. Provide the OPR documentation to the CxA and D-B for information and use.
2. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.

3. Provide the BoD documentation, prepared by Architect and approved by Owner, to the CxA and D-B for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.
4. Manage contracts of Architect, D-B and CxA.
5. Arrange for facility operating and maintenance personnel to attend various field commissioning activities and field training sessions.
6. Provide final approval for completion of commissioning Work.
7. Warranty Period: Ensure that seasonal or deferred testing and deficiency issues are addressed.

E. Architect: Responsibilities of the Architect as relate to Commissioning Process include, but are not limited to the following:

1. Attend commissioning scoping meeting and other commissioning team meetings as requested by Commissioning Authority and as selected by Architect.
2. Perform normal submittal review, construction observation, record drawing preparation, and operations and maintenance data preparation, as required by Contract Documents.
3. Review Commissioning Authority's submittal review comments and issue directive to D-B and/or Design Professionals as deemed applicable.
4. Coordinate resolution of system deficiencies identified during commissioning, as required by Contract Documents. Review Commissioning Issues Logs and issue directives to D-B and/or Design Professionals as applicable.
5. Prepare and submit final as-built design intent documentation for inclusion in Operation and Maintenance Data Manual, and review and approve Operation and Maintenance Data Manual.
6. Review Commissioning Report and issue directive to resolve all outstanding deficiencies prior to project close-out.
7. Warranty Period: Coordinate resolution of design non-conformance and design deficiencies identified during warranty period commissioning.

F. Design Professionals Responsible for Design of Each Portion of Work Being Commissioned:

1. Perform normal submittal review, construction observations, and record drawing preparation, as required by Contract Documents. Perform site observation immediately preceding system startup.
2. Respond to deficiencies identified by Commissioning Authority as directed by Architect.
3. Provide design narrative and sequence documentation requested by Commissioning Authority. Assist, along with D-B, in clarifying operation and control of commissioned equipment in areas where specifications, control drawings, or equipment documentation are not sufficient for writing detailed testing procedures.
4. Attend commissioning scoping meetings and other commissioning team meetings as requested by Commissioning Authority and as directed by Architect or responsible design professional.
5. Participate in resolution of system deficiencies identified during commissioning, as required by Contract Documents.
6. Prepare and submit final as-built design intent and operating parameters documentation for inclusion in Operation and Maintenance Manual, and review and approve Operation and Maintenance Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL

A. Authority

1. The Commissioning Authority carries out his responsibilities as the Owner's authorized agent in accordance with plans, specifications, and contractual requirements.
2. CxA reports deficiencies found to the D-B, Architect and Owner.
3. The Architect evaluates deficiencies and issues directive to D-B to remedy CxA's deficiencies lists, in accordance with contract documents.
4. No change in scope work is to take place without express written consent of Owner. Any deficiencies identified by CxA that are deemed by Architect to be outside of the scope of work shall be discussed with Owner for consideration.
5. D-B and CxA are to copy Architect on all correspondence related to the commissioning process.

B. D-B Participation In The Commissioning Process

1. Attend meetings related to Commissioning process and arrange for attendance by subcontractors and vendors prior to commissioning of their systems, at the discretion of CxA.
2. Provide skilled technicians to start and test all systems, and place systems in complete and fully functioning service in accordance with contract documents and design intent.
3. Provide skilled technicians, experienced and familiar with systems being commissioned, to assist CxA in commissioning process.
4. Attend initial commissioning team scoping meeting, pre-commissioning meetings specific to each system, and other meetings requested by CxA as required to discuss resolution of deficiencies.
5. Coordinate with sub-Contractors and equipment vendors/representatives to set aside adequate time to address Pre-Functional Checklists, Functional Testing, Operations and Maintenance Training, and associated coordination meetings.

C. Work Prior To Testing

1. A commissioning team scoping meeting shall be held at a time and place designated by Commissioning Authority. Owner, Architect, Commissioning Authority, Contractor, and Mechanical, Electrical, and Controls Contractors, shall be present at this meeting. The main objectives of the meeting are to familiarize all parties with the requirements of the commissioning process; to ensure that the responsibilities of each party are clearly understood; and obtain information to develop the preliminary commissioning plan, including:
    a. Personnel representing the various entities participating in the process (D-B, subcontractors, Owner, Architect, Engineer, CxA)
    b. Lines of communications;
    c. Assignment of responsibilities;
    d. Review pre-functional checklists;

e. Submittal schedule;
f. Preliminary construction schedule

2. Following the initial commissioning team scoping meeting, and upon reviewing submittals, CxA shall prepare a Preliminary Commissioning Plan outlining procedures and responsibilities, including names and contact information of responsible parties, tentative dates for commissioning activities, and pre-functional checklists. Preliminary Commissioning Plan shall be distributed to D-B and Owner electronically for review and comment. CxA shall modify the Commissioning Plan based on feedback from D-B and Owner and will generate a final Cx Plan.
3. Prior to pre-functional and functional testing, CxA will conduct site inspections at critical times and issue Cx Field Reports with observations on installation deficiencies so that they may be issued by Architect as deemed appropriate
4. D-B shall complete all phases of the work so the systems can be started, tested, adjusted, balanced, and otherwise commissioned.
5. D-B shall verify requirements of Divisions 22, 23 and 26 outlining responsibilities for start-up of equipment with obligations to complete systems, including all sub-systems so that they are fully functional.
6. Convene system-specific pre-commissioning meetings prior to start of pre-functional testing of each system. The D-B shall hold a pre-commissioning meeting with all Team members in attendance. The purpose of the meeting is to review the pre-functional checklists, and equipment start-up procedures for each system to be commissioned, confirm that systems are ready for testing, and define a schedule for testing activities.
7. A minimum of seven (7) days prior to any verification by CxA (Pre-functional Checklists or Functional Testing) submit to Commissioning Authority for review copies of all required completed checklists, start-up forms, and test procedures D-B proposes to perform to demonstrate conformance of systems to specifications and commissioning checklists.

D. Pre-functional checks and functional performance tests

1. The D-B shall provide all materials, services, and labor required to operate equipment and/or system in order to perform the pre-functional checks and functional performance tests. A pre-functional check or functional performance test shall be aborted if any system deficiency prevents the successful completion of the test or if any participating commissioning team member of which participation is specified is not present for the test. The D-B shall reimburse the Owner and A/E for all costs associated with effort lost due to tests that are aborted. These costs shall include salary, travel costs and per diem (where applicable).
2. Functional performance tests may sometimes duplicate the checking, testing, and inspection methods established in related Sections. Where checking, testing, and inspection methods are not specified in other Sections, methods shall be established which will provide required information. Testing and verification required by this section shall be performed during the Commissioning phase. Requirements in related Sections are independent from the requirements of this Section and shall not be used to satisfy any of the requirements specified in this Section without the approval of CxA.
3. Follow start-up and initial checkout procedures listed in article titled “RESPONSIBILITIES” in Part 1, and additional requirements specified in this Section. Divisions 22, 23 and 26 have startup responsibilities and are required to complete systems and sub-systems so systems are fully functional, meeting design requirements of Contract Documents. Commissioning procedures and functional testing do not relieve or lessen this

responsibility or shift this responsibility, in whole or in part, to Commissioning Agent or Owner.

E. Work To Resolve Deficiencies

1. Complete corrective work in a timely manner to allow expeditious completion of commissioning process. If deadlines pass without resolution of identified problems, Owner reserves the right to obtain supplementary services and/or equipment to resolve the problem. Costs thus incurred will be D-B's responsibility.

3.2 PRE-FUNCTIONAL CHECKLISTS

A. General

1. Pre-functional checklists are important to ensure that equipment and systems are properly installed and connected in accordance with specifications, drawings, manufacturer's requirements, and all applicable codes.
2. Checklists ensure that system start-up and functional performance testing (in-depth checkout) may proceed without unnecessary delays.
3. Completion of pre-functional checklists, startup, and checkout shall be directed and executed by authorized subcontractors or vendors. Only individuals that have direct knowledge and who witnessed that line item task on pre-functional checklist was performed shall initial or check item off.
4. Each piece of equipment and major distribution system receives full pre-functional checkout. No sampling strategies are used.
5. Pre-functional checkout for given system must be successfully completed prior to requesting verification by CxA and to formal functional performance testing of equipment or subsystems of given system.

B. Pre-functional Checklists

1. Pre-functional performance tests shall be documented in a checklist format, as prepared and provided by CxA, for each piece of equipment. Each checklist shall be initialed by D-B, verifying that all items on checklist have been addressed and completed.
2. Commissioning Pre-functional checklists are not to preclude D-B or its subcontractor or vendors from applying their own construction inspection checklists.
3. All system elements shall be checked to verify that they have been installed, adjusted, and calibrated properly, that all connections have been made correctly, and that it is ready to be started-up and function as specified. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, control sequence, and other conditions which may cause damage.
4. Verify that tests, meter readings and specific electrical characteristics agree with those required by equipment or system manufacturer.
5. All discrete elements and sub-systems shall be adjusted and shall be checked for proper operation.
6. Verify wiring and support components for equipment are complete and tested.
7. Do not conduct start-up procedure recommended by equipment/system manufacturer prior

to pre-functional testing.

8. When filling-out Pre-Functional Checklists, subcontractors shall clearly list outstanding items that were not successfully verified by noting them at bottom of procedures form or on separate sheet attached to form. Installing subcontractor or vendor shall correct deficient or incomplete areas in timely manner and shall submit updated pre-functional checklist and startup report with statement of correction on original non-compliance report.
9. Upon completion of pre-functional checklists for a particular system or subsystems D-B will request verification by CxA.
10. Completed forms and attached start-up and documentation sheets shall be provided to Commissioning Authority seven (7) days prior to requested verification date.
11. D-B and subcontractors shall accompany CxA during pre-functional checklist verification.
12. If during pre-functional checklist verification, CxA finds a significant number of deficiencies, D-B shall have all the checklists associated with similar system redone.

3.3 SYSTEM START-UP

A. D-B will arrange for start-up of operating equipment and systems after completion of pre-functional checklists and prior to requesting CxA verification. In some cases (at CxA's discretion and when in the best interest of the project schedule), equipment start-up by specialized vendors may take place at the same time as CxA verification of pre-functional checklists.

B. Start-up of equipment and systems shall be performed only by a manufacturer's representative, or person(s) who are specifically manufacturer-approved. All start-up personnel shall be trained and authorized, experienced and knowledgeable in the operations of such equipment and systems.

C. Coordinate schedule for start-up of various equipment and systems so that subsystems required for major systems operation are tested first.

D. Manufacturer's start-up reports must be submitted to CxA prior to scheduling Functional Testing.

3.4 FUNCTIONAL TESTING

A. The objective of Functional Testing is to demonstrate that each system is operating according to documented design intent and Contract Documents, through all possible modes of operation.

B. D-B and sub-Contractors shall include in his bid proposal all costs associated with preparation and execution of Testing Procedures for all systems to be commissioned in accordance with requirements specified under Divisions 22, 23 and 26

C. Functional testing is intended to begin after pre-functional checklists have been completed and verified for all related systems. Functional testing for some systems/subsystems may proceed prior to pre-functional verification of all systems at discretion of Commissioning Authority. Beginning system testing before completion does not relieve D-B from fully completing all work, including pre-functional checklists as early as possible.

D. D-B and sub-Contractors shall provide detailed Testing Procedures and resources that will allow all items to be verified.

E. Testing shall be conducted under specified operating conditions as recommended or approved by Commissioning Authority.

F. A Functional Performance Test shall be performed on each complete system. Each function shall be demonstrated to the satisfaction of Commissioning Authority in accordance with proposed test procedures developed to demonstrate compliance with specifications.

G. Each Functional Test shall be witnessed and signed off by Commissioning Authority upon satisfactory completion. Functional Test is not to be considered complete until Owner accepts Commissioning Authority's recommendation for completion.

H. All elements of system shall be tested to demonstrate that total systems satisfy all requirements of these specifications. Testing shall be accomplished on hierarchical basis. Test each piece of equipment for proper operation, followed by each subsystem, followed by the entire system, followed by any inter-ties to other major systems.

I. Notification, Scheduling Of Functional Testing and Re-Testing

1. Notify CxA and Owner, in writing, of request for scheduling Functional Testing. Submit request no fewer than seven (7) days prior to desired date for beginning functional testing.

    a. D-B must certify that systems and equipment are functioning satisfactorily, according to specifications and design intent, prior to requesting Functional Testing. Upon receipt of such certification, CxA will schedule with D-B a time for the particular system test.

        1) CxA will attempt to schedule Functional Testing when convenient for D-B and his vendors, and to minimize lost time to D-B.

    b. D-B will resolve all deficiencies identified during initial test prior to submitting request, in writing, for re-testing. Such request for re-testing shall certify that D-B has resolved all deficiencies, or list reason why any deficiencies remain which cannot be resolved.

    c. CxA will witness re-test to ensure that all deficiencies have been resolved.

        1) Deficiencies that were not detected in first Functional Test, but are discovered in subsequent re-testing, are to be resolved by D-B as if they had been discovered in initial testing.

J. Functional Testing Requirements and Procedures:

1. D-B and sub-Contractors shall perform tests in the presence of CxA. Tests not witnessed by CxA shall not be considered complete.
2. To facilitate Functional Testing, D-B shall provide services of personnel to accompany CxA for the duration of Functional Testing, including any follow-up testing. Such personnel must be experienced, qualified, and intimately familiar with the system being tested.

    a. Participation by representative(s) of direct digital controls (DDC) systems is of particular importance in Functional Testing. All systems which are controlled and/or monitored by DDC are to be thoroughly tested, point by point, through all modes of

operation, with the assistance of manufacturer's representative. DDC graphics, setpoints, and programming are to be included as a part of Functional Testing as well.

b. D-B's or subcontractor's assigned personnel shall be responsible for subjecting systems to test procedures. Should these personnel suspect that a given test condition may be detrimental to the system or equipment, he/she shall notify CxA and test shall be aborted.
c. D-B continues to bear full responsibility for equipment warranty throughout the Commissioning process. Owner and CxA will not be held responsible for damage to equipment, or other actions which might impact warranty, when performing Functional Testing of systems.

3. Each system shall be operated through all modes of operation including, but not limited to seasonal, occupied, unoccupied, warm-up, cool-down, part-load, and full-load, where system response is specified.

   a. For multiple units, sampling strategy established by Commissioning Authority and subject to approval of Owner may be used.
   b. Verification of each sequence in sequences of operation is required.
   c. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, and the like, shall also be tested.

4. Where possible, inspections carried out on systems by local Authorities Having Jurisdiction (AHJ) may serve as Functional Testing for purposes of Commissioning.

   a. CxA will accompany AHJ during testing procedures required by AHJ.
   b. It is responsibility of D-B to arrange for testing by AHJ and to coordinate with CxA to find mutually convenient times for testing. Provide CxA a minimum of four days in advance of intent to schedule testing by AHJ.
   c. CxA will issue a separate report with results of testing.
   d. CxA reserves the right to require additional testing, should testing by AHJ not adequately cover all system components in all modes of operation.

5. Functional Testing is to be dedicated solely to testing of equipment and systems, and not to resolution of deficiencies. Deficiencies identified during testing process must be corrected by D-B at a time other than during Functional Testing.
6. Within six days of performing functional test, CxA will issue test report with findings and a list of deficiencies that must be addressed by D-B or sub-Contractors.
7. Commissioning Authority shall submit a Final Report to Owner recommending acceptance or non-acceptance of individual system components as well as the systems as a whole.

K. Re-Testing and Failure To Remedy Deficiencies:

1. Despite D-B's best efforts to ensure systems are problem-free, it is expected that some deficiencies will be found during initial inspection of Pre-functional Checklist, and during initial Functional Testing; such deficiencies are expected to be minimal.
2. It is D-B's responsibility to remedy identified deficiencies, both in Pre-functional Checklist and in Functional Testing phases of work, in a timely and thorough manner.
3. It is D-B's responsibility to ensure that all deficiencies are corrected prior to requesting a re-inspection or re-test of systems and equipment. Do not request re-inspection or re-test until deficiencies are corrected.

a. At his discretion, CxA may agree to re-testing systems or equipment where deficiencies remain which are beyond D-B's control to resolve expeditiously.
b. Typically such re-testing of incomplete systems and equipment will take place only if remaining deficiencies are minor in scope and nature, and are of such nature that they cannot be resolved in a timely manner (such as those due to difficulties in obtaining parts, or where Owner has requested a change that has delayed work, etc.)

4. CxA will carry out a second re-inspection or re-test of systems and equipment subsequent to receiving D-B's request.

a. If CxA finds deficiencies identified in initial inspection or test have not been remedied (with exception of un-resolvable deficiencies in 3.b. above), and such remaining deficiencies are significant enough to require additional inspection or re-testing, D-B will be back-charged for CxA's expenses, and time at a rate of $120 per hour, for a third and any subsequent re-inspections and re-tests.

3.5 DEFERRED TESTING

A. "Seasonal Commissioning" pertains to testing during peak heating or cooling seasons when HVAC equipment is operating at full-load or heavy-load conditions. Initial commissioning will be done as soon as contract work is completed, regardless of season. Seasonal Commissioning under full- or heavy-load conditions other than the current season will be handled at later time by D-B and CxA.

1. If adequate load may be artificially placed upon heating or cooling equipment, CxA, at his discretion, may perform functional testing during non-peak load periods.
2. D-B is to provide services of personnel and participate in seasonal testing process in the same manner as he would in non-seasonal testing.
3. Until off-season commissioning can be accomplished, Owner may retain an amount from D-B's payment sufficient to cover the cost of off-season testing.

B. Unforeseen Deferred Tests: If any check or test cannot be completed due to building structure, required occupancy condition, or other reason, execution of checklists and functional testing may be delayed upon approval of Owner. Tests shall be conducted in same manner as seasonal tests, as soon as possible. Services of required parties will be negotiated. Make final adjustments to Operation and Maintenance Manuals and record drawings due to unforeseen deferred tests.

1. D-B is to provide services of personnel and participate in deferred testing in the same manner as he would for normal commissioning.
2. Until deferred testing can be accomplished, Owner may retain an amount from D-B's payment sufficient to cover the cost of deferred testing.

3.6 TRAINING

A. The following requirements are in addition to operation and maintenance requirements specified elsewhere in this specifications manual. D-B shall be responsible for training coordination and scheduling, and ultimately to ensure that training is completed.

B. Scheduling

1. Organize training to fit Owner's schedule and to optimize the learning experience. Limit continuous sessions to no more than four hours, or otherwise only as approved by Owner and/or Architect.
2. Provide an outline of the proposed training agenda for review by Owner and CxA a minimum of 10 days prior to proposed date for training session.
3. Provide CxA a minimum 5 days advance notice of intent to carry out a training session.
4. The CxA will not be required to attend all training sessions for building personnel, but will attend selected sessions and monitor progress and content.
5. No training will take place prior to successful completion of Functional Testing.

C. Training Materials

1. Develop Training Manuals to meet requirements of individual equipment specification sections.
2. Operating and Maintenance Manuals alone are NOT considered training manuals. O&M Manuals may be used as reference, but shall not be considered to meet requirements for training materials.
3. Develop a detailed outline showing how training program will be organized, including classroom and hands-on training as required by individual specifications sections.
4. Provide with training materials, a quick-reference "how-to" index which will allow operators to easily access information included in Training Manuals and/or O&M Manuals. This reference will include, as a minimum; routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions.
5. Refer to individual equipment or system specifications and paragraph 3.10 of this specification for minimum requirements.

D. Documentation

1. All training sessions are to be fully documented. Document:

    a. Basic information on training session (name of system, time, date, and location of training, name of presenter, length of training session, etc.).
    b. Names of persons who attended the training session (provide a sign-in sheet).
    c. Signature from authorized Owner’s representative indicating that training took place and was satisfactory.

2. Provide CxA copy of sign-in sheet with training session documentation.

E. System-Specific Training Requirements:

1. General:
    a. Participants that will receive training on the systems will be determined by Owner.
    b. The minimum level of instruction and topics to be covered for each system are as follows:
        1) Emergency instructions and procedures.
        2) Operation instructions and procedures.
        3) Troubleshooting procedures.
        4) Maintenance and inspection procedures.
        5) Repair procedures.

6) Upkeep the system manual and associated maintenance documentation logs.

3.7 SPECIAL WARRANTY

A. Provide special warranty in accordance with equipment specifications. Refer to the tables in paragraph 3.10 for a summary.

3.8 O&M MANUALS

A. Provide operation and maintenance manuals as specified in section 017700 Closeout Submittals, and as outlined in individual sections of Divisions 22, 23 and 26.

B. Provide CxA with a single copy of Operation and Maintenance Manuals for review. CxA's copy of O&M manuals shall be submitted through Architect.

C. CxA shall review O&M Manuals and submit comments through the Architect.

3.9 SYSTEMS TO BE COMMISSIONED

A. HVAC Systems

1. Rooftop Units
2. Fan Coil Units
3. Controls
4. Testing-Adjusting-Balancing (verification)

B. Electrical Systems

1. Switchboards & Panelboards

Refer to Div. 22, 23, and 26 for specific tasks associated with each system.

END OF SECTION

SECTION 09 5100
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

1.02 REFERENCE STANDARDS

A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.

B. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2008e1.

C. SCS Indoor Advantage Gold certification for air quality.

D. Green Guard Gold certification for air quality.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate grid layout and related dimensioning.

C. Samples: Submit two samples illustrating material and finish of acoustical units.

D. Provide documentation for recycled content of tile and grid.

E. Provide GREENGUARD Gold Certification or SCS Advantage Gold Certification for ceiling tiles.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

A. Manufacturers:
   1. Armstrong World Industries, Inc.
   2. CertainTeed Corporation
   3. USG
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Acoustical Units - General: ASTM E1264, Class A.

C. Acoustical Panels – Classrooms & Offices:

   Armstrong Cortega Lay-In or approved equal
   1. Size: 24 x 48 inches (610 x 1220 mm).
   2. Thickness: 5/8” inches.
   3. Composition: Wet felted.
   4. Edge: Square Lay-In 15/16 in.
   5. Surface Color: White.
   6. Suspension System: Exposed grid.
   7. Tiles to have a NRC of .70 minimum.

D. Acoustical Panels – Corridors:

   Armstrong Cortega Lay-In or approved equal
   1. Size: 24 x 24 inches (610 x 610 mm).
   2. Thickness: 5/8 inches.
   3. Composition: Wet felted.
   4. Edge: Square Lay-In 15/16 in.
   5. Surface Color: White.
   6. Suspension System: Exposed grid.
   7. Tiles to have a NRC of .70 minimum.

E. Acoustical Panels – Restrooms and Kitchens:
Armstrong Optima Health Zone or approved equal.
1. Size: 24 x 24 inches (600 x 600 mm).
2. Thickness: 15/16 inches.
3. Composition: Fiberglass with DuraBrite scrim/ DuraBrite factory applied latex paint.
4. Edge: Square.
5. Surface Color: White.
6. Suspension System: Exposed grid.
7. Tiles to have a NRC of .95 minimum.

2.02 SUSPENSION SYSTEM(S)

A. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

B. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; intermediate-duty.
1. Profile: Tee; 15/16 inch (24 mm) wide face.
2. Construction: Double web.
3. Kitchen Grid to include aluminum cap.
4. Finish: White painted.

2.03 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.
1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

C. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 INSTALLATION - SUSPENSION SYSTEM

A. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

B. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

C. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

D. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

E. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

F. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each corner, or support components independently.

G. Do not eccentrically load system or induce rotation of runners.

H. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
1. Use longest practical lengths.
2. Overlap and rivet corners.

3.02 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install units after above-ceiling work is complete.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.

3.03 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.04 ATTIC STOCK

A. Provide the Owner with 10% attic stock (extra material) for future material replacement. Deliver to location indicated by the Owner's Representative.

END OF SECTION

RESILIENT FLOORING

SECTION 096500

1 PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this Section.

1.2 DESCRIPTION OF WORK

A. Extent of resilient flooring and accessories is shown on Drawings and in schedules and includes the following:

1. Vinyl composition floor tile
2. Rubber tile flooring
3. Sheet vinyl flooring
4. Rubber base
5. Rubber stair treads, stringers, risers and nosing

1.3 QUALITY ASSURANCE

A. Manufacturer: Provide resilient flooring and accessories as produced by a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.

B. All flooring sealants, adhesives, coatings and primers shall comply with SCAQMD rules 113 and 1168 as consistent with performance and warranty requirements.

C. All resilient flooring shall be FloorScore certified.

1.4 SUBMITTALS

A. Product Data: Submit two (2) copies of manufacturer's technical data and installation instructions for each type of resilient flooring and accessory.

B. Samples: Submit samples of each type, color, and pattern of resilient flooring, including accessories, required, indicating full range of color and pattern variation. Provide full-size tile units and 2-1/2" long sections of resilient flooring accessories.

C. Maintenance Instructions: Submit two (2) copies of manufacturer's recommended maintenance practices for each type of resilient flooring and accessory required.

D. Submit verification of FloorScore certification or GreenGurard certification.

E. Submit product data and MSDS for all flooring sealants, adhesives, coatings and primers, indicating the VOC content in g/l of each product.

1.5 JOB CONDITIONS

A. Maintain minimum temperature of 65 degrees F (18 degrees) in spaces to receive resilient flooring for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. Store resilient flooring materials in spaces where they will be installed for at least 48 hours before beginning installation. Subsequently, maintain minimum temperature of 55 degrees F (13 degrees C) in areas where work is completed.

B. Install resilient flooring and accessories after other finishing operations, including painting, have been completed. Do not install resilient flooring over concrete slabs until the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by manufacturer's recommended bond and moisture test.

1.6 GUARANTEE

A. Provide Owner with installer’s written guarantee that shall guarantee completed installation to be free of defects in materials and workmanship for a period of one year after final acceptance. Guarantee shall provide for replacement of defective work at no cost to Owner.

2 PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, provide products of one of the following or an acceptable substitute approved prior to bidding. For substitution request, refer to Section 01631.

1. Vinyl Composition Tile

a) Armstrong : Standard Excelon; Imperial Texture or pre-approved equal.
Specifications:

Gauge	1/8 inch
Form	12 inch x 12 inch size
Reference	ASTM F-1066, Class 2-through pattern
Fire Test Data	ASTM E 648 Critical Radiant Flux 0.45 watts /cm sq or more. Class 1 ASTM E 662 Smoke – 450 or less
Static Load Limit	ASTM F 970; 75 psi
Adhesive	As recommended by manufacturer **and complaint with current VOC limits of SCAQMD rule 1168 as consistent with performance and warranty requirements.**

b) Azrock: V-423-3 Autumn Haze;

Gauge	1/8 inch
Form	12 inch x 12 inch
Adhesive	As recommended by manufacturer **and complaint with current VOC limits of SCAQMD rule 1168 as consistent with performance and warranty requirements.**

2. Rubber Tile Flooring: Provide low profile disc design rubber floor tile with sanded back, continuous field pattern of 3/4" diameter discs raised .025", made of homogenous rubber compound, color extending throughout thickness.

a. Thickness: 1/8"

b. Size: 24" x 24"

3. Wall Base: Provide vulcanized rubber base (SBR) complying with FS SS-W-40, Type I, with matching end stops and preformed, molded, or job fabricated corner units, and as follows:

a. Height: 4"

b. Thickness: 1/8" gage

c. Style: Standard cove style

d. Finish: High gloss

4. Rubber Stringers: At all stairs provide stringers to match adjacent wall base.

a. Height: 12"

b. Thickness: .10"

5. Rubber Stair Treads: Molded rubber treads with diamond design, square nose, in lengths as required, FS RR-T-650, Composition A.

a. Depth: 12-1/2"

b. Thickness: 1/4" tapering to 3/16"

6. Rubber Stair Risers: Molded rubber risers to match stair treads or nosings, in lengths as required.

a. Thickness: 0.10"

b. Height: 7"

7. Flooring Type 12: Vinyl Sheet Flooring

a. Armstrong: Medintec or pre approved equal
Specifications:

Gauge:	0.080 inch overall
Reference:	ASTM F-1913
Fire test data	ASTM E 648 Critical Radiant Flux .45 watts/cm sq or more Class 1 ASTM E 662 Smoke – 450 or less
Static Load Limit	ASTM F 970 750 psi (modified)
Adhesives:	As recommended by manufacturer **and complaint with current VOC limits of SCAQMD rule 1168 as consistent with performance and warranty requirements**.

b. Flooring Type 13: Vinyl Sheet Flooring

Armstrong: Classic Corlon or pre approved equal.

Specifications	
Gauge:	.085 inch
Reference:	ASTM F 1303 Type II Grade 1 Class A Backing
Fire Test Data	ASTM 648 Critical Radiant Flux .45 watts/cm sq or more Class 1
Static Load Limit	ASTM F 970 9 (modified) 500 psi
Installation	Securabond method

8. Resilient Edge Strips: 1/8" thick, homogeneous vinyl or rubber composition, tapered or bullnose edge, color to match flooring, or as selected by Architect from standard colors available; not less than 1" wide.
9. Adhesives (Cements): Waterproof, stabilized type as recommended by flooring manufacturer to suit material and substrate conditions**. Adhesive shall comply with current VOC limit of SCAQMD rule 1168 as consistent with performance and warranty requirements.**

10. Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer. **Primer shall comply with current VOC limit of SCAQMD rule 1113 as consistent with performance and warranty requirements.**

11. Leveling Compound: Latex type as recommended by flooring manufacturer.

3. PART 3 - EXECUTION

3.1 PREPARATION

A. Broom clean or vacuum surfaces to be covered, and inspect subfloor. Start of flooring installation indicates acceptance of subfloor conditions and full responsibility for completed work.

B. Use leveling compound as recommended by flooring manufacturer for filling small cracks and depressions in subfloors.

C. Perform bond and moisture tests on concrete slabs to determine that concrete surfaces are sufficiently cured, dried and ready to receive flooring.

D. Apply concrete slab primer, if recommended by flooring manufacturer, prior to application of adhesive. Apply in compliance with manufacturer's directions.

3.2 INSTALLATION

A. General

1. Install flooring using method indicated in strict compliance with manufacturer's recommendations. Extend flooring into toe spaces, door reveals, and into closets and similar openings.

2. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other non-permanent marking device.

3. Tightly cement flooring to subbase without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections.

B. Tile Floors

1. Lay tile from center marks established with principal walls, discounting minor offsets, so that tile at opposite edges of room area of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis, unless otherwise shown.

2. Match tiles for color and pattern by using tile from cartons in same sequence as manufactured and packaged if so numbered. Cut tile neatly around all fixtures. Broken, cracked, chipped, or deformed tiles are not acceptable.

3. Lay tile in a pattern to be provided by the Architect consisting of not more than 3 different colors of tile.

4. Adhere tile flooring to substrates using full spread of adhesive applied in compliance with flooring manufacturer's directions.

C. Accessories

1. Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required. Install base in lengths as long as practicable, with preformed corner units, or

fabricated from base materials with mitered or coped inside corners. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces.

2. On masonry surfaces, or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.

3. Place resilient edge strips tightly butted to flooring and secure with adhesive. Install edging strips at edges of flooring which would otherwise be exposed.

3.3 CLEANING AND PROTECTION

A. Remove any excess adhesive or other surface blemishes, using neutral type cleaners as recommended by flooring manufacturer. Protect installed flooring with heavy Kraft paper or other covering.

B. Finishing: After completion of project and just prior to final inspection of work, thoroughly clean floors and accessories.

END OF SECTION 096500

CARPET
SECTION 096800

1 PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general conditions of contract, including general and supplementary general conditions, and Division 01 specification sections, apply to this section.

1.2 WORK INCLUDED

A. Inspect and approve surfaces to receive carpet.

B. Project proposals will be provided on the AISD Project Proposal Form and will include a plan of the area to receive new carpet, with dimensions, description of all material proposed with quantities and MSDS sheets for each material.

C. Receive AISD approval before commencing work.

D. Apply glue down carpet on floor surface where indicated, complete with all required accessories.

E. Install appropriate transition edge strips where carpet terminates at other floor finishes.

F. Leave job site clean, vacuumed and ready for immediate use.

G. Inspect and verify all work is complete and ready for occupancy.

1.3 STANDARDS

The following association standards (and all latest revisions thereto) shall apply to this work in their full content except as may be noted herein. The Contractor is responsible for application to the specific items found herein.

American Carpet Institute, Inc., 350 – 5th Avenue, N.Y. 1, N.Y.

1.4 CODES

A. Carpet shall meet the following Specification Standards, and all latest revisions thereto apply to this work in their full content except as may be noted herein. The Contractor is responsible for their application to the specific items found herein.

1. Certified
   to pass the Methenamine Pill Test for Carpet Flammability in accordance with Federal Specifications DOC-FF1-70, having a flame spread of not more than 75.

2. Radiant Panel Apparatus Test conforming to Federal Specification 00-13B and SATM E-648 NFPA-253 having a minimum critical radiant flux of 0.45 watts per square centimeter.

3. Smoke Density Test in accordance with ASTM E-622-83 and NFPA 258-1976 having a smoke developed or specific optical density of 450 or less.

4. Electrostatic Propensity Test (AATCC 134) - less than 3.0 kilovolts.

1.5 ENVIRONMENTAL

A. All installed carpet products and their emissions shall not effect indoor air quality.

B. All carpet adhesives shall comply with the current VOC limits of SCAQMD rule 1168.

C. Do not apply adhesives in a closed unventilated environment.

D. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, available colors, and method of installation.

E. Samples: Submit two sample books illustrating color and pattern specified.

F. Provide Material Data Safety Sheets: This information shall be submitted before any products are installed.

G. Carpets installed within the building shall meet the testing and product requirements of the Carpet and Rug Institute (CRI) Green Label Plus program; Carpet pad installed within the building shall meet the testing and product requirements of the CRI Green label program.

1.6 QUALITY ASSURANCE

A. Installer: A firm with not less than 5 years experience in installation of commercial carpet, by methods similar to those required for this project.

B. All materials shall be installed by workmen skilled in the carpet trade, and shall meet or exceed the highest standards of the carpet.

1.7 SUBMITTALS

A. Work
proposals will be provided on the AISD Proposal Form and will include a plan of the area to receive new carpet, with dimensions, description of all materials proposed with quantities and MSDS sheets for each material proposed.

B. Provide Material Data Safety Sheets **and Product data stating VOC content in g/l:** This information shall be submitted before any products are installed.

C. Submit documentation indicating all carpet meets the testing and product requirements of the CRI Green Label Plus program and all carpet pad meets the testing and product requirements of the CRI Green Label program.

D. Submit documentation indicating the percentage of pot-consumer and post-industrial recycled material in carpet and carpet pad.

1.8 EXTRA STOCK AND REMNANTS

Upon completion of the carpet installation, the carpet contractor shall deliver to the Owner an amount of each type and pattern of carpet used equal to 1% of the net area laid, not to exceed 10 square yards. Trim strips and cutouts suitable for patching purposes shall also be packaged and delivered to Owner.

1.9 DELIVERY AND STORAGE

A. Deliver carpet in rolls covered with original mill protective wrapping and in sealed cartons with register number tags attached to each roll or carton. Deliver tags to the Architect or Project Manager along with a sample of carpet cut from each roll.

B. Store flat in dry protected, well ventilated areas.

1.10 JOB CONDITIONS

A. All areas to be carpeted shall be field measured prior to installation. The AISD Project Manager shall be notified in writing of the required quantities and color selection for each project prior to the placement of an order with the carpet mill. Notification shall be on the AISD Project Proposal Form.

B. Existence of vinyl composition tile in existing buildings in the area to receive new carpet shall be brought to the attention of the AISD Project Manager prior to the commencement of any work. Testing and any necessary asbestos abatement will be performed by AISD.

C. Environmental Conditions: Building and carpet materials shall be heated at a minimum of 68°F for at least 72 hours prior to installation with the relative humidity not more than 65%. Keep temperatures at same level night and day during installation for at least 40 hours after completion of installation. A minimum temperature of 50°F shall be maintained thereafter.

1.11 GUARANTEE

A. Provide Owner with installer's written guarantee that shall guarantee completed installation to be free of defects in materials and workmanship for a period of one year after final acceptance. Guarantee shall provide for replacement of defective work at no cost to Owner.

B. Provide Owner with manufacturer's written guarantee signed by an officer of the firm, that warrants carpet against delamination, edge ravel and tuft bind (20# wet or dry) for a period of ten-years. Warranty shall provide for replacement of defective material at no cost to Owner.

C. Provide Owner with manufacturer's written guarantee, signed by an officer of the corporation, that warrants carpet against excessive wear (loss over 10% of face yarn by weight) within a period of ten years. Warranty shall provide for replacement of worn areas at no cost to Owner.

2 PART 2 - PRODUCTS

2.1 PRODUCTS

A. Approved Carpets:

1. Flooring Type 1: New Carpet – Broadloom

Mannington Gametime III 20 or pre-approved equal
Carpet shall meet or exceed the following minimum specifications.

Specifications

Construction:	Tufted Texture – Twist Loop
Face Fiber:	XTI Type 6,6 nylon
Dye Method:	Solution/Yarn
Gauge:	1/10”
Stitches per Inch:	6.33
Tuft Density:	63.30 /sq inch
Pile Thickness:	.086 inch
Tufted Yarn Weight:	20 ounces /Sq. Yd.
Primary Backing:	100% Woven Synthetic
Secondary Backing:	Integra HP RE
Standard Width	12’

2. Flooring Type 2: New Carpet – Broadloom

Lees, *Faculty IV,* or pre-approved equal. Carpet shall meet or exceed the following minimum specifications:

Specifications

Construction	Tufted
Surface Texture	Performance loop pile
Gauge	1/8" (31.5/10cm)
Stitches per inch	8.3 per inch (32.68/10cm)
Pile Height	.145" avg. (3.7 m)
Face Fiver	100% Dupont Antron® Legacy with DuraTech Soil Protection by DuPont
Dye Method	Yarn dyed
Fiber Technology	DuraColorv® by Lees Stain Resistant System
Face yarn weight	26 oz./yd². (881.66 gm/m²)
Primary Backing	Reinforced Synthetic
Bonding Agent	Premium vinyl fiberglass reinforced
Secondary Backing	fiberglass reinforced thermoplastic composite
Total weight	146.45.20 oz/yd²
Size	6' width (1.83m)

3. Flooring Type 3: New Carpet – Broadloom

Shaw Interplay 24 Eco Worx Performance Broadloom
Carpet shall meet or exceed the following minimum specifications:

Specifications

Construction:	Textured Loop
Face Fiber:	100% Eco Solution-Nylon
Dye Method:	Solution Dyed, with SSP Shaw Soil Protection
Face Yarn Weight:	24. ozs./sq.yd.
Gauge:	1/10
Stitches per inch:	06.66 per inch
Primary Backing:	Synthetic
Secondary Backing	EcoWorx Performance Broadloom
Density:	10.286 ozs./.cu.yd.
Size:	12'

4. Flooring Type 4: New Carpet Tile- Modular

Mannington Everywear Modular or pre-approved equal
Carpet shall meet or exceed the following minimum specifications.

Specifications

Construction:	Tufted Texture – Twist Loop
Face Fiber:	XTI Type 6,6 nylon
Dye Method::	Solution /Yarn
Gauge:	1/10”
Stitches per Inch:	6.33
Tuft Density:	63.30 / sq inch
Pile Thickness:	.086 inch
Tufted Yarn Weight:	20 ounces /Sq. Yd.
Primary Backing:	100% Woven Synthetic
Secondary Backing:	Integra HP RE
Size:	24” &24” Modular Tile

5. Flooring Type 5: New Carpet – Modular

   Lees, Faculty IV DK162 Modular, or pre-approved equal. Carpet shall meet or exceed the following minimum specifications:

   Specifications

Construction	Tufted
Surface Texture	Performance loop pile
Gauge	1/8”
Stitches per inch	8.3 per inch
Pile Height	.145” avg.
Face Fiber	100% Dupont Antron® Legacy with DuraTech Soil Protection by DuPont
Dye Method	Yarn dyed
Fiber Technology	DuraColor® by Lees Stain Resistant System
Face yarn weight	26 oz./yd² .
Primary Backing	Reinforced Synthetic
Bonding Agent	Premium vinyl
Secondary Backing	fiberglass reinforced thermoplastic composite
Total weight	146.45.20 oz/yd²
Size	18”x18”

6. Flooring Type 6: New Carpet Tile – Modular

   Shaw Interplay 24 EcoWorx Performance Tile
   Carpet shall meet or exceed the following minimum specifications:

   Specifications

Construction:	Textured Loop
Face Fiber:	100% Eco Solution-Nylon

Dye	Method:
Face Yarn Weight:	24. ozs./sq.yd.
Gauge:	1/10
Stitches per inch:	06.66 per inch
Primary Backing:	Synthetic
Secondary Backing	EcoWorx Performance Broadloom
Density:	10.286 ozs./.cu.yd.
Size:	24” x 24”

2.2 OTHER MATERIALS

A. Adhesive: Only Type recommended by floor covering manufacturer to suit application and expected service to ensure carpet warrantee. **Adhesive shall comply with current VOC limits of SCAQMD as consistent with performance and warranty requirements.**

B. Rubber Reducer Strip: Standard 1 inch wide with beveled width Roppe Series; color to be selected

C. Rubber Cove Base: F-1861, Type TS, Group 1 (solid) Rubber, 4 inches high by 1/8 “thick; with matching ends stops and performed, molded corners. Manufacturers: Roppe Pinnacle Rubber or approved equal. Color as selected by Project Manager.

D. Underlayment: Only the type recommended by manufacturer to suite application and expected service and warranties.

2.3 SPECIAL REQUIREMENTS FOR ALL CARPETS

A. Antimicrobial treatment must be in all carpet installed under this contract.

3. PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION

A. Prior to installation, inspect and approve surfaces to receive carpeting for proper application. Installation of carpet shall constitute acceptance of flooring substrate by contractor. Inspect sub-flooring for cracks, holes, abrasions, rough spots and ridges and be sure floor has been cleaned of dust, dirt, solvents, oil, grease, paint, plaster, wax and other substances detrimental to proper performance of adhesive and carpet, or other conditions that will adversely affect execution and quality of work. Report discrepancies in writing to General Contractor or Owner with copies to Project Manager.

B. New concrete slabs shall be allowed to age 60 days minimum. If directed, perform moisture test and obtain acceptable results. See manufacturer's

specifications for porosity of floor.

C. Fill depressions, holes, and cracks with underlayment. Do not use water base "floor stone" product. Trowel and featheredge unerlayment to a smooth and level surface. Grind down high spots and finish with underlayment. Finish floor level to within 1/8"; in 10 feet. Do not proceed until defects are corrected.

D. Carefully check dimensions and other conditions in facilities and be responsible for proper fitting of carpet in areas designated.

E. Do not proceed until defects are entirely corrected. Application or installation of carpet shall constitute acceptance of substrates.

3.2 INSTALLATION

A. All materials shall be installed by qualified carpet mechanics under proper supervision. Prior to installation, all floor irregularities shall be repaired and the floor shall be thoroughly clean with all grit and dirt removed before carpet is laid.

B. Lay carpet on floors with the run of the pile in same direction as anticipated traffic flow.

C. Do not change run of pile on any one room or from one room to next where continuous through a wall opening. If multiple wall openings exist, lay carpet with run of pile continuous through openings with heaviest anticipated traffic flow.

D. Use only manufacturer's recommended adhesive.

E. Cut two pieces of carpet to length, plus trim and lay in place. Form seams by method as recommended by the carpet manufacturer. Snap a chalk line to mark seam location.

(NOTE: The carpet installer should be a qualified experienced professional, using all proper equipment as recommended by manufacturer.)

F. If recommended by the manufacturer, it is imperative that the carpet installer applies a bead of latex adhesive seam sealer to the cut edge following manufacturer's instruction.

G. Place the edge of one length along the chalkline. Smooth out wrinkles. Then stay nail at 12-18 inch (304.8-457.2mm) intervals down the carpet's center line parallel to its edge. The line of stay nails may have to be made closer to the seam if so dictated by the previously determined open time or the number of men present. Use long thin nails hammered through carpet scraps for greater visibility and easier removal. Make sure carpet does not shift from the chalk line.

H. Check the pile direction before unrolling the second length.

I. Using a notched trowel (1/8" x 1/8" x 1/8") spread the adhesive evenly, using a semi-circular motion to avoid excessive deposits or missed areas. Check the trowel occasionally to see that it is free of foreign matter, and also that the 1/8" notch is maintained.

J. Since the atmospheric conditions, type of substrate, and spread rate vary from job to job, the determination of the proper open time of the adhesive must be made by the installer on each particular job site.

K. Next, space the crew evenly apart and pick up the folded back first edge. Hold the edge and walk it in toward the proposed seam.

L. Have the center man walk slightly faster and ahead of the others. This forms a wedge of carpet at the center that he places on the spread adhesive.

M. Followed by the rest of the crew until the entire previously folded back portion is back on the adhesive. This wedge carrying technique helps avoid wrinkles in the carpet when placing it on the adhesive.

N. The next optional but useful step is to sweep the carpet. Natural fiber push brooms offer little resistance to the sweeping. Sweep from the stay nails toward the cut edge and both ends of the length to allow any trapped air to escape.

O. Now use a roller 50-100 lbs. (22.68 - 45.36 kg) to roll the entire carpet. The rolling is very important since you must achieve a good transfer of adhesive from the floor to the carpet back in order to assure permanent adhesion. First roll across the width of the carpet to remove air pockets. Then roll in the length direction to assure complete adhesive transfer.

P. Now pick up the folded back second edge. This time have all the men walk in an even line to carry the edge toward the cemented down first edge and place it on the adhesive.

Q. Since most of the fitting was previously made, the seam can be completed with minimal adjustments. The resulting seam should be tight but show no peak. By the same token, it should not be open and require kicking up as that would be difficult at this stage of the installation.

R. Remove the stay nails in both lengths. Brush and roll the cemented portion of the second length. This completes the adhesion of the same portion in both starting lengths.

S. Finish the seam by brushing it with a stiff hand brush. Trim any protrusions with napping shears. Electric shears, such as animal shears, can be used on large installation.

T. Continue the above procedure throughout the installation striking a chalk line for the placement of each seam.

U. At columns and other penetrations, cut carpet with maximum possible overage. Position the seams made by these cuts first.

V. Neatly trim edgings of carpet for tight fit to walls and base: cut and fit evenly around projects and into trims strips.

W. Fit closely and evenly to, in and through doorways, terminating carpet under doors.

X. Lay carpet with a minimum of seams in accordance with approved Shop Drawings. Do not use small carpet to fill strips. Do not place seams perpendicular to doors or entries. Minimize seams in traffic lanes. Do not install carpet from different dye lots adjacent to or abutting each other in the same areas. Materials abutting one another shall have no noticeable variation in color.

Y. Cross joints necessary due to layout of areas shall be at absolute minimum.

Z. Cross joints necessary due to length of rolls received shall be placed in cutting to avoid occurrence at conspicuous locations, near doors or at pivot points.

AA. Install edge strip where carpet meets other flooring materials, including door-opening locations. Trim toe of reducer to same thickness as adjacent flooring material. Use full-length pieces only. Butt tight to vertical surfaces. Where splicing cannot be avoided, butt end and flush.

BB. Sew seams at risers. Place seams in non-conspicuous locations.

CC. Neatly cut carpet around floor openings, electrical outlets and other projections.

DD. Leave finished installation smooth and free of ripples, puckers or other defects.

3.3 PROTECTION AND CLEANING

A. After carpet installation is completed, remove remnants, wrapping paper and debris.

B. Remove loose pieces of yarn with sharp scissors.

C. Remove soiled spots from carpet using proper spot remover.

D. Clean carpet with commercial beater bar type vacuum cleaner.

E. Repair any damages or stains to adjacent materials, caused by installer or his workmen.

F. Do not place heavy objects such as furniture on carpet surface for minimum of 24 hours, or until adhesive is set. Replace carpet displaying adhesive "bleed through".

3.4 REPLACEMENT CARPET

Upon completion of the current installation, the carpet contractor shall deliver to the Owner an amount of each type or pattern of carpet used equal to 1% of the net area laid about not to exceed ten (10) square yards. Trim strips and cutouts suitable for patching purposes shall be delivered to Owner.

3.5 PRECAUTIONS

A. Precautions shall be taken to protect work performed or completed by other trades.

B. The carpet installer shall be responsible for his damages to work of other trades.

C. The carpet subcontractor shall inspect all surfaces to receive carpet prior to the beginning of any carpet installation and shall notify the General Contractor and the Project Manager in writing of any surfaces not properly prepared. Installation of carpeting assumes responsibility by carpet subcontractor of any defects of surface below.

D. Appropriate equipment will be used during the installation per manufacturer's recommendation.

E. Upon completion of the total installation of carpeting, the carpet shall be smooth, uniform, pattern-matched, and thoroughly cleaned in every respect. All remnants and scraps smaller than 3'x3' shall be removed from the job site.

F. Maintenance Manuals: The carpeting manufacturer shall furnish the Owner a minimum of three printed copies of the manufacturer's recommendation for the care, cleaning and maintenance for the carpet furnished. After installation is completed, the carpet installer shall instruct the Owner's maintenance personnel in the care, cleaning, and maintenance of the installed carpet.

END OF SECTION 096800

CARPET TILE

SECTION 096900

1 PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this Section.

1.2 DESCRIPTION OF WORK

A. Extent of carpet tile and accessories is shown on Drawings and in schedules and includes the following:

1. Carpet tile floor

1.3 SUBMITTALS

A. Product Data: Submit two (2) copies of manufacturer's technical data and installation instructions for carpet tile flooring and accessory.

B. Samples: Submit samples of each type, color, and pattern of carpet tile flooring material, including accessories, required, and indicating full range of color and pattern variation. Provide full-size units of each carpet tile.

C. Asbestos-Free Certification: All products and materials included in this Section shall be free from all forms of asbestos and shall be so certified by the Contractor and Manufacturer. Certification shall accompany Submittals and shall be required prior to final acceptance.

D. Provide product data and MSDS indicating the VOC content in g/l of all carpet and base adhesives.

E. Submit documentation indicating all carpet meets the testing and product requirements of the CRI Green Label Plus program and all carpet pad meets the testing and product requirements of the CRI Green Label program.

F. Recycling Certification: Submit manufacturer’s certification that new carpet and backing materials meet or exceed the following recycling requirements.

1. Products: Shall contain a minimum of 21.5% recycled materials. **Provide manufacture's documentation of percentage post-consumer and post-industrial recycle content.**

2. Product can be recycled through an on-going manufacturer's lifecycle program.

G. Shop Drawings showing columns, doorways, enclosing walls or partitions, borders, patterns, built-in cabinets, and locations where cutouts are required in carpet tile. Indicate the following:

1. Existing flooring materials to be removed.
2. Carpet tile type, color, and dye lot.
3. Locations where dye lot changes occur.
4. Seam locations, types, and methods.
5. Type of subfloor.
6. Type of installation.
7. Pattern type, location, and direction.
8. Pile direction.
9. Type, color, and location of insets and borders.
10. Type, color, and location of edge, transition, and other accessory strips.
11. Transition details to other flooring materials.

H. Samples for initial selection in the form of manufacturer's color charts or Samples of materials showing the full range of colors, texture, and patterns available for each type of carpet tile indicated.

I. Samples for verification of the following products, in manufacturer's standard sizes, showing the full range of color, texture, and pattern variations expected. Prepare Samples from the same material type, color, pattern, and designation indicated on Drawings and carpet tile schedule. Submit the following:

1. Full-size samples of each type of carpet tile required.
2. 12-inch Samples of each type of exposed edge stripping and accessory item.

J. Schedule of carpet tile using same room or area designations indicated on Drawings.

K. Maintenance data for carpet tile to include in the operation and maintenance manual specified in Division 1. Include the following:

1. Methods of maintaining carpet tile, including manufacturer's recommended frequency for maintaining carpet tile.

2. Precautions for cleaning materials and methods that could be detrimental to finishes and performance. Include cleaning and stain-removal products and procedures.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who is certified by the Floor Covering Installation Board (FCIB) or who can demonstrate compliance with FCIB certification program requirements.

B. Single-Source Responsibility: Obtain each type of carpet tile from one source and by a single manufacturer.

C. Fire-Test-Response Characteristics: Provide carpet tile with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify carpet tile with appropriate markings of applicable testing and inspecting agency.

1. Surface Flammability: Passes CPSC 16 CFR, Part 1630.
2. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.
3. Flame Spread: 25 or less per ASTM E 84.
4. Smoke Developed: 450 or less per ASTM E 84.

D. Mockups: Prior to installing carpet tile, construct mockups for each form construction and finish required to verify selections made under Sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.

1. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect.
2. Notify Architect one week in advance of the dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architects' approval of mockups before start of final unit of Work.
5. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. When directed, demolish and remove mockups from Project site.
7. Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with the Carpet and Rug Institute's CRI 104, Section 5: "Storage and Handling."

B. Deliver materials to Project site in original factory wrappings and containers, labeled with identification of manufacturer, brand name, and lot number.

C. Store materials on-site in original undamaged packages, inside well-ventilated area protected from weather, moisture, soilage, extreme temperatures, and humidity. Lay flat, with continuous blocking off ground.

1.6 PROJECT CONDITIONS

A. General: Comply with CRI 104, Section 6: "Site Conditions."

B. Space Enclosure and Environmental Limitations: Do not install carpet tile until space is enclosed and weather proof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

C. Subfloor Moisture Conditions: Moisture emission rate of not more than 3 lb/1000 sq. ft./24 hours when tested by calcium chloride moisture test in compliance with CRI 104, 6.2.1, with sub floor temperatures not less than 55 deg F.

D. Sub floor Alkalinity Conditions: A pH range of 5 to 9 when sub floor is wetted with potable water and pHydrion paper is applied.

1.7 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in additions to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Carpet Tile Warranty: Submit a written warranty executed by carpet tile manufacturer and Installer agreeing to repair or replace carpet tile that does not meet requirements or that fails in materials or workmanship within the specified warranty period. Failures include, but are not limited to, more than 10 percent loss of face fiber, tile curling, snags, runs, and delamination.

C. Warranty Period: 15 year non-Prorated Commercial Wear, edge ravel and delamination warranties, from date of Substantial Completion.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.

B. Carpet Tile: Before installation begins, furnish quantity of full-size units equal to 5 percent of amount installed for each color.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Approved Manufacturers, subject to the specific requirements of this Section are: Interface and Shaw.

B. Carpeting Substitutions: The products listed herein are based on a specific manufacturer to establish a standard of quality and minimum design requirements. Products from other approved manufacturers will be considered by the Architect provided they comply with the technical requirements of this section and match the specified product in colors, texture, pattern and finish to the satisfaction of the Owner and Architect. If one of the listed manufacturers wishes to submit a specific product during the bidding of the project, he shall comply with the following:

1. Submit Product Data Sheet for Carpet Tile, indicating compliance with all requirements.
2. Submit Sample Book for comparable patterns and textures.
3. Without prejudice, submitted samples may not be acceptable for intended design and may be rejected by the Architect for this project.
4. Acceptable substitutes must be established prior to Bid and within the time frames established in the Contract Documents.

2.2 CARPET TILE

A. Products: Subject to compliance with requirements, provide one of the products specified in each carpet tile Product Data sheet at end of this Section.

B. Interface Carpet Tile, as specified below, is an approved product. The Interface product specified contains a recycled petroleum waste product used in Interface's GlasBac Backing.

C. PRODUCT DATA SHEETS – CARPET TILE

1. Carpet Tile Designations: Border and Field areas shown on the plans.
2. Field Area: Interface “Cubic”. (Quarter turn installation.)

2.3 ACCESSORIES

A. Carpet Edge Guard and Reducer Strips: Extruded or molded heavy-duty rubber of size and profile selected by Architect; minimum 2-inch wide anchorage flange; manufacturer’s standard colors: Roppe or equal.

B. Carpet Tile Adhesive: Adhesive must be environmentally sensitive with a low emittance of VOC’s. Adhesive shall be water resistant and non-staining as recommended by carpet manufacturer to comply with flammability requirements for installed carpet. **All adhesive shall comply with current VOC limits of SCAQMD rule 1168 as consistent with performance and warranty requirements.**

C. Interface Grid-Set Green Glue 2000, a releasable, pressure sensitive, low VOC adhesive is an approved product.

D. Under no circumstances shall a “chlorinated hydrocarbon” solvent be used on this project. Do not use solvent based adhesives.

2.4 INSTALLATION ACCESSORIES

A. Concrete-Slab Primer: Non-staining type as recommended by carpet tile manufacturer. **Slab primer shall comply with current VOC limits of SCAQMD rule 113 and 1168 as consistent with performance and warranty requirements.**

B. Pressure Sensitive Vinyl Backed Carpet Adhesive: Provide product equal in all respects to Shaw Industries, Inc. Sureset 5000; address: 615 East Walnut Ave., P.O. Drawer 2128, Dallon, GA 30722-2128. Furnish MSDS with Submittal. **Carpet Adhesive shall comply with current VOC limits of SCAQMD rule 1168 as consistent with performance and warranty requirements.**

C. Submit recycling literature and certifications.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine subfloors and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation

tolerances, and other conditions affecting performance of carpet tile. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Verify that subfloors and conditions are satisfactory for carpet tile installation and comply with requirements specified in this Section and those of carpet tile manufacturer.

3.2 PREPARATION

A. General: Comply with carpet tile manufacturer's installation recommendations to prepare substrates indicated to receive carpet tile installation.

B. Existing Subfloor: Remove all traces of existing adhesives before proceeding with further subfloor preparation, in accordance with recommendations of carpet tile manufacturer.

Note: If asbestos containing materials are suspected in subfloor adhesive, notify Owner and Architect immediately for testing before proceeding with demolition of existing carpet.

C. Level subfloor within ¼ inch in 10 feet non cumulative, in all directions. Sand or grind protrusions, bumps, and ridges. Patch and repair cracks and rough areas. Fill depressions. Use leveling and patching compounds to fill cracks, holes, and depressions in subfloor as recommended by carpet tile manufacturer.

D. Remove subfloor coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone.

E. Broom or vacuum clean subfloors to be covered with carpet tile. Following cleaning examine subfloors for moisture, alkaline salts, carbonation, or dust.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 13: "Carpet Modules (Tiles)."

B. Where demountable (modular) partitions or other items are indicated for installation on top of finished carpet tile floor, install carpet tile before installation of these items.

C. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.

D. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

E. Rotate each tile quarter turn when installing.

3.4 CLEANING

A. Perform the following operations immediately after completing installation:

1. Remove visible adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove protruding yarns from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

3.5 PROTECTION

A. General: Comply with CRI 104, Section 15: "Protection of Indoor Installation."

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure carpet tile is without damage or deterioration of the time of Substantial Completion

END OF SECTION 096900

SECTION 09 9000
PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains, varnishes, and other coatings.

C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished

D. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Floors, unless specifically so indicated.
   6. Glass.
   7. Concealed pipes, ducts, and conduits.

1.02 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. Green Seal GS-11 (current standard at time of project’s notice to proceed) for paints, primers and anti-corrosive coatings applied within the building weatherproofing system.

C. SCAQMD r1113 for all interior coatings.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.

1.04 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Provide lighting level of 80 ft. candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

B. Paints, stains and transparent finishes:
   1. Diamond Vogel Paints: www.diamondvogel.com.

2. Glidden Professional: www.gliddenprofessional.com.
3. PPG Architectural Finishes, Inc: www.ppgaf.com.
4. Pratt & Lambert Paints: www.prattandlambert.com.
5. Sherwin-Williams Company: www.sherwin-williams.com.

C. Primer Sealers: Same manufacturer as top coats

D. Block Fillers: Same manufacturer as top coats.

E. Substitutions: See Section 01 6000 - Product Requirements.

F. Paint colors: As indicated on drawings.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
2. Supply each coating material in quantity required to complete entire project's work from a single production run.
3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content: Comply with Section 01 8113.

2.03 PAINT SYSTEMS - EXTERIOR

A. Paint - Ferrous Metals, Primed, Alkyd, 2 Coat:
1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
2. Semi-gloss: Two coats of alkyd enamel;

B. Paint - Galvanized Metals, Alkyd, 3 Coat:
1. One coat galvanize primer.
2. Semi-gloss: Two coats of alkyd enamel;

2.04 PAINT SYSTEMS - INTERIOR

A. Paint - Medium Duty Vertical/Overhead: Including gypsum board, uncoated steel, shop primed steel, galvanized steel, and wood.
1. Two top coats and one coat primer.
2. Top Coat(s): MPI High Performance Architectural Interior Latex; MPI #138-141.
3. Satin: MPI gloss level 4; use this sheen at all locations.
4. Primer(s): As recommended by manufacturer of top coats.

B. Polyurethane Varnish System on Interior Wood:
1. Prime Coat: matching topcoat
2. Intermediate Coat: matching topcoat
3. Topcoat: Varnish, interior, polyurethane, oil-modified, satin (MPI Gloss Level 4), MPI #57
2. Topcoat: Varnish, interior, polyurethane, oil-modified, gloss (MPI Gloss Level 6), MPI #56

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

3.02 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance.

D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.03 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.04 ATTIC STOCK

A. Prpvide the Owner with 10% attic stock (extra material) in full containers, marked with contents/color. Deliver to location indicated by the Owner's Representative.

END OF SECTION

SECTION 230100 – COMMISSIONING OF MECHANICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes commissioning process requirements for mechanical (HVAC&R) systems, assemblies, and equipment.

B. Related Sections:

1. Division 01 Section 016500 – "GENERAL COMMISSIONING REQUIREMENTS" for general commissioning process requirements.

2. Division 22 Section 220100 - "COMMISSIONING OF PLUMBING SYSTEMS".

3. Division 26 Section 260100 - "COMMISSIONING OF ELECTRICAL SYSTEMS".

1.3 DEFINITIONS

A. Commissioning Authority (CxA): Independent agent hired by Owner and not associated with General Contractor or its subcontractors, Architect or its sub-consultants, or Construction Administrator or its staff or consultants. Under Owner's direction, and not General Contractor's direction, CA will direct and coordinate day-to-day commissioning activities without assuming oversight responsibilities.

B. Refer to section 016500- GENERAL COMMISSIONING REQUIREMENTS for additional definitions and assignment of responsibilities.

1.4 REFERENCES

A. National Environmental Balancing Bureau (NEBB) - Procedural Standards for Building Systems Commissioning

B. American Air Balance Council (AABC) - Commissioning Guideline

C. SMCNA - HVAC Systems commissioning Manual

1.5 CONTRACTOR'S RESPONSIBILITIES

A. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS.

B. Perform commissioning tests at the direction of the CxA.

C. Attend construction phase controls coordination meeting.

D. Attend testing, adjusting, and balancing review and coordination meeting.

E. Participate in mechanical systems, assemblies, equipment, and component maintenance orientation and inspection.

F. Provide information requested by the CxA for final commissioning documentation.

G. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

H. Complete project-specific pre-functional/construction checklists and commissioning process test procedures for actual mechanical systems, assemblies, equipment, and components to be furnished and installed as part of the construction contract.

I. Direct and coordinate commissioning testing among subcontractors, suppliers, and vendors.

J. Verify testing, adjusting, and balancing of Work are complete.

K. Provide test data, inspection reports, and certificates in Systems Manual.

1.6 COMMISSIONING DOCUMENTATION

A. Provide the following information to the CxA for inclusion in the commissioning plan:

1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
3. Process and schedule for completing construction checklists and manufacturer's pre-start and startup checklists for mechanical systems, assemblies, equipment, and components to be verified and tested.
4. Certificate of completion certifying that installation, pre-start checks, and startup procedures have been completed.
5. Certificate of readiness certifying that mechanical systems, subsystems, equipment, and associated controls are ready for testing.
6. Test and inspection reports and certificates.
7. Corrective action documents.
8. Verification of testing, adjusting, and balancing reports.

1.7 SUBMITTALS

A. Certificates of readiness.

B. Certificates of completion of installation, pre-start, and startup activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL

A. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS.

3.2 PRE-FUNCTIONAL CHECKLISTS

A. Contractor shall conduct Pre-functional Testing to document compliance with installation and pre-functional checklists prepared by Commissioning Authority for Division-23 items.

B. Request verification of Pre-functional checklists by CxA prior to proceeding with system start-up and Functional Testing of systems.

C. Refer to Section 016500 - GENERAL COMMISSIONING REQUIREMENTS for issues relating to pre-functional checklists and testing, description of process, details on non-conformance issues relating to pre-functional checklists and test.

3.3 SYSTEM START-UP & INSPECTIONS

A. Contractor is solely responsible for system start-up. CxA may, at his discretion, witness start up procedures, but will not perform any Functional Testing of systems until Contractor has completed start-up and resolved all operating deficiencies.

B. Contractor is solely responsible for all tests and inspections required by the Authority Having Jurisdiction (AHJ). All test reports and certificates required by the AHJ shall be submitted prior to Functional Testing.

C. Contractor shall provide no less than 48 hours notice prior to conducting tests specified in other sections of the specifications, including:

1. Duct pressure tests
2. Hydronic piping pressure tests
3. Hydronic piping flushing

CxA shall witness tests at his discretion. Test results shall be documented with respective Pre-functional/construction checklists

3.4 FUNCTIONAL TESTING PREPARATION

A. Certify that mechanical systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify that mechanical instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, corrective work approved, and balance has been verified by CxA (see paragraph below).

D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, and alarm conditions).

E. Inspect and verify the position of each device and interlocks identified on checklists.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed.

3.5 TESTING AND BALANCING VERIFICATION

A. Prior to performance of testing and balancing Work, provide copies of reports, sample forms, checklists, and certificates to the CxA.

B. Upon completion of testing and balancing work, submit a copy of the report for CxA via Architect. CxA shall review report and issue comments via the Architect.

C. Verification: The CxA will notify Contractor seven (7) days in advance of the date of field verification. Notice will not include data points to be verified. This verification must take place prior to Functional Testing of systems.

1. Provide technicians, instrumentation, and tools to verify testing and balancing of mechanical systems at the direction of the CxA.
2. The testing and balancing Subcontractor shall use the same instruments (by model and serial number) that were used when original data were collected.
3. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final testing, adjusting, and balancing report. For sound pressure readings, a deviation of 3 dB shall result in rejection of final testing. Variations in background noise must be considered.
4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.6 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.

B. Scope of mechanical testing shall include entire HVAC installation, from central equipment for heat generation and refrigeration through distribution systems to each space served. Testing shall include measuring capacities and effectiveness of operational and control functions.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. Tests will be performed using design conditions whenever possible.

E. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the Contracting Officer and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

F. The CxA may direct that set points be altered when simulating conditions is not practical.

G. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

H. If tests cannot be completed because of a deficiency outside the scope of the mechanical system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.

I. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.7 GENERAL TESTING PROCEDURES FOR HVAC SYSTEMS, SUBSYSTEMS, AND EQUIPMENT

A. HVAC Instrumentation and Control System Testing: Contractor shall fully test operation of controls system prior to requesting Functional Testing of equipment and systems with CxA. Point-to-point check out sheets and as-built control diagrams shall be provided to CxA so he may develop testing procedures. Refer to Section 230926c BUILDING AUTOMATION SYSTEM COMMISSIONING REQUIREMENTS for commissioning of controls.

B. Mechanical Subcontractor shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan for piping systems. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA.

C. HVAC Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of air distribution systems, chilled water systems and hot water systems.

D. HVAC Equipment Testing: Provide technicians, instrumentation, tools, and equipment to test performance of all HVAC equipment as outlined below.

3.8 FUNCTIONAL TEST PROCEDURES FOR SYSTEMS TO BE COMMISSIONED

A. General

1. The following paragraphs outline the functional test procedures for the various Div. 23 items to be commissioned. Functional testing will take place only after pre-functional checklists have been completed, equipment has been started-up, TAB has been verified, and Contractor has certified that systems are ready for functional testing.
2. All systems controlled via the Building Automation System shall have all control points and sequences tested by Controls Contractor prior to requesting testing by Commissioning Authority. Refer to Section 230926c BUILDING AUTOMATION SYSTEM COMMISSIONING REQUIREMENTS for commissioning of controls.
3. Refer to Section 016500 - GENERAL COMMISSIONING REQUIREMENTS for specific systems to be tested.

B. All Equipment:

1. Verify nameplate information (serial numbers, model numbers, etc.); verify that equipment capacity is in accordance with requirements of construction documents.
2. Verify unit runs smoothly and quietly.
3. Verify operation of safeties.
4. Verify electrical wiring and grounding is correct.
5. Verify maintenance and NEC clearances are maintained.
6. Verify Pre-Functional Checklists have completed.

C. Air Handling Units:

1. Record outside air temperature during test.
2. Record programmed setpoints (occ/unocc heating and cooling temps, coil discharge air temps, static pressure, economizer temp, CO2 setpoint, safeties and alarms)
3. Record programmed schedules
4. Verify fans run smoothly and quietly.
5. Verify voltages and amperages are within tolerance.
6. Verify correct fan rotation (in VFD Auto, Hand, Manual, and Bypass positions).
7. Verify AHU data in TA&B report versus design.
8. Verify chilled water control valve modulation to control supply air temperature.
9. Verify hot water control valve modulation to control discharge air temperature
10. Verify fan modulation to maintain duct static pressure setpoint.
11. Verify damper operation (Return, Outside and relief).
12. Verify Smoke detector operation.
13. Verify all alarms and safeties.
14. Verify all sequences.

D. Dx Single-Zone Units:

1. Record outside air temperature during test.
2. Record space temperature during test.

3. Record programmed setpoints (occ/unocc heating and cooling temps, runtime, safeties and alarms)
4. Record programmed schedules and interlocks
5. Verify fans run smoothly and quietly.
6. Verify voltages and amperages are within tolerance.
7. Verify unit data in TA&B report versus design.
8. Verify compressor cycling to control space temperature.
9. Verify Smoke detector operation.
10. Verify all alarms and safeties.
11. Verify all sequences.

E. Testing Adjusting and Balancing (TAB).

1. Review TAB report for accuracy and completeness.
2. Take random sample of air flow from supply air diffusers and compare to TAB report / design drawings.
3. Take pressure readings at inlets and outlets of hydronic pumps and compare to TAB report and pump curves.

F. Direct Digital Controls (DDC) for HVAC –Refer to Section 230926c BUILDING AUTOMATION SYSTEM COMMISSIONING REQUIREMENTS.

3.9 TRAINING

A. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS.

3.10 O&M MANUALS

A. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS and section 017800 CLOSEOUT SUBMITTALS.

END OF SECTION

SECTION 260100 – COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes commissioning process requirements for electrical systems, assemblies, and equipment.

B. Related Sections:

1. Division 01 Section 016500 – "GENERAL COMMISSIONING REQUIREMENTS" for general commissioning process requirements.

2. Division 22 Section 220100 – "COMMISSIONING OF PLUMBING SYSTEMS".

3. Division 23 Section 230100 - "COMMISSIONING OF MECHANICAL SYSTEMS".

1.3 DEFINITIONS

A. Commissioning Authority (CxA): Independent agent hired by Owner and not associated with General Contractor or its subcontractors, Architect or its sub-consultants, or Construction Administrator or its staff or consultants. Under Owner's direction, and not General Contractor's direction, CA will direct and coordinate day-to-day commissioning activities without assuming oversight responsibilities.

B. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS.

1.4 CONTRACTOR'S RESPONSIBILITIES

A. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS.

B. Perform commissioning tests at the direction of the CxA.

C. Attend construction phase controls coordination meeting.

D. Participate in electrical systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.

E. Provide information requested by the CxA for final commissioning documentation.

F. Complete project-specific construction checklists and commissioning process test procedures for actual electrical systems, assemblies, equipment, and components to be furnished and installed as part of the construction contract.

G. Direct and coordinate commissioning testing among subcontractors, suppliers, and vendors.

H. Provide test data, inspection reports, and certificates for Systems Manual.

1.5 COMMISSIONING DOCUMENTATION

A. Provide the following information to the CxA for inclusion in the commissioning plan:

1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
3. Process and schedule for completing construction checklists and manufacturer's pre-start and startup checklists for electrical systems, assemblies, equipment, and components to be verified and tested.
4. Certificate of completion certifying that installation, pre-start checks, and startup procedures have been completed.
5. Certificate of readiness certifying that electrical systems, subsystems, equipment, and associated controls are ready for testing.
6. Test and inspection reports and certificates.
7. Corrective action documents.

1.6 SUBMITTALS

A. Certificates of readiness.

B. Certificates of completion of installation, pre-start, and startup activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL

A. Refer to section 016500 - GENERAL COMMISSIONING REQUIREMENTS.

3.2 PRE-FUNCTIONAL CHECKLISTS

A. Contractor shall conduct Pre-functional Testing to document compliance with installation and start-up checklists prepared by Commissioning Authority for the Division-26 items.

B. Request verification of Pre-functional checklists by CxA prior to proceeding with system start-up and Functional Testing of systems.

C. Contractor shall participate in Pre-Functional testing activities to document electrical work associated with mechanical and plumbing systems.

D. Refer to Section 016500 - GENERAL COMMISSIONING REQUIREMENTS for issues relating to pre-functional checklists and testing, including list of systems to be commissioned, description of process, details on non-conformance issues relating to pre-functional checklists and test.

3.3 SYSTEM START-UP, TESTS & INSPECTIONS

A. Contractor is solely responsible for system start-up. CxA may, at his discretion, witness start up procedures, but will not perform any Functional Testing of systems until General Contractor has completed start-up and resolved all operating deficiencies.

B. Contractor is solely responsible for all tests and inspections required by the Authority Having Jurisdiction (AHJ). All test reports and certificates required by the AHJ shall be submitted prior to Functional Testing.

C. Contractor shall provide no less than 48 hours notice prior to conducting tests specified in other sections of the specifications, including:

1. Grounding tests

3.4 FUNCTIONAL TESTING PREPARATION

A. Certify that electrical systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify that instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

D. Inspect and verify the position of each device and interlock identified on checklists.

E. Check all notification and initiation devices and interlocks with associated systems during each mode of operation.

F. Testing Instrumentation: Provide instrumentation and personnel as required to conduct tests.

3.5 FUNCTIONAL TESTING PROCEDURES OF SYSTEMS TO BE COMMISSIONED

A. All Electrical and Electrically Powered Equipment

1. Inspect electrical wiring and grounding for proper connections, color coding, and quality of installation.
2. Verify supply voltage, all hot legs.
3. Verify amperage is within allowable limits.
4. Inspect for physical damage, proper installation, anchorage.
5. Verify equipment runs smoothly and quietly.
6. Verify operation of safeties.
7. Verify all required means of disconnect are in place.
8. Verify maintenance and NEC clearances are maintained.

B. Electrical Distribution System

1. Switchboards and Panelboards.
    a. Wiring:
        1) Verify wiring connections are secure.
        2) Verify ground wires properly terminated, panels are grounded.
        3) Verify wiring color coding is proper.
    b. Verify panel is properly identified.
    c. Verify load indicated in circuit directory is actual load served in space (by opening circuit breaker and observing response in space).
    d. Verify load identification is adequately descriptive of load.
    e. Verify phase rotation
    f. Verify phase to phase and phase to neutral volts.
    g. Document phase balance.

3.6 TRAINING

A. Refer to sections 016500 - GENERAL COMMISSIONING REQUIREMENTS.

3.7 O&M MANUALS

A. Refer to sections 016500 - GENERAL COMMISSIONING REQUIREMENTS and section 017800 CLOSEOUT SUBMITTALS.

END OF SECTION

AUSTIN INDEPENDENT SCHOOL DISTRICT

PROJECT #19-0015-CASEY

CSP# 19CSP085

RENOVATIONS AT CASEY ELEMENTARY SCHOOL

DEPARTMENT OF CONSTRUCTION MANAGEMENT

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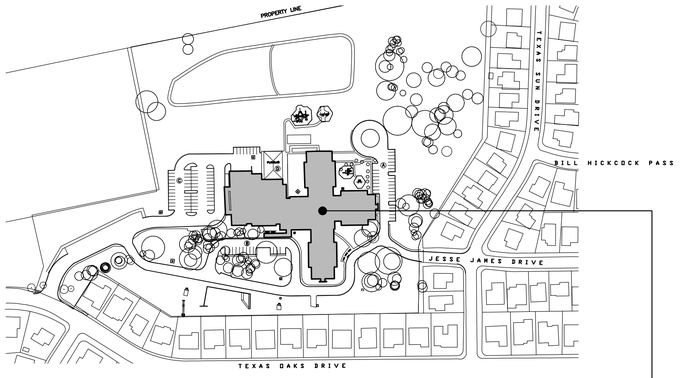
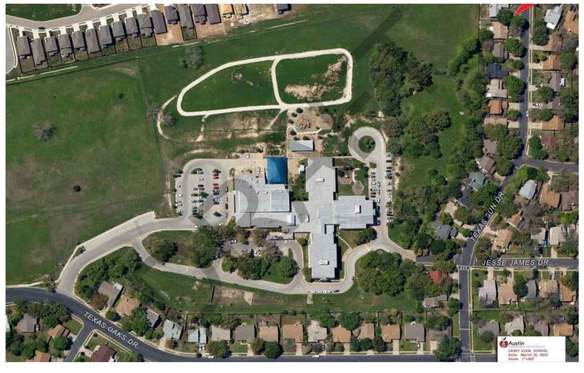
DRAWING INDEX:

CASEY ELEMENTARY SCHOOL





CASEY ELEMENTARY SCHOOL
9400 TEXAS OAKS DR
AUSTIN, TX 78748

AISD BOARD OF TRUSTEES 2017-2018
Geronimo M. Rodriguez, Jr., Vice President, District 6
Julie Cowan, Secretary, District 4
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Jayme Mathias, District 2
Ann Teich, District 3
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Yasmin Wagner, District 7
Cindy Anderson, At-Large Position 8
Paul Cruz, Ph.D., Superintendent
Nicole Conley Johnson, Chief Business Officer

APPLICABLE CURRENT CODES FOR THIS BID PACKAGE
2015 International Building Code
2015 Uniform Mechanical Code
2015 Uniform Plumbing Code
2017 National Electrical Code
2015 International Energy Conservation Code
2010 ASHRAE 62.1
2010 ASHRAE 90.1
City of Austin Amendments

GENERAL SMOKE DETECTOR NOTE:
THE REMOVAL OF SMOKE DETECTORS OR OTHER COMPONENTS OF ANY AISD FIRE ALARM SYSTEM SHALL BE PERFORMED BY A PROPERLY LICENSED FIRE ALARM CONTRACTOR.

NOTES FOR FIRE ALARM CONTRACTOR:
IT IS THE INTENTION OF AISD THAT THE BUILDING FIRE ALARM WILL REMAIN OPERATIONAL DURING CONSTRUCTION.

- SMOKE DETECTORS/FIRE ALARM DEVICES LOCATED IN CEILINGS TO BE RENOVATED ARE TO BE REMOVED BY A STATE LICENSED FIRE ALARM CONTRACTOR PRIOR TO CEILING RELATED DEMOLITION.
- DEVICES ARE TO BE STORED IN A SECURE PLACE FOR RE-INSTALLATION. LEAVE ALL ASSOCIATED WIRING AND CONDUIT IN PLACE FOR THE RE-CONNECTION OF DEVICES IN THE NEW CEILING.
- THE FIRE ALARM CONTRACTOR WILL ENSURE THAT FIRE ALARM WIRING AND CONDUCTORS ARE PROPERLY TERMINATED AND SECURED DURING CONSTRUCTION.
- UPON REINSTALLATION OF SMOKE DETECTORS, THE FIRE CONTRACTOR SHALL RE-PROGRAM THE SYSTEMS AND PERFORM A 100% FIRE ALARM INSPECTION AND TEST DESCRIBED IN NFPA 72, 2013 ED., OF ALL DEVICES IN THE CONSTRUCTION AREA. FIRE ALARM CONTRACTOR SHALL PROVIDE AISD LIFE SAFETY SYSTEMS (512-414-2210) WITH COPY OF INSPECTION REPORT.

NOTES FOR VIDEO/SECURITY AND DISTRIBUTED ANTENNA SYSTEMS (DAS) CONTRACTORS:
ALL WORK SHALL BE PERFORMED BY AN AISD APPROVED VENDOR. SEE DRAWING A2.2 FOR ADDITIONAL REQUIREMENTS.

NOTES FOR ENGINEER, FIRE DESIGNER AND FIRE CONTRACTOR:
IT IS THE INTENTION OF AISD TO MINIMIZE THE NUMBER OF DUCT DETECTORS INSTALLED IN OUR BUILDINGS.
WHEN AHU SHUTDOWN IS REQUIRED IT IS THE PREFERENCE OF AISD TO USE AREA TYPE SMOKE DETECTORS AND FIRE ALARM RELAYS TO ACHIEVE THE REQUIRED AHU SHUTDOWN.

THE CITY OF AUSTIN MECHANICAL CODE ENFORCEMENT ALLOWS AN ALTERNATE TO DUCT SMOKE DETECTORS "WHERE THE SPACE SUPPLIED BY THE AIR-MOVING EQUIPMENT IS SERVED BY A TOTAL COVERAGE SMOKE-DETECTION SYSTEM IN ACCORDANCE WITH THE FIRE CODE."

WHERE "TOTAL COVERAGE SMOKE-DETECTION" IS NOT CURRENTLY IN PLACE IT IS PREFERABLE TO ADD ADDITIONAL AREA SMOKE DETECTORS TO ATTAIN TOTAL COVERAGE TO COMPLY WITH CODE AS OPPOSED TO ADDING A DUCT TYPE SMOKE DETECTOR.

UMC ARTICLE 608.1 EXCEPTION 1 ALLOWS THE FOLLOWING: "WHERE THE SPACE SUPPLIED BY THE AIR-MOVING EQUIPMENT IS SERVED BY A TOTAL COVERAGE SMOKE-DETECTION SYSTEM IN ACCORDANCE WITH THE FIRE CODE, INTERCONNECTION TO SUCH SYSTEM SHALL BE PERMITTED TO BE USED TO ACCOMPLISH THE REQUIRED SHUTOFF.

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SKE PROJECT # 0690118

STATE OF TEXAS
TOM BORKOWSKI
106590
LICENSED
PROFESSIONAL ENGINEER
12/21/18

MECHANICAL & PLUMBING

STATE OF TEXAS
STEVE L. KANETZKY
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12/21/18

ELECTRICAL

NO.	DWN	CHK	DATE	REVISION DESCRIPTION
1	JR / AH	TB / DM	12 / 21 / 18	ADDENDUM #01

PLOT DATE: 12/21/18 11:28:39PM, LAYOUT TAB: Cover Sheet, USER: jrunicobo, DWG NAME: K:\Projects\2018\0690118-AISD--Casey ES\01 Design Phase\0690118-COVER.dwg

MECHANICAL SYMBOL LEGEND

NOT ALL SYMBOLS SHOWN MAY BE USED

DUCTWORK SYMBOLS

SYMBOL	DEFINITION
30/24	SUPPLY DUCT (POSITIVE PRESSURE) FIRST FIGURE IS HORIZONTAL WIDTH
30/26	RETURN DUCT (NEGATIVE PRESSURE) FIRST FIGURE IS HORIZONTAL WIDTH
24/12	DUCT IN PLAN, FIRST FIGURE IS HORIZONTAL WIDTH. ARROW DENOTES DIRECTION OF AIRFLOW.
24/12	DUCT (ONE-LINE REPRESENTATION) ARROW DENOTES DIRECTION OF AIRFLOW.
	DUCT TRANSITION SINGLE LINE
UP	ELEVATION CHANGE, UP OR DOWN.
A.D.	ACCESS DOOR
	EXISTING DUCTWORK
	EXISTING DUCTWORK (ONE-LINE)
	DEMO DUCTWORK
	DEMO DUCTWORK (ONE-LINE)
	FLEXIBLE DUCTWORK CONNECTION
	FLEXIBLE DUCTWORK (ONE-LINE)
MVD	MANUAL VOLUME DAMPER
VD	MOTORIZED VOLUME DAMPER
FD	FIRE DAMPER
SFD	SMOKE FIRE DAMPER
8/8 12/8	DUCT TRANSITION
	ELBOWS WITHOUT TURNING VEINS
	ELBOWS WITH TURNING VEINS
MVD MVD	BRANCH DUCT WITH HEEL TAP AND DAMPERS.
	SUPPLY AIR DEVICE.
	RETURN AIR DEVICE.
(R)	SUPPLY AIR DEVICE, RELOCATED OR TO BE DEMOLISHED.
(R)	RETURN AIR DEVICE, RELOCATED OR TO BE DEMOLISHED.
	SIDEWALL AIR DEVICE.
	LINEAR SLOT DIFFUSER AIR DEVICE.
	ROUND SPIN-IN DUCT TAP WITH VOLUME DAMPER.
	ROUND SPIN-IN DUCT TAP WITHOUT VOLUME DAMPER.

INDUSTRIAL COOLING

SYMBOL	DESCRIPTION
— CHS —	CHILLED WATER SUPPLY
— CHR —	CHILLED WATER RETURN
— CS —	CONDENSER WATER SUPPLY
— CR —	CONDENSER WATER RETURN
— RL —	REFRIGERANT LIQUID
— RS —	REFRIGERANT SUCTION
— C —	CONDENSATE
— D —	DRAIN LINE

INDUSTRIAL HEATING

SYMBOL	DESCRIPTION
— HWS —	HOT WATER SUPPLY
— HWR —	HOT WATER RETURN
— HPS —	HIGH PRESSURE STEAM CONDENSATE
— LPS —	LOW PRESSURE STEAM CONDENSATE
— PCR —	PUMPED CONDENSATE RETURN
	THERMOSTATIC TRAP
	FLOAT AND THERMOSTATIC TRAP

DRAWING SYMBOLS

SYMBOL	DESCRIPTION
	POINT OF CONNECTION NEW TO EXISTING
	POINT OF DISCONNECTION EXISTING TO DEMO
XXX-1 NEW	EQUIPMENT TAG
1	REFERENCE NOTE
TAG, A 100, 8"ø, CFM, DUCT SIZE	AIR DEVICE TAG
1 M0.1 DETAIL SCALE	DETAIL OR PLAN NUMBER 1, SHEET M0.1 (SCALE AS INDICATED)
T TS	THERMOSTAT / TEMPERATURE SENSOR
H HS	HUMIDISTAT / HUMIDITY SENSOR
F	FIRESTAT
C	CO2 SENSOR
S	DOOR SWITCH
SD	DUCT SMOKE DETECTOR (SHOWN FOR REFERENCE ONLY) PROVIDED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

ABBREVIATIONS

ABV	ABOVE
AC	ABOVE CEILING
ACC	AIR COOLED CHILLER
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
APPROX.	APPROXIMATE
AV	AIR VENT
ARCH.	ARCHITECTURAL
B	BOILER
BDD	BACK DRAFT DAMPER
BF	BELOW FLOOR
BLDG.	BUILDING
BHP	BRAKE HORSEPOWER
BTU	BRITISH THERMAL UNIT
CFM	CUBIC FEET PER MINUTE
CH	CHILLER
CI	CAST IRON
CLG	CEILING
CO	CLEANOUT
CONC	CONCRETE
COND	CONDENSATE
CONT	CONTINUATION
CL	CENTERLINE
CT	COOLING TOWER
CU	CONDENSING UNIT
CHWP	CHILLED WATER PUMP
CWP	CONDENSER WATER PUMP
DDC	DIRECT DIGITAL CONTROLS
DG	DOOR GRILLE
DI	DUCTILE IRON
DIA	DIAMETER
DB	DRYBULB
DN	DOWN
DSD	DUCT SMOKE DETECTOR
DWG	DRAWING
DX	DIRECT EXPANSION
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EDH	ELECTRIC DUCT HEATER EXHAUST FAN
EF	FAN
EG	EXHAUST GRILLE
ELEC	ELECTRICAL
ELEV	ELEVATION
EMCS	REFRIGERANT MONITORING CONTROL SYSTEM
ENT	ENTERING
EQIP.	EQUIPMENT
ERV	ENERGY RECOVERY VENTILATOR
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
EXIST	EXISTING
F	FAHRENHEIT
FA	FRESH AIR
FC	FAN COIL
FD	FIRE DAMPER
FG	FILTER GRILLE
FPM	FEET PER MINUTE
FS	FLOW SWITCH
FT	FEET
GAL	GALLON(S)
GALV	GALVANIZED
GPM	GALLONS PER MINUTE
HB	HOSE BIBB
HD	HEAD
HP	HORSEPOWER
HTR	HEATER

2 working days Call before you Dig.

CALL 811

ABBREVIATIONS (CONT'D)

H2O	WATER
HW	HOT WATER
HZ	HERTZ
ID	INSIDE DIAMETER
INV IN	INVERT INCHES
IN WG	INCHES OF WATER
JST	JOIST
KW	KILOWATT
L	LENGTH
LAT	LEAVING AIR TEMPERATURE
LVR MAX	LOUVER MAXIMUM
LWT	LEAVING WATER TEMPERATURE
MVD	MANUAL VOLUME DAMPER
MECH	MECHANICAL
MIN	MINIMUM
MD	MOTORIZED DAMPER
MTD	MOUNTED
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
OH	OVERHEAD
PC	PUMP CONDENSATE
PD	PRESSURE DROP
PP	PLUMBING PRESSURE
PSI	POUNDS PER SQUARE INCH, GAUGE
PTAC	PACKAGE TERMINAL AIR CONDITIONER
PVC	POLYVINYL CHLORIDE
RA	RETURN AIR
REFRIG.	REFRIGERATION
RHD	RELIEF HOOD
RH	RELATIVE HUMIDITY
RTU	ROOF TOP UNIT
SA	SUPPLY AIR
SCH	SCHEDULE
SD	SMOKE DAMPER
SF	SQUARE FOOT
SHT	SHEET
SP	STATIC PRESSURE
SPEC(S)	SPECIFICATION(S)
STD STL	STANDARD STEEL
SW	SWITCH
T/A	THROW AWAY (FILTERS)
T-STAT	THERMOSTAT
TEMP	TEMPERATURE
TXV	THERMOSTATIC EXPANSION VALVE
TYP	TYPICAL
UF	UNDER FLOOR
UG	UNDER GROUND
UH	UNIT HEATER
UL	UNDERWRITER'S LABORATORIES
V	VENT
VB	VALVE BOX
VCP	VITRIFIED CLAY PIPE
VEL	VELOCITY
VENT	VENTILATE
VOL	VOLUME
VOLT	VOLTAGE
VTR	VENT THRU ROOF
W	WIDE, WIDTH
WB	WET BULB
W.C.	WATER COLUMN
W/	WITH
W/O	WITHOUT

GENERAL NOTES:(APPLICABLE TO ALL MECHANICAL SHEETS)

1. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF ALL EXISTING BUILDING CONTROL SYSTEMS WITH BUILDING OWNER PRIOR TO SUBMITTING A BID.
2. THE CONTRACTOR SHALL FOLLOW PUBLISHED MANUFACTURER'S RECOMMENDED INSTALLATION INSTRUCTIONS FOR THE INSTALLATION OF ALL MATERIALS AND EQUIPMENT.
3. PROVIDE EQUIPMENT LABELS AS SPECIFIED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
4. DURING CONSTRUCTION, SEAL ALL OPEN DUCTS WITH PLASTIC TO PREVENT DUST/DIRT. CLEAN ALL INTERIOR DUCT SURFACES PRIOR TO DUCT INSTALLATION. ALL EQUIPMENT FILTERS SHALL BE MAINTAINED DURING CONSTRUCTION AND REPLACED AT THE END OF CONSTRUCTION. PROVIDE CONSTRUCTION FILTERS OVER AIR HANDLING UNIT INTAKES AND MAINTAIN FILTER MEDIA DURING CONSTRUCTION. REPLACE ALL FILTERS AT END OF CONSTRUCTION. ALL RETURN AIR INTAKES TO MECHANICAL ROOM SHALL BE COVERED WITH FILTER MEDIA DURING CONSTRUCTION. REMOVE UPON COMPLETION.
5. INSULATE ALL HVAC EQUIPMENT, DUCTWORK AND PIPING. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
6. HVAC SYSTEMS SHALL BE INTERLOCKED WITH FIRE ALARM CONTROL PANEL (FACP) TO ALLOW AUTOMATED SHUTDOWN OF ALL SYSTEMS UPON A CALL FROM THE FIRE ALARM.
7. DAMPERS SHALL BE NORMALLY CLOSED UNLESS SPECIFICALLY NOTED. MECHANICAL CONTRACTOR SHALL PROVIDE ALL REQUIRED LINKAGES AND CONTROLS. CONTRACTOR SHALL PROVIDE REQUIRED ACTUATOR MOTOR AND INTERLOCK WITH BAS. ACTUATORS SHALL BE INSTALLED OUT OF THE AIRSTREAM.
8. INDICATED DUCTWORK SIZES ARE FREE AREA SIZES (INTERNAL DIMENSIONS).
9. PROVIDE MINIMUM 12x12 ACCESS DOORS AT ALL DUCT CHASES, FIRE DAMPER, AND FIRE/SMOKE DAMPER LOCATIONS.
10. SUPPORT DUCT FROM RAFTERS ONLY NOT FROM ROOF TRUSS SYSTEM.
11. EXHAUST AND RELIEF DUCTWORK WHICH HAS EXTERNAL DISCHARGE SHALL BE INSULATED A MINIMUM OF TEN (10) FEET FROM THE POINT OF PENETRATION OF THE BUILDING EXTERIOR WALL.
12. COORDINATE LOCATION OF EXHAUST AND PLUMBING VENTS TO MAINTAIN 10 FT. MIN DISTANCE FROM BUILDING OPENINGS.
13. REFER TO MECHANICAL DETAIL FOR EXACT MOUNTING HEIGHT AND RELATIVE POSITION ON THE WALL FOR HVAC SENSORS, THERMOSTATS, SWITCHES, VISUAL INDICATORS, AND OTHER FURNITURE OR WALL MOUNTED EQUIPMENT.
14. (1) PRIOR TO ANY CONSTRUCTION THE MECHANICAL CONTRACTOR SHALL RECORD THE AIR QUANTITY FOR EACH EXISTING AIR DEVICE IN THE ADJACENT SPACES AND RESTROOMS THAT IS CONNECTED TO COMMON EQUIPMENT SERVING THIS SPACE. AFTER THE COMPLETION OF THE RENOVATION WORK, TEST & BALANCE AGENCY SHALL USE THE SAME BALANCING EQUIPMENT TO RE-BALANCE ALL EXISTING AIR DEVICES TO THE ORIGINAL AIR QUANTITIES. TEST & BALANCE SHALL BE COMPLETED BY A THIRD PARTY AGENCY, HIRED BY DESIGN TEAM.
15. IT SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO BRING TO THE ATTENTION OF THE MECHANICAL ENGINEER ANY SLAB-TO-SLAB PARTITIONS THAT DO NOT HAVE PROPER RETURN AIR PATHWAYS. ALL PENETRATIONS OF SLAB-TO-SLAB PARTITIONS SHALL BE SEALED AIR-TIGHT.
16. THE CONTRACTOR SHALL VERIFY THAT THERE ARE NO NON-PLENUM RATED MATERIALS IN THE RETURN AIR PLENUM. THE CONTRACTOR SHALL ENCAPSULATE ALL NON PLENUM RATED MATERIALS IN A MATTER APPROVED BY THE AUTHORITY HAVING JURISDICTION. IF NON-PLENUM RATED MATERIALS ARE NOT ENCAPSULATED IN A MATER APPROVED BY THE AUTHORITY HAVING JURISDICTION, THEN THE CONTRACTOR SHALL REPLACE MATERIAL WITH AN APPROVED PLENUM RATED MATERIAL.
17. CONTRACTOR SHALL PROVIDE A MINIMUM 24"X24" ACCESS PANEL IN GYPSUM BOARD CEILINGS FOR ACCESS TO EQUIPMENT LOCATED ABOVE INACCESSIBLE CEILINGS. COORDINATE EXACT LOCATION, FINISH, AND SPECIFICATIONS WITH THE PROJECT SUPERVISOR.
18. PROVIDE REMOTE DAMPER OPERATORS FOR ALL DAMPERS LOCATED ABOVE INACCESSIBLE CEILINGS. OPERATORS SHALL BE ROTO-TWIST (OR APPROVED EQUAL) CABLE-TYPE OPERATOR, CONCEALED WITHIN DUCT RUN-OUT TO DEVICE, AND ACCESSIBLE FOR BALANCING FROM FACE OF AIR DEVICE. PROVIDE REQUIRED CABLE LENGTHS, MOUNTING CLAMPS, AND ALL OTHER REQUIRED COMPONENTS FOR PROPER INSTALLATION AND OPERATION.
19. THE CONTRACTOR SHALL REPLACE ANY DAMAGED OR NON-FUNCTIONING THERMOSTATS. NEW THERMOSTATS SHALL MATCH BUILDING STANDARD.
20. UNLESS NOTED OTHERWISE DISCONNECT SWITCHES SHALL NOT BE UNIT MOUNTED AND SHALL BE PROVIDED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
21. WHERE THERMOSTATS ARE LOCATED ADJACENT TO LIGHTING FIXTURE SWITCHES, THE THERMOSTAT SHALL BE ALIGNED WITH THE SWITCH. DO NOT MOUNT THERMOSTAT ABOVE DIMMING LIGHT SWITCHES. REFER TO DETAIL. IN CLASSROOM SETTING, THE THERMOSTAT SHALL RESIDE ON THE HINGE SIDE OF THE DOOR TO AVOID TAMPERING FROM EXITING OCCUPANTS. COORDINATE WITH MAINTENANCE SUPERVISOR AND/OR OWNER BEFORE RELOCATION OR NEW INSTALLATION.
22. ALL REFRIGERANT CIRCUITS WITH SERVICE PORTS LOCATED ON THE EXTERIOR OF THE BUILDING SHALL BE PROVIDED WITH LOCKING ACCESS PORT CAPS. THIS REQUIREMENT APPLIES TO ALL NEW REFRIGERANT CIRCUITS AND EXISTING REFRIGERANT CIRCUITS WHEN EQUIPMENT IS RE-USED ON CHANGE OF USAGE PROJECTS.
23. DUCTWORK RUNOUTS TO AIR DEVICES SHALL BE RIGID ROUND SHEETMETAL. FLEXIBLE DUCT MAY BE UTILIZED FOR THE LAST 72-INCHES OF THE RUNOUT.
24. SEAL ALL NEW AND EXISTING PIPES, CONDUITS, AND DUCT PENETRATIONS THRU FIRE RATED WALLS WITH FIRE CAULKING. FIRE CAULKING SHALL BE EQUAL TO 3M BRAND CP25WP FIRE CAULK. INSTALL CAULKING IN STRICT ACCORDANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS AND WRITTEN INSTRUCTIONS AND IN ACCORDANCE WITH ALL APPLICABLE UL DETAILS.
25. INSTALL DUCTWORK AND PIPING TIGHT TO STRUCTURE UNLESS NOTED OTHERWISE.
26. AFTER COMPLETION OF INSTALLATION, BUT PRIOR TO SUBSTANTIAL COMPLETION, CONTRACTOR SHALL CERTIFY IN WRITING THAT PRODUCTS AND MATERIALS INSTALLED AND PROCESSES USED DO NOT CONTAIN ASBESTOS OR POLYCHLORINATED BIPHENYL (PCB).
27. IN THE EVENT THAT MATERIALS, PRODUCTS, AND/OR PROCESSES BEING PROPOSED FOR THIS PROJECT CONTAIN, OR MAY EMIT, ANY VOLATILE ORGANIC COMPOUNDS (VOC), FORMALDEHYDE FORMULATIONS, OR HAZARDOUS OUT-GASSING, AS DETERMINED BY THE MANUFACTURER, A MATERIALS SAFETY DATA SHEET SHALL BE SUBMITTED AS PART OF THE SHOP DRAWING PROCESS FOR REVIEW BY THE ARCHITECT/ENGINEER/OWNER.
28. ALL EQUIPMENT AND MATERIAL TO BE FURNISHED AND INSTALLED ON THIS PROJECT SHALL BE UL OR ETL LISTED, IN ACCORDANCE WITH THE AUTHORITY HAVING JURISDICTION, AND SUITABLE FOR ITS INTENDED USE ON THIS PROJECT.
29. THE CONTRACTOR SHALL PROTECT THE WORK, EQUIPMENT, AND MATERIALS FROM DAMAGE BY HIS WORK OR HIS PERSONNEL, AND SHALL CORRECT ALL DAMAGE THUS CAUSED WITHOUT ADDITIONAL COST TO THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK, MATERIALS, AND EQUIPMENT UNTIL FINAL ACCEPTANCE BY THE OWNER. PROTECT ALL WORK AGAINST THEFT, INJURY, OR DAMAGE AND CAREFULLY STORE MATERIAL AND EQUIPMENT RECEIVED ON SITE WHICH IS NOT IMMEDIATELY INSTALLED. THE CONTRACTOR SHALL CLOSE OPEN ENDS OF WORK WITH TEMPORARY COVERS OR PLUGS DURING CONSTRUCTION TO PREVENT THE ENTRY OF DUST, DIRT, AND OBSTRUCTING MATERIAL. THE CONTRACTOR SHALL PROTECT ALL EQUIPMENT AND MATERIALS FROM DAMAGE DUE TO WATER, SPRAY-ON FIREPROOFING, CONSTRUCTION DEBRIS, ETC. IN A MANNER ACCEPTABLE TO THE ENGINEER AND/OR OWNER.
30. AREAS OF THE EXISTING BUILDING MIGHT BE OCCUPIED DURING CONSTRUCTION OF THIS PROJECT. NOISY, DUSTY, AND/OR OTHER CONSTRUCTION OPERATIONS REQUIRED FOR WORK WHICH DISTURB OR CAUSE COMPLAINTS BY THE EXISTING BUILDING OCCUPANTS SHALL NOT BE ACCEPTABLE. ALL AFTER-HOUR OR OVERTIME WORK REQUIRED BY THE CONTRACTOR TO AVOID DISRUPTION OF EXISTING OCCUPANTS WILL BE PROVIDED AT NO COST TO THE OWNER. THE CONTRACTOR SHALL USE CONSTRUCTION METHODS AND MATERIALS WHICH SHALL NOT ADVERSELY AFFECT THE INDOOR AIR QUALITY OF THE EXISTING OCCUPIED AREAS.
31. PORTIONS OF THE BUILDING WILL BE IN USE AND OCCUPIED DURING THE CONSTRUCTION PERIOD OF THIS PROJECT. ALL BUILDING SERVICES, UTILITIES, POWER, CHILLED WATER, FIRE PROTECTION, AND DOMESTIC COLD AND HOT WATER WHICH WILL BE REQUIRED FOR THIS PROJECT MAY NOT BE DISRUPTED FOR ANY REASON WITHOUT PRIOR COORDINATION WITH A REPRESENTATIVE OF BUILDING MANAGEMENT AND THE OWNER AND A WRITTEN AUTHORIZATION FROM THE BUILDING MANAGER AND OWNER DESIGNATING A DATE, TIME, AND DURATION THAT ARE APPROVED BY THE BUILDING MANAGER AND OWNER FOR SUCH DISRUPTION. AN ADDITIONAL ADVANCE NOTIFICATION OF SEVEN (7) DAYS SHALL BE GIVEN TO THE BUILDING MANAGER AND OWNER PRIOR TO EACH DISRUPTION.
32. PREMIUM TIME MAY BE REQUIRED TO PERMIT CERTAIN PORTIONS OF THE WORK TO BE PERFORMED AT TIMES ACCEPTABLE TO THE PROJECT MANAGER AND OWNER. THE COST OF SUCH PREMIUM TIME SHALL BE INCLUDED AS PART OF THE BASIC CONTRACT COST.
33. ADDITIONAL REINFORCEMENTS TO STRUCTURE THAT WILL BE EXPOSED TO INTERIOR VIEW SHALL BE PRIMED AND PAINTED BY THE CONTRACTOR. COORDINATE WITH PROJECT MANAGER FOR COLOR SCHEME PRIOR TO BID.

(1) MECHANICAL DRAWING INDEX

NO.	DWN	CHK	DATE	REVISION DESCRIPTION
1	JR / AH	TB / DM	12 / 21 / 18	ADDENDUM #01

AUSTIN I.S.D.
RENOVATIONS AT
CASEY ELEMENTARY SCHOOL
9400 TEXAS OAKS DR
AUSTIN TEXAS 78748

AUSTIN I.S.D.
DEPARTMENT OF CONSTRUCTION MANAGEMENT
CSP# 19CSP085

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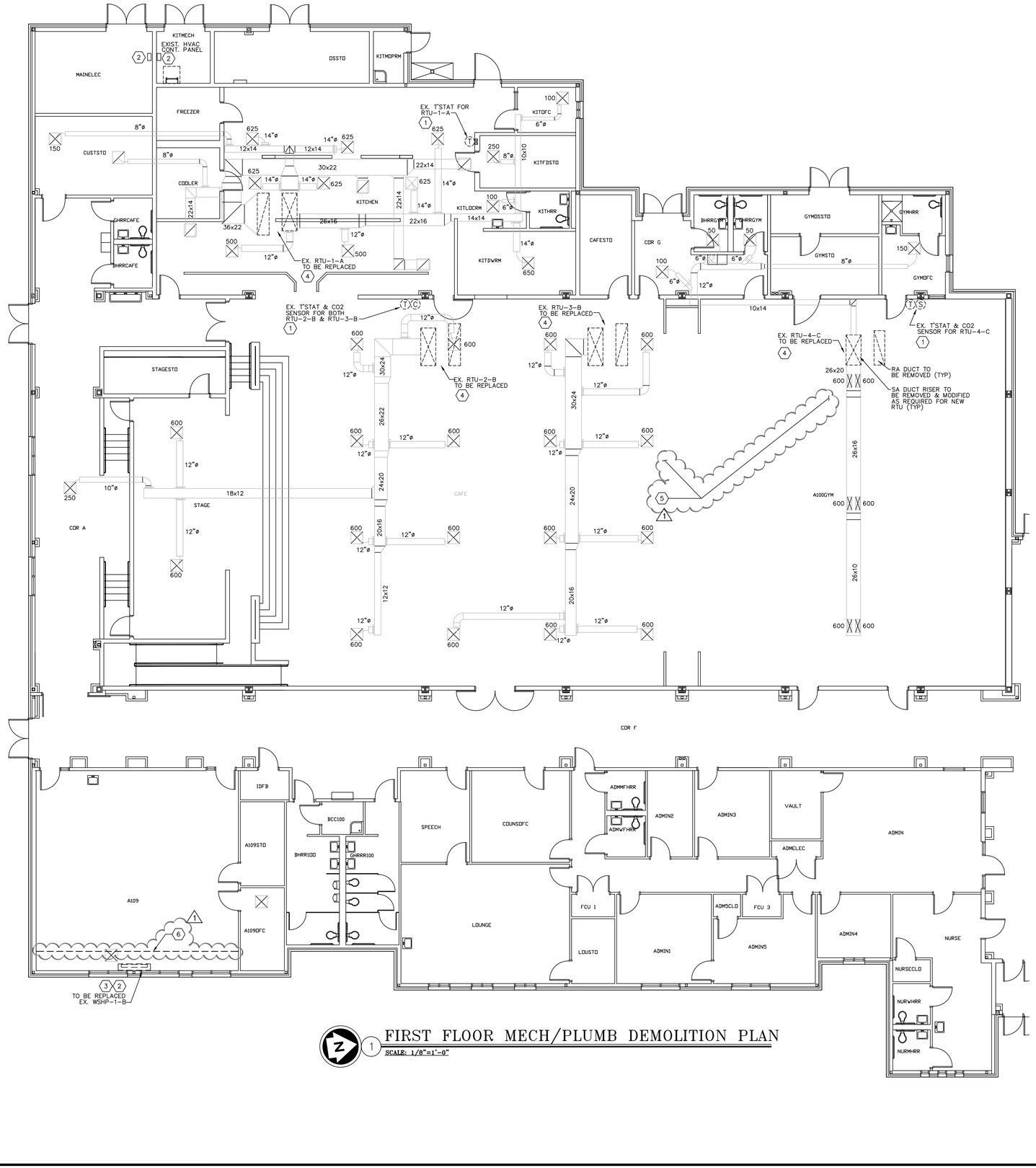
TBPE Firm No. F-2356
SKE PROJECT # 0690118
19-0015-CASEY

Filename:
Scale: AS NOTED
Drawn By: AH/GB/JR
Checked By: SK/TB
Date: 12/21/2018
DWG Number:

Title: MECHANICAL NOTES, SYMBOLS AND ABBREVIATIONS

Sheet: M0.1



1 FIRST FLOOR MECH/PLUMB DEMOLITION PLAN

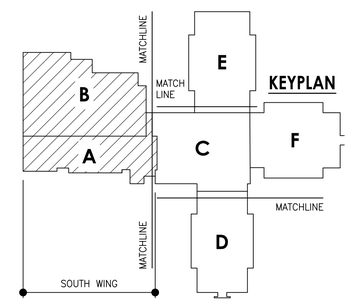
SCALE: 1/8"=1'-0"

KEYED NOTES:

1. REMOVE THE EXISTING THERMOSTATS AND CO2 SENSORS WHERE INDICATED.
2. REMOVE CONTROLS FROM EXISTING CONTROL PANEL FOR REPLACED HVAC UNITS.
3. REMOVE THE EXISTING FLOOR MOUNTED CONSOLE WATER SOURCE HEAT PUMP AS INDICATED.
4. REMOVE/MODIFY THE EXISTING DUCTWORK AS REQUIRED TO ACCOMMODATE THE NEW INSTALLATION.
5. EXISTING CEILING TILES AND GRID TO BE REMOVED, AND STORED FOR RE-INSTALLATION AS REQUIRED FOR MEP WORK.
6. REMOVE PORTION OF EXISTING CARPET ALONG THE WEST WALL OF RM A109 TO ALLOW FOR INSTALLATION OF NEW STRIP OF CARPET (APPROXIMATELY 36" WIDE) THAT WILL COVER THE FLOOR REPAIRS FOR THE FCU'S BEING REMOVED.

CONSTRUCTION NOTES:

1. THIS PROJECT IS INTENDED TO BE CONDUCTED IN A COMPETITIVE SEALED PROPOSAL FORMAT. THE INTENT OF THESE DRAWINGS IS TO INDICATE THE SCOPE OF WORK WITH RELIANCE ON CURRENT CODES, AUSTIN ISD STANDARDS FOR THE QUALITY OF WORK. ALL 2015 INTERNATIONAL BLDG CODES, 2015 UNIFORM MECHANICAL CODES, 2015 UNIFORM PLUMBING CODES AND CURRENT AUSTIN ISD STANDARDS SHALL BE ADHERED.
2. REFER TO SPECIFICATIONS AND M0.1 SHEET, AND COORDINATE WITH THE AUSTIN ISD PROJECT MANAGER, ENGINEER AND GENERAL CONTRACTOR FOR PHASING, WORK-HOUR REQUIREMENTS, AND OTHER GENERAL INFORMATION APPLICABLE TO ALL M SHEETS. APPLY ALL INFORMATION ACCORDINGLY.
3. COORDINATE WITH OWNER'S ENVIRONMENTAL CONSULTANT PRIOR TO CONDUCTING ANY DEMOLITION. OBTAIN TEST RESULTS OF ALL HAZARDOUS MATERIALS LOCATED IN THE WORK AREAS, AND AVOID SUCH MATERIALS. ABATEMENT OF LEAD, ASBESTOS, AND OTHER HAZARDOUS MATERIALS SHALL BE COMPLETED BY OTHERS PRIOR TO ANY DEMOLITION.
4. PHOTOGRAPHICALLY DOCUMENT ALL EXISTING CONDITIONS PRIOR TO START OF WORK.
5. REPAIR ALL DAMAGE TO THE BUILDING OR SYSTEMS TO REMAIN AT NO ADDITIONAL COST TO THE CONTRACT, UNLESS DOCUMENTED AS EXISTING PRIOR TO START OF WORK.
6. COORDINATE WITH THE GENERAL AND/OR PRIME CONTRACTOR TO REMOVE OR REMOVE/REINSTALL BUILDING COMPONENTS AS REQUIRED FOR ACCESS FOR REMOVAL/ALTERATION OF MECHANICAL SYSTEMS.
   a. FOR LOCATIONS WHERE FAN-COIL UNITS ARE TO BE INSTALLED: REMOVE THE CEILING TILES, CEILING GRID, AND CEILING MOUNTED DEVICES TO FACILITATE REMOVAL AND/OR INSTALLATION OF THE NEW UNIT AND ASSOCIATED ELECTRICAL, DDC, AND PIPING. SALVAGE CEILING COMPONENTS FOR REINSTALLATION.
   b. FOR LOCATIONS BENEATH NEW ROOFTOP UNITS: REMOVE THE CEILING TILES, CEILING GRID, AND CEILING MOUNTED DEVICES TO FACILITATE REMOVAL AND MODIFICATION OF THE DUCTWORK/NEW WATER HYDRANT PIPING BENEATH THE UNIT. SALVAGE CEILING COMPONENTS FOR REINSTALLATION.
   c. FOR LOCATIONS AT WATER SOURCE HEAT PUMPS: REMOVE SHELVING/FURNITURE/ WINDOW COMPONENTS/FLOORING/WALL MATERIAL AS NECESSARY FOR THE REMOVAL OF THE UNIT. CAP PIPING AT THE FLOOR.
7. REMOVE DUCTWORK AS INDICATED.
   a. REMOVE/MODIFY DUCTWORK AS NECESSARY TO ACCOMMODATE THE NEW ROOFTOP UNITS.
   b. REMOVE ANY ABANDONED WALL GRILLES IN MUSIC ROOM A109.
8. REMOVE CONTROLS SERVING THE DEMOLISHED HVAC EQUIPMENT AS INDICATED.
   a. REMOVE EXISTING THERMOSTATS AND CO2 SENSORS.
   b. REMOVE ROOFTOP UNIT CONTROLS AND SAFETIES COMPLETE.
9. REMOVE DUCT INSULATION AS REQUIRED TO ACCOMMODATE THE NEW INSTALLATION.
10. REMOVE THE WATER SOURCE HEAT PUMP INDICATED.
    a. DISCONNECT FROM CONDENSER WATER AND CONDENSATE DRAIN PIPING. CAP THE CONDENSER WATER PIPING AT THE FLOOR. MODIFY THE CONDENSATE DRAIN PIPING TO FACILIATE CONDENSATE DRAINAGE FROM THE NEW FAN-COIL.
    b. CAPTURE REFRIGERANT FROM THE SYSTEM. TURN OVER TO OWNER.
    c. DISCONNECT ELECTRICAL.



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1	JR / AH	TB / DM	12 / 21 / 18	ADDENDUM #01

0 4 8 12 24

GRAPHIC SCALE: 1/8"=1'-0"

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DEPARTMENT OF CONSTRUCTION MANAGEMENT

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SKE PROJECT # 19-0015-CASEY

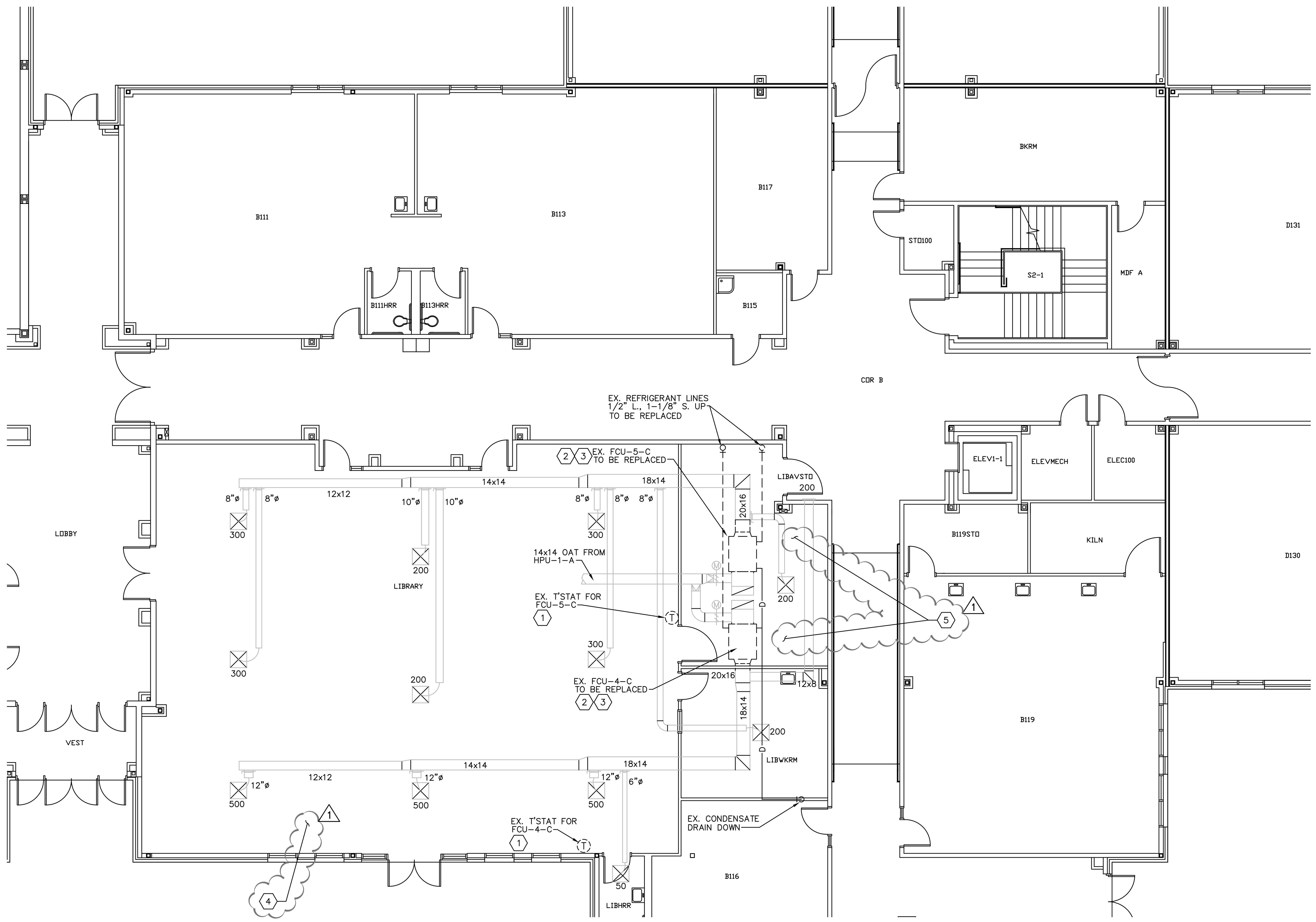
Filename:
Scale: AS NOTED
Drawn By: AH/GB/JR
Checked By: JG/SK/TB
Date: 11/28/2018

DWG Number:

Title: **FIRST FLOOR MECH/PLUMB DEMOLITION PLAN "A&B"**

Sheet: **MP3.1**

PLOT DATE: 12/21/18 11:05:48PM LAYOUT TAB: MP3.1 USER: jvanmiddlesworth DWG NAME: K:\Projects\2018\2018018-ASD - Casey ES\01 Design Phase\2018018_MP31-32-61-62.dwg



FIRST FLOOR MECH/PLUMB DEMOLITION PLAN (1)

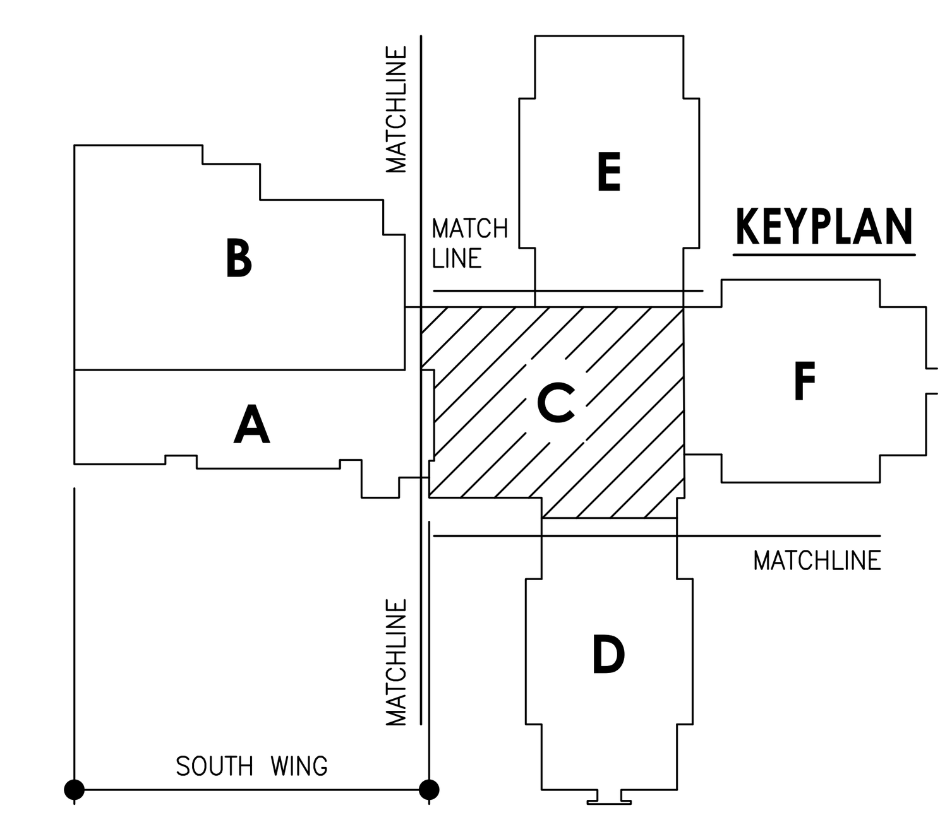
SCALE: 1/8"=1'-0"

KEYED NOTES:

1. REMOVE THE EXISTING THERMOSTATS AND CO2 SENSORS WHERE INDICATED.
2. REMOVE THE EXISTING FAN-COIL UNITS AS INDICATED. DEMOLISH & MODIFY THE EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE THE FAN-COIL UNITS.
3. REMOVE CONTROLS FROM EXISTING CONTROL PANEL FOR REPLACED HVAC UNITS.
4. PROVIDE TEMPORARY COOLING FOR LIBRARY DURING CONSTRUCTION. TO MAINTAIN 75° F/50% RH.
5. REMOVE EXISTING CEILING TILE AND GRID IN RM LIBAVSTO TO ALLOW FOR FCU REPLACEMENT.

CONSTRUCTION NOTES:

1. THIS PROJECT IS INTENDED TO BE CONDUCTED IN A COMPETITIVE SEALED PROPOSAL FORMAT. THE INTENT OF THESE DRAWINGS IS TO INDICATE THE SCOPE OF WORK WITH RELIANCE ON CURRENT CODES, AUSTIN ISD STANDARDS FOR THE QUALITY OF WORK. ALL 2015 INTERNATIONAL BUILDING CODES, 2015 UNIFORM MECHANICAL CODES, 2015 UNIFORM PLUMBING CODES, AND CURRENT AUSTIN ISD STANDARDS SHALL BE ADHERED.
2. REFER TO SPECIFICATIONS AND M0.1 SHEET, AND COORDINATE WITH THE AUSTIN ISD PROJECT MANAGER, ENGINEER AND GENERAL CONTRACTOR FOR PHASING, WORK-HOUR REQUIREMENTS, AND OTHER GENERAL INFORMATION APPLICABLE TO ALL M SHEETS. APPLY ALL INFORMATION ACCORDINGLY.
3. COORDINATE WITH OWNER'S ENVIRONMENTAL CONSULTANT PRIOR TO CONDUCTING ANY DEMOLITION. OBTAIN TEST RESULTS OF ALL HAZARDOUS MATERIALS LOCATED IN THE WORK AREAS, AND AVOID SUCH MATERIALS. ABATEMENT OF LEAD, ASBESTOS, AND OTHER HAZARDOUS MATERIALS SHALL BE COMPLETED BY OTHERS PRIOR TO ANY DEMOLITION.
4. PHOTOGRAPHICALLY DOCUMENT ALL EXISTING CONDITIONS PRIOR TO START OF WORK.
5. REPAIR ALL DAMAGE TO THE BUILDING OR SYSTEMS TO REMAIN AT NO ADDITIONAL COST TO THE CONTRACT, UNLESS DOCUMENTED AS EXISTING PRIOR TO START OF WORK.
6. COORDINATE WITH THE GENERAL AND/OR PRIME CONTRACTOR TO REMOVE OR REMOVE/REINSTALL BUILDING COMPONENTS AS REQUIRED FOR ACCESS FOR REMOVAL/ALTERATION OF MECHANICAL SYSTEMS.
   a. FOR LOCATIONS WHERE FAN-COIL UNITS ARE TO BE INSTALLED: REMOVE THE CEILING TILES, CEILING GRID, AND CEILING MOUNTED DEVICES TO FACILITATE REMOVAL AND/OR INSTALLATION OF THE NEW UNIT AND ASSOCIATED ELECTRICAL, DDC, AND PIPING. SALVAGE CEILING COMPONENTS FOR REINSTALLATION.
7. REMOVE THE EXISTING FAN-COIL UNITS INDICATED.
   a. CAPTURE REFRIGERANT AND SAVE FOR REUSE. TURN OVER TO THE OWNER.
   b. DISCONNECT THE REFRIGERANT PIPING, ELECTRICAL BRANCH CIRCUIT, AND CONDENSATE DRAIN. REMOVE THE EXISTING REFRIGERANT PIPING. REUSE THE EXISTING CONDENSATE DRAIN PIPING.
   c. DISCONNECT THE DUCTWORK. REUSE THE EXISTING SUPPLY, RETURN, AND OUTDOOR AIR DUCTWORK.
   d. REMOVE THE EQUIPMENT SUPPORTS.
   e. REMOVE THE DRAIN PAN.
8. PHASING:
   a. THE BOOKS IN THE LIBRARY WILL REMAIN IN PLACE. ANY AIR CONDITIONING OUTAGES IN THE LIBRARY SHALL BE LIMITED TO 24 HOURS IN DURATION. AFTER EACH OUTAGE, THE TEMPERATURE IN THE LIBRARY SHALL BE RETURNED TO 75 DEGREES F/50% RH.
   b. PROVIDE TEMPORARY SPOT AIR CONDITIONING AS NECESSARY TO MAINTAIN ENVIRONMENTAL CONDITIONS WITHIN THE LIBRARY.
9. REMOVE DUCTWORK AS INDICATED.
   a. REMOVE/MODIFY DUCTWORK AS NECESSARY TO ACCOMMODATE THE NEW FAN-COIL UNITS.
10. REMOVE EXISTING CONTROLS SERVING THE DEMOLISHED HVAC EQUIPMENT AS INDICATED.
    a. REMOVE EXISTING THERMOSTATS AND CO2 SENSORS.
    b. REMOVE FAN-COIL UNIT CONTROLS AND SAFETIES COMPLETE.
11. REMOVE DUCT INSULATION AS REQUIRED TO ACCOMMODATE THE NEW INSTALLATION.



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GRAPHIC SCALE: 1/8"=1'-0"

NO.	DWN	CHK	DATE	REVISION DESCRIPTION
1	JR / AH	TB / DM	12 / 21 / 18	ADDENDUM #01

AUSTIN I.S.D.
RENOVATIONS AT CASEY ELEMENTARY SCHOOL, REV 2
9400 TEXAS OAKS DR
AUSTIN TEXAS 78748

AUSTIN I.S.D.
DEPARTMENT OF CONSTRUCTION MANAGEMENT

TOM BORKOWSKI 106590 LICENSED PROFESSIONAL ENGINEER
12/21/18

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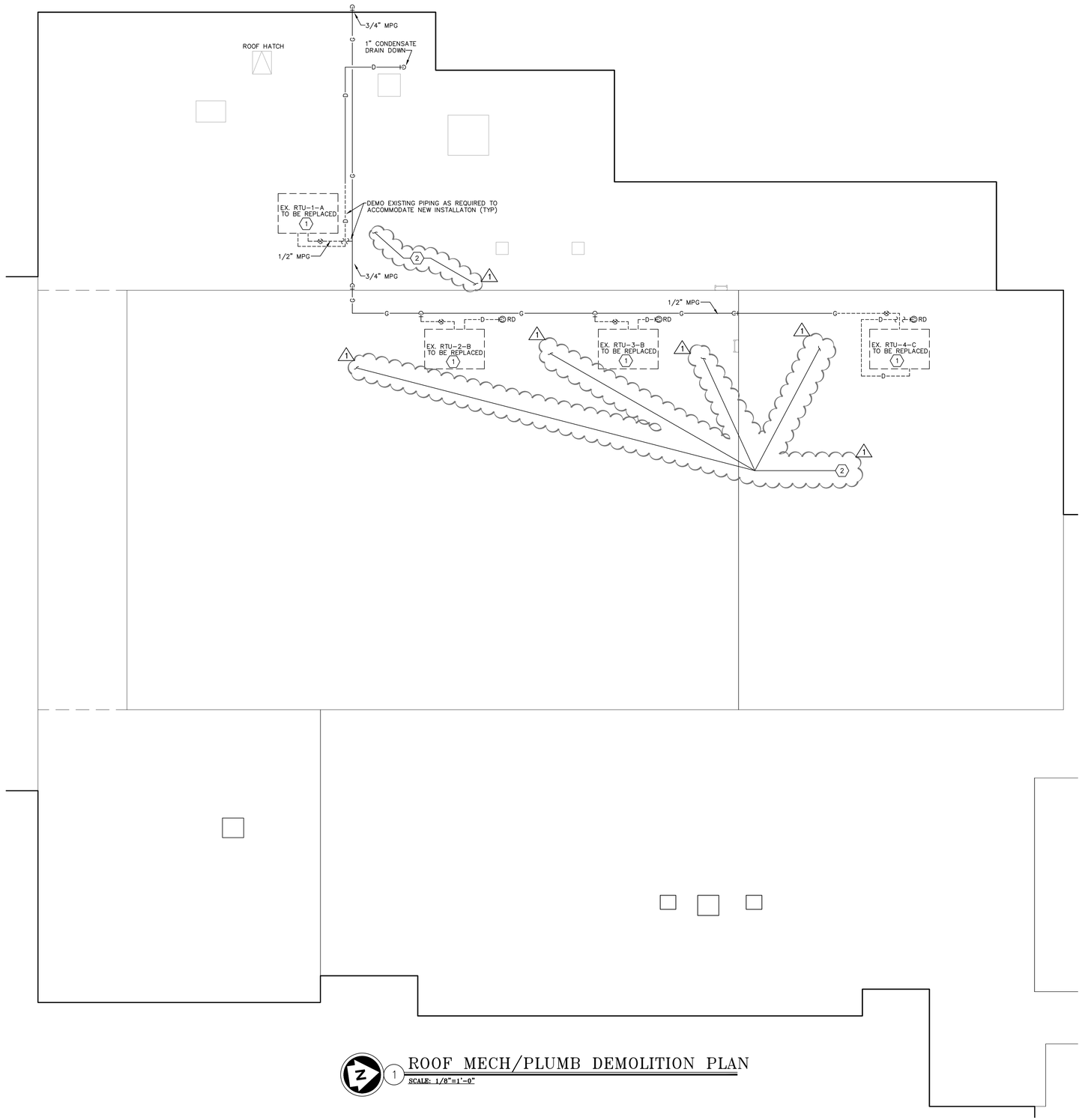
TBPE Firm No. F-2356
SKE PROJECT # 19-0015-CASEY

Filename:
Scale: AS NOTED
Drawn By: AH/GB/JR
Checked By: JG/SK/TB
Date: 11/28/2018
DWG Number:

Title:
FIRST FLOOR MECH/PLUMB DEMOLITION PLAN "C"

Sheet:
MP3.2



1 ROOF MECH/PLUMB DEMOLITION PLAN

SCALE: 1/8"=1'-0"

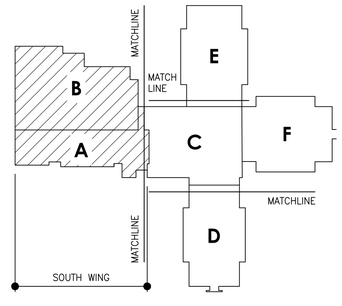
KEYED NOTES:

1 REMOVE THE EXISTING ROOFTOP UNIT.

2 PROVIDE PLYWOOD ON ROOF IN ALL WORK AREAS DURING CONSTRUCTION TO PROTECT THE ROOF. PLYWOOD SHEETS SHALL BE SECURED TOGETHER, WEIGHTED DOWN AND ATTACHED TO BUILDING TO PREVENT THEM FROM BEING BLOWN OFF THE ROOF.

CONSTRUCTION NOTES:

1. THIS PROJECT IS INTENDED TO BE CONDUCTED IN A COMPETITIVE SEALED PROPOSAL FORMAT. THE INTENT OF THESE DRAWINGS IS TO INDICATE THE SCOPE OF WORK WITH RELIANCE ON CURRENT CODES, AUSTIN ISD STANDARDS FOR THE QUALITY OF WORK. ALL 2015 INTERNATIONAL BUILDING CODES, 2015 UNIFORM MECHANICAL CODES, 2015 UNIFORM PLUMBING CODES, AND CURRENT AUSTIN ISD STANDARDS SHALL BE ADHERED.
2. REFER TO SPECIFICATIONS AND M0.1 SHEET, AND COORDINATE WITH THE AUSTIN ISD PROJECT MANAGER, ENGINEER AND GENERAL CONTRACTOR FOR PHASING, WORK-HOUR REQUIREMENTS, AND OTHER GENERAL INFORMATION APPLICABLE TO ALL M SHEETS. APPLY ALL INFORMATION ACCORDINGLY.
3. INSTALL THE NEW ROOFTOP PACKAGED UNITS AS INDICATED.
   a. REUSE THE EXISTING ROOF OPENINGS AND ROOF CURBS AS MUCH AS POSSIBLE. MODIFY AS REQUIRED TO ACCOMMODATE THE NEW INSTALLATION. PROVIDE CURB ADAPTERS TO FACILITATE REUSE OF THE EXISTING CURBS. MINIMUM INSTALLED CURB HEIGHT SHALL BE 18".
   b. EXTEND AND CONNECT THE EXISTING GAS PIPING TO THE NEW UNIT. INSTALL A NEW GAS REGULATOR AND SHUT-OFF VALVE. PRIME AND PAINT ALL NEW AND EXISTING GAS PIPING ON THE ROOF YELLOW.
   c. EXTEND AND CONNECT THE EXISTING CONDENSATE DRAIN PIPING TO THE NEW UNIT. INSULATE ALL CONDENSATE DRAIN PIPING SERVING THE RTU'S, WITHIN THE BUILDING. WHERE PIPING IS INSULATED, INSPECT AND REPAIR AS NECESSARY.
4. PRESSURE TEST REFRIGERANT PIPING PRIOR TO PLACING INTO OPERATION.
   a. TEST WITH NITROGEN GAS AT 150 PSIG. TEST SHALL MAINTAIN PRESSURE FOR 4 HOURS.
5. INSTALL THE NEW CONDENSING UNIT.
   a. INSTALL NEW SUPPORTS. PATCH/REPAIR ROOFING TO MATCH EXISTING ADJACENT SURFACES.
   b. INSTALL THE NEW UNIT IN ACCORDNCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
   c. INSTALL REFRIGERANT PIPING WITH SUPPLEMENTAL SUPPORTS AND INSULATE.
6. INSTALL NEW DIRECT DIGITAL CONTROLS.
   a. INSTALL THE NEW BACNET DDC CONTROL PANEL WHERE INDICATED. INTEGRATE INTO THE CAMPUS DDC. INTEGRATE ALL NEW HVAC EQUIPMENT CONTROLS INTO THIS PANEL.
   b. ROOFTOP UNITS AND CONDENSING UNITS SHALL BE PROVIDED WITH INTEGRAL BACNET COMPATIBLE CONTROLLERS. INSTALL A NEW BACNET TRIDIUM JACE AS THE SERVER/INTEGRATOR/INTERFACE. REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
7. TESTING AND BALANCING. THE MECHANICAL CONTRACTOR, DDC CONTRACTOR, AND TAB AGENCY SHALL PARTICIPATE IN TESTING AND BALANCING THE SYSTEM TO SPECIFIED PERFORMANCE. COORDINATE WITH THE OWNER'S COMMISSIONING AGENT FOR OBSERVATION AS REQUIRED.
8. COMMISSIONING: COORDINATE WITH THE OWNER'S COMMISSIONING AGENT AS REQUIRED FOR COMMISSIONING ACTIVITIES. PROVIDE INFORMATION, AND CONDUCT ACTIVITIES AS REQUIRED BY THE OWNER'S COMMISSIONING AGENT. THIS MAY INCLUDE, BUT IS NOT LIMITED TO, EQUIPMENT STARTUP REPORTS, TAB REPORTS, AND DOCUMENTATION.



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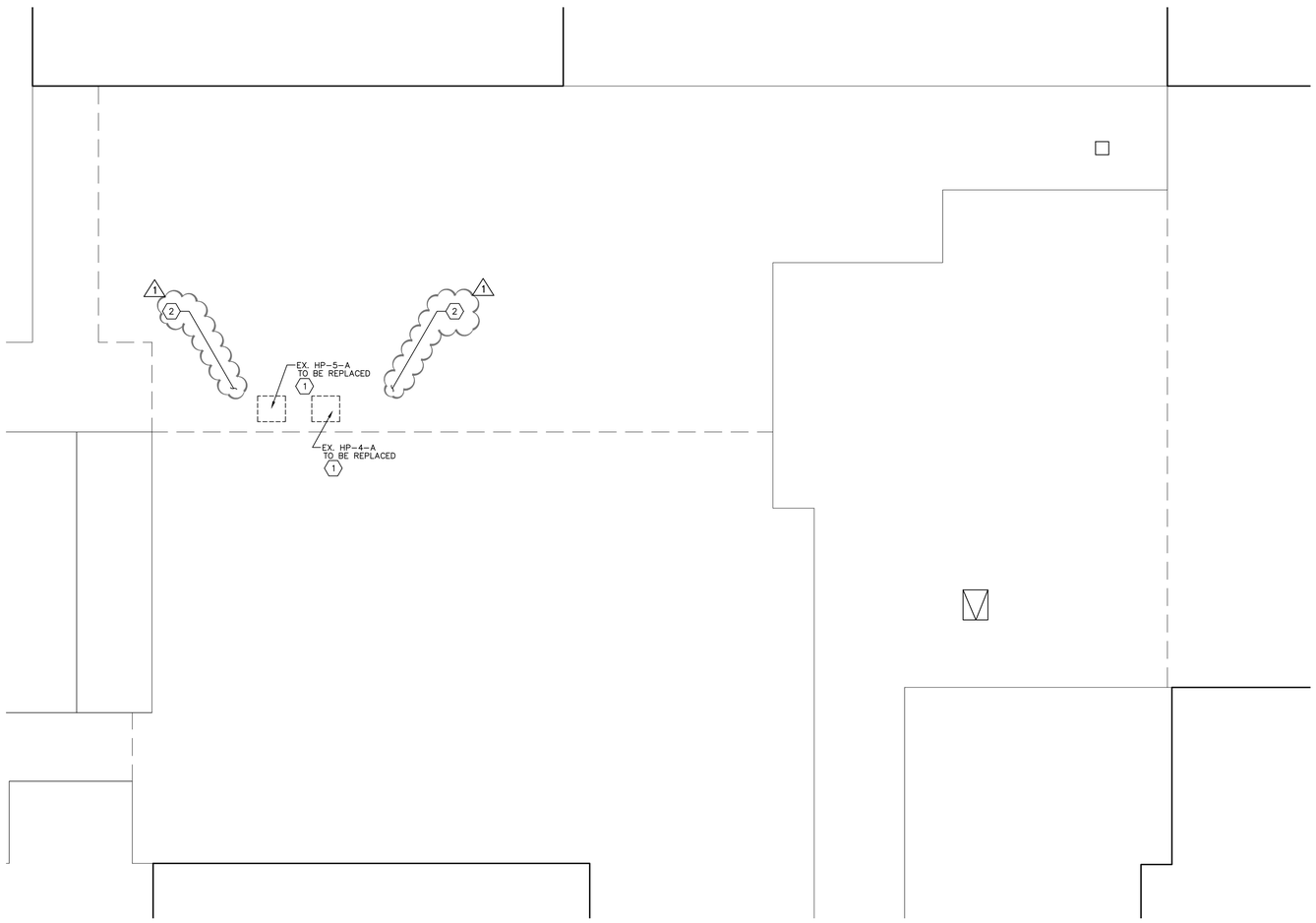
Title: **ROOF MECH/PLUMB DEMOLITION PLAN "A&B"**

Sheet: **MP3.4**



1 ROOF MECH/PLUMB DEMOLITION PLAN
SCALE: 1/8"=1'-0"

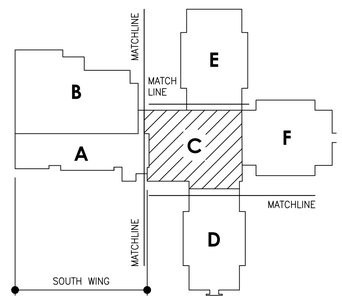
KEYED NOTES:

1 REMOVE THE EXISTING CONDENSING UNITS.

2 PROVIDE PLYWOOD ON ROOF IN ALL WORK AREAS DURING CONSTRUCTION TO PROTECT THE ROOF. PLYWOOD SHEETS SHALL BE SECURED TOGETHER, WEIGHTED DOWN AND ATTACHED TO BUILDING TO PREVENT THEM FROM BEING BLOWN OFF THE ROOF.

CONSTRUCTION NOTES:

1. THIS PROJECT IS INTENDED TO BE CONDUCTED IN A COMPETITIVE SEALED PROPOSAL FORMAT. THE INTENT OF THESE DRAWINGS IS TO INDICATE THE SCOPE OF WORK WITH RELIANCE ON CURRENT CODES, AUSTIN ISD STANDARDS FOR THE QUALITY OF WORK. ALL 2015 INTERNATIONAL BUILDING CODES, 2015 UNIFORM MECHANICAL CODES, 2015 UNIFORM PLUMBING CODES, AND CURRENT AUSTIN ISD STANDARDS SHALL BE ADHERED.
2. REFER TO SPECIFICATIONS AND M0.1 SHEET, AND COORDINATE WITH THE AUSTIN ISD PROJECT MANAGER, ENGINEER AND GENERAL CONTRACTOR FOR PHASING, WORK-HOUR REQUIREMENTS, AND OTHER GENERAL INFORMATION APPLICABLE TO ALL M SHEETS. APPLY ALL INFORMATION ACCORDINGLY.
3. COORDINATE WITH OWNER'S ENVIRONMENTAL CONSULTANT PRIOR TO CONDUCTING ANY DEMOLITION. OBTAIN TEST RESULTS OF ALL HAZARDOUS MATERIALS LOCATED IN THE WORK AREAS, AND AVOID SUCH MATERIALS. ABATEMENT OF LEAD, ASBESTOS, AND OTHER HAZARDOUS MATERIALS SHALL BE COMPLETED BY OTHERS PRIOR TO ANY DEMOLITION. COORDINATE WITH ABATEMENT ACTIVITIES AS REQUIRED.
4. PHOTOGRAPHICALLY DOCUMENT ALL EXISTING CONDITIONS PRIOR TO START OF WORK.
5. REPAIR ALL DAMAGE TO THE BUILDING OR SYSTEMS TO REMAIN AT NO ADDITIONAL COST TO THE CONTRACT, UNLESS DOCUMENTED AS EXISTING PRIOR TO START OF WORK.
6. COORDINATE WITH THE GENERAL AND/OR PRIME CONTRACTOR TO REMOVE OR REMOVE/REINSTALL BUILDING COMPONENTS AS REQUIRED FOR ACCESS FOR REMOVAL/ALTERATION OF MECHANICAL SYSTEMS.
7. REMOVE THE EXISTING CONDENSING UNITS INDICATED.
   a. CAPTURE THE REFRIGERANT FROM THE SYSTEM. TURN OVER TO OWNER.
   b. DISCONNECT REFRIGERANT PIPING AND ELECTRICAL BRANCH CIRCUIT.
   c. REMOVE THE SUPPORTS.
8. REMOVE EXISTING CONTROLS SERVING THE DEMOLISHED HVAC EQUIPMENT AS INDICATED.



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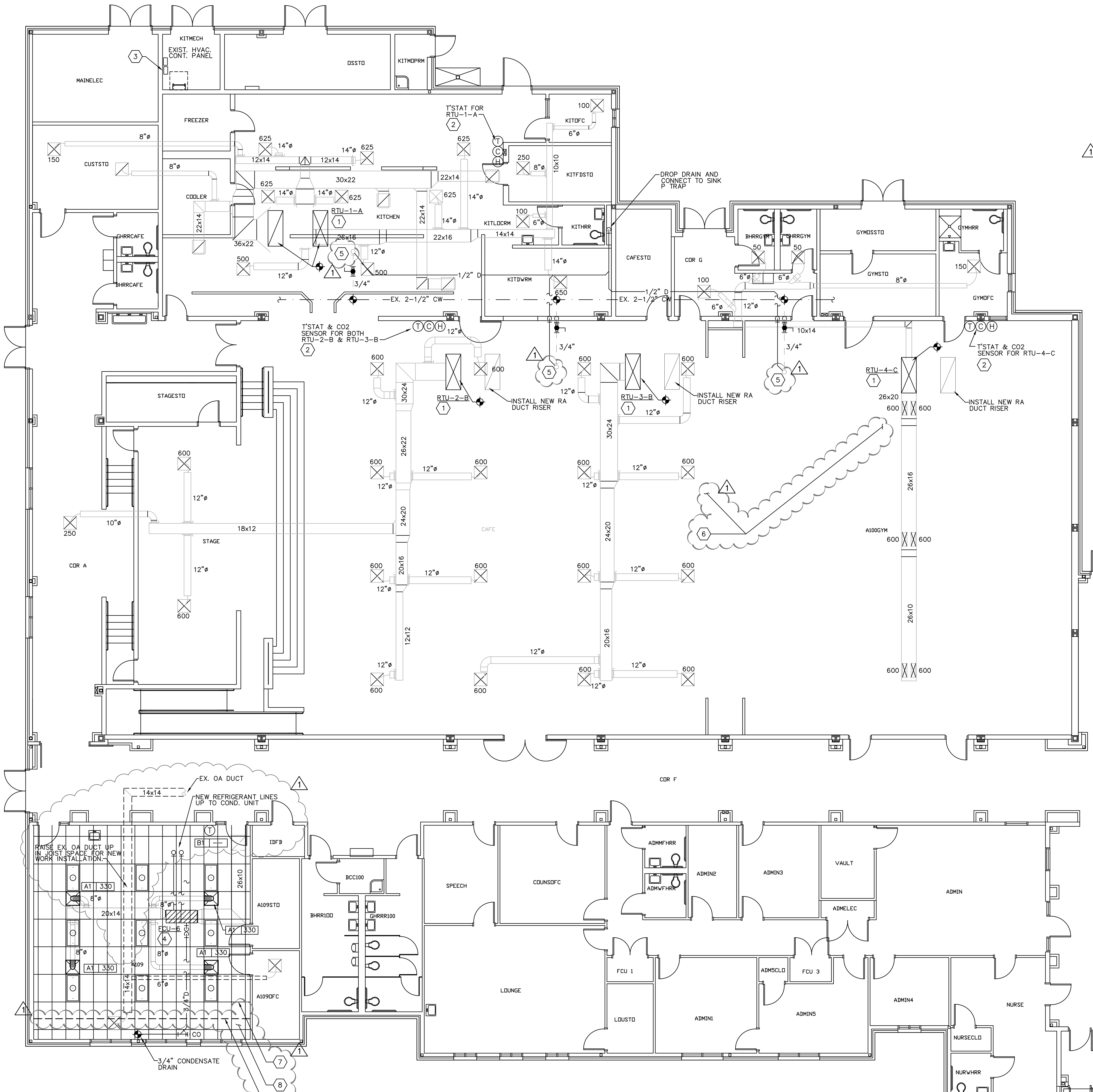
ROOF MECH/PLUMB DEMOLITION PLAN "C"

Sheet:
MP3.5



FIRST FLOOR MECH/PLUMB REVISED PLAN

SCALE: 1/8"=1'-0"

KEYED NOTES:

1. MODIFY DUCTWORK AS REQUIRED TO ACCOMMODATE THE NEW ROOFTOP UNITS.
2. INSTALL NEW DIGITAL THERMOSTATS, HUMIDISTATS, AND CO2 SENSORS AS INDICATED. INTEGRATE INTO THE NEW BACNET DDC.
3. INSTALL THE NEW BACNET DDC CONTROL PANEL. INTEGRATE CONTROLS FOR ALL NEW EQUIPMENT INTO THIS CONTROL PANEL.
4. INSTALL NEW FAN-COIL UNITS, ASSOCIATED DUCTWORK AND DUCTWORK. ROUTE ¾" CONDENSATE DRAIN DOWN IN WALL AND CONNECT TO EXISTING. PROVIDE FURRNG AS REQUIRED. ROUTE NEW REFRIGERANT PIPING UP THROUGH ROOF TO NEW CONDENSING UNIT.
5. INSTALL NEW ROOF HYDRANT. REFERENCE DETAIL M7.1/1 FOR ADDITIONAL INFORMATION.
6. REINSTALL EXISTING CEILING GRID AND CEILING TILE THAT WAS REMOVED FOR ACCESS TO EQUIPMENT REPLACEMENT.
7. PROVIDE NEW CEILING GRID AND TILE IN A109 . REFER TO SPECIFICATIONS FOR DETAILS.
8. REPAIR EXISTING FLOOR WHERE FCU UNITS WHERE REMOVED. REFER TO SPECIFICATIONS FOR ADDITIONAL DETAILS.
9. PROVIDE NEW CARPET TILE, APPROXIMATELY 36" WIDE, ALONG THE EAST WALL OF RM A109 TO COVER THE FLOOR REPAIRS. REFER TO SPECIFICATIONS FOR ADDITIONAL DETAILS.

CONSTRUCTION NOTES:

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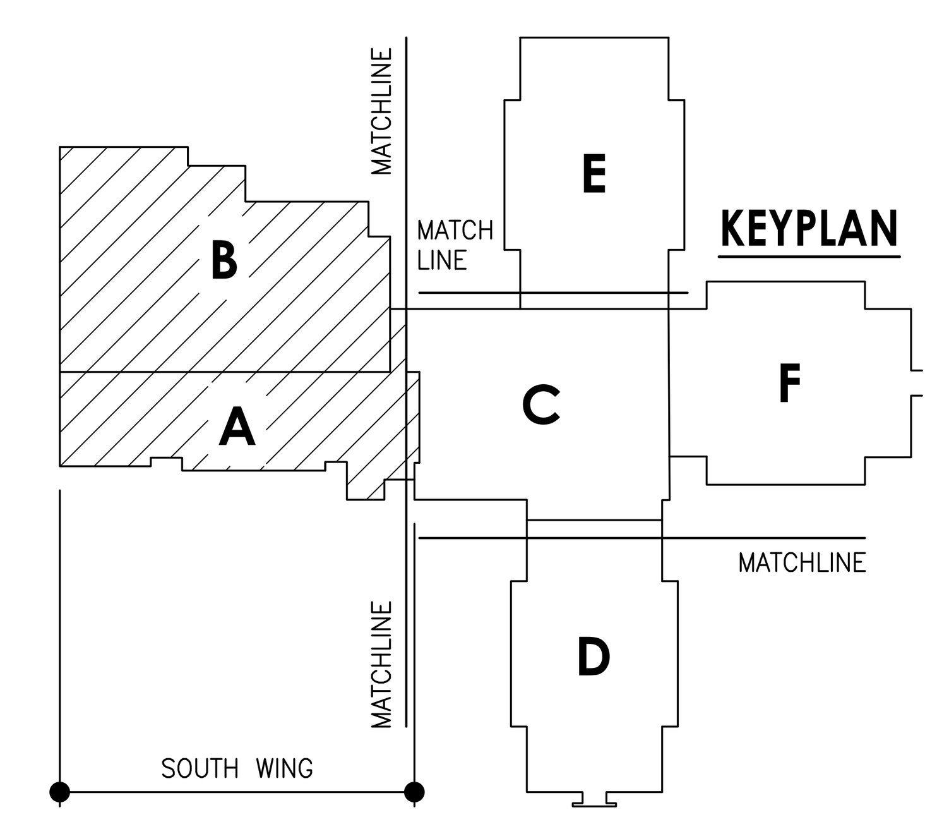
2. REFER TO SPECIFICATIONS AND M0.1 SHEET, AND COORDINATE WITH THE AUSTIN ISD PROJECT MANAGER, ENGINEER AND GENERAL CONTRACTOR FOR PHASING, WORK-HOUR REQUIREMENTS, AND OTHER GENERAL INFORMATION APPLICABLE TO ALL M SHEETS. APPLY ALL INFORMATION ACCORDINGLY.
3. MODIFY/SUPPLEMENT/REPLACE THE EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE THE NEW ROOFTOP UNITS.
4. INSULATE THE NEW DUCTWORK. TAPE TO THE EXISTING DUCTWORK AND SEAL ALL SEAMS.
5. INSTALL THE NEW FAN-COIL AND ASSOCIATED CONDENSING UNITS.
   a. SUPPORT FROM THE STRUCTURE.
   b. INSTALL NEW REFRIGERANT PIPING. PROVIDE SUPPLEMENTAL HANGERS AND ROOF SUPPORTS AS NECESSARY. INSULATE THE PIPING AND PROVIDE A METAL JACKET ON ALL OUTDOOR INSULATED PIPING.
   c. INSTALL NEW CONDENSATE DRAIN PIPING. EXTEND AND CONNECT TO EXISTING.
   d. INSULATE ALL NEW CONDENSATE DRAIN PIPING. PROVIDE SUPPORTS AS NECESSARY.
   e. PROVIDE NEW SUPPLY AND RETURN AIR DUCTWORK, DIFFUSERS, AND GRILLES AS INDICATED.
   f. NOTE THAT THE OUTDOOR AIR SYSTEM IN THE MUSIC ROOM IS A SEPARATE SYSTEM.
6. INSTALL NEW DIRECT DIGITAL CONTROLS.
   a. INSTALL THE NEW BACNEET DDC CONTROL PANEL WHERE INDICATED. INTEGRATE INTO THE CAMPUS DDC. INTEGRATE ALL NEW HVAC EQUIPMENT CONTROLS INTO THIS PANEL.
   b. THE EXISTING CONTROL PANEL SHALL BE MODIFIED TO REMOVE COMMUNICATION FROM THE REPLACED HVAC EQUIPMENT. BOTH CONTROL PANELS SHALL BE IN SERVICE SIMULTANEOUSLY.
   c. CONNECT THE NEW ROOFTOP UNIT AND DX SPLIT SYSTEM CONTROLS AND SAFETIES INTO THE NEW DDC.
   d. INSTALL NEW THERMOSTATS AND CO2 SENSORS ROOFTOP UNIT.
   e. INSTALL NEW THERMOSTAT FOR THE FAN-COIL UNIT.
7. COORDINATE WITH THE PRIME CONTRACTOR FOR PATCH/REPAIR/INSTALLATION OF BUILDING COMPONENTS AS REQUIRED TO PLACE THE BUILDING IN FULL FUNCTIONALITY.
   a. FOR LOCATIONS WHERE FAN-COIL UNITS ARE TO BE INSTALLED: INSTALL CEILING TILES, CEILING GRID, AND CEILING MOUNTED DEVICES. SUPPLEMENT THE CEILING GRID/TILES AS NEEDED FOR A COMPLETE INSTALLATION.
   b. FOR LOCATIONS BENEATH NEW ROOFTOP UNITS: INSTALL CEILING TILES, CEILING GRID, AND CEILING MOUNTED DEVICES. SUPPLEMENT THE CEILING GRID/TILES AS NEEDED FOR A COMPLETE INSTALLATION.
   c. FOR LOCATIONS AT WATER SOURCE HEAT PUMPS: REPLACE/REPAIR/SUPPLEMENT SHELVING/FURNITURE/ WINDOW COMPONENTS/WALL BASE BOARD/FLOORING/WALL MATERIAL AS NECESSARY. PAINT AS REQUIRED. PROVIDE FURRING TO ACCOMMODATE THE NEW CONDENSATE DRAIN CONNECTION TO EXISTING.
   d. ALL MODIFIED SURFACES IN WORK AREAS SHALL BE FINISHED TO MATCH EXISTING ADJACENT SURFACES.
8. PROVIDE NEW FREEZE PROOF ROOF HYDRANTS AS INDICATED. CONNECT NEW DOMESTIC WATER PIING TO EXISTING AND EXTEND TO NEW HYDRANTS. EXTEND DRAIN PIPING TO AN ACCEPTABLE DISCHARGE LOCATION.
9. TESTING AND BALANCING. THE MECHANICAL CONTRACTOR, DDC CONTRACTOR, AND TAB AGENCY SHALL PARTICIPATE IN TESTING AND BALANCING THE SYSTEM TO SPECIFIED PERFORMANCE. COORDINATE WITH THE OWNER'S COMMISSIONING AGENT FOR OBSERVATION AS REQUIRED.
10. COMMISSIONING: COORDINATE WITH THE OWNER'S COMMISSIONING AGENT AS REQUIRED FOR COMMISSIONING ACTIVITIES. PROVIDE INFORMATION, AND CONDUCT ACTIVITIES AS REQUIRED BY THE OWNER'S COMMISSIONING AGENT. THIS MAY INCLUDE, BUT IS NOT LIMITED TO, EQUIPMENT STARTUP REPORTS, TAB REPORTS, AND DOCUMENTATION.



GRAPHIC SCALE: 1/8"=1'-0"

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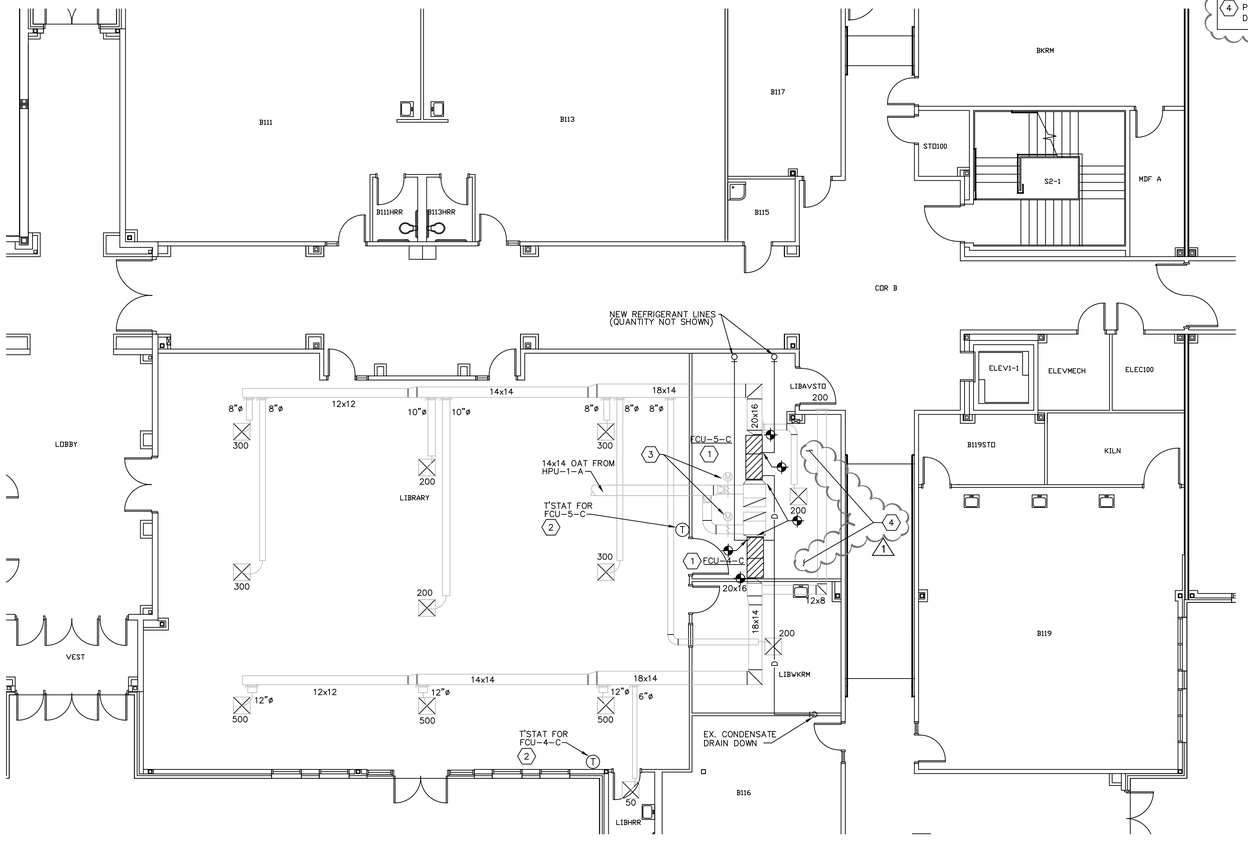
Title: FIRST FLOOR MECH/PLUMB REVISED PLAN "A&B"

Sheet: MP6.1



FIRST FLOOR MECH/PLUMB REVISED PLAN

SCALE: 1/8"=1'-0"

KEYED NOTES:

1. INSTALL NEW FAN COIL UNITS. MODIFY THE EXISTING DUCTWORK AS REQUIRED TO ACCOMMODATE THE NEW FAN-COIL UNITS. THE EXISTING SUPPLY, RETURN, AND OUTDOOR AIR DUCTWORK SHALL BE REUSED.
2. INSTALL NEW DIGITAL THERMOSTATS SENSORS AS INDICATED. INTEGRATE INTO THE NEW BACNET DDC.
3. BALANCE THE EXISTING OUTDOOR AIR CONTROL DAMPERS IN THE EXISTING OUTDOOR AIR DUCT TO SCHEDULED OUTDOOR AIR QUANTITIES.
4. PROVIDE NEW CEILING GRID AND TILE IN LIBAVSTO. REFER TO SPECIFICATIONS FOR DETAILS.

CONSTRUCTION NOTES:

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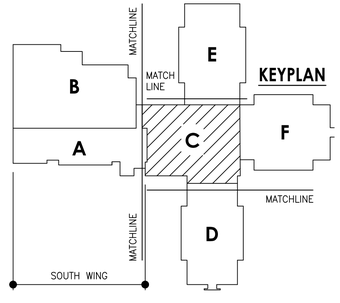
2. REFER TO SPECIFICATIONS AND M0.1SERIES SHEET, AND COORDINATE WITH THE AUSTIN ISD PROJECT MANAGER, ENGINEER AND GENERAL CONTRACTOR FOR PHASING, WORK-HOUR REQUIREMENTS, AND OTHER GENERAL INFORMATION APPLICABLE TO ALL M SHEETS. APPLY ALL INFORMATION ACCORDINGLY.
3. PROVIDE SUPPLEMENTAL SUPPORT FOR THE EXISTING CONDENSATE DRAIN PIPING. PIPING SHALL SLOPE UNIFORMLY TO THE DISCHARGE POINT AT 1/8" PER FOOT WITHOUT SAGGING.
4. REPAIR/SUPPLEMENT INSULATION ON THE REFRIGERANT PIPING AND CONDENSATE DRAIN PIPING AS NEEDED. ALL PIPING SHALL BE INSULATED.
5. INSTALL THE NEW FAN-COIL AND ASSOCIATED CONDENSING UNITS.
   a. SUPPORT FROM THE STRUCTURE
   b. INSTALL A NEW CONDENSATE DRAIN PAN BENEATH THE UNIT. CONNECT TO THE EXISTING CONDENSATE DRAIN PIPING. INSTALL AN OVERFLOW SAFETY FLOAT SWITCH TO SHUTOFF THE UNIT ON ACTIVATION. PROVIDE AN ALARM CIRCUIT ON THE SWITCH, INTEGRATED INTO THE NEW DDC.
   c. INSTALL NEW REFRIGERANT PIPING. PROVIDE SUPPLEMENTAL HANGERS AND ROOF SUPPORTS AS NECESSARY. INSULATE THE PIPING AND PROVIDE A METAL JACKET ON ALL OUTDOOR INSULATED PIPING.
   d. INSULATE ALL NEW AND EXISTING CONDENSATE DRAIN PIPING. PROVIDE SUPPLEMENTAL SUPPORTS AS NECESSARY. CONNECT THE NEWCONDENSATE DRAIN PIPING TO THE NEW CONDENSATE DRAIN PANS AND EXTEND TO AN ACCEPTABLE DISCHARGE LOCATION.
   e. RECONNECT THE EXISTING SUPPLY, RETURN, AND OUTDOOR AIR DUCTWORK. MODIFY THE EXISTING DUCTWORK AS NEEDED AND SUPPLEMENT AS REQUIRED FOR A COMPLETE INSTALLATION.
   f. NOTE THAT THE OUTDOOR AIR SUPPLIED TO THE FAN-COILS IS PRE-TREATED FROM AN EXISTING MAKEUP AIR UNIT.
6. MODIFY/SUPPLEMENT/REPLACE THE EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE THE NEW FAN-COIL UNITS.
7. INSULATE NEW AND MODIFIED DUCTWORK. TAPE TO THE EXISTING DUCTWORK AND SEAL ALL SEAMS.
8. INSTALL NEW DIRECT DIGITAL CONTROLS.
   a. INTEGRATE ALL NEW HVAC EQUIPMENT CONTROLS INTO THE NEW BACNET DDC PANEL.
   b. INSTALL NEW THERMOSTATS AND CO2 SENSORS FOR THE LIBRARY FAN-COIL UNITS.
9. COORDINATE WITH THE PRIME CONTRACTOR FOR PATCH/REPAIR/INSTALLATION OF BUILDING COMPONENTS AS REQUIRED TO PLACE THE BUILDING IN FULL FUNCTIONALITY.
   a. FOR LOCATIONS WHERE FAN-COIL UNITS ARE TO BE INSTALLED: INSTALL CEILING TILES, CEILING GRID, AND CEILING MOUNTED DEVICES. SUPPLEMENT THE CEILING GRID/TILES AS NEEDED FOR A COMPLETE INSTALLATION.
   b. ALL MODIFIED SURFACES IN WORK AREAS SHALL BE FINISHED TO MATCH EXISTING ADJACENT SURFACES.
10. PHASING:
    a. THE BOOKS IN THE LIBRARY WILL REMAIN IN PLACE. ANY AIR CONDITIONING OUTAGES IN THE LIBRARY SHALL BE LIMITED TO 24 HOURS IN DURATION. AFTER EACH OUTAGE, THE TEMPERATURE IN THE LIBRARY SHALL BE RETURNED TO 75 DEGREES F/50% RH.
    b. PROVIDE TEMPORARY SPOT AIR CONDITIONING AS NECESSARY TO MAINTAIN ENVIRONMENTAL CONDITIONS WITHIN THE LIBRARY.
11. TESTING AND BALANCING. THE MECHANICAL CONTRACTOR, DDC CONTRACTOR, AND TAB AGENCY SHALL PARTICIPATE IN TESTING AND BALANCING THE SYSTEM TO SPECIFIED PERFORMANCE. COORDINATE WITH THE OWNER'S COMMISSIONING AGENT FOR OBSERVATION AS REQUIRED.
12. COMMISSIONING: COORDINATE WITH THE OWNER'S COMMISSIONING AGENT AS REQUIRED FOR COMMISSIONING ACTIVITIES. PROVIDE INFORMATION, AND CONDUCT ACTIVITIES AS REQUIRED BY THE OWNER'S COMMISSIONING AGENT. THIS MAY INCLUDE, BUT IS NOT LIMITED TO, EQUIPMENT STARTUP REPORTS, TAB REPORTS, AND DOCUMENTATION.



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Sheet: **MP6.2**

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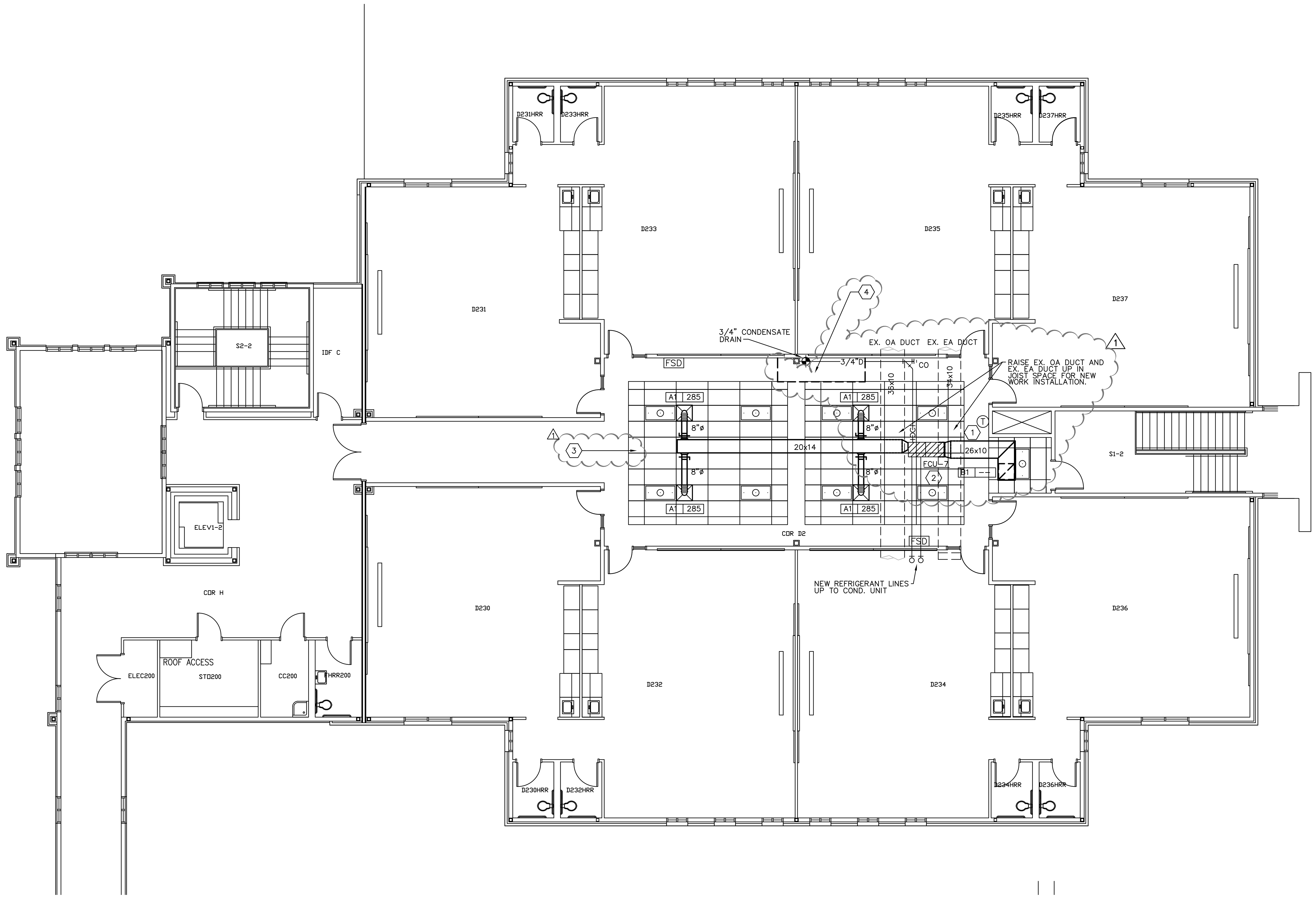

1 SECOND FLOOR MECH/PLUMB REVISED PLAN

SCALE: 1/8"=1'-0"

KEYED NOTES:

1. INSTALL NEW DIGITAL THERMOSTAT WHERE INDICATED. INTEGRATE INTO THE NEW BACNET DDC.
2. INSTALL NEW FAN-COIL UNITS, ASSOCIATED DUCTWORK AND DUCTWORK. ROUTE ¾" CONDENSATE DRAIN DOWN IN WALL AND CONNECT TO EXISTING. PROVIDE FURRNG AS REQUIRED. ROUTE NEW REFRIGERANT PIPING UP THROUGH ROOF TO NEW CONDENSING UNIT.
3. PROVIDE NEW CEILING GRID AND TILE IN A109 . REFER TO SPECIFICATIONS FOR DETAILS.
4. REPAIR EXISTING FLOOR TILE WHERE FCU WAS REMOVED. PROVIDE NEW TILES AS REQUIRED. REFER TO SPECIFICATIONS FOR ADDITIONAL DETAILS.

CONSTRUCTION NOTES:

1. THIS PROJECT IS INTENDED TO BE CONDUCTED IN A COMPETITIVE SEALED PROPOSAL FORMAT. THE INTENT OF THESE DRAWINGS IS TO INDICATE THE SCOPE OF WORK WITH RELIANCE ON CURRENT CODES, AUSTIN ISD STANDARDS FOR THE QUALITY OF WORK. ALL 2015 INTERNATIONAL BUILDING CODES, 2015 UNIFORM MECHANICAL CODES, 2015 UNIFORM PLUMBING CODES, AND CURRENT AUSTIN ISD STANDARDS SHALL BE ADHERED.
2. REFER TO SPECIFICATIONS AND M0.1 SHEET, AND COORDINATE WITH THE AUSTIN ISD PROJECT MANAGER, ENGINEER AND GENERAL CONTRACTOR FOR PHASING, WORK-HOUR REQUIREMENTS, AND OTHER GENERAL INFORMATION APPLICABLE TO ALL M SHEETS. APPLY ALL INFORMATION ACCORDINGLY.
3. INSTALL THE NEW FAN-COIL AND ASSOCIATED CONDENSING UNITS.
   a. SUPPORT FROM THE STRUCTURE.
   b. INSTALL NEW REFRIGERANT PIPING. PROVIDE SUPPLEMENTAL HANGERS AND ROOF SUPPORTS AS NECESSARY. INSULATE THE PIPING AND PROVIDE A METAL JACKET ON ALL OUTDOOR INSULATED PIPING.
   c. INSULATE ALL NEW CONDENSATE DRAIN PIPING. PROVIDE SUPPORTS AS NECESSARY. CONNECT THE NEW CONDENSATE DRAIN PIPING TO THE NEW CONDENSATE DRAIN PANS AND EXTEND/CONNECT TO THE EXISTING CONDENSATE DRAIN PIPING.
   d. PROVIDE NEW SUPPLY AND RETURN AIR DUCTWORK, DIFFUSERS, AND GRILLES AS INDICATED.
4. INSTALL NEW DIRECT DIGITAL CONTROLS.
   a. INTEGRATE ALL NEW HVAC EQUIPMENT CONTROLS INTO THE NEW BACNET DDC PANEL.
   b. INSTALL NEW THERMOSTAT FOR THE NEW FAN-COIL UNIT.
5. COORDINATE WITH THE PRIME CONTRACTOR FOR PATCH/REPAIR/INSTALLATION OF BUILDING COMPONENTS AS REQUIRED TO PLACE THE BUILDING IN FULL FUNCTIONALITY.
   a. FOR LOCATIONS WHERE FAN-COIL UNITS ARE TO BE INSTALLED: INSTALL CEILING TILES, CEILING GRID, AND CEILING MOUNTED DEVICES. SUPPLEMENT THE CEILING GRID/TILES AS NEEDED FOR A COMPLETE INSTALLATION.
   b. FOR LOCATIONS AT WATER SOURCE HEAT PUMPS: REPLACE/REPAIR/SUPPLEMENT SHELVING/FURNITURE/ WALL BASE BOARD/FLOORING/WALL MATERIAL AS NECESSARY. PAINT AS REQUIRED.
   c. ALL MODIFIED SURFACES IN WORK AREAS SHALL BE FINISHED TO MATCH EXISTING ADJACENT SURFACES.
6. TESTING AND BALANCING. THE MECHANICAL CONTRACTOR, DDC CONTRACTOR, AND TAB AGENCY SHALL PARTICIPATE IN TESTING AND BALANCING THE SYSTEM TO SPECIFIED PERFORMANCE. COORDINATE WITH THE OWNER'S COMMISSIONING AGENT FOR OBSERVATION AS REQUIRED.
7. COMMISSIONING: COORDINATE WITH THE OWNER'S COMMISSIONING AGENT AS REQUIRED FOR COMMISSIONING ACTIVITIES. PROVIDE INFORMATION, AND CONDUCT ACTIVITIES AS REQUIRED BY THE OWNER'S COMMISSIONING AGENT. THIS MAY INCLUDE, BUT IS NOT LIMITED TO, EQUIPMENT STARTUP REPORTS, TAB REPORTS, AND DOCUMENTATION.

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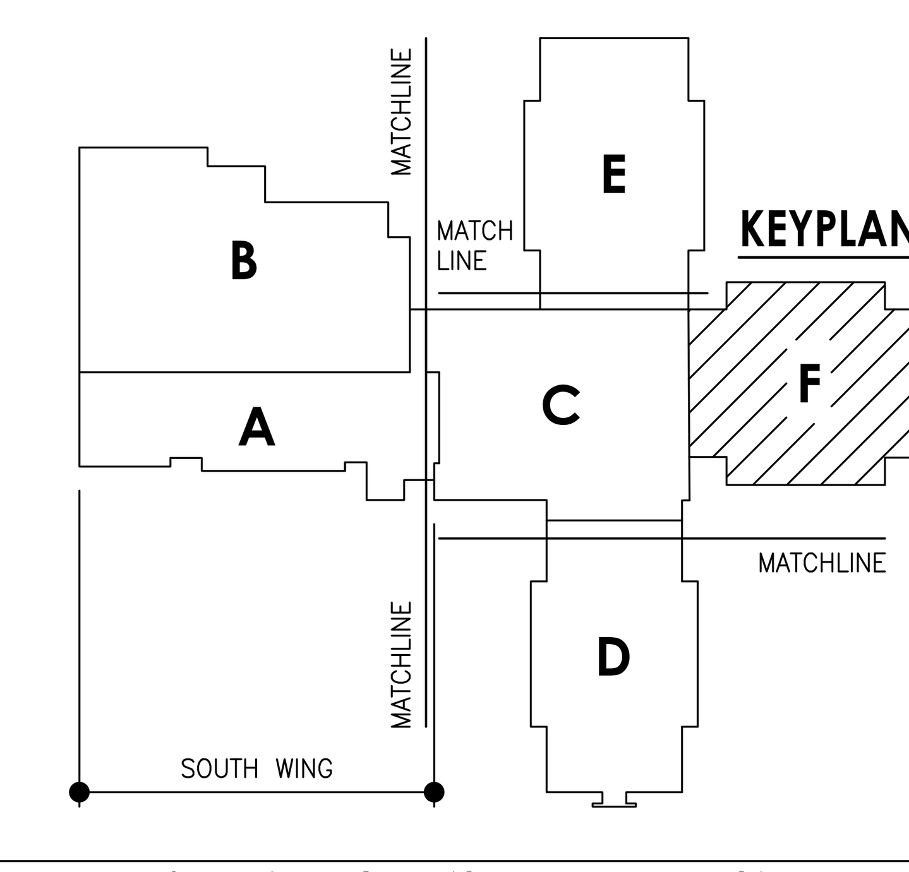
19-0015-CASEY



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Drawn By:	AH/GB/JR
Checked By:	JG/SK/TB
Date:	11/28/2018

DWG Number:

Title:
SECOND FLOOR MECH/PLUMB REVISED PLAN "F"

Sheet:
MP6.3

NO.	DWN	CHK	DATE	REVISION DESCRIPTION
1	JR / AH	TB / DM	12 / 21 / 18	ADDENDUM #01

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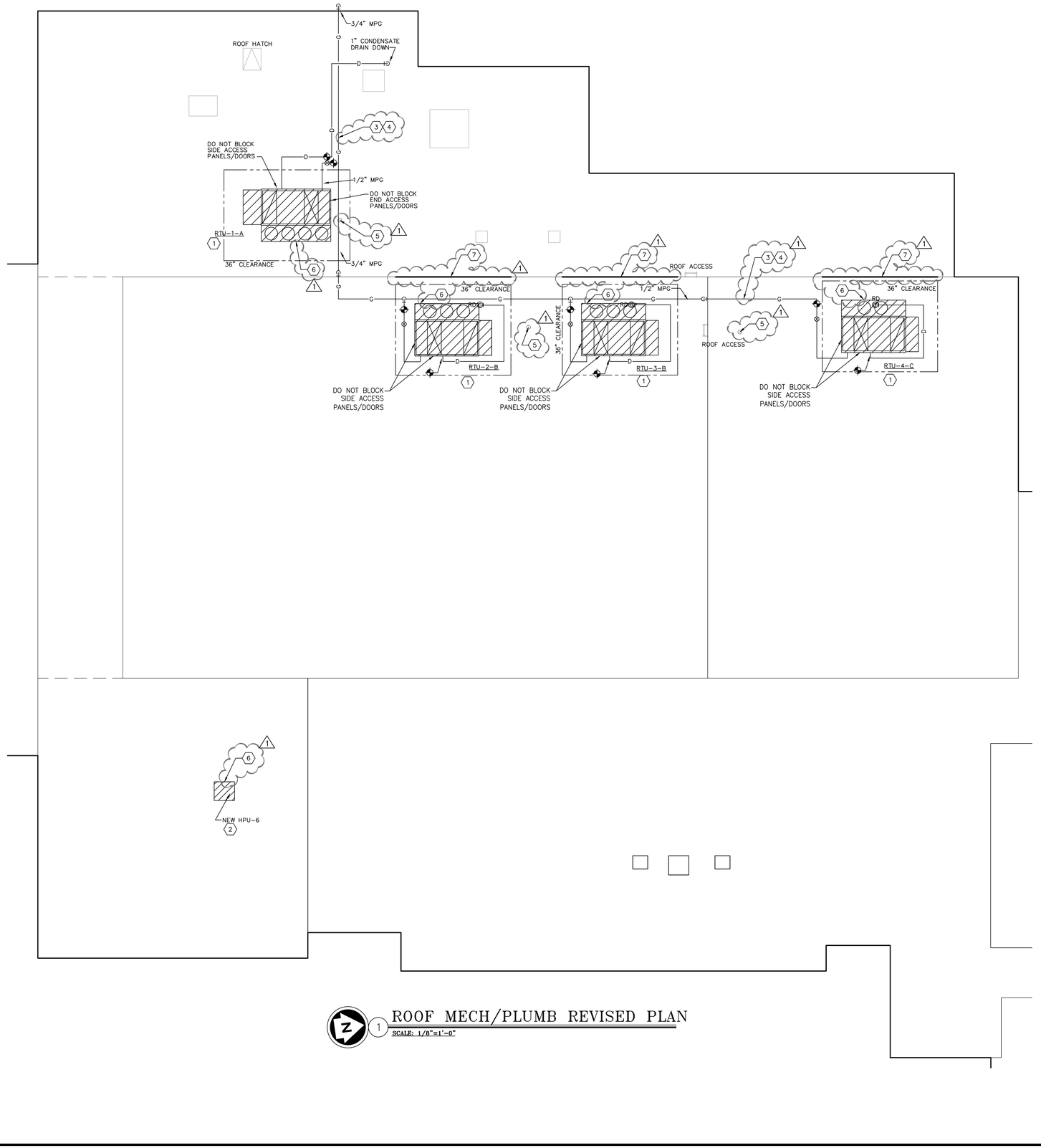
GRAPHIC SCALE: 1/8"=1'-0"



ROOF MECH/PLUMB REVISED PLAN

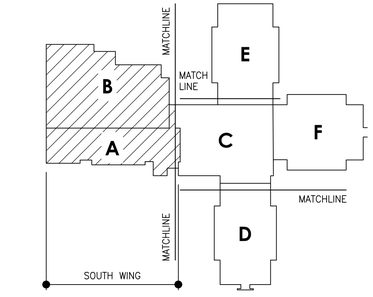
SCALE: 1/8"=1'-0"

KEYED NOTES:

1. INSTALL NEW ROOFTOP PACKAGED UNIT AT EXISTING LOCATION.
2. INSTALL NEW CONDENSING UNITS.
3. PRIME AND PAINT ALL NEW AND EXISTING GAS PIPING ON ROOF.
4. PROVIDE NEW SUPPORTS FOR ALL NEW AND EXISTING GAS PIPING ON ROOF.
5. PROVIDE NEW ROOF HOSE BIBBS.
6. REPAIR THE ROOF AND FLASHING AROUND THE NEW RTU'S, AND CONDENSING UNITS AS REQUIRED. REFER TO SPECIFICATIONS FOR ADDITIONAL DETAILS.
7. PROVIDE NEW SAFETY RAILS FOR RTU'S LOCATED TOO CLOSE TO THE ROOF EDGE. REFER TO SPECIFICATIONS FOR ADDITIONAL DETAILS.

CONSTRUCTION NOTES:

1. THIS PROJECT IS INTENDED TO BE CONDUCTED IN A COMPETITIVE SEALED PROPOSAL FORMAT. THE INTENT OF THESE DRAWINGS IS TO INDICATE THE SCOPE OF WORK WITH RELIANCE ON CURRENT CODES, AUSTIN ISD STANDARDS FOR THE QUALITY OF WORK. ALL 2015 INTERNATIONAL BUILDING CODES, 2015 UNIFORM MECHANICAL CODES, 2015 UNIFORM PLUMBING CODES, AND CURRENT AUSTIN ISD STANDARDS SHALL BE ADHERED.
2. REFER TO SPECIFICATIONS AND M0.1 SHEET, AND COORDINATE WITH THE AUSTIN ISD PROJECT MANAGER, ENGINEER AND GENERAL CONTRACTOR FOR PHASING, WORK-HOUR REQUIREMENTS, AND OTHER GENERAL INFORMATION APPLICABLE TO ALL M SHEETS. APPLY ALL INFORMATION ACCORDINGLY.
3. INSTALL THE NEW ROOFTOP PACKAGED UNITS AS INDICATED.
   a. REUSE THE EXISTING ROOF OPENINGS AND ROOF CURBS AS MUCH AS POSSIBLE. MODIFY AS REQUIRED TO ACCOMMODATE THE NEW INSTALLATION. PROVIDE CURB ADAPTERS TO FACILITATE REUSE OF THE EXISTING CURBS. MINIMUM INSTALLED CURB HEIGHT SHALL BE 18".
   b. EXTEND AND CONNECT THE EXISTING GAS PIPING TO THE NEW UNIT. INSTALL A NEW GAS REGULATOR AND SHUT-OFF VALVE. PRIME AND PAINT ALL NEW AND EXISTING GAS PIPING ON THE ROOF YELLOW.
   c. EXTEND AND CONNECT THE EXISTING CONDENSATE DRAIN PIPING TO THE NEW UNIT. INSULATE ALL CONDENSATE DRAIN PIPING SERVING THE RTU'S, WITHIN THE BUILDING. WHERE PIPING IS INSULATED, INSPECT AND REPAIR AS NECESSARY.
4. PRESSURE TEST REFRIGERANT PIPING PRIOR TO PLACING INTO OPERATION.
   a. TEST WITH NITROGEN GAS AT 150 PSIG. TEST SHALL MAINTAIN PRESSURE FOR 4 HOURS.
5. INSTALL THE NEW CONDENSING UNIT.
   a. INSTALL NEW SUPPORTS. PATCH/REPAIR ROOFING TO MATCH EXISTING ADJACENT SURFACES.
   b. INSTALL THE NEW UNIT IN ACCORDNCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
   c. INSTALL REFRIGERANT PIPING WITH SUPPLEMENTAL SUPPORTS AND INSULATE.
6. INSTALL NEW DIRECT DIGITAL CONTROLS.
   a. INSTALL THE NEW BACNET DDC CONTROL PANEL WHERE INDICATED. INTEGRATE INTO THE CAMPUS DDC. INTEGRATE ALL NEW HVAC EQUIPMENT CONTROLS INTO THIS PANEL.
   b. ROOFTOP UNITS AND CONDENSING UNITS SHALL BE PROVIDED WITH INTEGRAL BACNET COMPATIBLE CONTROLLERS. INSTALL A NEW BACNET TRIDIUM JACE AS THE SERVER/INTEGRATOR/INTERFACE. REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
7. PROVIDE NEW FREEZE PROOF ROOF HYDRANTS AS INDICATED. CONNECT NEW DOMESTIC WATER PIING TO EXISTING AND EXTEND TO NEW HYDRANTS. EXTEND DRAIN PIPING TO AN ACCEPTABLE DISCHARGE LOCATION.
8. TESTING AND BALANCING. THE MECHANICAL CONTRACTOR, DDC CONTRACTOR, AND TAB AGENCY SHALL PARTICIPATE IN TESTING AND BALANCING THE SYSTEM TO SPECIFIED PERFORMANCE. COORDINATE WITH THE OWNER'S COMMISSIONING AGENT FOR OBSERVATION AS REQUIRED.
9. COMMISSIONING: COORDINATE WITH THE OWNER'S COMMISSIONING AGENT AS REQUIRED FOR COMMISSIONING ACTIVITIES. PROVIDE INFORMATION, AND CONDUCT ACTIVITIES AS REQUIRED BY THE OWNER'S COMMISSIONING AGENT. THIS MAY INCLUDE, BUT IS NOT LIMITED TO, EQUIPMENT STARTUP REPORTS, TAB REPORTS, AND DOCUMENTATION.



GRAPHIC SCALE: 1/8"=1'-0"

NO.	DWN	CHK	DATE	REVISION DESCRIPTION
1	JR	TB	12 / 20 / 18	ADDENDUM NO. 1

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SKE PROJECT # 19-0015-CASEY

Filename:
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Drawn By: AH/GB/JR
Checked By: JG/SK/TB
Date: 11/28/2018

DWG Number:

Title: ROOF MECH/PLUMB REVISED PLAN "A&B"

Sheet: MP6.4

PACKAGED AIR CONDITIONING UNIT SCHEDULE

Ident.	Air Delivery (c.f./m.)		External	No. of	Capacities (Mb.t.u./h.)			Furnace Data		Entering Air Temperature (%%dF)			Leaving Air Temperature (%%dF)			Condenser Coil Reheat					Condenser	Approx. Refrig.	Approx.	Approx. Footprint	Sound Data (max. inlet/outlet dB)								Electrical Data					Comments
	Supply	Minimum Outdoor	Static Pressure (in. w.g.)	Compressor Stages	Sensible	Total	Heating SLO	Fuel Type	Gas Input (MBH.)	Summer D.B.	Summer W.B.	Winter D.B.	Cooling DX COIL D.B.	Cooling DX COIL W.B.	Heating D.B.	EAT (%%dF) D.B.	EAT (%%dF) W.B.	LAT (%%dF) D.B.	LAT (%%dF) W.B.	CAP (MBTU/h)	Entering Air Temp. (%%dF)	Condensing Temp. (%%dF)	Weight (lbs.)	Dimension (in.)	63Hz	125 Hz	250 Hz	560 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Approx SA Fan Motor (hp.)	MCA amps	MOCP amps	Volt/Phase	IEER	
RTU-1	3,000	2,500	1.50	2.0	139.4	246.4	240	Nat. Gas	300.0	94.2	75.5	29.2	52.0	51.7	102.4	52.0	51.7	79.5	62.4	85.1	105	125	3,200	120x60	83	81	91	86	87	87	78	75	2 @ 1 HP	100.0	125	208/3	13.6	Valent VPR-210-20F-30I-A-1KX
RTU-2	4,370	1,755	1.25	2.0	154.6	243.9	200	Nat. Gas	250.0	84.2	69.0	52.9	52.1	51.6	105.0	52.1	51.6	74.3	60.5	98.2	105	125	3,205	120x60	84	82	85	80	77	72	66	62	2 @ 1 1/2 HP	103.6	125	208/3	13.6	Valent VPR-210-20F-25I-A-1KX
RTU-3	3,675	1,825	1.00	2.0	144.9	239.5	200	Nat. Gas	250.0	86.4	70.4	47.7	50.5	50.1	105.0	50.5	50.1	75.4	60.3	94.0	105	125	3,109	120x60	83	80	83	78	75	70	64	60	2 @ 1 1/2 HP	103.6	125	208/3	13.6	Valent VPR-210-20F-25I-A-1KX
RTU-4	2,930	990	1.00	2.0	88.0	124.6	160	Nat. Gas	200.0	82.8	68.1	55.4	55.4	55.0	105.0	55.4	55.0	79.1	63.9	71.0	105	125	2,612	120x60	83	81	91	86	87	87	78	75	2 @ 3/4 HP	54.5	70	208/3	16.1	Valent VPR-210-10F-20I-A-1KX

NOTES:

1. Provide curb adapters as necessary. Overall curb height shall be at least 18".
2. Provide economizer with gravity relief.
3. Unit weights are approximate and do not include roof mounting curb.
4. Gas input is anticipated unit requirement and may exceed scheduled capacity.
5. If electrical requirements of the units provided vary from the amounts scheduled, modify electrical service as necessary to properly service the units.
6. Units shall operate in single zone mode.
7. Units shall be provided with full onboard BACNet DDC, with communications and sensors as requried for a turnkey installation. Refer to the specifications and DDC drawings for additional information.
8. DX Coil to have stainless steel coil casings.
9. Provide a HGRH coil. Provide 6" seperation between the DX Coil and HGRH coil for sensors and cleaning.
10. Provide HACR breaker style disconnect switch.
11. Provide unit with one standard scroll compressor and One Inverter scroll compressor for each unit.
12. Provide unit with condensate overflow switch.
13. Manufacture to provide the room thermostat, room humidistat and CO2 sensor. Sensors are mounted within the space by the controls contractor.
14. Manufacture to provide condenser coil hail guards.
15. Manufacture to provide supply airflow and fresh air inlet damper airflow monitoring stations.
16. Manufacture to provide 5 year compressor warranty and 10 year heat exchanger warranty.

DX FAN-COIL UNIT SCHEDULE

Ident.	Air Delivery (c.f./m.)		External	Capacities (b.t.u./h.)			Entering Air Temperature (%%dF)			Leaving Air Temperature (%%dF)			Approx.	Electrical Data				Comments
	Supply Air	Minimum Outdoor Air	Static Pressure (in. w.g.)	Sensible Cooling	Total Cooling	Heating	Summer D.B.	Summer W.B.	Winter D.B.	Cooling D.B.	Cooling W.B.	Heating D.B.	Weight (lbs.)	Heating Coil (kw)	Fan Motor (Hp.)	MCA	MOCP	Volt/phase	
FCU-4	1,285	275	1.00	23,964	29,005	18,807	75.00	62.40	75.00	55.00	53.50	105.00	175	5	1	31	35	208/1	Carrier FE4ANF005
FCU-5	1,505	555	1.00	32,422	41,724	12,096	75.00	62.30	75.00	55.00	52.50	105.00	175	5	1	31	35	208/1	Carrier FE4ANB006L
FCU-6	1,320	0	1.00	28,370	33,175	21,064	75.00	62.50	75.00	55.00	53.70	105.00	175	9	1	48.5	50	208/1	Carrier FE4ANF005
FCU-7	1,136	0	1.00	24,463	33,763	7,281	75.00	62.50	75.00	55.00	51.90	105.00	175	5	1	31	35	208/1	Carrier FE4ANF005

NOTES:

1. Rooms served by FCU-6 and FCU-7 are served by a separate existing outdoor air system.
2.

OUTDOOR AIR CALCULATION

Unit ID	Occupancy Class	Zone Area (s.f.)	Design Conditions No. of People	OA/P	OA/s.f.	Exhuast Makeup	Min. OA	Comments
RTU-1	Kitchen	2,146	11	7.5	0.18	2000	2,469	RTU contains CO2 demand control
RTU-2	Cafeteria	2,100	143	7.5	0.277	0	1,654	RTU contains CO2 demand control
	Stage	1,080	10	0	0.06	0	65	
	Corridor	600	6	0	0.06	0	36	
Unit Total							1,755	
RTU-3	Cafeteria	1,800	200	7.5	0.18	0	1,824	RTU contains CO2 demand control
RTU-4	Gym	3,293	20	20	0.18	0	993	RTU contains CO2 demand control
FAC-4	Library	840	35	5	0.12	0	276	
FAC-5	Library	1,914	65	5	0.12	0	555	
FAC-6	Classroom	-	-	-	-	-	-	Room is served by existing separate OA unit
FAC-7	Common	-	-	-	-	-	-	Room is served by existing separate OA unit

REFRIGERANT CONDENSING UNIT SCHEDULE

Ident.	Type	Refrigerant	Refrigeration Capacity (b.t.u./h.)		Ambient (%%dF)		Approx. Condensing	No. Speeds		SEER	Approx. Weight	Electrical Data				Comments
			Cooling	Heating	Summer	Winter	Temperature (%%dF)	Fan	Compressor		(lbs.)	Fan FLA	MCA	MOCP	V./ph.	
HPU-04	Air Cooled Heat Pump	R-410A	29,005	18,807	105	20	125	Variable	Variable	17	220	1.2	31.4	50	208/1	Carrier 25VNA848
HPU-05	Air Cooled Heat Pump	R-410A	41,724	12,096	105	20	125	Variable	Variable	18	250	1.4	40.8	60	208/1	Carrier 25VNA860
HPU-06	Air Cooled Heat Pump	R-410A	33,175	21,064	105	20	125	Variable	Variable	18	220	1.2	31.4	50	208/1	Carrier 25VNA848
HPU-07	Air Cooled Heat Pump	R-410A	33,763	7,281	105	20	125	Variable	Variable	18	220	1.2	31.4	50	208/1	Carrier 25VNA848

NOTES:
1. All units shall be provided with low ambient kits and crankcase heaters.
2. Provide factory refrigerant piping kits
3. Provide factory programmable thermostat

AIR DEVICE SCHEDULE

Ident.	Type	Service	Neck Size (in.)	Face Size (in.)	Sound Data (max. NC)	Notes
A1	Ceiling Diffuser	Supply Air	8	24x24	30	
B1	Return Air Grille	Return Air	24x24	24x24	30	

NOTES:

1. Face size standard margin with the manufacturer.
2. Face size for grate type grilles to fit lay-in ceiling grid or hard ceiling as applicable.

NO.	DWN	CHK	DATE	REVISION DESCRIPTION
1	JR / AH	TB / DM	12 / 21 / 18	ADDENDUM #01

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SKE PROJECT #
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Filename:
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Drawn By: AH/GB/JR
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Date: 11/28/2018

DWG Number:

Title:
MECHANICAL SCHEDULES

Sheet:
M8.1

SEQUENCE OF OPERATIONS:

APPLICABLE TO THE FOLLOWING UNITS.
- A. GYM
- B. CAFETERIA
- C. KITCHEN

DESCRIPTION
1. KITCHEN UNIT IS SINGLE ZONE, CONSTANT VOLUME ROOFTOP PACKAGED UNIT WITH NEW CONTROLS AND SAFETIES, BAC-NET CARD, COMPARATIVE ENTHALPY ECONOMIZER, SINGLE OR TWO STAGES OF DX COOLING, AND GAS SUPPLEMENTAL HEATING.
2. CAFETERIA & GYM UNITS ARE SINGLE ZONE, VARIABLE AIR VOLUME ROOFTOP PACKAGED UNIT WITH NEW CONTROLS AND SAFETIES, BAC-NET CARD, COMPARATIVE ENTHALPY ECONOMIZER, SINGLE OR TWO STAGES OF DX COOLING, AND GAS SUPPLEMENTAL HEATING.
3. CONTRACTOR SHALL GENERATE GRAPHICS FOR REPRESENTING ACTUAL UNIT INSTALLED WITH ALL COMPONENTS AS INSTALLED. REFER TO POINT LIST FOR POINTS TO BE EXPOSED ON THE HUMAN MACHINE INTERFACE (HMI) AND ON THE GRAPHIC USER INTERFACE (GUI).
4. SEQUENCE OF OPERATION IS PRESENTED BELOW FOR REFERENCE ONLY. CONTRACTOR SHALL REVIEW SEQUENCE FOR UNIT OCCUPANCY, SCHEDULING, SETPOINT CALCULATIONS, AND CURRENT OPERATING CONDITIONS.

SETPOINTS & STATUS POINTS
1. OCCUPIED, UNOCCUPIED , BYPASS/OVERRIDE & DEHUMIDIFICATION:
   - A. BASE SETPOINT (nviSetpoint) [DEFAULT: 73°F]
   - B. OCCUPIED COOL SETPOINT (nciSetpoints.OCC_COOL) [DEFAULT: 74°F]
   - C. OCCUPIED HEAT SETPOINT (nciSetpoints.OCC_HEAT) [DEFAULT: 70°F]
   - D. UNOCCUPIED COOL SETPOINT (nciSetpoints.UNOCC_COOL) [DEFAULT: 85°F]
   - E. UNOCCUPIED HEAT SETPOINT (nciSetpoints.UNOCC_HEAT) [DEFAULT: 60°F]
   - F. DEHUMIDIFICATION SETPOINT (nviSpaceDehumSP/nciSpaceDehumSP) [DEFAULT: 60%]
   - G. LOCAL SETPOINT RANGE (CALCULATED POINT) [DEFAULT: +/-3F]
   - H. LOCAL SETPOINT ADJUST (CALCULATED POINT):
     - a. SETPOINT ADJUST = nvoSetpoint – 72F
     - ii. LIMIT SETPOINT ADJUST VALUE TO RANGE DEFINED BY LOCAL SETPOINT RANGE
     - iii. WRITE SETPOINT ADJUST VALUE TO nviSetptOffset
   - I. DEAD-BAND (CALCULATED POINT):
     - i. DEAD-BAND (DB) = nciSetpoints.OCC_COOL – nciSetpoints.OCC_HEAT
   - J. EFFECTIVE COOLING SETPOINT (CALCULATED POINT):
     - i. EFF. COOLING SETPOINT (OCCUPIED) = nviSetpoint + (DB/2) + Local_Setpoint_Adjust
     - ii. EFF. COOLING SETPOINT (UNOCCUPIED) = nciSetpoints.UNOCC_COOL
     - iii. EXPOSE ON GUI AS ONE POINT THAT UPDATES BASED ON THE UNIT'S ACTUAL OCCUPANCY
   - K. EFFECTIVE HEATING SETPOINT (CALCULATED POINT):
     - i. EFF. HEATING SETPOINT (OCCUPIED) = nviSetpoint – (DB/2) + Local_Setpoint_Adjust
     - ii. EFF. HEATING SETPOINT (UNOCCUPIED) = nciSetpoints.UNOCC_HEAT
     - iii. EXPOSE ON GUI AS ONE POINT THAT UPDATES BASED ON THE UNIT'S ACTUAL OCCUPANCY
   - L. CALCULATED POINTS DESCRIBED ABOVE SHALL BE PROGRAMMED ON THE BUILDING CONTROLLER (I.E. JACE).

OCCUPIED MODE
1. FAN CONTROL:
   - A. THE FAN SHALL BE STARTED AND STOPPED UNDER CONTROL OF SOFTWARE BY A TIME SCHEDULE. WHEN THE UNIT IS STARTED, THE FAN SHALL START AND RUN CONTINUOUSLY.
   - B. THE TIME SCHEDULE SHALL INITIALLY BE OCCUPIED DURING 6AM-6PM M-F.
2. TEMPERATURE CONTROL:
   - A. THE OCCUPIED AND UNOCCUPIED TEMPERATURE SETPOINTS SHALL BE ESTABLISHED IN THE CONFIGURATION SETPOINT VARIABLE (cSP) AND SHALL BE AS FOLLOWS:
     - i. OCCUPIED COOL: 73°F
     - ii. OCCUPIED HEAT: 70°F
     - iii. UNOCCUPIED COOL: 85°F
     - iv. UNOCCUPIED HEAT: 60°F
   - B. THE DIFFERENCE BETWEEN THE HEAT AND COOL SETPOINT SHALL BE REFERRED TO AS DEAD-BAND (ZERO-ENERGY BAND).
     - i. DEAD-BAND (ZERO-ENERGY BAND) = COOL SETPOINT – HEAT SETPOINT
   - C. DEFAULT LOCAL SETPOINT ADJUST RANGE SHALL BE -3/+3°F (cSAR).
   - D. THE JACE CONTROLLER SHALL PROVIDE A DEMAND FOR FIRST STAGE COOL WHEN THE SENSED TEMPERATURE IS GREATER THAN ONE-HALF THE PROPORTIONAL BAND (cPB) ADDED TO THE COOL CONFIGURATION SETPOINT:
     - i. 1ST-STAGE COOL ON = COOL SETPOINT + (1/2 PROPORTIONAL BAND)
   - E. THE JACE CONTROLLER SHALL PROVIDE A DEMAND FOR SECOND STAGE COOL WHEN THE SENSED TEMPERATURE IS GREATER THAN THE COOL CONFIGURATION SETPOINT PLUS ONE-HALF THE PROPORTIONAL BAND (cPB) ADDED TO THE SECOND STAGE TEMPERATURE DELTA (cD2S):
     - i. 2ND-STAGE COOL ON = COOL SETPOINT + (1/2 PROP. BAND + 2ND STAGE DELTA)
   - F. THE JACE CONTROLLER SHALL REMOVE THE DEMAND FOR FIRST & SECOND STAGE COOL WHEN THE SENSED TEMPERATURE IS LESS THAN ONE-HALF THE PROPORTIONAL BAND SUBTRACTED FROM THE COOL CONFIGURATION SETPOINT:
     - i. 1ST-STAGE COOL OFF = COOL SETPOINT – (1/2 PROPORTIONAL BAND)
     - ii. 2ND-STAGE COOL OFF = COOL SETPOINT – (1/2 PROPORTIONAL BAND)
   - H. THE JACE CONTROLLER SHALL PROVIDE A DEMAND FOR HEAT WHEN THE SENSED TEMPERATURE IS LESS THAN ONE-HALF THE PROPORTIONAL BAND (cPB) SUBTRACTED FROM THE HEAT CONFIGURATION SETPOINT:
     - ij. HEAT ON = HEAT SETPOINT – (1/2 PROPORTIONAL BAND)
   - I. THE HEAT OUTPUT SHALL INITIATE TO MAINTAIN HEAT SETPOINT.
   - J. THE JACE CONTROLLER SHALL REMOVE THE DEMAND FOR HEAT WHEN THE SENSED TEMPERATURE IS GREATER THAN ONE-HALF THE PROPORTIONAL BAND ADDED TO THE HEAT CONFIGURATION SETPOINT:
     - i. HEAT OFF = HEAT SETPOINT + (1/2 PROP. BAND)
   - K. DEFAULT PROPORTIONAL BAND VALUE SHALL BE 2°F (cPB).
   - L. DEFAULT 2ND STAGE DELTA VALUE SHALL BE 2°F (cD2S).
3. VENTILATION CONTROL:
   - A. UPON UNIT OCCUPANCY (OCCUPIED AND BYPASS/OVERRIDE MODE), OUTSIDE AIR DAMPER SHALL MODULATE OPEN TO PROVIDE THE SCHEDULED OUTSIDE AIR CFM PER THE UNIT SCHEDULE (%-OPEN POSITION SHALL BE PROVIDED BY TAB CONTRACTOR).
   - B. OUTSIDE AIR DAMPER SHALL REMAIN CLOSED DURING NIGHT SETUP/SETBACK MODES.
   - C. DISTECH CONTROLLER SHALL PROVIDE MEANS TO OVERRIDE OUTSIDE AIR DAMPER FROM THE HMI.
4. ECONOMIZER CONTROL:
   - A. ECONOMIZER MODE IS PROVIDED BY THE UNIT ECONOMIZER MODULE USING COMPARATIVE ENTHALPY.
     - i. ECONOMIZER IS ENABLED WHEN OA ENTHALPY < (RA ENTHALPY -3 BTU/LB)
     - ii. ECONOMIZER IS DISABLED WHEN OA ENTHALPY > RA ENTHALPY
   - B. WHEN ECONOMIZING MODE IS ENABLED, THE UNIT IS OPERATING IN THE COOLING MODE AND OA ENTHALPY IS BELOW THE RA ENTHALPY AS DESCRIBED ABOVE, THE ECONOMIZER DAMPER IS MODULATED BETWEEN ITS MINIMUM POSITION AND 100% TO MAINTAIN THE ZONE TEMPERATURE.
   - C. IF THE ECONOMIZER IS NOT ABLE TO SATISFY THE COOLING SETPOINT, MECHANICAL COOLING WILL BE ENERGIZED. MECHANICAL COOLING WILL NOT START UNTIL THE ECONOMIZER HAS BEEN FULLY OPEN FOR FIVE MINUTES.
5. DEMAND CONTROL VENTILATION:
   - A. DURING OCCUPIED HRS. THE OUTSIDE AIR DAMPERS SHALL MODULATE OPEN/CLOSE TO MAINTAIN A CO2 LEVEL OF 400 PPM (ADJ) ABOVE CO2 LEVEL. THE MIN/MAX RANGE SHALL BE 200-600 PPM (ADJ). ABOVE THE OUTSIDE CO2 LEVEL.
6. KITCHEN ROOFTOP UNIT OUTDOOR AIR CONTROL:
   - A. THE DDC SHALL RECEIVE A DI STATUS SIGNAL FROM THE KITCHEN HOOD EXHAUST FAN.
   - B. DURING OCCUPIED HOURS, AND WHEN KITCHEN HOOD IS OFF, THE ROOFTOP UNIT AIR FLOW SHALL BE CONTROLLED AS DENOTED IN 5 ABOVE, DEMAND CONTROL VENTILATION.
   - C. WHEN KITCHEN HOOD EXHAUST FAN IS ON, THEN THE MINIMUM OUTDOOR AIR FOR THIS ROOFTOP UNIT SHALL BE AS SCHEDULED. THE OUTDOOR AIR FLOW SHALL BE MEASURED BY A FLOW STATION.

UNOCCUPIED MODE
1. NIGHT SETUP/SETBACK MODE:
   - A. WHEN THE UNIT IS IN THE UNOCCUPIED MODE AND THE SPACE TEMPERATURE EXCEEDS THE NIGHT UNOCCUPIED COOL/HEAT SETPOINTS, THE UNIT WILL ENABLE IN THE RESPECTIVE COOLING/HEATING MODE UNTIL THE SPACE TEMPERATURE IS SATISFIED.
2. BYPASS MODE:
   - A. WHEN UNIT IN THE UNOCCUPIED MODE, AN OVERRIDE BUTTON SHALL COMMAND UNIT TO THE OCCUPIED MODE FOR A PERIOD OF ONE HOUR (ADJUSTABLE).
   - B. THE UNIT SHALL RETURN TO ITS PREVIOUS MODE ONCE THE BYPASS TIME HAS ELAPSED.

5. DEHUMIDIFICATION CONTROL (OCCUPIED AND BYPASS/OVERRIDE MODES ONLY):
   - A. IF SPACE TEMPERATURE IS WITHIN ZERO-ENERGY DEAD-BAND AND SPACE HUMIDITY RISES ABOVE 60%, ENABLE 1ST-STAGE COOL AND HOT-GAS REHEAT. CONTINUE UNTIL SPACE HUMIDITY DECREASES BELOW 55%.
   - B. IF SPACE HUMIDITY IS ABOVE SETPOINT WHILE ON 1ST OR 2ND STAGE COOL AND SPACE TEMPERATURE FALLS WITHIN ZERO-ENERGY DEAD-BAND, 1ST STAGE COOL SHALL CONTINUE TO OPERATE AND HOT-GAS REHEAT SHALL BE ENABLED.

TERMINATE DEHUMIDIFICATION CONTROL (DISABLE HOT-GAS REHEAT) UPON A DEMAND FOR COOL OR HEAT.

GRAPHIC USER INTERFACE
1. THE FOLLOWING POINTS SHALL BE EXPOSED ON THE ASSOCIATED GRAPHIC:
   - A. EFFECTIVE OCCUPANCY (oOc) -SHOW AS OCCUPIED/UNOCCUPIED
   - B. FAN COMMAND (oFanCommand) -SHOW AS START/STOP
   - E. COOLING CALL (oC) -SHOW AS ON/OFF (50%=STAGE-1 ON; 100%=STAGE-2 ON)
   - F. HEATING CALL (oH) -SHOW AS 0-100%
   - I. OUTSIDE AIR DAMPER COMMAND -SHOW AS ON/OFF
   - J. DISCHARGE AIR TEMPERATURE (oT2)
   - K. OCCUPIED COOL (cSP)
   - L. OCCUPIED HEAT (cSP)
   - M. UNOCCUPIED COOL (cSP)
   - N. UNOCCUPIED HEAT (cSP)
   - O. SPACE TEMPERATURE (oT)
   - P. SPACE HUMIDITY
   - Q. LOCAL SETPOINT ADJUST (iUSO)
   - R. EFFECTIVE SETPOINT (oESP)
   - S. MIN. OUTSIDE AIR DAMPER POSITION SETPOINT
   - T. OK-TO-ECONOMIZE STATUS -SHOW AS YES/NO
   - U. OUTSIDE AIR DAMPER OVERRIDE

GENERAL
1. CONTRACTOR SHALL PROVIDE PROGRAM IN TRIDIUM-JACE BUILDING CONTROLLER TO ISSUE CALL FOR OK-TO-ECONOMIZE TO SMART-STAT WHEN GLOBAL OUTDOOR AIR ENTHALPY IS EQUAL OR BELOW 28 BTU/LB (ADJUSTABLE) USING NEW GLOBAL OUTSIDE AIR TEMPERATURE AND HUMIDITY SENSORS. PROGRAM SHALL BE PROVIDED WITH A 2 BTU/LB DEAD-BAND TO PREVENT MODE SHORT-CYCLING.
2. CONTRACTOR TO PROVIDE NEW OUTSIDE AIR TEMPERATURE AND HUMIDITY SENSORS, ASSOCIATED WIRING AND CONDUIT. CONNECT SENSORS INTO ONE OF THE NEW DISTECH CONTROLLERS. COORDINATE LOCATION OF NEW SENSORS WITH OWNER'S REPRESENTATIVE.

ST-35ER SMART-STAT IO COUNT

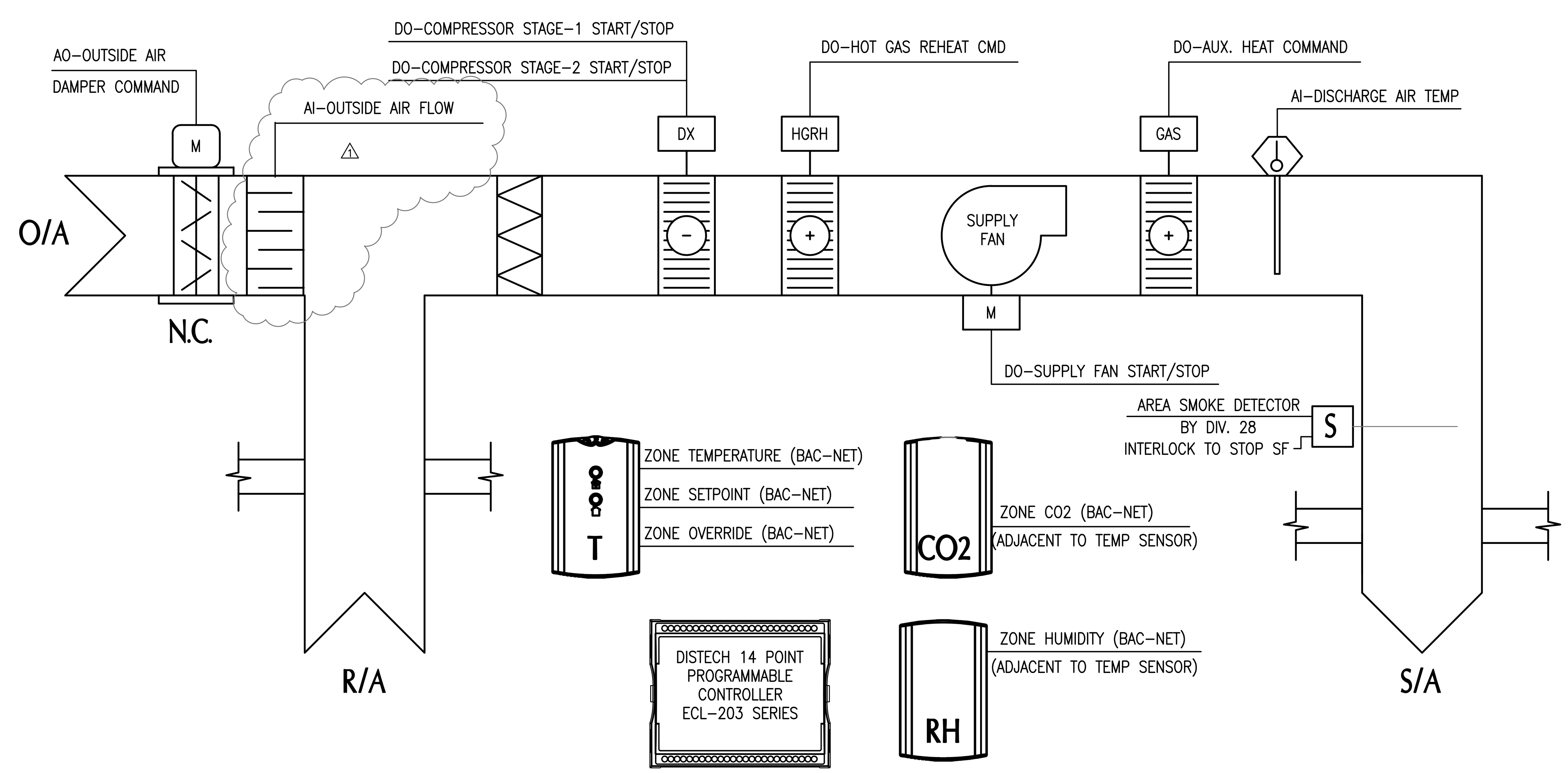
	Relay Out	Uni In/Out
	1	
		1
	1	
	1	
	1	
		1
		1
		1
Total:	4	4
Avail:	1	0

DDC POINT LIST

DUAL STAGE PACKAGED ROOFTOP UNIT WITH OUTSIDE AIR, HOT-GAS REHEAT, AND GAS HEAT

POINT DESCRIPTION	TAG	TYPE	COMMENT
SUPPLY FAN START/STOP	SF-C	DO	
OUTSIDE AIR FLOW	OA-C	AI	AIR FLOW STATION
OUTSIDE AIR DAMPER CMD	OAD-O	AO	Spring-return BELIMO actuator.
COMPRESSOR STAGE-1 START/STOP	DX1-C	DO	
COMPRESSOR STAGE-2 START/STOP	DX2-C	DO	If unit provided with two stages of cooling.
HOT GAS REHEAT CMD	DEH-C	DO	
GAS HEAT CMD	GH-O	AO	
DISCHARGE AIR TEMPERATURE	DA-T	AI	10K Type-II thermistor.
ZONE HUMIDITY	ZN-H	AI	SENVA 3% Room Recessed. Mount above zone sensor (stack).
ZONE TEMPERATURE	–	–	Built-in.
ZONE SETPOINT ADJUST	–	–	Built-in.
ENERGY RECOVERY			

AO = Analog Output, AI = Analog Input, DO = Digital Output, DI = Digital Input
Provide Smart-Stat programmable controller Model# ST-35ER Manufactured by Smart Controls.
Contact Smart Controls for equipment questions (800) 893-4846.



DUAL STAGE PACKAGED ROOFTOP UNIT WITH HOT-GAS REHEAT AND SINGLE STAGE GAS HEAT

NOT TO SCALE

NO.	DWN	CHK	DATE	REVISION DESCRIPTION
1	JR / AH	TB / DM	12 / 21 / 18	ADDENDUM #01

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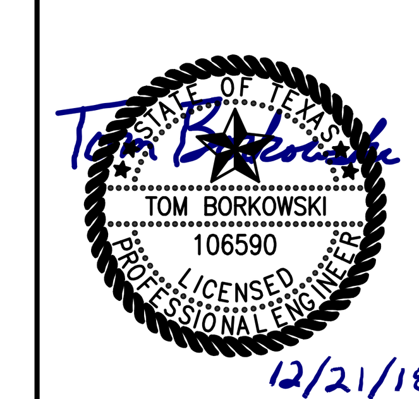

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SKE PROJECT # 19-0015-CASEY

Filename:
Scale: AS NOTED
Drawn By: AH/GB/JR
Checked By: JG/SK/TB
Date: 11/28/2018
DWG Number:

Title: **RTU CONTROL DIAGRAMS**

Sheet: **M9.1**

SEQUENCE OF OPERATIONS:

DESCRIPTION
1. UNITS ARE SINGLE ZONE, CONSTANT VOLUME SPLIT DX HEAT PUMPS EQUIPPED WITH ELECTRO–MECHANICAL CONTROLS, ONE OR TWO ON/OFF STAGES OF DX COOLING, OUTSIDE AIR DAMPER AND ONE OR TWO STAGES OF ELECTRIC HEATING.
2. ALL CONTROL DEVICES, SENSORS, AND ACTUATORS DESCRIBED HEREIN SHALL BE FURNISHED AND INSTALLED BY THE CONTROLS CONTRACTOR, UNLESS OTHERWISE NOTED. REFER TO SCHEMATIC AND DDC POINT LIST.
3. UPON PROJECT COMPLETION CONTRACTOR SHALL PROVIDE OWNER WITH IMPLEMENTED PROFILE DOCUMENTATION INCLUDING PROFILE QUICK REFERENCE, APB, NXE, XIF FILES, ETC.

SMART–STAT POINTS
1. THE FOLLOWING MINIMUM POINTS FROM THE SMART–STAT SHALL BE AVAILABLE FOR MONITORING AND/OR ADJUSTMENT ON THE HMI:
   - A. iOc: SETS THE OCCUPANCY MODE OF THE THERMOSTAT (occupied; unoccupied).
   - B. iUSO: INDICATES THE VALUE OF THE LOCAL SETPOINT ADJUST.
   - C. iESD: SETS THE THERMOSTAT FOR EMERGENCY SHUTDOWN (0=normal; 1=shutdown).
   - D. oT: INDICATES THE VALUE OF THE LOCAL SPACE TEMPERATURE SENSOR.
   - E. oOc: INDICATES THE STATUS OF THE OCCUPANCY STATE.
   - F. oESP: INDICATES THE CURRENT EFFECTIVE SETPOINT VALUE FOR TEMPERATURE CONTROL.
     - i. oESP = (Heat/Cool Setpoint) + iUSO
   - G. oBT: INDICATES THE CURRENT VALUE OF THE TIME IN SECONDS REMAINING ON THE BYPASS TIMER.
   - H. oFanCommand: INDICATES THE STATE OF THE FAN COMMAND (0=off; 1=on).
   - I. oFanStatus: INDICATES THE STATE OF THE FAN STATUS (0=off; 1=on).
   - J. oFN: INDICATES THE CURRENT STATE OF THE FAN ALARM (0=normal; 1=alarm).
   - K. oC: INDICATES THE CURRENT DEMAND FOR COOL (0=no demand; 100%=demand).
   - L. oH: INDICATES THE CURRENT DEMAND FOR HEAT (0–100%).
   - N. oT2: INDICATES THE VALUE OF THE TEMPERATURE MEASURED FROM UI04.
   - O. cSP: DEFINES THE OCCUPIED COOL, HEAT AND UNOCCUPIED COOL AND HEAT SETPOINTS.
   - P. cPB: DEFINES THE PROPORTIONAL BAND AROUND THE DISPLAYED SETPOINT.
   - Q. cD2S: DEFINES THE 2ND STAGE TEMPERATURE DELTA FOR 2ND STAGE COOL/HEAT.
   - R. cO: DEFINES THE OFFSET ADDED TO THE MEASURED TEMPERATURE FOR CALIBRATION.
   - S. cSAR: DEFINES THE SETPOINT ADJUST RANGE THAT A USER IS ALLOWED TO ADJUST THE OCCUPIED SETPOINT VALUES ABOVE OR BELOW THE VALUE ESTABLISHED BY THE CONFIGURATION SETPOINT (cSP).
   - T. cBT: DEFINES THE DURATION OF THE BYPASS TIME IN SECONDS.
   - U. cF: DEFINES THE FAN MODE OPERATION (0=auto; 1=continuous).
   - V. cCO: DEFINES IF THE REVERSING VALVE IS ENERGIZED WITH A DEMAND FOR COOL (0) OR HEAT (1).
   - W. cDs: DEFINES THE DISPLAY OF TEMPERATURE IN FAHRENHEIT (0) OR CELSIUS (1).
   - X. cAH: DEFINES THE APPLICATION AS AN AIR (0) OR WATER (1) SOURCED HEAT PUMP.
   - Y. cCST: DEFINES THE TIME IN SECONDS FOR THE FAN ALARM.
   - Z. cCS: DISABLES (0) OR ENABLES (1) THE FUNCTIONAL OPERATION OF UI03 AS AN INPUT FOR FAN ALARM. THE DEFAULT SHALL BE DISABLED.
   - AA. cT2: DEFINES IF THE THERMOSTAT MEASURES, CONTROLS AND DISPLAYS THE ON–BOARD TEMPERATURE SENSOR (0) OR THE REMOTE TEMPERATURE SENSOR (1). DEFAULT SHALL BE ON–BOARD SENSOR (0).
   - AB. cXX: DEFINES IF UNIT IS PROVIDED WITH ECONOMIZER (0=NO ECONOMIZER; 1=ECONOMIZER).
   - AC. cXX: DEFINES THE MINIMUM OUTSIDE AIR DAMPER POSITION FOR VENTILATION (0–100% OPEN).
   - AD. iXX: INDICATES IF UNIT IS "OK–TO–ECONOMIZE" (0=FALSE; 1=TRUE)

2. ALL POINTS SHALL BE PROVIDED WITH DESCRIPTIONS ON THE HMI TO INDICATE THEIR PURPOSE.

OCCUPIED MODE

1. FAN CONTROL:
   - A. THE FAN SHALL BE STARTED AND STOPPED UNDER CONTROL OF SOFTWARE BY A TIME SCHEDULE. WHEN THE UNIT IS STARTED, THE FAN SHALL START AND RUN CONTINUOUSLY (cF).
   - B. SMART–STAT SHALL ILLUMINATE LEFT–DECIMAL POINT ANYTIME UNIT IS IN THE OCCUPIED OR BYPASS MODE.
   - C. IF UNIT REPLACING AN OLD UNIT, ADD UNIT TO EXISTING ASSOCIATED TIME SCHEDULE. OTHERWISE, PROVIDE NEW TIME SCHEDULE [INITIAL SCHEDULE: 6AM–6PM M–F]. GROUP ALL UNITS SERVING SAME AREA/WING INTO A SINGLE TIME SCHEDULE.

2. TEMPERATURE CONTROL:
   - A. THE OCCUPIED AND UNOCCUPIED TEMPERATURE SETPOINTS SHALL BE ESTABLISHED IN THE CONFIGURATION SETPOINT VARIABLE (cSP) AND SHALL BE AS FOLLOWS:
     - i. OCCUPIED COOL: 73°F
     - ii. OCCUPIED HEAT: 70°F
     - iii. UNOCCUPIED COOL: 85°F
     - iv. UNOCCUPIED HEAT: 60°F
   - B. THE DIFFERENCE BETWEEN THE HEAT AND COOL SETPOINT SHALL BE REFERRED TO AS DEAD–BAND (ZERO–ENERGY BAND).
     - i. DEAD–BAND (ZERO–ENERGY BAND) = COOL SETPOINT – HEAT SETPOINT
   - C. DEFAULT LOCAL SETPOINT ADJUST RANGE SHALL BE –3/+3°F (cSAR).
   - D. THE SMART–STAT SHALL PROVIDE A DEMAND FOR FIRST STAGE COOL WHEN THE SENSED TEMPERATURE IS GREATER THAN ONE–HALF THE PROPORTIONAL BAND (cPB) ADDED TO THE COOL CONFIGURATION SETPOINT:
     - i. 1ST–STAGE COOL ON = COOL SETPOINT + (1/2 PROPORTIONAL BAND)
   - E. THE SMART–STAT SHALL PROVIDE A DEMAND FOR SECOND STAGE COOL WHEN THE SENSED TEMPERATURE IS GREATER THAN THE COOL CONFIGURATION SETPOINT PLUS ONE–HALF THE PROPORTIONAL BAND (cPB) ADDED TO THE SECOND STAGE TEMPERATURE DELTA (cD2S):
     - i. 2ND–STAGE COOL ON = COOL SETPOINT + (1/2 PROP. BAND + 2ND STAGE DELTA)
   - F. THE SMART–STAT SHALL REMOVE THE DEMAND FOR FIRST & SECOND STAGE COOL WHEN THE SENSED TEMPERATURE IS LESS THAN ONE–HALF THE PROPORTIONAL BAND SUBTRACTED FROM THE COOL CONFIGURATION SETPOINT:
     - i. 1ST–STAGE COOL OFF = COOL SETPOINT – (1/2 PROPORTIONAL BAND)
     - ii. 2ND–STAGE COOL OFF = COOL SETPOINT – (1/2 PROPORTIONAL BAND)
   - H. THE SMART–STAT SHALL PROVIDE A DEMAND FOR HEAT WHEN THE SENSED TEMPERATURE IS LESS THAN ONE–HALF THE PROPORTIONAL BAND (cPB) SUBTRACTED FROM THE HEAT CONFIGURATION SETPOINT:
     - ij. HEAT ON = HEAT SETPOINT – (1/2 PROPORTIONAL BAND)
   - I. THE ELECTRIC HEAT OUTPUT SHALL INITIATE TO MAINTAIN HEAT SETPOINT.
   - J. THE SMART–STAT SHALL REMOVE THE DEMAND FOR HEAT WHEN THE SENSED TEMPERATURE IS GREATER THAN ONE–HALF THE PROPORTIONAL BAND ADDED TO THE HEAT CONFIGURATION SETPOINT:
     - i. HEAT OFF = HEAT SETPOINT + (1/2 PROP. BAND)
   - K. DEFAULT PROPORTIONAL BAND VALUE SHALL BE 2°F (cPB).
   - L. DEFAULT 2ND STAGE DELTA VALUE SHALL BE 2°F (cD2S).

3. VENTILATION CONTROL:
   - A. UPON UNIT OCCUPANCY (OCCUPIED AND BYPASS/OVERRIDE MODE), OUTSIDE AIR DAMPER SHALL MODULATE OPEN TO PROVIDE THE SCHEDULED OUTSIDE AIR CFM PER THE UNIT SCHEDULE (%–OPEN POSITION SHALL BE PROVIDED BY TAB CONTRACTOR).
   - B. OUTSIDE AIR DAMPER SHALL REMAIN CLOSED DURING NIGHT SETUP/SETBACK MODES.
   - C. SMART–STAT SHALL PROVIDE MEANS TO OVERRIDE OUTSIDE AIR DAMPER FROM THE HMI.

UNOCCUPIED MODE
1. NIGHT SETUP/SETBACK MODE:
   - A. WHEN THE UNIT IS IN THE UNOCCUPIED MODE AND THE SPACE TEMPERATURE EXCEEDS THE UNOCCUPIED COOL/HEAT SETPOINTS, THE UNIT SHALL ENABLE IN THE RESPECTIVE COOLING/HEATING MODE UNTIL THE SPACE TEMPERATURE DECREASES/INCREASES BY 5°F AT WHICH POINT UNIT SHALL RETURN TO ITS PREVIOUS MODE OF OPERATION.
   - B. OUTSIDE AIR DAMPER SHALL REMAIN CLOSED DURING THIS MODE.

2. BYPASS MODE:
   - A. WHEN THE UNIT IN THE UNOCCUPIED MODE, PRESSING THE MODE PUSH–BUTTON ON THE SMART–STAT SHALL COMMAND UNIT TO THE OCCUPIED MODE FOR A PERIOD OF ONE HOUR (cBT).
   - B. THE UNIT SHALL RETURN TO ITS PREVIOUS MODE ONCE THE BYPASS TIME HAS ELAPSED (oBT).

GRAPHIC USER INTERFACE
1. THE FOLLOWING POINTS SHALL BE EXPOSED ON THE ASSOCIATED GRAPHIC:
   - A. EFFECTIVE OCCUPANCY (oOc) –SHOW AS OCCUPIED/UNOCCUPIED
   - B. FAN COMMAND (oFanCommand) –SHOW AS START/STOP
   - E. COOLING CALL (oC) –SHOW AS ON/OFF (50%=STAGE–1 ON; 100%=STAGE–2 ON)
   - F. HEATING CALL (oH) –SHOW AS 0–100%
   - I. OUTSIDE AIR DAMPER COMMAND –SHOW AS ON/OFF
   - J. DISCHARGE AIR TEMPERATURE (oT2)
   - K. OCCUPIED COOL (cSP)
   - L. OCCUPIED HEAT (cSP)
   - M. UNOCCUPIED COOL (cSP)
   - N. UNOCCUPIED HEAT (cSP)
   - O. SPACE TEMPERATURE (oT)
   - P. SPACE HUMIDITY
   - Q. LOCAL SETPOINT ADJUST (iUSO)
   - R. EFFECTIVE SETPOINT (oESP)
   - S. SPACE HUMIDITY SETPOINT
   - T. MIN. OUTSIDE AIR DAMPER POSITION SETPOINT
   - U. OK–TO–ECONOMIZE STATUS –SHOW AS YES/NO
   - V. OUTSIDE AIR DAMPER OVERRIDE

GENERAL
1. CONTRACTOR SHALL PROVIDE PROGRAM IN TRIDIUM–JACE BUILDING CONTROLLER TO ISSUE CALL FOR OK–TO–ECONOMIZE TO SMART–STAT WHEN GLOBAL OUTDOOR AIR ENTHALPY IS EQUAL OR BELOW 28 BTU/LB (ADJUSTABLE) USING EXISTING GLOBAL OUTSIDE AIR TEMPERATURE AND HUMIDITY SENSORS. PROGRAM SHALL BE PROVIDED WITH A 2 BTU/LB DEAD–BAND TO PREVENT MODE SHORT–CYCLING.

DISTECH CONTROLLER IO COUNT

	Relay Out	Uni In/Out
	1	
		1
	1	
		1
	1	
	1	
	1	
		1
		1
		1
		1
		1
Total:	5	6
Avail:	3	0

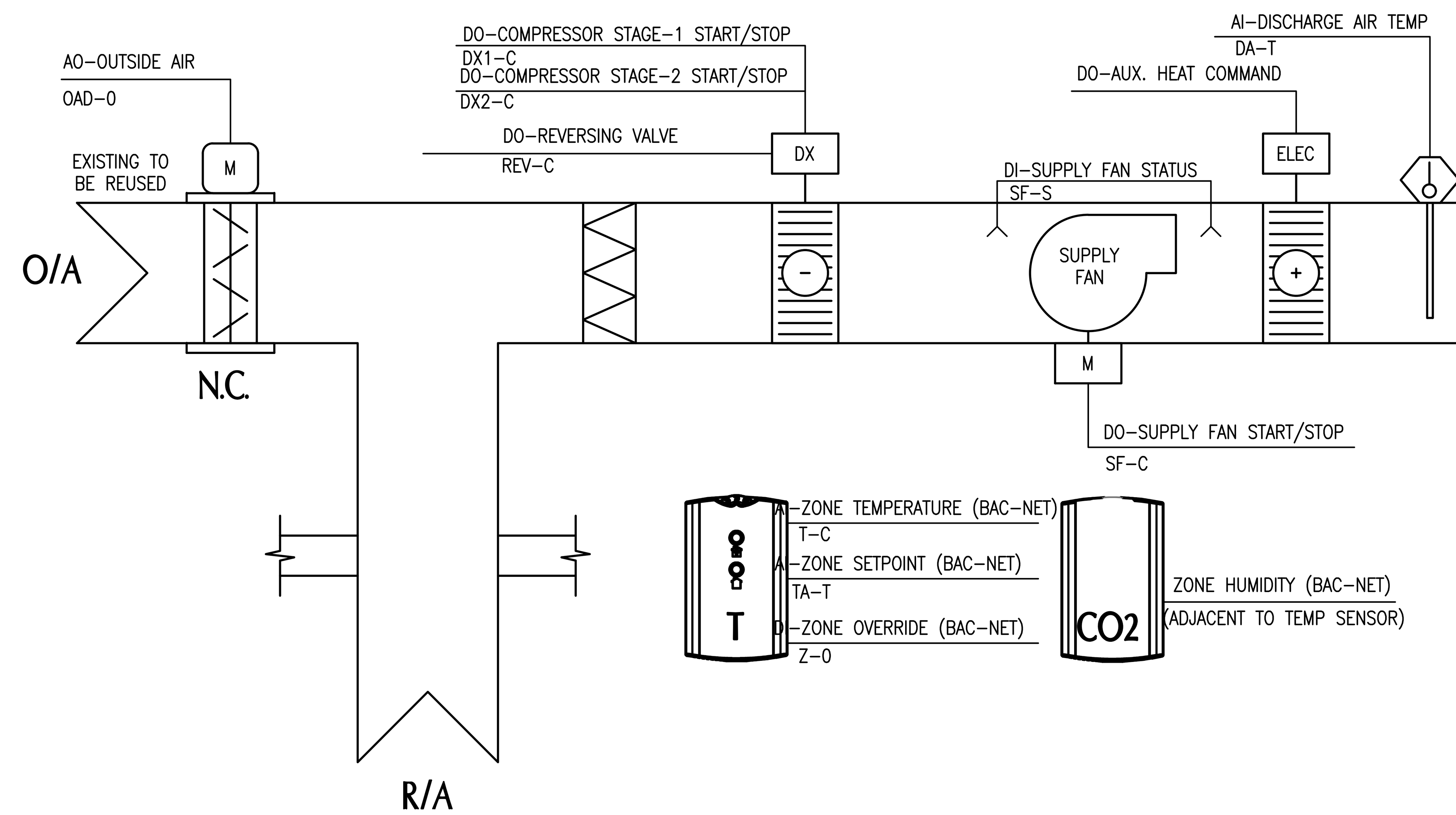
DDC POINT LIST

SINGLE OR TWO STAGE AIR SPLIT DX HEAT PUMP WITH OUTSIDE AIR AND ELECTRIC HEAT

POINT DESCRIPTION	TAG	TYPE	COMMENT
SUPPLY FAN START/STOP	SF–C	DO	
SUPPLY FAN STATUS	SF–S	DI	
OUTSIDE AIR DAMPER CMD	OAD–O	AO	
DISCHARGE AIR TEMPERATURE	DA–T	AI	
COMPRESSOR STAGE–1 START/STOP	DX1–C	DO	
COMPRESSOR STAGE–2 START/STOP	DX2–C	DO	
REVERSING VALVE	REV–C	DO	
ZONE TEMPERATURE	T–C	AI	
ZONE SETPOINT ADJUSTMENT	TA–T	AI	
ZONE OVERRIDE	Z–O	DI	
AUX HEAT		DO	

AO = Analog Output, AI = Analog Input, DO = Digital Output, DI = Digital Input

COMPRESSOR VARIABLE SPEED SHALL BE INTERNALLY CONTROLLED



SINGLE AND DUAL STAGE HEAT PUMP WITH OUTSIDE AIR & AUX. ELECTRIC HEAT

NOT TO SCALE

NO.	DWN	CHK	DATE	REVISION DESCRIPTION
1	JR / AH	TB / DM	12 / 21 / 18	ADDENDUM #01

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SKE PROJECT #
19-0015-CASEY

Filename:
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Drawn By: AH/GB/JR
Checked By: JG/SK/TB
Date: 11/28/2018

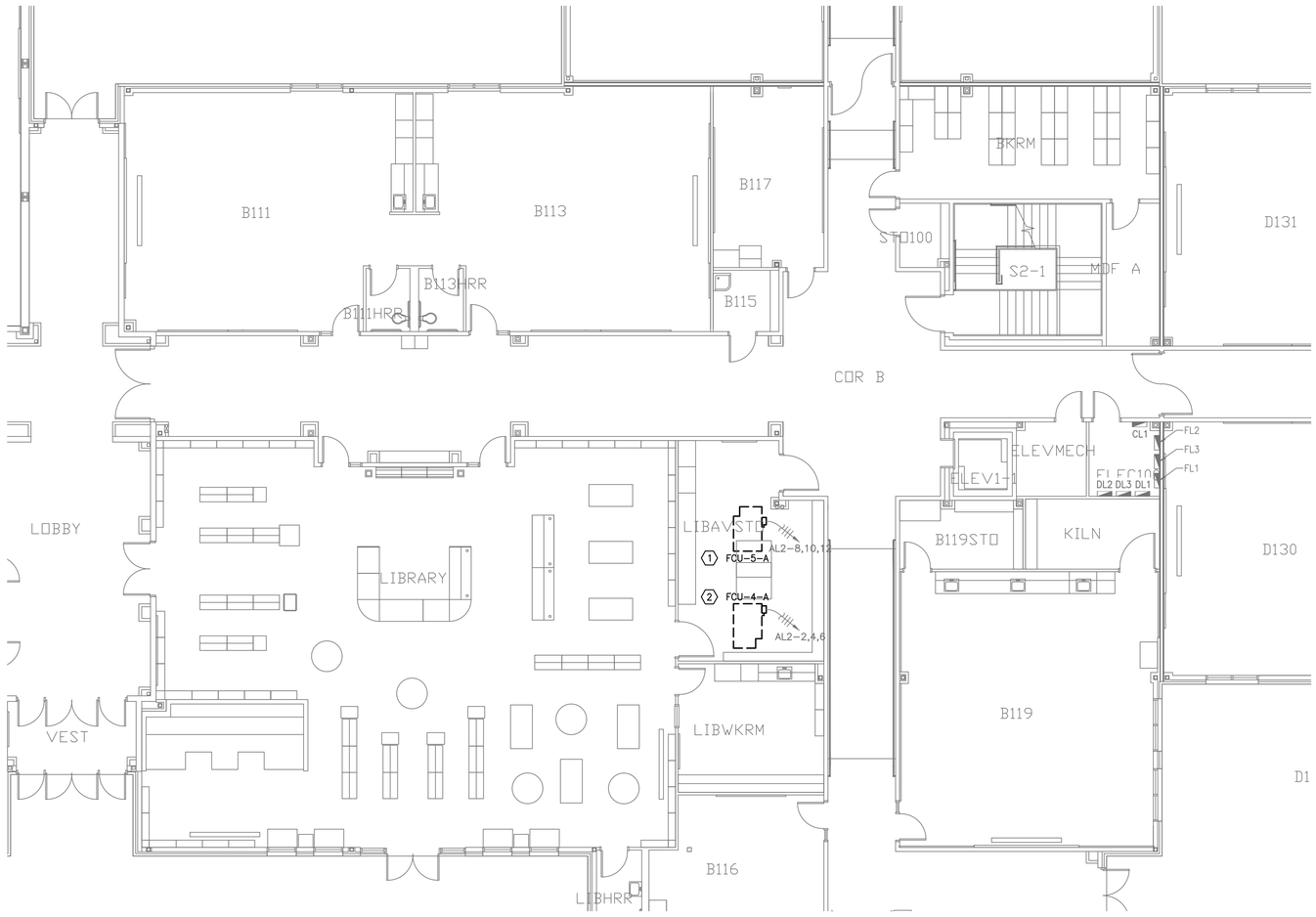
DWG Number:

Title:
FCU CONTROL DIAGRAMS

Sheet:
M9.2

REFERENCE NOTES

1. ① DISCONNECT EXISTING ELECTRICAL ASSOCIATED WITH EXISTING FAN COIL UNIT FCU-5-A. EXISTING RACEWAYS AND CONDUCTORS TO BE RE-USED AS REQUIRED.
2. ② DISCONNECT EXISTING ELECTRICAL ASSOCIATED WITH EXISTING FAN COIL UNIT FCU-4-A. EXISTING RACEWAYS AND CONDUCTORS TO BE RE-USED AS REQUIRED.



1 FIRST FLOOR ELECTRICAL DEMOLITION PLAN
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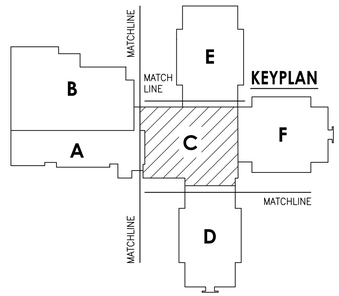

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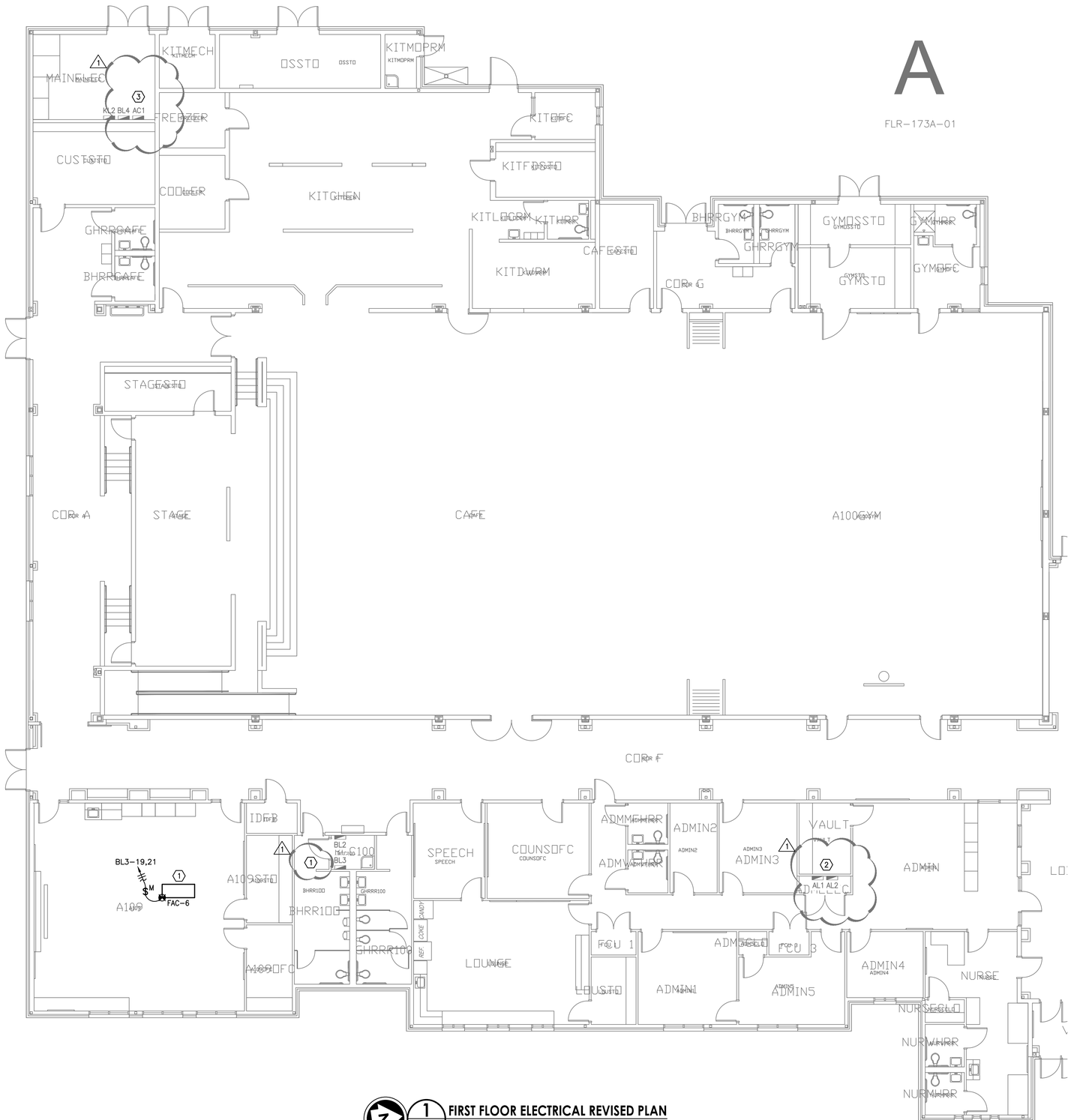
SKE PROJECT # 0690118

Filename:
Scale: AS NOTED
Drawn By: AH/GB/JR
Checked By: SK/TB
Date: 11/28/2018
DWG Number:

Title: **FIRST FLOOR ELECTRICAL DEMOLITION PLAN "C"**

Sheet: **E1.2**

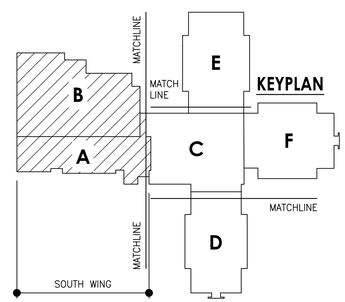
PLOT DATE: 12/21/18 10:14:12AM LAYOUT TAB: E1.2 USER: mark DWG NAME: K:\Projects\2018\0690118-AISD-Casey ES\07 Design Phase\0690118-E12.dwg



REFERENCE NOTES

1. ELECTRICAL CONTRACTOR SHALL CONNECT NEW FAN COIL UNIT FAC-6 TO EXISTING PANEL BL3 LOCATED ELECTRICAL ROOM AS SHOWN. PROVIDE AND INSTALL 1"C W/2#6, 1#10G FROM PANEL BL3 TO NEW FAN COIL UNIT.
2. LOCATION OF EXISTING PANEL AL2.
3. LOCATION OF EXISTING PANEL AC1.

1 E2.1 FIRST FLOOR ELECTRICAL REVISED PLAN
SCALE: 1/8"=1'-0"



NO.	DWN	CHK	DATE	REVISION DESCRIPTION
1	JR / AH	TB / DM	12 / 21 / 18	ADDENDUM #01

AUSTIN I.S.D.
RENOVATIONS AT CASEY ELEMENTARY SCHOOL
9400 TEXAS OAKS DR AUSTIN TEXAS 78748

AUSTIN I.S.D.
DEPARTMENT OF CONSTRUCTION MANAGEMENT
CSP# 19CSP085

STATE OF TEXAS
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TBPE Firm No. F-2356
SKE PROJECT # 0690118

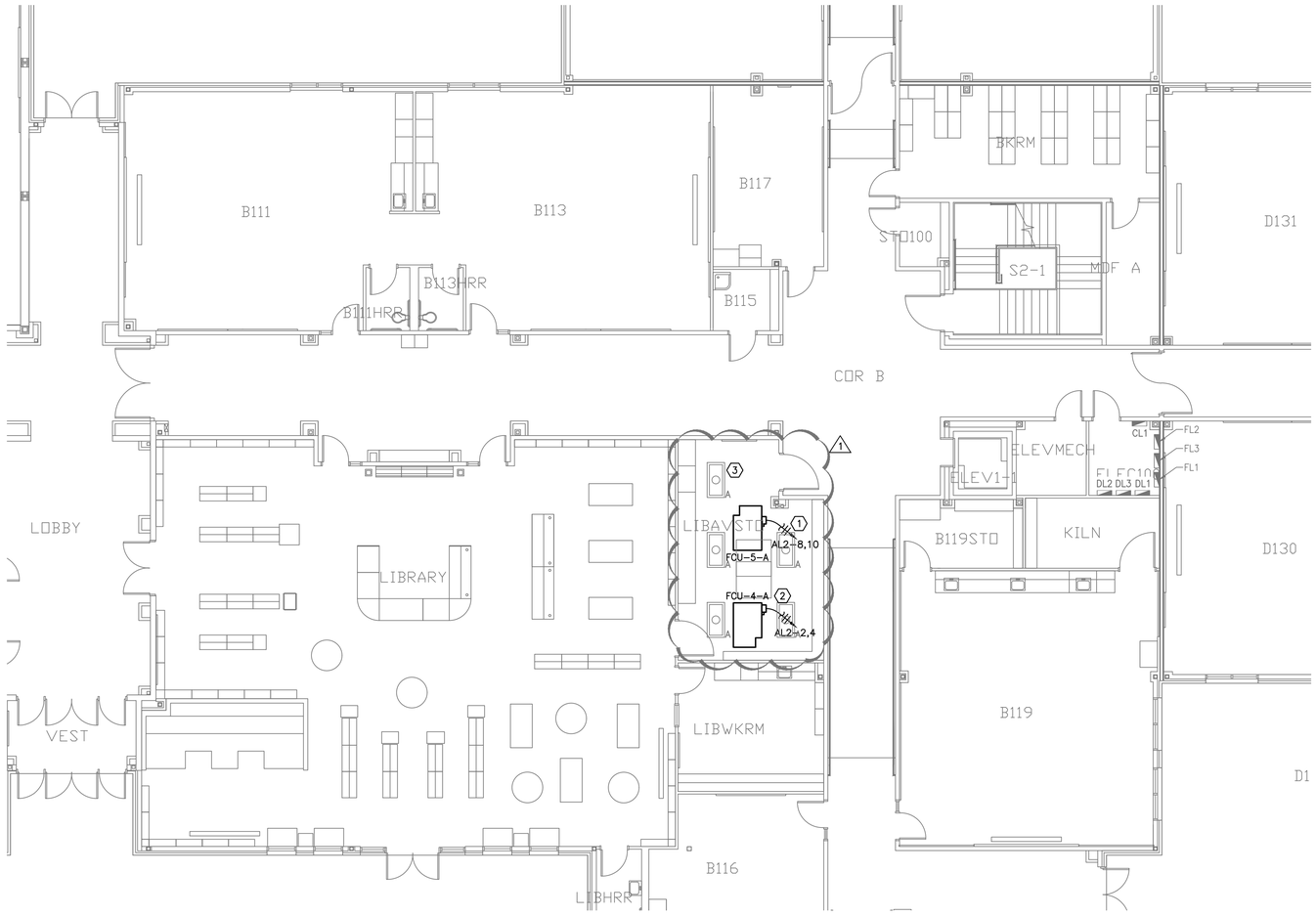
Filename:
Scale: AS NOTED
Drawn By: AH/GB/JR
Checked By: SK/TB
Date: 11/28/2018
DWG Number:

Title: **FIRST FLOOR ELECTRICAL REVISED PLAN "A&B"**

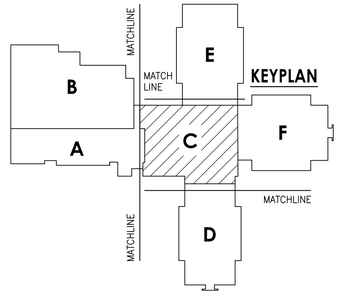
Sheet: **E2.1**

REFERENCE NOTES

1. ELECTRICAL CONTRACTOR SHALL CONNECT NEW FAN COIL UNIT FCU-5-A TO EXISTING PANEL AL2 LOCATED ELECTRICAL ROOM AS SHOWN. UTILIZE EXISTING CONDUCTORS AND RACEWAYS AS REQUIRED.
2. ELECTRICAL CONTRACTOR SHALL CONNECT NEW FAN COIL UNIT FCU-4-A TO EXISTING PANEL AL2 LOCATED ELECTRICAL ROOM AS SHOWN. UTILIZE EXISTING RACEWAYS AND CONDUCTORS AS REQUIRED.
3. ELECTRICAL CONTRACTOR SHALL RE-INSTALL EXISTING 2X4 LIGHT FIXTURES IN ROOM AS REQUIRED. TYPICAL.



1 FIRST FLOOR ELECTRICAL REVISED PLAN
E2.2 SCALE: 1/8"=1'-0"



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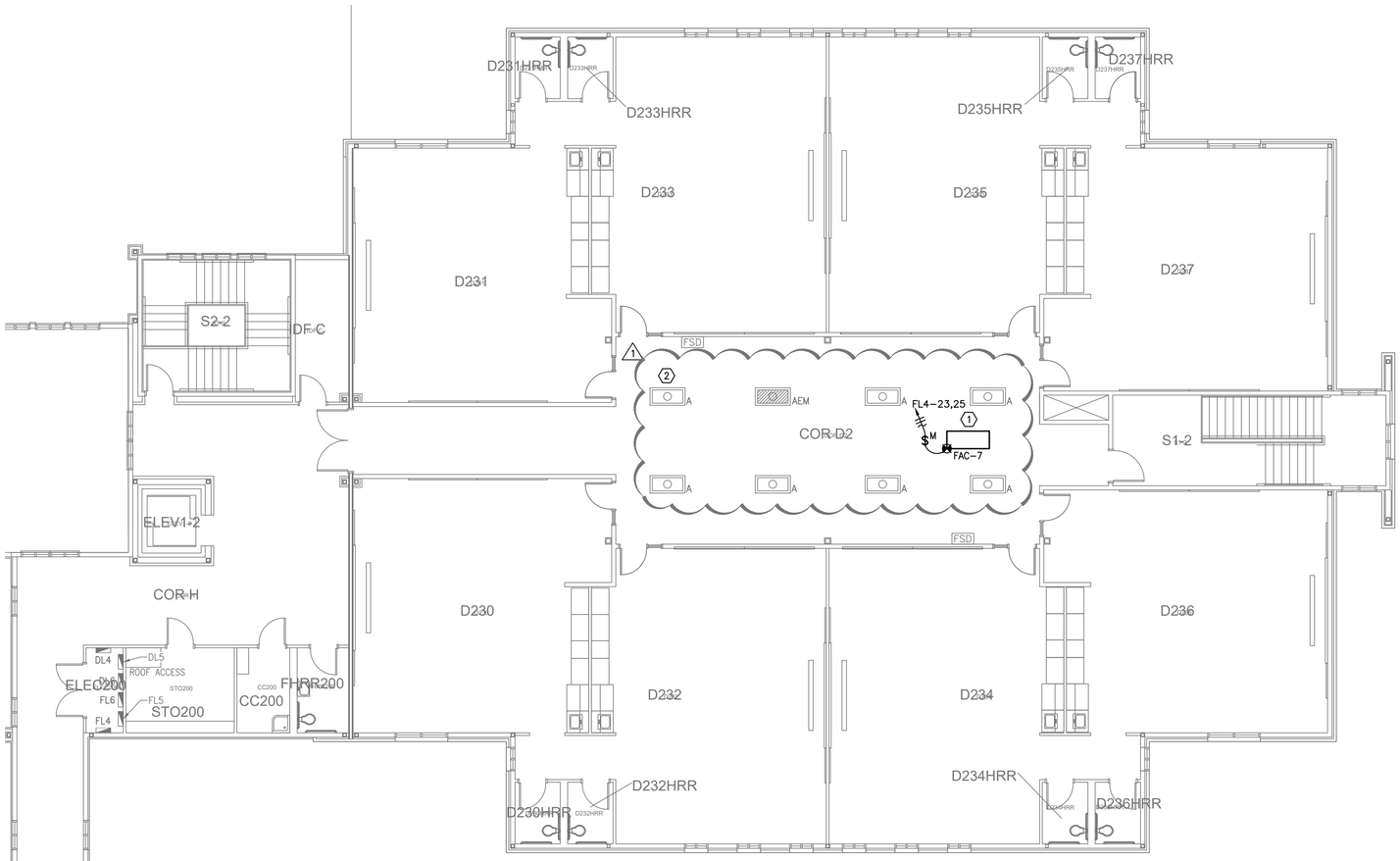
DWG Number:

Title: **FIRST FLOOR ELECTRICAL REVISED PLAN "C"**

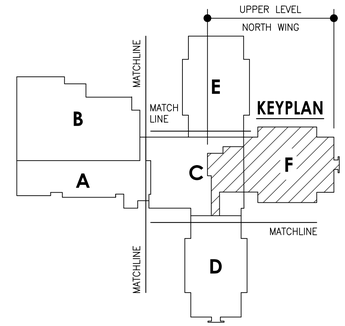
Sheet: **E2.2**

REFERENCE NOTES

1. ELECTRICAL CONTRACTOR SHALL CONNECT NEW FAN COIL UNIT FAC-7 TO EXISTING PANEL FL4 LOCATED ELECTRICAL ROOM AS SHOWN. PROVIDE AND INSTALL 3/4"C W/2#8, 1#10G FROM PANEL FL4 TO NEW FAN COIL UNIT.
2. ELECTRICAL CONTRACTOR SHALL RE-INSTALL EXISTING 2X4 RECESSED LIGHT FIXTURES IN ROOM AS REQUIRED. TYPICAL.



1 E2.3 **SECOND FLOOR ELECTRICAL REVISED PLAN**
SCALE: 1/8"=1'-0"



NO.	DWN	CHK	DATE	REVISION DESCRIPTION
1	JR / AH	TB / DM	12 / 21 / 18	ADDENDUM #01

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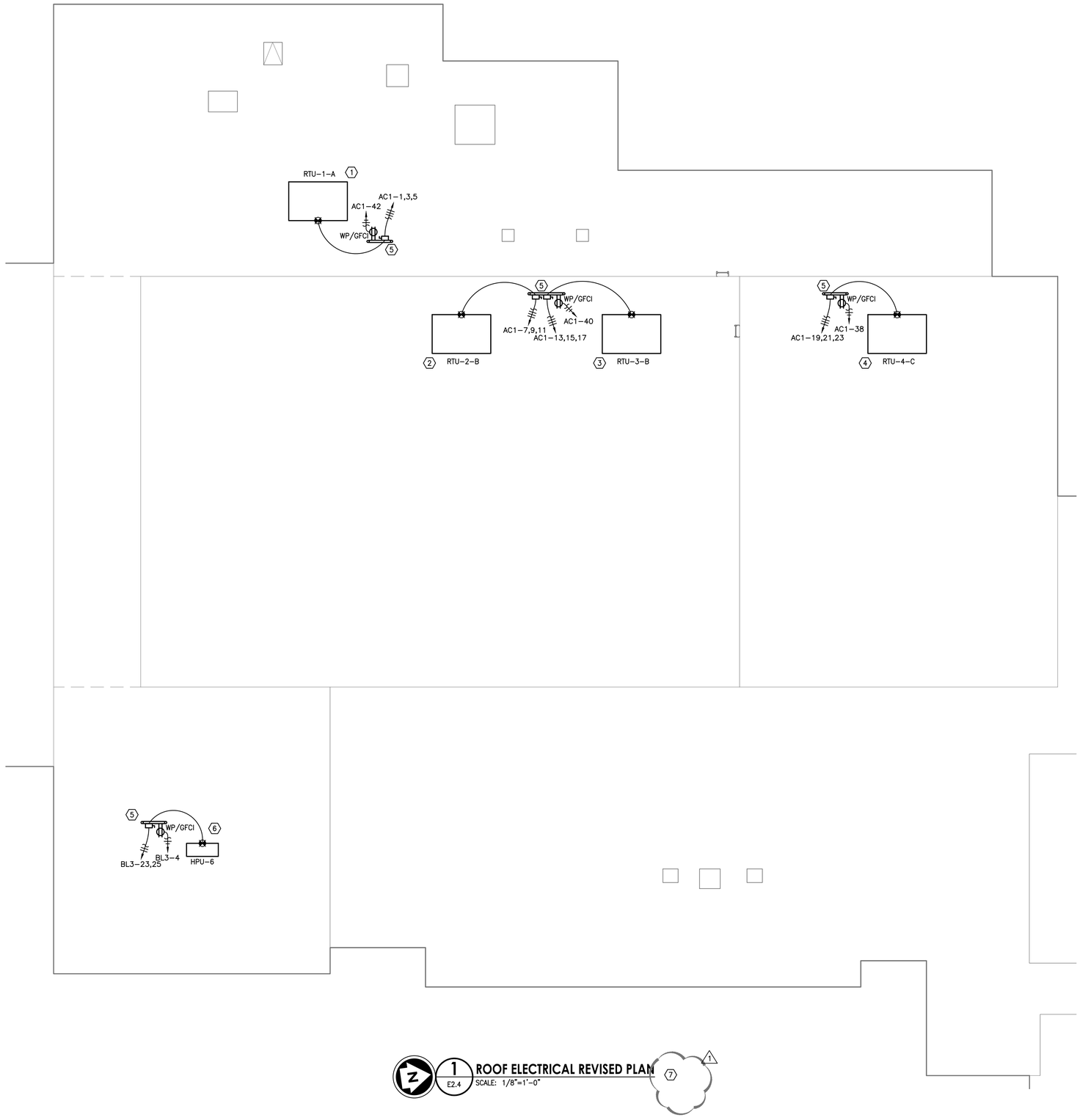
DWG Number:

Title: **SECOND FLOOR ELECTRICAL REVISED PLAN "F"**

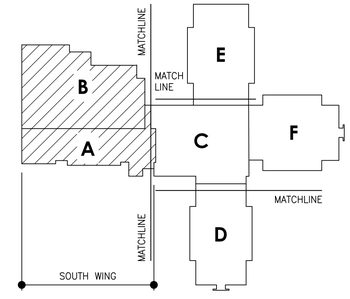
Sheet: **E2.3**



REFERENCE NOTES

1. ELECTRICAL CONTRACTOR SHALL CONNECT NEW ROOFTOP UNIT RTU-1-A TO EXISTING PANEL AC1 LOCATED IN SERVICE ENTRANCE ELECTRICAL ROOM AS SHOWN. PROVIDE AND INSTALL 1-1/2"C W/3#1, 1#6G FROM PANEL AC1 TO NEW RTU. PROVIDE AND INSTALL NEW RACK MOUNTED DISCONNECT SWITCH 200A/3P/NF/600V/N3R TYPE SQUARE D OR EQUAL.
2. ELECTRICAL CONTRACTOR SHALL CONNECT NEW ROOFTOP UNIT RTU-2-B TO EXISTING PANEL AC1 LOCATED IN SERVICE ENTRANCE ELECTRICAL ROOM AS SHOWN. PROVIDE AND INSTALL 1-1/2"C W/3#1, 1#6G FROM PANEL AC1 TO NEW RTU. PROVIDE AND INSTALL NEW RACK MOUNTED DISCONNECT SWITCH 200A/3P/NF/600V/N3R TYPE SQUARE D OR EQUAL.
3. ELECTRICAL CONTRACTOR SHALL CONNECT NEW ROOFTOP UNIT RTU-3-B TO EXISTING PANEL AC1 LOCATED IN SERVICE ENTRANCE ELECTRICAL ROOM AS SHOWN. PROVIDE AND INSTALL 1-1/2"C W/3#1, 1#6G FROM PANEL AC1 TO NEW RTU. PROVIDE AND INSTALL NEW RACK MOUNTED DISCONNECT SWITCH 200A/3P/NF/600V/N3R TYPE SQUARE D OR EQUAL.
4. ELECTRICAL CONTRACTOR SHALL CONNECT NEW ROOFTOP UNIT RTU-4-C TO EXISTING PANEL AC1 LOCATED IN SERVICE ENTRANCE ELECTRICAL ROOM AS SHOWN. PROVIDE AND INSTALL 1-1/2"C W/3#1, 1#6G FROM PANEL AC1 TO NEW RTU. PROVIDE AND INSTALL NEW RACK MOUNTED DISCONNECT SWITCH 200A/3P/NF/600V/N3R TYPE SQUARE D OR EQUAL.
5. PROVIDE AND INSTALL NEW EQUIPMENT MOUNTING RACKS AS SHOWN. SEE DETAILS 1 & 2 SHEET E3.1 FOR DETAILS. TYPICAL.
6. ELECTRICAL CONTRACTOR SHALL CONNECT NEW HEAT PUMP UNIT HP-6 TO EXISTING PANEL BL3 LOCATED IN OFFICE ELECTRICAL ROOM AS SHOWN. PROVIDE AND INSTALL 1"C W/2#6, 1#10G FROM PANEL BL3 TO NEW HEAT PUMP. PROVIDE AND INSTALL NEW RACK MOUNTED DISCONNECT SWITCH 60A/2P/NF/600V/N3R TYPE SQUARE D OR EQUAL.
7. ALL EXPOSED RACEWAYS ON ROOF SHALL BE GALVANIZED RIGID CONDUIT AS REQUIRED IN SPECIFICATION 260533. TYPICAL.

1 E2.4 **ROOF ELECTRICAL REVISED PLAN**
SCALE: 1/8"=1'-0"



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DWG Number:

Title: **ROOF ELECTRICAL REVISED PLAN "A&B"**

Sheet: **E2.4**

PANEL AC1

AMPS: 400 MLO | PHASE: 3 | MOUNTING: SURFACE
VOLTAGE: 208/120V | WIRE: 4 | MINIMUM AIC RATING: 10 KA
LOCATION: MAINELEC | BUSSING: COPPER
FED FROM: SWGR | NEMA: 1

	CKT. NO.	SERVICE DESCRIPTION	WIRE	BKR	POLES	KVA	A	B	C	KVA	POLES	BKR	WIRE	SERVICE DESCRIPTION	CKT. NO.
1	1	RTU-1-A (HACR)		90	3	0.0	0.0			0.0	1	20		SPACE	2
	3	|				0.0		0.0		0.0	1	20		SPACE	4
	5	|				0.0			0.0	0.0	1	20		SPACE	6
1	7	RTU-2-B (HACR)		90	3	0.0	0.0			0.0	1	20		SPACE	8
	9	|				0.0		0.0		0.0	1	20		SPACE	10
	11	|				0.0			0.0	0.0	1	20		SPACE	12
1	13	RTU-3-B (HACR)		90	3	0.0	0.0			0.0	1	20		SPACE	14
	15	|				0.0		0.0		0.0	1	20		SPACE	16
	17	|				0.0			0.0	0.0	1	20		SPACE	18
2	19	RTU-4-C (HACR)		60	3	0.0	0.0			0.0	1	20		SPACE	20
	21	|				0.0		0.0		0.0	1	20		SPACE	22
	23	|				0.0			0.0	0.0	1	20		SPACE	24
	25	SPACE		20	1	0.0	0.0			0.0	1	20		SPACE	26
	27	SPACE		20	1	0.0		0.0		0.0	1	20		SPACE	28
	29	SPACE		20	1	0.0			0.0	0.0	1	20		SPACE	30
	31	SPACE		20	1	0.0	0.0			0.0	1	20		SPACE	32
	33	SPACE		20	1	0.0		0.0		0.0	1	20		SPACE	34
	35	SPACE		20	1	0.0			0.0	0.0	1	20		SPACE	36
	37	SPACE		20	1	0.0	0.0			0.0	1	20		SPACE	38
	39	SPACE		20	1	0.0		0.0		0.0	1	20		SPACE	40
	41	SPACE		20	1	0.0			0.0	0.0	1	20		SPACE	42
						PHASE LOAD IN KVA:	0.0	0.0	0.0						
						PHASE LOAD IN AMPS:	0	0	0						

NOTE: SIEMENS S1

PANEL AC1 (MODIFIED)

AMPS: 400 MLO | PHASE: 3 | MOUNTING: SURFACE
VOLTAGE: 208/120V | WIRE: 4 | MINIMUM AIC RATING: 10 KA
LOCATION: MAINELEC | BUSSING: COPPER
FED FROM: SWGR | NEMA: 1

	CKT. NO.	SERVICE DESCRIPTION	WIRE	BKR	POLES	KVA	A	B	C	KVA	POLES	BKR	WIRE	SERVICE DESCRIPTION	CKT. NO.
3	**1**	**RTU-1-A (HACR)**		**125**	**3**	**11.9**	**11.9**			0.0	1	20		SPACE	2
	3	**|**				**11.9**		**11.9**		0.0	1	20		SPACE	4
	5	**|**				**11.9**			**11.9**	0.0	1	20		SPACE	6
3	**7**	**RTU-2-B (HACR)**		**125**	**3**	**11.9**	**11.9**			0.0	1	20		SPACE	8
	9	**|**				**11.9**		**11.9**		0.0	1	20		SPACE	10
	11	**|**				**11.9**			**11.9**	0.0	1	20		SPACE	12
3	**13**	**RTU-3-B (HACR)**		**125**	**3**	**11.9**	**11.9**			0.0	1	20		SPACE	14
	15	**|**				**11.9**		**11.9**		0.0	1	20		SPACE	16
	17	**|**				**11.9**			**11.9**	0.0	1	20		SPACE	18
4	**19**	**RTU-4-C (HACR)**		**70**	**3**	**6.5**	**6.5**			0.0	1	20		SPACE	20
	21	**|**				**6.5**		**6.5**		0.0	1	20		SPACE	22
	23	**|**				**6.5**			**6.5**	0.0	1	20		SPACE	24
	25	SPACE		20	1	0.0	0.0			0.0	1	20		SPACE	26
	27	SPACE		20	1	0.0		0.0		0.0	1	20		SPACE	28
	29	SPACE		20	1	0.0			0.0	0.0	1	20		SPACE	30
	31	SPACE		20	1	0.0	0.0			0.0	1	20		SPACE	32
	33	SPACE		20	1	0.0		0.0		0.0	1	20		SPACE	34
	35	SPACE		20	1	0.0			0.0	0.0	1	20		SPACE	36
	37	SPACE		20	1	0.0	0.8			**0.8**	**1**	**20**	**12**	**RECEPTACLE**	**38**	5
	39	SPACE		20	1	0.0		0.8		**0.8**	**1**	**20**	**12**	**RECEPTACLE**	**40**	5
	41	SPACE		20	1	0.0			0.8	**0.8**	**1**	**20**	**12**	**RECEPTACLE**	**42**	5
						PHASE LOAD IN KVA:	**43.0**	**43.0**	**43.0**						
						PHASE LOAD IN AMPS:	**358**	**358**	**358**						

NOTE: SIEMENS S1

PANEL BL3 (MODIFIED)

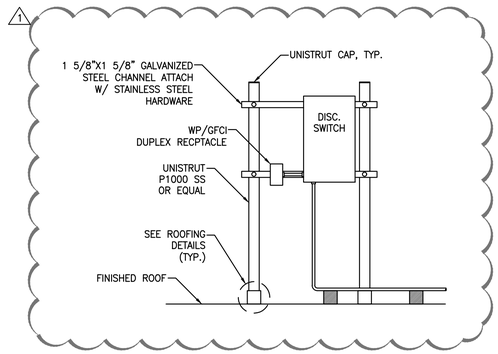
AMPS: 100 MLO | PHASE: 3 | MOUNTING: SURFACE
VOLTAGE: 208/120V | WIRE: 4 | MINIMUM AIC RATING: 10 KA
LOCATION: BCC100 | BUSSING: COPPER
FED FROM: SWGR | NEMA: 1

	CKT. NO.	SERVICE DESCRIPTION	WIRE	BKR	POLES	KVA	A	B	C	KVA	POLES	BKR	WIRE	SERVICE DESCRIPTION	CKT. NO.
	1	MUSIC-COMP RECPT	12	20	1	0.0	0.0			0.0	1	20	12	LIBRARY-COMPTR	2
	3	EX. CKT	12	20	1	0.0		0.0		0.0	1	20		SPARE	4
	5	BL 3-5(IG)	12	20	1	0.0			0.0	0.0	1	20		SPARE	6
	7	GUID,WKRM RECEPT	12	20	1	0.0	0.0			0.0	1	20	12	SPCL ED RECPT	8
	9	CONF, PRIN-CMPTR RCPT	12	20	1	0.0		0.0		0.0	1	20	12	SPCL ED RECPT	10
	11	VPRIN, SEC/REC	12	20	1	0.0			0.0	0.0	1	20	12	SPCL ED RECPT	12
	13	SEC/REC RECEPT	12	20	1	0.0	0.0			0.0	1	20	12	SPCL ED RECPT	14
	15	PE OFFICE	12	20	1	0.0		0.0		0.0	1	20		SPARE	16
	17	EX. CKT	13	20	1	0.0			0.0	0.0	1	20		SPARE	18
6	**19**	**FCU-6**	**6**	**50**	**2**	**5.0**	5.0			0.0	1	20		SPARE	20
	21	**|**				**5.0**		5.0		0.0	1	20		SPARE	22
	23	SPACE				0.0			0.0	0.0	1	20		SPARE	24
	25	SPACE				0.0	0.0			0.0				SPACE	26
	27	SPACE				0.0		0.0		0.0				SPACE	28
	29	SPACE				0.0			0.0	0.0				SPACE	30
	31	SPACE				0.0	0.0			0.0				SPACE	32
	33	SPACE				0.0		0.0		0.0				SPACE	34
	35	SPACE				0.0			0.0	0.0				SPACE	36
	37	SPACE				0.0	0.0			0.0				SPACE	38
	39	SPACE				0.0		0.0		0.0				SPACE	40
	41	SPACE				0.0			0.0	0.0				SPACE	42
						PHASE LOAD IN KVA:	5.0	5.0	0.0						
						PHASE LOAD IN AMPS:	42	42	0						

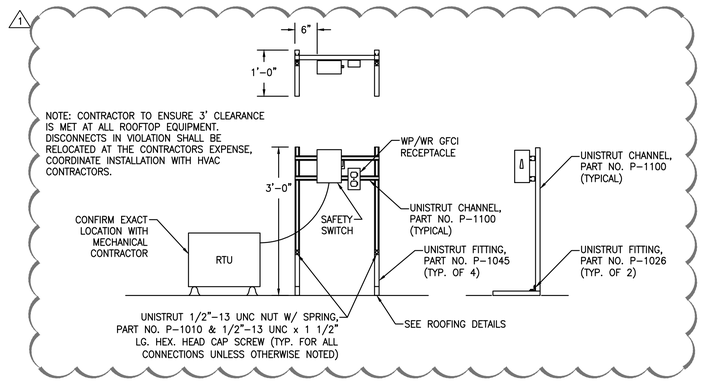
NOTE: SIEMENS S1

REFERENCE NOTES

1. ELECTRICAL CONTRACTOR SHALL DISCONNECT AND REMOVE EXISTING 90A/3P BREAKER FROM EXISTING PANELBOARD AS SHOWN. TYPICAL.
2. ELECTRICAL CONTRACTOR SHALL DISCONNECT AND REMOVE EXISTING 60A/3P BREAKER FROM EXISTING PANELBOARD AS SHOWN. TYPICAL.
3. ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL NEW 125A/3P CIRCUIT BREAKER TYPE SIEMENS BL IN EXISTING PANELBOARD AS SHOWN. TYPICAL.
4. ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL NEW 70A/3P CIRCUIT BREAKER TYPE SIEMENS BL IN EXISTING PANELBOARD AS SHOWN. TYPICAL.
5. ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL NEW 20A/1P CIRCUIT BREAKER TYPE SIEMENS BL IN EXISTING PANELBOARD AS SHOWN. TYPICAL.
6. ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL NEW 50A/2P CIRCUIT BREAKER TYPE SIEMENS BL IN EXISTING PANELBOARD AS SHOWN. TYPICAL.



2 E3.1 **DETAIL - PANEL MOUNTING**
SCALE: NTS



1 E3.1 **ROOF MOUNT CONDENSING UNIT DISCONNECT RACK**
SCALE: NTS

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DWG Number:

Title: **ELECTRICAL SCHEDULES AND DETAILS**

Sheet: **E3.1**